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Knowledge, Attitude and Practice Regarding Basic Life Support in Postgraduate Medical Students in Atertiary Care Medical Institute of Western Maharashtra

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Abstract

Background: An adequate knowledge and practice of providing Basic Life Support (BLS) and a positive attitude towards initiating the procedure is very necessary among postgraduate medical students. The objective of this study was to assess the knowledge, attitude and practice regarding BLS among the medical postgraduate students in a tertiary care medical institute.

Methods: In the present cross-sectional study, 160 postgraduate students were assessed using a predefined questionnaire based on American Heart Association's BLS guidelines. Students who gave consent to participate were included and those who filled the questionnaire incomplete were excluded from the study. Data analysis was done by calculating the mean of the scores and converting that into percentages using Microsoft Excel. Odds ratio was calculated to compare the scores of clinical and non-clinical postgraduate students.

Conclusion: Participants trained recently had better scores than those trained many years ago. All participants showed positive attitude towards BLS. Clinical postgraduate students are 16.2 times more likely to have an average knowledge of BLS (OR: 16.2) and are 4.84 times better at practice of BLS (OR: 4.84) than non-clinical postgraduate students concluding that repeated training of all postgraduate medical students especially those working in non-clinical departments is very important.

Keywords: Basic life support, KAP, postgraduate.

Introduction

The knowledge of Basic Life Support is necessary to save the life of a patient. Every person in the medical field should know and must have an adequate practice of the method of providing basic

life support to a patient. BLS (Basic Life Support) includes the medical procedures and skills that are used to save a patient from life-threatening emergencies until medical care is provided at the hospital. BLS is a part of emergency medical care.

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It includes recognizing the signs of sudden cardiac arrest, heart attack, stroke, obstruction of the airway due to a foreign body, as well as performing CPR (Cardiopulmonary resuscitation) and defibrillation with an AED (Automated External Defibrillator).^[1] BLS (Basic Life Support) includes the procedures like CPR (Cardiopulmonary resuscitation), basic airway management, artificial ventilation and bleeding control.

Due to limited availability of CPR facilities, about 92% out-of-hospital cardiac arrest patients all over the world lose their lives. About 10% of total mortality in developing countries is due to out-of-hospital cardiac arrest (OHCA) and it is one of the leading causes of death and disability all over the world.^[2]

If a doctor is not properly trained for BLS and is unable to cope with the emergencies, it can result in legal complications and serious consequences.^[3] So it is necessary that all medical and paramedical staff should know about BLS as they face life threatening situations in their everyday life.^[4]

According to the General Medical Council, preregistration house officers must get training in BLS before they start with their first posting and they should receive advanced life support training during the first year.^[5]

The American Heart Association (AHA, 2004) has recommended that students and teachers should be given training regarding BLS.^[6]

Undergraduate medical students in UK and Poland are also not trained properly for BLS.^[7,8] Medical students in Europe can't perform BLS in a proper way and those in Switzerland do not have adequate knowledge of BLS.^[9,10] In developing countries like India, BLS and resuscitation training is not routinely practiced. In India, most of the emergencies are handled by doctors working in casualties of government and private hospitals.^[11] The awareness of BLS among Indian medical students, doctors and nurses is also very poor.^[4]

Assessment of the knowledge, attitude and practice regarding BLS among the post graduate medical students of the institute in the study will help to take one step closer to introducing these skills into regular curriculum.

The objective of the present cross-sectional study was to assess the knowledge, attitude and practice regarding BLS (Basic Life Support) among the medical postgraduate students in a tertiary care medical institute.

Materials and Methods

The present cross-sectional study was carried out in a tertiary care medical institute, from 5/7/2022 to 5/9/2022. All the medical post graduate students studying in the tertiary care institute during the study period were included in the study. There were a total 170 postgraduate students, 87 in first academic year and 83 in third academic year studying in the institute during the study period. There was a delay in admissions due to the COVID 19 pandemic and so there were no postgraduate students in second academic year in the institute. After applying the following inclusion and exclusion criteria, 160 postgraduate students were selected.

Inclusion criteria: All the medical post graduate students studying in the institute who gave consent to participate in the study.

Exclusion criteria: Incompletely filled forms.

A predefined questionnaire consisting of 30 questions based on American Heart Association's BLS guidelines^[12] was used in the study. There were 13 questions in the Knowledge section and 10 questions in the Practice section and these were structured as multiple-choice questions while the pattern of the 7 questions in the Attitude section was yes/no/not sure. The questionnaire was given to the participants and collected back on the spot after the responses were filled in by the participants.

Before conducting the study, ethical approval was obtained from the Institutional Ethics Committee.

The nature and purpose of the study was explained to the participants and verbal consent was obtained before they were handed the questionnaire. The participants were informed that their names won't be revealed.

Data entry and analysis was done in Microsoft Excel.

One mark was given for each correct response in the Knowledge and Practice section. The total marks obtained were converted into percentage. A score of less than 30% was considered as very poor, 30% to 45% as poor, 46% to 55% as average, 56% to 65% as good, 66% to 75% as very good. 76% and above as excellent.^[13] Assessment of the questions in the Attitude section was done by calculating the number of responses received to each question.^[13]

Comparison between clinical and non-clinical postgraduate students was done taking into consideration the number of students who obtained scores above 46% (average level score) and those who obtained scores below 46% both in the Knowledge as well as Practice sections and odds ratio was calculated.

Results

Table 1: Distribution of the study participants in various departments on the basis of training received or not received.

Department	Trained (Number and percent)	Untrained (Number and percent)
Pharmacology	1 (0.62%)	1 (0.62%)
Microbiology	2 (1.25%)	3 (1.87%)
Pathology	8 (5%)	1 (0.62%)
Community Medicine	7 (4.37%)	1 (0.62%)
ENT	4 (2.5%)	0
Ophthalmology	7 (4.37%)	1 (0.62%)
FMT	2 (1.25%)	0
General Medicine	12 (7.5%)	0
General Surgery	23 (14.37%)	0
Paediatrics	17 (10.62%)	0
OBGY	20 (12.5%)	3 (1.87%)
Anaesthesia	14 (8.75%)	5 (3.12%)
Psychiatry	3 (1.87%)	1 (0.62%)
Orthopaedics	6 (3.75%)	0
Emergency Medicine	4 (2.5%)	0
Radiology	9 (5.62%)	1 (0.62%)
Dermatology	4 (2.5%)	0
Total	143 (89.37%)	17 (10.62%)

Table 1 shows the number of trained and untrained participants in the various departments of the institute.

The overall score of all the study participants in the Knowledge section was 8.19 ± 2.48 (out of 13).

It comes out to be 63%. In the Practice section, the overall score was 5.84 ± 1.68 (out of 10). This comes out to be 58.4%. So, the overall scores both in the Knowledge as well as Practice sections were good.

Table 2: Scores obtained by the untrained and trained study participants in the Knowledge and Practice sections.

Section	Trained	Untrained
Knowledge score out of 13 (Mean SD) and percent	8.5 (65.4%)	5.7 (43.8%)
Practice score out of 10 (Mean	6 (60%)	4.5 (45%)

Table 2 shows that the scores of the trained sections were higher than that of untrained study participants both in the Knowledge and Practice participants.

Table 3: Distribution of scores obtained in the Knowledge and Practice sections by the participants in various departments.

Departments	Knowledge	Practice
Pharmacology	6 1.4 (46.15%)	4.5 0.7 (45%)
Microbiology	5.6 0.9 (43.07%)	4 0 (40%)
Pathology	5.88 1.45 (45.23%)	5.22 1.85 (52.2%)
Community Medicine	6.12 2.4 (47.07%)	4.75 1.38 (47.5%)
FMT	5 1.4 (38.46%)	6 1.4 (60%)
ENT	7 0.8 (53.84%)	6.25 0.5 (62.5%)
Ophthalmology	6.5 1.7 (50%)	5.5 1.5 (55%)
General Medicine	9.33 1.37 (71.76%)	7.66 1.7 (76.6%)
General Surgery	7.86 1.45 (60.46%)	5.73 1.13 (57.3%)
Pediatrics	11.9 0.82 (91.53%)	6.05 1.47 (60.5%)
OBGY	9.82 2.14 (75.53%)	6.17 2.1 (61.7%)
Orthopedics	8.83 1.16 (67.92%)	6.16 1.16 (61.6%)
Psychiatry	6.75 0.5 (51.92%)	4.75 1.5 (47.5%)
Dermatology	8 1.41 (61.53%)	6.25 1.25 (62.5%)
Radiology	7.3 1.76 (56.15%)	5.8 1.47 (58%)
Anesthesia	6.84 2.3 (52.61%)	5.2 1.5 (52%)
Emergency Medicine	10.5 1 (80.77%)	8.25 0.5 (82.5%)
Total	8.19 2.48 (63%)	5.84 1.68 (58.4%)

Table 3 shows that the score in the Knowledge section was highest in the department of Paediatrics (91.53%) followed by Emergency Medicine, OBGY and General Medicine. The score in the Practice section was highest in the department of Emergency Medicine (82.5%) followed by General Medicine (76.6%).

Table 4: Distribution of scores obtained in the Knowledge and Practice sections on the basis of time since last training (n=110).

Time since last training	2 years	3 years	4 years	>4 years
Knowledge score out of 13 (Mean SD) and percent	9.6 3.36 (73.84%)	8.48 2.21 (65.23%)	8.85 (68.07%)	9 2.23 (69.23%)
Practice score out of 10 (Mean	6.4 1.67 (64%)	5.98 (59.8%)	1.58 (62.5%)	5.42 1.9 (54.2%)

Table 4 shows that participants who had received training 2 years ago, their scores in the Knowledge as well as Practice section were more than those who had received training more than 4 years ago.

Out of the 160 study participants, 17 had not received any training. Out of the remaining 143 participants, 141 had received BLS training during

MBBS and 2 had received training in a workshop.

Out of the 143 participants who had received BLS training, 33 participants did not remember the date of their training. So, in table 4 assessment of 110 individuals who remembered the date of their last BLS training was done.

Table 5: The number and percentage of responses by study participants to questions in the Attitude section.

Answers	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Yes	160 (100%)	-	71 (44.37%)	22 (13.75%)	23 (14.37%)	151 (94.37%)	156 (97.5%)
No	-	-	89 (55.62%)	134 (83.75%)	132 (82.5%)	7 (4.37%)	2 (1.25%)
Not sure	-	-	-	-	-	-	-
Very much important	-	159 (99.37%)	-	-	-	-	-
Important	-	1 (0.62%)	-	-	-	-	-
Hesitant	-	-	-	4 (2.5%)	5 (3.12%)	-	-

Table 5 shows that all 160 (100%) participants said that BLS training is necessary. 71 (44.37%) said that they had voluntarily performed BLS while

89 (55.62%) had not. 151 (94.37%) participants said that they would like to undergo BLS training in a workshop.

Table 6: Scores obtained in the Knowledge and Practice section by the participants in their respective academic years.

Academic year	Knowledge score out of 13 (Mean SD) and percent	Practice score out of 10 (Mean SD) and percent
1 st year	7.73 2.57 (59.46%)	5.64 1.72 (56.4%)
3 rd year	8.64 2.32 (66.46%)	6.03 1.63 (60.3%)

There were 79 first year PG students and 81 third year PG students in the study. Table 6 shows that the scores in the Knowledge and Practice section obtained by the 1st year PG students were lower compared to those obtained by the 3rd year PG students.

Comparison of the Knowledge and Practice scores between clinical and non-clinical postgraduate students was done keeping in mind the average score (46%) obtained. The total number of clinical PG students was 134 and that of non-clinical PG students was 26.

Departments	Knowledge score		Odds ratio
	46% and above	46% and below	
Clinical	125	9	16.20
Non-clinical	12	14	

So, in the Knowledge section, odds ratio of 16.20 showed that clinical postgraduate students are 16.2 times more likely to have at least an average

knowledge of BLS than non-clinical postgraduate students.

Departments	Practice score		Odds ratio
	46% and above	46% and below	
Clinical	108	26	4.84
Non-clinical	12	14	

In the Practice section, odds ratio of 4.84 meant that clinical PG students are 4.84 times better at practice of BLS than non-clinical PG students.

Discussion

BLS (Basic Life Support) can save the life of a patient from life-threatening emergencies until medical care is provided at the hospital. Every post

graduate student studying in clinical as well as non-clinical department should have an adequate knowledge and practice of the method of providing BLS.

The awareness of BLS among Indian medical students and doctors is very poor and so this study was conducted in postgraduate medical students in a tertiary care medical institute to assess their knowledge, attitude and practice regarding BLS.

In this study, the scores of the non-clinical post graduate students were low compared to the clinical post graduate students who are in continuous practice of providing BLS. The sample size in this study was 160 as compared to the studies done by various authors: Sudeep et al. 250, Chandrasekaran et al. 1054, Kumar et al. 190, Srinivas et al. 500, Narayan et al. 202, Roshana et al. 121, Sharma and Attar 162. [3,4,11,14,15,16,17]

Attitude of a study participant is very important especially in starting the BLS procedure. In the present study, all 160 (100%) participants said that BLS training is necessary while 151 (94.37%) participants said that they would like to undergo BLS training in a workshop. In the present study, the study participants had a positive attitude towards BLS, similar to the findings obtained in studies done by Kumar et al., Narayan et al. and Roshana et al. [11,15,16]

The study conducted by Roshana et al. [16] showed that the knowledge of BLS in medical, dental and paramedical staffs was not adequate but they had a positive attitude towards it.

The findings from a study showed that the acquisition of knowledge is highest immediately after the training of the individual and it reduces with time. [18] In the present study, participants who had received BLS training 2 years ago, their score in the Knowledge section was 73.84% and in the Practice section it was 64% while those who had received BLS training more than 4 years ago, their score in the Knowledge section was 69.23% and in the Practice section it was 54.2%.

About 15% to 20% of all deaths all over the world are due to sudden cardiac death (SCD), [19,20] and in this out of hospital SCDs are the cause of more than 49.1% of all deaths. [21] Around 250,000 to 300,000

patients all over the world experience an OHCA (Out of hospital cardiac arrest) every year. [22] The patients of OHCA who receive BLS have a better chance of survival than those who do not.

Providing BLS in the first few moments after a cardiac arrest determines patient outcome. Early chest compression and defibrillation are the only two interventions that have been proven to be effective. [23]

In the present study, the scores in the Knowledge as well as the Practice sections were higher in case of the study participants who had received BLS training 2 years ago compared to those who had received BLS training more than 4 years ago. In previous studies, it has been found that there was an improvement in an individual's knowledge and skills of BLS after retraining of that individual. [24,25]

In the present study, the score in the Knowledge section was highest in the department of Paediatrics (91.53%) followed by Emergency Medicine, OBGY and General Medicine. The score in the Practice section was highest in the department of Emergency Medicine (82.5%) followed by General Medicine (76.6%).

Conclusion

The scores of trained study participants were good while that of untrained participants were poor. So BLS training of all medical students must be made compulsory. Participants who had received BLS training recently had better scores than those who had received training many years ago. So repeated training of the individuals is necessary. Clinical post graduate students due to their continuous practice of providing BLS to patients have better knowledge and practice of BLS than the non-clinical postgraduate students and so training of non-clinical postgraduate students is equally important.

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Nutritional Status and Anganwadi Services Utilization Among Under 5 Children in Aligarh: A Cross Sectional Study

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Abstract

Child health should be of prime concern. Their protection is the greatest investment for the country's economic and political stability. This cross sectional study was conducted at the Anganwadi centres under registered areas of the Department of Community Medicine, Jawaharlal Nehru Medical College Aligarh Muslim University, Aligarh. The study was conducted from July, 2017 to June 2018 among 400 children of age 3-6 years registered at the Anganwadi centres of field practice area. It was found that although the age group distribution among registered population was almost equal, majority of the children were found to suffer from stunting. along with this, children belonging to lower middle class socio economic status had the most registration under ICDS scheme. The statistical association between underweight, stunting and socio-economic status was found to be statistically significant ($p < 0.05$) while it was not associated with wasting ($p > 0.05$). It can be understood that socio economic status also has role to play in access of these services. It is therefore necessary that people are made aware of ICDS program and motivated to reap benefits of the same for improved nutritional outcome of their children.

Key Words: anganwadi centres, nutritional status, children, malnourished, stunting, wasting

Introduction

The first six years of a child's life are the most crucial as the foundations for cognitive, social, emotional, physical, motor and psychological development are laid down at this stage¹. Nutrition plays a key role in physical, mental and emotional development of children and much emphasis has been given to provide good nutrition to growing populations especially in the formative years of life.² These growing children require constant supplementation

of calories, proteins and micronutrients to keep pace with the increasing demands of the body. Since childhood is the most vulnerable phase in the life of a human being, nutritional inadequacies will result in the hampering of the development of the body. If this nutritional inadequacy is continued for a long period of time it results in the growth faltering manifested in the form of low weight, small height, low IQ³. The adverse effects of malnutrition are growth failure, breakdown of immunity, increased susceptibility

to infections, prolongation of the recovery period, impairment of mental capacity and motor skills, decreased alertness and physical capacity.

The World Health Organization defines malnutrition as the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance and specific functions.⁴ It is the syndrome that results from the interaction between poor diets and disease and leads to most of the anthropometric deficits observed among children in the world's less developed countries.²

To tackle the problem of malnutrition and provide integrated health services, the Government of India launched the Integrated Child Development Services (ICDS) in 1975.² ICDS has expanded over the years and is now one of the world's largest and unique outreach programmes to meet the holistic needs of a child. Over the years the programme has undergone transformations in terms of scope, content and implementation, but the primary goal of breaking the inter-generational cycle of malnutrition, reducing morbidity and mortality caused by nutritional deficiencies, reaching out to children, pregnant women, lactating mothers and adolescent girls has remains unaltered⁵

Aims and Objectives

The present study aims to assess the nutritional and development status of children aged between 3 to 6 years registered in Anganwadi centres of Aligarh under the registered area of the department. It will help delineate the effect ICDS has on children with regard to their nutritional status and their level of development. The objective of the study was to study the nutritional status of children in Anganwadi centres under registered areas of department of community medicine, Jawaharlal Nehru Medical College, Aligarh and to determine the association of nutritional status with socio-economic status.

Materials and Method

This cross sectional study was conducted at the Anganwadi centres under registered areas of the Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University,

Aligarh from July 2017 to June 2018. Study population were the Children registered at the Anganwadi centres under registered areas of the department. Children belonging between the age group of 3 years to 6 years and the caregivers of whom consented to participate in the study were included in the study, while those children who were not registered at the Anganwadi centres, children with non-cooperative caregivers, children with any congenital disease or immune-compromised states were excluded from the study.

Sample size was calculated the following formula

$$n = z^2 \frac{p \times (1-p)}{d^2}$$

where, n = sample size

P = prevalence of underweight in Uttar Pradesh [NFHS-3] taken as 42.4%⁶. d = allowable absolute error (5%) z = value of the standard normal variable at 0.05 level of significance (1.96)

$$n = (1.96)^2 \frac{424 \times (1 - 0.424)}{(0.05)^2}$$

Total sample size (n) was 375.

Taking non response rate of 5%, the sample size comes out to be 393, which was rounded off to 400.

The data was collected through simple random sampling.

Ethical clearance was obtained from Institutional Ethics Committee, JNMC, AMU, Aligarh before conduction of the study. Informed verbal consent was taken from caregivers before interview and they were assured of the confidentiality of the information and data collected. Appropriate health education and personalized counseling was provided to all the respondents and prompt referral was addressed to any patient found to be afflicted with serious malnutrition warranting specialist attention.

Operational Definitions:

Malnutrition: It is defined as a weight-for-age below-2 Z-scores of the median of the WHO child

growth standards. It can be due to a low weight-for-height (wasting) or a low height for-age (stunting) or a combination of both.⁷

Underweight : Moderate - below minus two standard deviations from median weight for age of reference population; **severe** - below minus three standard deviations from median weight for age of reference population.⁸

Wasting Moderate - below minus two standard deviations from median weight for height of reference population; **severe**- below minus three standard deviations from median weight for height of reference population.⁸

Stunting Moderate - below minus two standard deviations from median height for age of reference population; **severe** - below minus three standard deviations from median height for age of reference population.⁸

Statistical Analysis

Z score for anthropometric measurements was calculated using WHO ANTHRO and WHO ANTHRO PLUS software^{9,10}, and compared with standard WHO reference charts. Descriptive summary using frequencies, proportions, graphs and cross tabs were used to present study results in SPSS 20.0. Probability (p) was calculated to test for statistical significance at the 5% level of significance. Association between variables was determined using Chi Square test.

Results and Discussion

As far as the age wise distribution of the study population is concerned, it came out to be almost equal with 48-59 months (34%), 60-71 months (34%) followed by age group 36-47 months (32%). The table also depicts that more than half (54%) of the study subjects were male and 45% were females. In the present study, it was observed that, mothers of 46.5% Anganwadi children were illiterate and 53.5% were literate. Of the literate, about 41.7% of the mothers had an educational level upto high school whereas only 11.8% of mother had education above high school. According to modified B.G. Prasad classification-2018 around half (50.0%) of the children

belonged to households of Class IV socioeconomic class followed by Class V (27.3%) and Class III (13.4%) socioeconomic class while only 6% and 3.3% were belonged to households of Class II and Class I respectively. This shows that it's the poorer section of the society which is enrolled in ICDS.

Table 1: Social profile of the study population

Characteristics	Frequency (n)	Percentage (%)
Age group (in months)		
36 -47	128	32.0
48-59	136	34.0
60-71	136	34.0
Gender		
Male	216	54.0
Female	184	46.0
Mother's education		
Illiterate	186	46.5
Up to primary	67	16.7
Middle school	56	14.0
High school	44	11.0
Intermediate	31	7.8
Graduate and above	16	4.0
Father's education		
Illiterate	93	23.3
Up to primary	62	15.4
Middle school	89	22.3
High school	72	18.0
Intermediate	38	9.5
Graduate and above	46	11.5
Socio- economic status		
I	13	3.3
II	24	6.0
III	54	13.4
IV	200	50.0
V	109	27.3

Among the enrolled children in the present study there were 123 (30.6%) children with no altered nutritional parameter, while 128 (32%) children were found to be underweight and stunting was reported in 146 (36.5%) out of 400.

Table 2: Nutritional Status of the Anganwadi children (N=400)

Nutritional Status	Frequency (N (%))		Total N (%)
	Present N (%)	Absent N (%)	
Normal	123(30.6)	277(69.4)	400(100)
Underweight	128 (32)	272(68.0)	400 (100)
Stunting	146 (36.5)	254(63.5)	400(100)
Wasting*	50 (18.9)	214(81.1)	264(100)

Overall immunization status of the registered children was observed to be good where 80.5% found to be fully immunized, and only 13.0% and 6.5% were reported to be partially and non immunized.

Table 3: Association of Nutritional Status with socio-economic status of the household

Socio-economic class	Underweight <-2SD			Stunting <-2SD			Wasting <-2SD		
	Present n (%)	Absent n (%)	Total N (%)	Present n (%)	Absent n (%)	Total N (%)	Present n (%)	Absent n (%)	Total N (%)
I	0 (0.0)	13 (100.0)	13 (100)	0 (0.0)	13 (100.0)	13 (100)	0 (0.0)	9 (100.0)	9 (100)
II	3 (12.5)	21 (87.5)	24 (100)	3 (12.5)	21 (87.5)	24 (100)	3 (23.1)	10 (76.9)	13 (100)
III	14 (25.9)	40 (74.1)	54 (100)	20 (37.0)	34 (63.0)	54 (100)	4 (12.1)	29 (87.9)	33 (100)
IV	71 (35.5)	129 (64.5)	200 (100)	74 (37.0)	126 (63.0)	200 (100)	28 (20.6)	108 (79.4)	136 (100)
V	40 (36.7)	69 (63.3)	109 (100)	49 (45.0)	60 (55.0)	109 (100)	15 (20.5)	58 (79.5)	73 (100)
Total	128 (32.0)	272 (68.0)	400 (100)	146 (36.5)	254 (63.5)	400 (100)	50 (18.9)	214 (81.1)	264 (100)
	P=0.009			P=0.002			P=0.461		

It can be understood that Socio-economic class exhibits a significant inverse association with underweight and stunting. Similar results were found in various studies conducted elsewhere.^{11, 12, 13,14,15}

The possible reason for the poor nutritional status among those who are utilizing the services at Anganwadi center more could be, because families which have extreme dearth of resources, utilizing the services of Anganwadi centers more and families which have just enough, just don't bother about

sending their kids to the center on a regular basis. Also, it can be argued that mothers might not send their children regularly to the centre because of recurrent infections that are common among the malnourished population which might affect the utilization of services of ICDS program. Along with this, another factor could be no information regarding this programme among the community, or lack of trust regarding the program being implemented at the ground level. In this case, it becomes imperative that the local bodies work actively to promote the

program and provide information regarding the benefits of the same to the eligible population.

Conclusion

There should be intensification of ICDS with multi sectorial strengthening, that can be achieved by help of ASHA, AWW, ANM and local village self help groups.¹⁶ Education of women should be improved. Mothers should be counseled regarding exclusive breast feeding and proper complementary feeding which contribute to the nutritional and developmental status of children. Since majority of the study population was of low socio-economic status, efforts should be done to improve their Socio-Economic Status. Help of local NGO's and Self Help Groups may be involved for some ICDS activities like procurement and supply of supplementary nutrition. Emphasis on proper hand washing practice should be given at the centres before meals and the mothers of the children should also be counseled for the same to prevent recurrent infections and promote healthy eating habits.

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Feeding Practices affecting Nutritional Status of Anganwadi Children

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Abstract

Each Anganwadi unit covers a population of about 400 to 800 and mini Anganwadi center about 150 to 400. The work of Anganwadi centers is supervised by Mukhyasevikas. Field supervision is done by the Child Development Project Officer (CDPO). Nutrition-related factors contribute to about 45% of deaths in children under 5 years of age. This study was conducted to find the factors affecting nutritional status of children at anganwadi centres in Aligarh.

This study was conducted (cross sectional) at the Anganwadi centres under registered areas of the Department of Community Medicine, Jawaharlal Nehru Medical College Aligarh Muslim University, Aligarh. The study was conducted from July, 2017 to June 2018. All children of age 3-6 years registered at the Anganwadi centres of field practice area. **INCLUSION CRITERIA:** Child of 3 years to 6 years (36 months to 71 months) of age and Child whose caregiver gave consent for the study. **EXCLUSION CRITERIA:** Child not registered at Anganwadi centre, Non-cooperative caregivers, Caregiver and child not present in three visit periods. Ethical clearance was obtained from Institutional Ethics Committee, JNMC, AMU, Aligarh. Informed verbal consent was taken from caregiver before interview.

It was found among the feeding practices that nutritional status was found to be associated with duration of exclusive breast feeding, age of start of complementary feeding, and total duration of breast feeding.

Key Words: anganwadi centres, exclusive breast feeding, age of start of complementary feeding, nutritional status

Introduction

Two of three preschool children in India are malnourished⁵. Malnutrition is defined as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients¹. Undernutrition is a condition

which results from insufficient food eaten over an extended period of time². As per World Health Organization (WHO) Report, approximately 45% of deaths among children under 5 years of age are linked to undernutrition as malnutrition presents with serious, long-term consequences impeding motor, sensory, cognitive, social, and emotional

development³. Only 1 in 10 Indian children aged 6–23 months get adequate diet and 35.7% of children below 5 years of age are underweight as per the National Family Health Survey (NFHS) 2015-16⁴. Government of India started Integrated Child Development Services (ICDS) Scheme in 1975 so as to meet nutritional requirement of children of 0–6 years of age in addition to other Services. Each Anganwadi unit covers a population of about 400 to 800 and mini Anganwadi center about 150 to 400. The work of Anganwadi centers is supervised by Mukhyasevikas. Field supervision is done by the Child Development Project Officer (CDPO)⁶. Nutrition-related factors contribute to about 45% of deaths in children under 5 years of age⁷.

This study was conducted to find the feeding practices affecting nutritional status of children at anganwadi centres in Aligarh.

Material and methods

This study cross sectional study was conducted at the Anganwadi centres under registered areas of the Department of Community Medicine, Jawaharlal Nehru Medical College Aligarh Muslim University, Aligarh. The study was conducted from July, 2017 to June 2018. All children of age 3-6 years registered at the Anganwadi centres of field practice area. INCLUSION CRITERIA: Child of 3 years to 6 years (36 months to 71 months) of age and Child whose caregiver gave consent for the study. EXCLUSION CRITERIA: Child not registered at Anganwadi centre, Non-cooperative caregivers, Caregiver and child not present in three visit periods.

Sample Size Determination

Sample size was calculated the following formula

$$n = z^2 \frac{p \times (1-p)}{d^2}$$

where, n = sample size

P = prevalence of underweight in Uttar Pradesh [NFHS-3] taken as 42.4%. d = allowable absolute error (5%) z = value of the standard normal variable at 0.05 level of significance (1.96)

$$n = (1.96)^2 \frac{424 \times (1-0.424)}{(0.05)^2}$$

Total sample size (n) was 375.

Taking non response rate of 5% of the sample size, n=375 + 18 = 393

Sampling Design: Simple random sampling.

Information was collected from the guardian of the child beneficiary of the Anganwadi Centres with a pre-tested and pre-structured questionnaire.

Ethical clearance was obtained from Institutional Ethics Committee, JNMC, AMU, Aligarh. Informed verbal consent was taken from caregiver before interview. Confidentiality was assured.

Results

Feeding Practices affecting Nutritional Status of Anganwadi children

Table 1

Time of initiation of breastfeeding	Underweight <-2SD			Stunting <-2SD			Wasting* <-2SD		
	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
≤ 1 hour	41 31.10%	91 68.90%	132 (100)	54 40.90%	78 59.10%	132 (100)	18 18.40%	80 81.60%	98 (100)
> 1 hour	87 32.50%	181 67.50%	268 (100)	92 34.30%	176 65.70%	268 (100)	32 19.30%	134 80.70%	166 (100)
Total	128 32%	272 68%	400 (100)	146 36.50%	254 63.50%	400 (100)	50 18.90%	214 81.10%	264 (100)
	0.777			0.199			0.855		

Table-2

Colostrum given	Underweight <-2SD			Stunting <-2SD			Wasting* <-2SD		
	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
Yes	119 32.30%	249 67.70%	368 (100)	114 86.36%	18 13.64%	132 (100)	49 20%	196 80%	245 (100)
No	9 28.10%	23 71.90%	32 (100)	32 12%	236 88%	268 (100)	1 5.30%	18 94.70%	19 (100)
Total	128 32%	272 68%	400 (100)	146 36.50%	254 63.50%	400 (100)	50 18.90%	214 81.10%	264 (100)
	0.624			0.374			0.144		

Table-3

Duration of breast feeding	Underweight <-2SD			Stunting <-2SD			Wasting* <-2SD		
	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
No Exclusive Breast Feeding	32 36.80%	55 63.20%	87 (100)	35 40.20%	52 59.80%	87 (100)	12 20.30%	47 79.70%	59 (100)
<6 months	67 37.20%	113 62.80%	180 (100)	68 37.80%	112 62.20%	180 (100)	29 24.80%	88 75.20%	117 (100)
6 months	29 21.80%	104 78.20%	133 (100)	43 32.30%	90 67.70%	133 (100)	9 10.20%	79 89.80%	88 (100)
Total	128 32%	272 68%	400 (100)	146 36.50%	254 63.50%	400 (100)	50 18.90%	214 81.10%	264 (100)
	0.009			0.439			0.03		

Table-4

Age of starting complementary feeding	Underweight <-2SD			Stunting <-2SD			Wasting* <-2SD		
	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
6 months	95 37.50%	158 62.50%	253 (100)	100 39.50%	153 60.50%	253 (100)	40 24.10%	126 75.90%	166 (100)
Delayed	33 22.40%	114 77.60%	147 (100)	46 31.30%	101 68.70%	147 (100)	10 10.20%	88 89.80%	98 (100)
Total	128 32%	272 68%	400 (100)	146 36.50%	254 63.50%	400 (100)	50 18.90%	214 81.10%	264 (100)
	0.002			0.099			0.005		

Table-5

Duration of breast-feeding	Underweight <-2SD			Stunting <-2SD			Wasting* <-2SD		
	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
< 1 year	42 42%	58 58%	100 (100)	40 40%	60 60%	100 (100)	16 27.60%	42 72.40%	58 (100)
1-2 years	58 29%	142 71%	200 (100)	67 33.50%	133 66.50%	200 (100)	26 19.50%	107 80.50%	133 (100)
≥2 years	28 28%	72 72%	100 (100)	39 39%	61 61%	100 (100)	8 11%	65 89%	73 (100)
Total	128 32%	272 68%	400 (100)	146 36.50%	254 63.50%	400 (100)	50 18.90%	214 81.10%	264 (100)
	0.046			0.455			0.053		

Discussion

As shown in tables 1-5, among the feeding practices observed, nutritional status was found to be associated with duration of exclusive breast feeding, age of start of complementary feeding, and total duration of breast feeding.

Proportion of underweight children was significantly less ($p=0.009$) among those who exclusively breastfed for 6 months compared to children breastfed for less than 6 months or not breastfed at all. Similar results obtained with wasting as well ($p=0.030$). Another study⁸ reported lack of exclusive breast feeding to be measured risk factor for SAM children. Davey⁹, found exclusive breast feeding not done for 6 months to be significantly associated with malnutrition. Age at which complementary feeding started significantly affected all the nutritional parameters as proportion of underweight, stunted, and wasted children was observed to be more in which feeding delayed beyond 6 months. Another study⁸, found delayed introduction of complimentary feeding to be measured risk factor for SAM children. Davey⁹ also found wrong age of initiation complementary feeding to be significantly associated with malnutrition ($p<0.5$).

Duration of breast feeding found to be having a significant inverse association with higher proportion of underweight ($p=0.046$) and wasting ($p=0.053$) but not with stunting.

No significant association was observed with early

initiation of breast feeding and feeding of colostrum to the child in this study. However, Aprameya et al¹⁰, found a significant association between late initiation and SAM, Osei et al¹¹, observed that stunting was associated with early initiation of breastfeeding and Davey⁹ found improper colostrum feeding to be significantly associated with malnutrition.

Breast and complementary feeding, if adequately promoted and practiced, can prevent up to 19% of all childhood deaths in low-income countries¹². It is estimated that in low-income countries, where the relative benefits of optimal feeding are greatest, fewer than 50% of children under 6 months of age are exclusively breastfed^{13,14}. Pre-lacteals are unnecessary as they can reduce breast-milk intake and increase the risk of infection in infants¹⁵.

Conclusion

India is a vast country with socio-cultural diversity and public sector alone may not be able to cater the needs of the community, therefore local NGO's and Self Help Group may be involved for some ICDS activities like procurement and supply of supplementary nutrition. Emphasis on proper hand washing practice should be given at the centres before meals and the mothers of the children should also be counselled for the same. Mothers should be counselled regarding exclusive breast feeding and proper complementary feeding which contribute to the nutritional and developmental status of children. Attention should focus on socio-economic empowerment especially education of the girl child,

discouraging use of pre-lacteals, promoting use of oil to increase energy content of complementary food and the timeliness of complementary feeding so as to optimise the benefits of breastfeeding and complementary feeding 16.

Ethical clearance- Taken from Institutional Ethics Committee, JNMC, AMU, Aligarh(copy attached).

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Incidence of BCC in a Tertiary Care Hospital in western U.P

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Abstract

Objectives: Although the incidence of skin cancers in India (part of South Asia) is low, the absolute number of cases may be significant due to large population. The existing literature on BCC in India is scant. So, this study was done focusing on its epidemiology, risk factors, and clinicopathological aspects.

Methods: A hospital based cross-sectional study was conducted in western U.P, North India, from 2020 to 2021. History, examination and histopathological confirmation were done in all the patients visiting skin department with suspected lesions.

Results: Out of 36 confirmed cases, 63.9% were females with mean \pm SD age being years. Mean duration of disease was 4.7 years. Though there was statistically significant higher sun exposure in males compared to females (value being 0.000), BCC was commoner in females, explainable by intermittent sun exposure (during household work in the open kitchens) in women. Majority of patients (88.9%) had a single lesion. Head and neck region was involved in 97.2% of cases, with nose being the commonest site (50%) with nodular/noduloulcerative morphology in 77.8% of cases. Pigmentation was evident in 22.2% of cases clinically. Nodular variety was the commonest histopathological variant (77.8%).

Conclusions: This study highlights a paradoxically increasing trend of BCC with female preponderance, preferential involvement of nose, and higher percentage of pigmentation in Indians.

Keywords: basal cell carcinoma; pigmentation; histopathological

Introduction

Jacob Arthurin 1827 first coined the term "rodent ulcer" to describe what we now know as a basal cell carcinoma (BCC) [1]. It is the most common cutaneous malignancy worldwide, accounting for 65–75% of all skin cancers. Gross differences are noted in the percentage of skin cancer in the Asians (2–4%) and Blacks (1–2%) as compared to the Caucasians (35–40%) [2]. Although the incidence of skin cancers in India is lower as compared to the Western world,

absolute number of cases may be significant due to large population. The existing literature on BCC in India is scant with lack of clinical studies with statistical analysis [3]. So, this study was undertaken to fill this deficit in literature of BCC with focus on epidemiology, risk factors, and clinical and pathological aspects of the disease.

BCC is a nonmelanocytic skin malignancy arising from basal cells of the epidermis or follicular structures and is seen mostly on sun exposed areas,

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especially head and neck, occasionally over the trunk and limbs, and rarely on the palms, soles, mucous membranes, and genitals [4, 5].

The anatomic distribution of BCC correlates with embryonic fusion planes. Recently, it has been indicated that BCC occurrence is higher along embryonic fusion planes as compared to other areas of the midface, evidence that supports this hypothesis for BCC pathogenesis [6].

Ninety-five percent of these neoplasms occur in patients aged more than 40 years, although cases in childhood and congenital basal cell epitheliomas have been reported [7-9]. In children, it is usually associated with a genetic defect, such as basal cell nevus syndrome, xerodermapigmentosum, nevus sebaceous, epidermodysplasia verruciformis, Rombo syndrome, or Bazex syndrome.

Material and Methods

A hospital based study was conducted at a tertiary care hospital situated in western U.P, North India, from 2020 to 2021. Patients of all ages attending skin outpatient department with suspected lesions were screened for BCC after taking an informed written consent. Patients with histopathologically confirmed BCC were enrolled in the study.

Detailed history with recording of various patient variables like age, gender, duration of symptoms, Fitzpatrick skin phototype, skin color, average daily sun exposure (hours/day), occupation, residence place (rural or urban), exposure to chemicals including pesticides, radiation exposure history, treatment with psoralen UVA (PUVA) or narrow band UVB (NBUVB), smoking, alcohol intake, history of personal or family history of skin cancers, personal or family history of other cancers, history of genetic disorder like xerodermapigmentosum, albinism, and history of previous treatment.

Clinical examination was done with data collection on various tumor variables which included the following: size, location, number, morphological subtype, and pigmentation. For descriptive purposes, the lesions were classified based on size into small (less than 1cm in diameter), medium (1-2cm in diameter), and large (>2cm in diameter).

Investigations included complete blood count with differentials, bleeding time, clotting time, renal function tests, liver function tests, and viral markers. Additional investigations were done depending upon the clinical scenario. Diagnosis was confirmed by histopathological examination of biopsy specimen with documentation of histopathological variant. To analyze the results, descriptive statistics such as mean, standard deviation (SD), and frequency tables were utilized.

Results

A total of 36 histopathologically confirmed cases of BCC were enrolled in the study from 2011 to 2013. An increase was seen in absolute number of cases diagnosed per year with 9, 11, and 16 patients in 2017, 2018, and 2019, respectively.

Out of these patients, males were 36.1% (13/36) and females were 63.9% (23/36) with M:F being equal to 0.57:1. Age of the affected cases ranged from 29 to 92 years of age. The mean \pm SD age of the patients was years (60.9 yrs for males and 57.6 years in case of females). Although the difference in mean age between males and females was not statistically significant (data was analyzed using unpaired *t*-test), it carries a clinical relevance as females tend to seek medical care earlier than males for suspicious, asymptomatic, and cosmetically disfiguring lesions. The greatest number of patients was in the age group of 61-80 years (47.2%) followed by 41-60 years (38.95%), 21-40 years (8.3%), and 81-100 years (5.6%), respectively. The youngest age of presentation in case of females was 29 years, while in males the corresponding age was 45 years. Correlation between gender and age group was not statistically significant (Fisher exact test value being 0.177), implying that these two variables are independent.

Out of all patients, 69.4% (25/36) hailed from rural areas. Majority of the patients were illiterate (80.6%). A statistically significant association was seen between duration of disease and illiteracy (*t* value = 6.95 and *p* value = 0.01). This meant that illiterate patients present at a later stage of disease attributable to lack of awareness about disease entity. Farming was the main occupation among male patients (92.3%), while housekeeping was the major job among female patients (95.7%).

The duration of disease before seeking medical care ranged from 5 months to as long as 15 years, with mean duration being 4.7 years. The average duration of sun exposure was 6 hours/day in case of males and 2.91 hours/day in female patients. This difference in duration of sun exposure was statistically significant (p -value being 6.71 and value = 0.000). However, the females were intermittently exposed to high intensity sunlight due to work in open kitchens and fields during sowing and harvesting seasons.

None of the patients had been taking photoprotective measures such as use of sunscreens and protective clothing. There was no history of treatment with PUVA or NB-UVB in any of the study cases. All the patients were nonalcoholics and nonsmokers. No patient had features suggestive of genodermatoses associated with predilection for cutaneous malignancies like xerodermapigmentosa, albinism, and so forth. Out of 36 patients, one (2.8%) had been previously treated for breast and endometrial carcinoma. Family history of cutaneous and systemic malignancies was not present in any of them. All the cases belonged to Fitzpatrick skin types III and IV (calculated via Fitzpatrick scoring scale).

The most common histopathological variant was nodular subtype (77.8%) with a significant proportion of tumors being pigmented (16.7%). Other subtypes included basosquamous (8.3%), micronodular (2.8%), morpheaform (2.8%), keratotic (2.8%), and adenoid (2.8%) BCC and BCC with adnexal differentiation (2.8%).

Discussion

Basal cell carcinoma occurs worldwide. So far, BCC has been considered as the disease of the White¹⁴. Consequently, most of the studies have focused on White populations in Europe, USA, and Australia with scarcity of data from developing countries. Estimates of the incidence of BCC are imprecise since there is no cancer registry that collects data on BCC.

Although incidence rates of BCC vary significantly according to the ethnicity and geographic location, most studies show a rising trend in its incidence worldwide. This has been largely attributed to fair complexion and ozone layer depletion resulting in increased UV radiation reaching earth's surface.

Similar increasing trend was noticed in our study as well. But factors other than the mentioned above need to be searched and verified as darker skin complexion in Indians should otherwise be protective against BCC. Moreover, ozone layer destruction is most evident over the temperate and polar regions, while India is a tropical country^[15, 16].

Basal cell carcinoma is rare in young populations. An increased incidence has also been noticed in children and young adults^[17]. This finding highlights the need for early institution of UV protection and skin cancer screening in the pediatric and young adult population. However, there was no case below the age of 20 years in our study. Radiotherapy is another risk factor for the development of BCC in younger age group. Relative risk of BCC is more for children who have undergone radiation therapy for enlarged thymus^[18] or neoplasms such as medulloblastoma^[19].

BCCs are more common in males as reported in most studies worldwide, presumably due to greater occupational and recreational exposure to ultraviolet radiation (UVR). However, an unusual female preponderance was noticed in our study which is consistent with findings of another Indian series^[20]. Indian housewives especially rural women work in open kitchen during their household chores and work in the fields during sowing and harvesting seasons exposing them to intermittent, high intensity UVR. It might explain higher frequency of BCC in females in our study as intermittent rather than constant, cumulative UVR exposure is implicated in the pathogenesis of BCC^[21]. This female predilection may also be attributed to the changes in cultural practices like "veil" custom, structurally thinner skin with lower collagen density in the dermis when compared to men.

In our study, higher frequency among rural inhabitants was seen when compared to urban residents. This can be explained on the basis of more outdoor activities (as agriculture is the main occupation), changes in clothing preferences, illiteracy, and infrequent use of sunscreens. The rural patients regard initial lesions of BCC as a minor cosmetic problem with insignificant impact on health and seek medical advice only when lesions become symptomatic or disfiguring. So, late presentation

to health facilities is equally contributory. A study done in Punjab regarding cancer found that tap water contains high content of arsenic, chromium, iron, and mercury, whereas ground water has abundance of arsenic, chromium, nickel, and iron. Even pesticides have been detected in the locally grown vegetables as well. Tseng et al. found a dose-dependent relation between arsenic levels in drinking water and the prevalence of skin cancers. Thus, exposure to harmful metals and pesticides may also add to the risk of skin cancers, but further clinical and research studies are needed to confirm their role in the pathogenesis of BCC and to delineate underlying mechanisms. Occupations at risk of BCC that are highlighted in our study include agricultural workers and housekeepers.

Although most BCCs are slow-growing, relatively nonaggressive tumors, a minority have an aggressive behavior with local tissue destruction and, rarely, metastasis. Metastatic BCC has a reported incidence of only 0.0028–0.5%. Risk factors for development of metastatic BCC include large primary tumor (>2cm), location in head and neck region, long standing lesion, multiple primary tumors and recurrences, prior radiation therapy, large tumor depth, invasion of perineural space and blood vessels, fair skin, male gender, and immunosuppression. One of our patients was detected with metastatic BCC.

Conclusion

This study highlights a paradoxically increasing trend of BCC with female predilection and higher percentage of pigmented lesions in Indians. This skin malignancy tends to be commoner in rural and agriculture based population. Major contributory risk factors include intermittent rather than constant UV exposure, cultural and lifestyle changes, cosmetic indifference, possible role of arsenic and pesticides, improved clinical awareness, and diagnostic facilities. The increasing cancer burden calls for the need of introduction of national screening program including mandatory annual skin examination by trained health professionals at the national level. Since early detection and treatment of lesions are crucial to decrease functional and cosmetic morbidity and costs, this study highlights the importance of

improving awareness among general practitioners, public health workers, and general population. The clinical and epidemiological data collected in this study would serve as a reference for future research and may be helpful in the development of preventive and educational strategies.

Ethical clearance- Taken from ethical committee of institution

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Anosmia: A Clinic Based Review

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Abstract

Anosmia and hyposmia, the inability or decreased ability to smell, is estimated to afflict 3–20% of the population. Risk of olfactory dysfunction increases with old age and may also result from chronic sinonasal diseases, severe head trauma, and upper respiratory infections, or neurodegenerative diseases. These disorders impair the ability to sense warning odors in foods and the environment, as well as hinder the quality of life related to social interactions, eating, and feelings of well-being. This article reports and extends on a clinical update commencing at the 2016 Association for Chemoreception Sciences annual meeting. Included were reports from: a patient perspective on losing the sense of smell with information on Fifth Sense, a nonprofit advocacy organization for patients with olfactory disorders; an otolaryngologist's review of clinical evaluation, diagnosis, and management/treatment of anosmia; and researchers' review of recent advances in potential anosmia treatments from fundamental science, in animal, cellular, or genetic models. As limited evidence-based treatments exist for anosmia, dissemination of information on anosmia-related health risks is needed. This could include feasible and useful screening measures for olfactory dysfunction, appropriate clinical evaluation, and patient counseling to avoid harm as well as manage health and quality of life with anosmia.

Keywords: genetics, neural reorganization, olfactory dysfunction, quality of life, stem cell regeneration, treatment

Introduction

Smell accounts for 95% to 99% of chemosensation; while, taste accounts for the rest of chemosensation. Anosmia is the inability to perceive smell/odor. It can be temporary or permanent and acquired or congenital. There are many causes. For example, any mechanical blockage preventing odors from reaching the olfactory nerves can cause a loss of sense of smell. This blockage can be due to inflammatory processes like simple infections causing mucus plugs or nasal polyps.

Neurological causes can include disturbances to the sensory nerves that make up the olfactory bulb or

anywhere along the path in which the signal of smell is transferred to the brain. To better understand this process, it is helpful to understand how people can perceive smell.

When a particle with odorant molecules in the air is present, it travels up through the nasal canals to the nasal cavity, where olfactory receptor neurons extend from the olfactory bulb that sits on the cribriform plate of the brain. Each nasal cavity contains about 5 million receptor cells or neurons. There are 500 to 1000 different odor-binding proteins on the surface of these olfactory receptor cells. Each olfactory receptor cell expresses only one type of binding protein.

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These afferent olfactory neurons (cranial nerve I) facilitates the transfer of a chemical signal (particles in the air) to an electrical signal (sensed by afferent receptor neurons) which is then transferred and ultimately perceived by the brain. From the olfactory bulb, the signal is further processed by several other structures of the brain, including the piriform cortex, entorhinal cortex, amygdala, and hippocampus. Any blockage or destruction of the pathway along which smell is transferred and processed may result in anosmia.¹

Etiology

As stated in the introduction, any problems that cause a disturbance in the pathway that leads to the perception of smell, whether mechanical or along the olfactory neural pathway can lead to anosmia.

Inflammatory and Obstructive Disorders (50% to 70% of cases of anosmia)²

These are the most common causes of anosmia, and these include nasal and paranasal sinus disease (rhino-sinusitis, rhinitis, and nasal polyps). These disorders cause anosmia through inflammation of the mucosa as well as through direct obstruction.

Head Trauma

Head trauma is another common cause of anosmia as trauma to the head can cause damage to the nose or sinuses leading to a mechanical blockage and obstruction. Other ways an injury can cause anosmia is by trauma or destruction to the olfactory axons that are present at the cribriform plate, damage to the olfactory bulb, or direct injury to the olfactory areas of the cerebral cortex. The central (CNS) nervous system trauma leading to anosmia can be temporary or permanent depending on the area and extent of the injury. Olfactory neurons have regenerative capabilities that other CNS nerves in the body do not. This unique ability is the center of much current stem cell-related research.

Aging and Neurodegenerative Processes³

These processes are associated with the loss of smell that can eventually result in anosmia. Normal aging is associated with decreased sensitivity to smell. As individuals age, they lose the number of

cells in the olfactory bulb as well as the olfactory epithelium surface area which is important in sensing smell. Interestingly, there have been studies that associate the impairment of the ability to smell with neurodegenerative disorders such as Alzheimer disease, Parkinson disease, and Lewy Body dementia. Studies linked low ability to perceive smell associated with increased risk of development of neurodegenerative diseases. The highest association is between anosmia and later development of alpha-synucleinopathy including Parkinson disease, diffuse Lewy body disease, and multisystem atrophy.

Congenital Conditions

Congenital conditions that are associated with anosmia include Kallmann syndrome and Turner syndrome.

Infective Conditions⁴

Anosmia is said to be one of the early symptoms of COVID-19 infection.

Other Traumatic or Obstructive Conditions

Other causes of anosmia include *toxic agents* such as tobacco, drugs, and vapors that can cause olfactory dysfunction, post-viral olfactory dysfunction, facial traumas involving nasal or sinus deformity, *neoplasms* in nasal cavity or brain that prohibits the olfactory signal pathway, and subarachnoid hemorrhages. Olfactory groove meningioma can present with slowly worsening impaired olfaction.

Common conditions that can uncommonly cause a decreased sense of smell or anosmia include *diabetes mellitus* and *hypothyroidism*.

Medications can sometimes lead to olfactory defects as an unwanted side effect. These medications include beta-blockers, anti-thyroid drugs, dihydropyridine, ACE inhibitors, and intranasal zinc.

Epidemiology⁵

Anosmia afflicts 3% of the adult population older than the age of 40. The prevalence of impaired olfaction increases with age. In 2016, the National Health and Nutrition Examination Survey (NHANES) measured olfactory dysfunction which involved 1818 participants. Data showed that olfactory dysfunction

was 4% at age 40 to 49 years of age, 10% at 50 to 59, 13% at 60 to 69, 25% at 70 to 79, and 39% for those over 80 years of age. Anosmia affected 14% to 22% of those over 60 years of age.

History and Physical

When taking a history of the possible causes of anosmia, it is important a clinician keep the possible etiologies (listed above) in mind when asking relevant questions.

Sudden smell loss is often associated with head injuries or viral infections, while a gradual loss is more associated with allergic rhinitis, nasal polyps, and neoplasms. An intermittent loss is often common in allergic rhinitis and with the use of topical drugs.

It is important to ask about preceding events and the patient's medical history, as the most common causes of anosmia are chronic rhinitis and head trauma.

The patient's age can be helpful because if the patient is very young and has other symptoms, the clinician might investigate congenital causes such as Kallmann syndrome. Under such circumstances, careful examination of the gonads and neurological exams are very important. If the patient is elderly, the clinician may investigate whether the sense of smell is due to normal aging or if there are other symptoms to suggest an early stage of a neurodegenerative disorder like Parkinson disease.

Social history is also important in assessing occupation-associated exposures to toxins or allergens that can lead to anosmia. Medication history is always important, and sometimes the causal relationship can only be established by stopping the suspected offending agent.

Clinicians should pay attention to associated symptoms as anosmia is a symptom and not a diagnosis. Headaches and behavior disturbances may indicate problems with the CNS.

During the physical examination, clinicians should closely examine the nasal cavity and paranasal sinuses. Findings may be important depending on information retrieved from the patient's history.

A neurological examination may be useful in

revealing other neurological deficits that can suggest a larger neurological problem causing the loss of smell. Fundoscopy for evidence of raised intracranial pressure will help to pave the way for neuroimaging testing.

Examination and skin testing by an allergist might play an important role to evaluate whether rhinitis (if the cause) is allergic or non-allergic.

Evaluation

Simple office testing of smell with chocolates or coffee is sometimes conducted informally by a primary care provider. This test is subjective. If the clinician is concerned about any findings, detailed smell testing can be conducted at the smell centers. Tests include chemosensory testing, butanol threshold test, among others. These formal tests can give a more accurate level of "loss of smell" in that a minimum concentration of a chemical at which the patient can detect can be given and compared to the average threshold for that patient's age group. UPSIT, the University of Pennsylvania Small Identification Test is the most widely used odor identification test which can be administered in about 10 minutes.⁶

Other evaluations can be performed depending on the clinician's suspicion of the underlying cause of the patient's anosmia. Based on the history and physical examination, if the clinician is suspicious of head trauma, sinus disease, or neoplasm, they may order a magnetic resonance imaging (MRI) or computed tomogram (CT).

If there is concern about allergic rhinitis, a referral to an allergist and subsequent allergen skin testing might be revealing. If the patient has other symptoms that are suggestive of diseases that are inflammatory, a sedimentation rate might be helpful. Other labs that can be considered depending on the suspected etiology include complete blood count (CBC), plasma creatinine, liver function, thyroid profile, ANA, measurements of heavy metal, lead, and other toxins.

It is important to note that imaging (MRI) in those with idiopathic olfactory loss is often unrevealing. In olfactory loss, MRI was used to evaluate idiopathic olfactory loss 55% of the time, but only successfully found an imaging abnormality that would explain the loss in 0.8% of the time.

Treatment / Management⁷

The treatment and management depend on the etiology as anosmia is not a diagnosis but a symptom.

As stated above, inflammatory and obstructive diseases are the most common cause of anosmia (para-nasal and nasal sinus diseases), intranasal glucocorticoids can often manage these causes. Other medications that can be given include antihistamines and systemic glucocorticoids. Antibiotics such as ampicillin can be prescribed for bacterial sinus infections. Surgery can be an option for those with chronic sinus problems and nasal polyps that fail conservative medical management.

For all causes of anosmia, treatment and management depend on the treatment and management of the underlying disease and whether that disease is refractory to medical intervention.

Differential Diagnosis⁸

- Hyposmia - Reduced ability to smell
- Parosmia - An altered perception of an odor after stimulus presentation
- Phantosmia - Perception of odors without a stimulus

Prognosis⁹

For olfactory impairment caused by damage to the olfactory neurons due to trauma, there is no specific treatment. However, olfactory neurons do have the ability to regenerate. But the time and degree of regeneration depend on the extent of damage, and there is a difference in regenerative abilities between individuals. Regeneration can span over the course of days to years, and complete recovery is not a guarantee.

Complications

Anosmia by itself is unlikely to cause any complications. The inability to identify harmful smells can be life-threatening. Also, the ability to enjoy the taste of food properly may also be affected if there is anosmia.

Deterrence and Patient Education

Anosmia amongst patients can have safety

implications as those without the ability to smell might miss important warning odors such as smoke from a fire or natural gas leaks.

Pearls and Other Issues

In the evaluation of anosmia without an initial clear cause (sinus disease, head trauma), it is important to assess for other neurological deficits as to not miss a central nervous system hemorrhage, aneurysm, or neoplasm.

Enhancing Healthcare Team Outcomes

Because of the diverse cause of anosmia, an interprofessional team should be involved that includes an internist, endocrinologist, neurologist, ENT surgeon, a rheumatologist, and an infectious disease specialist. Anosmia is a symptom of a disease process, which needs to be treated. Inflammatory and obstructive diseases are the most common cause of anosmia (para-nasal and nasal sinus diseases). Surgery can be an option for those with chronic sinus problems and nasal polyps that fail conservative medical management. For olfactory impairment caused by damage to the olfactory neurons due to trauma, there is no specific treatment. However, olfactory neurons do have the ability to regenerate. Regeneration can span over the course of days to years, and complete recovery is not a guarantee. The overall prognosis for patients with anosmia is good as long as the primary condition has a cure or can be treated.

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Youth Risk Behaviour among Medical Students in a Medical College in Bengaluru

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Abstract

Risk taking behaviour is common amongst youth, who comprise of individuals between 15-24 years. They are in the formative stage of life and are vulnerable to developing habits that could be precursors to development of communicable and non communicable diseases. This study was undertaken to assess the risk taking behaviour among first year medical students as they will be the role models to the community. A cross-sectional study, using a semi-structured questionnaire, was conducted among first year medical students in RajaRajeswari Medical College over a one month period in 2015. The study revealed that most students had risk taking behaviour, especially with regard to unhealthy diet and lack of physical activity. There was a statistically significant association between consumption of junk food and obesity and between BMI and action taken to alter weight. A small percentage of students displayed risk taking behaviour contributing to unintentional injuries, substance abuse and physical inactivity. Behaviour change communication on health risk behaviours and life skills training among the future doctors will go a long way in bringing a change in the community as they will be the role models.

Key Words: Youth, Risk Behaviour, Medical Students

Introduction

With the emergence of rapid urbanization and modernization, our youth have been exposed to choices that are potentially harmful.¹ Priority health-risk behaviours, which are behaviours that contribute to the leading causes of morbidity and mortality among youth and adults, often, are established during childhood and adolescence, extend into adulthood and are interrelated and preventable.²

The Youth Risk Behavior Surveillance System (YRBSS) monitors six categories of priority health-risk behaviors among youth and young adults:

- 1) behaviors that contribute to unintentional injuries and violence;
- 2) tobacco use;
- 3) alcohol and other drug use;
- 4) sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases (STDs);
- 5) unhealthy dietary behaviors and
- 6) physical inactivity.

The 2011 national YRBS indicated that many high school students were engaged in priority health-risk behaviors associated with the leading causes of death among persons aged 10-24 years in the United States. ²World Health Survey - India reported that among individuals aged 18 to 24 yr, 3.9 per cent were infrequent heavy drinkers and 0.6 per cent were

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frequent heavy drinkers. The NFHS-3 survey revealed that 1% women and 11 % men aged 15-19 yr and 1.4% women and 28.8% aged 20-24 yr consumed alcohol.³ The Health Behavior Study in Bangalore covering nearly 10,000 individuals aged 18 to 45 years from urban, rural, slum and transitional areas reported that 30 per cent had more than five behaviors/conditions existing in the same individual.⁴

Most of the research into epidemiological profile of risk taking behavior among youth has been conducted in developed countries. This indicates the need for more Indian studies to aid in comparison and help in building larger picture on the epidemiology and prevention of morbidity and mortality related to risk taking behavior among youth. Hence this study was taken up to assess the risk taking behavior among medical students.

Objective

To assess the risk taking behavior among first year medical students of RajaRajeswari Medical College and Hospital (RRMCH), Bengaluru

Materials and Methods

A cross-sectional study was conducted among first year medical students in RajaRajeswari Medical College and Hospital, Bengaluru after obtaining institutional ethical clearance. This was over a one month period from 15th November to 15th December 2015. A Semi-structured Questionnaire was used which incorporated the health risk behaviours as per the Youth Risk Behavior Surveillance System (YRBSS) which monitored six categories of priority health-risk behaviors among youth namely 1) Behaviors that contribute to unintentional injuries and violence; 2) tobacco use; 3) Alcohol and other drug use; 4) Sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases (STDs); 5) Unhealthy dietary behaviors and 6) Physical inactivity.⁵ The questionnaire was administered to the 100 First year MBBS students, all of whom gave a written informed consent to take part in the study. The questionnaire consisted of a total of 45 questions under the six categories of priority health-risk behaviours.

The data was collected and compiled in MS Excel sheet and analyzed by using SPSS version 21.0. All qualitative variables were presented as frequency and percentages. Chi square test was applied to know the association between the variables.

Results

In this study, out of 100 participants, majority were females (63%) as compared to males (37%) as depicted in Fig. 1.

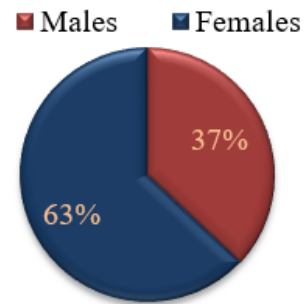


Figure 1: Gender wise distribution of participants

Fig. 2 shows that most of the study participants were above 18 years (94%)

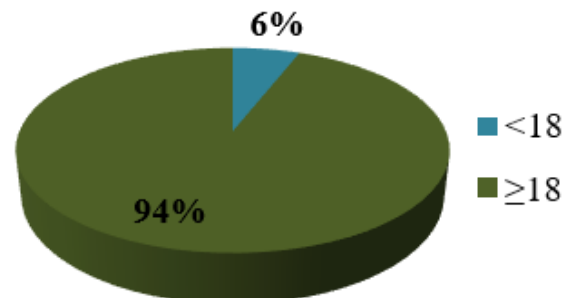


Figure 2: Age wise distribution of participants

Table 1 reveals that in this study, most of the students had some risk taking behavior.

Of the 100 participants, not all travelled by 2 wheelers or drove cars. 67 participants had used 2 wheelers to travel, of whom only 11(16.4%) participants wore helmets always. The use of helmet was almost same among males 6(54.5%) as compared to female participants 5(45.4%).

72 students used a car to commute to college of whom 18(25%) always wore seat belt. Females using seatbelts 11(15.3%) were more as compared to their male 7(9.7%) colleagues.

11% of participants had indulged in drinking and driving, 6(54.5%) of them were males and 5(45.5%) females.

Of the 11 students who were involved in physical fights, 6(54.5%) sustained injuries. Majority of students involved in physical fight were males (83.3%).

Occasional tobacco use was found amongst 5% of the students of whom 4(80%) were males.

Three male students (3%) reported experimenting with recreational drugs 1-2 times.

Of the 100 participants, 4% reported having sexual intercourse with multiple partners. All of them reported utilizing protection. Majority were males (75%).

Table 1: Distribution of medical students according to Risk Behaviour

Risk behaviour	Percentage	Total Number of participants
Not wearing helmet	27	67*
Not wearing seat belt	53	72**
Drinking and driving	11	100

Table 2: Association of BMI with Junk Food

Junk food	BMI			
	Normal	Overweight	Obese	Total
Not consumed	35 (72.9%)	6 (12.5%)	7 (14.5%)	48
Consumed	23 (44.2%)	12 (23.1%)	17 (32.7%)	52
Total	58	18	24	100

$\chi^2 = 8.503$, $DF = 2$, $P < 0.01$

7% of students, 4 males and 3 females consumed aerated drinks multiple times a day.

When it came to consumption of high sugar drinks, more number of females 34% consumed it as compared to males 19%. Of them 38.2% females and 21% males consumed high sugar drinks multiple times a day.

Regular exercise was done by 21% of students whereas 22% never exercised. More number of females 14 out of 21 did regular exercise as compared to 7 males.

Continue.....

Physical fight	11	100
Tobacco use	5	100
Alcohol consumption	10	100
Drug use	3	100
Junk food	52	100
Aerated drinks	39	100
Lack of exercise	61	100

*only 67 participants travelled by 2 wheelers

**only 72 participants had utilized 4 wheelers for transportation.

Of the 100 students, 24% had a BMI of 25 and above thus falling into the obese category according to Asia Pacific Classification. Of them 14 were females and 10 were males.

Most of the students (94%) consumed junk food, of whom 58 consumed occasionally and 36 consumed multiple times a day. More number of girls 66.7% (24) consumed junk food than boys 33.3% (12) on a daily basis.

Out of those who were overweight, 23.1% consumed junk food and 32.7% of those who were obese consumed junk food. This was found to be statistically significant as shown in table 2.

Long hours of sitting in front of television or computer was also assessed as risk factor for obesity. It was found that 38% of students never watched television, whereas 16% of the students sat in front of television for more than two hours everyday. More number of females 13 out of 16 spent long hours in front of the television compared to 3 out of 16 males.

15% of students spent more than 2 hours everyday in front of the computer out of whom eight were males and seven were females.

The perception of the students regarding their weight mainly revealed that 50% of the students wanted to lose weight. Of them there were more

females 64% wanting to lose weight as compared to males 36%. 11% of students wanted to gain weight, among whom 3 were females and 8 were males. But amongst them only 2 (one female and one male) were underweight as per their BMI.

Of those who were overweight or obese, 56.8% had taken action to lose weight. However, 28.6% of the overweight or obese medical students were not inclined to take any action. This was statistically significant as depicted in table 3.

Table 3: BMI and its association with action taken to alter weight

Action On weight	BMI		
	Normal	Overweight or obese	Total
Lose weight	22 (43.1%)	29 (56.8%)	51
No action	35 (71.4%)	14 (28.6%)	49
Total	57	43	100

$\chi^2 = 8.503$, $DF = 1$, $P < 0.01$

Discussion

This study on youth risk behavior among medical students covered six priority risk behaviour areas namely behaviors contributing to unintentional injuries and violence, tobacco use, alcohol and drug consumption, sexual behaviors leading to STDs and unhealthy dietary behaviours.

Behaviours that contribute to unintentional injury and violence include road safety measures like wearing a seatbelt and helmet while travelling. The current study revealed that 16.4% (11) participants wore helmets always. The use of helmet was almost same among males 6(54.5%) as compared to female participants 5(45.4%). This differed from the YRBS 2013 Vermont state study in which 27% of students always wore helmet while riding a bike.⁶

The use of seatbelts while driving a 4 wheeler was 25 % among the students in the current study whereas 53% never wore seatbelts. This trend was opposite to that seen in the 2013 Vermont study where 75% students always wore seat belt and only 3% never or rarely used seatbelts.⁶

The current study revealed 11% of students had travelled in or driven a vehicle under the influence of alcohol. Youth Risk behavior studies conducted in Vermont 2013 and in South Africa 2002 revealed a higher percentage 21% and 34.5% of youth driving under the influence of alcohol.^{6,7}

In this study 11% students had been in a physical fight in the last month and 6% had sustained injuries. There were more males (83% of those with injuries) as compared to females involved in physical fights. This was much less compared to other studies conducted in South Africa national YRBS 2002, YRBS 2011 in USA and YRBS Vermont 2013 surveys where 30.2%, 32.8% and 43% participants were involved in physical fights respectively. In the South African national YRBS 2002 study 29.3% of those involved in physical fights sustained injuries requiring treatment, which is much more than in the current study.^{2, 6, 7}

Tobacco use amongst youth even occasionally can lead to lifelong habituation and is a risk for cancers and cardiovascular diseases. The present study revealed that 5% of students, all males had used tobacco occasionally and 1% had used tobacco on a daily basis. This was similar to the results of studies conducted by, Sutapa et al, YRBS Vermont 2013 and Singh Sunita et al where 3.3%, 9% and 11.2% of students respectively, had tried tobacco in some form.^{3,6,8} Sutapa et al's study further showed that 1.2% of the students smoked tobacco on a daily basis.⁸ The South African YRBS study differed from the current study as there was a higher percentage, 30.5% of students, who had tried tobacco and 21.1% used tobacco daily.⁷

The current study revealed that 10% of students had consumed alcohol in the month preceding the study. Of them 60% were males and 40% were females. 1% of students had consumed alcohol on all days. This was in accordance with World health survey India where 3.9% of youth were found to be infrequent drinkers and 0.6% heavy drinkers.⁹ Our study differed from the results of NFHS 3 where only 1% of females and 11% males consumed alcohol.¹⁰ YRBS 2011 study conducted in USA revealed 38.7% youth consumed alcohol.² YRBS 2015 revealed 33% youth to have consumed alcohol, 18% youth had had more than 5 drinks in a single session.¹¹ 49.1% of

youth in South Africa YRBS study were found to be occasional drinkers, 23% had consumed more than 5 drinks on a single day.⁷ These were much higher than the results found in our study.

Marijuana and opium have been found to be the commonly used recreational drugs. The current study revealed 3% of the students, all males, had smoked marijuana one or two times. This was similar to the findings of YRBS 2013 where 3% students smoked marijuana and Chaturvedi et al's study where 2.3% males and 0.3% females had consumed opium occasionally.^{6,12} YRBS 2011 and 2015 studies in US revealed a much higher percentage of use of marijuana 23.1% and 22% respectively, in the month prior to the study, among youth.^{2,11}

In the present study 4% of the students were currently sexually active and all of them had more than 4 sexual partners. There were more males 75% as compared to females 25% among the students who were sexually active. All the students reported having used condoms during sexual intercourse. Our findings varied from the YRBS 2011, Vermont YRBS study 2013 and the South African YRBS 2002 where 33.7%, 33% and 70.2% were currently sexually active respectively.^{2, 6, 7} Vermont study and the US YRBS 2011 revealed 12% and 15.3% of students had more than 4 partners, which was different from our study where all the students had more than 4 partners.^{2, 6} Use of condoms was similar to Vermont 2013 study where 85 % students had used condoms or birth control pills.⁶ In the US YRBS 2011 study and South African YRBS study only 60.2% and 44.8% sexually active students used a condom which was lesser than in our study.^{2, 7}

Consumption of junk food by youth in the current study revealed that 52% of the students consumed junk food and 36% consumed it multiple times a day. Junk food eating was more among females 66.6% as compared to males 33.4%. This was much more than in the studies conducted by Nayak RK et al, Nitin Joseph et al where the daily consumption of junk food or fast foods were 16% and 3.6% respectively.^{13,14} The present study showed a strong association between consumption of junk food and obesity among the study participants which was similar to the results of Nithin et al where students who consumed fast foods

more than once a day had greater proportion of being overweight or obese.¹⁴

YRBS Vermont study 2013 showed that 17% youth consumed high sugar drinks daily which was the same as in this study where it was 17%.⁶

Physical inactivity is determined by factors like exercise and sitting for long periods in front of television or computer. In our study, prevalence of obesity was 24%, slightly more than the YRBS 2013 study where 13% students were obese.⁶

In the current study, 21% students exercised regularly whereas 22% students never exercised. More number of female students 59% did not exercise compared to 41% males. The results were similar to YRBS 2013 study where 25% students did some physical activity for an hour regularly.⁶ The South African YRBS data showed 44% of youth had participated in vigorous physical activity regularly, which is much more than in our study.⁷

When sitting for long hours was assessed, 16% students were in front of the television for more than two hours in a day (81.2% females and 18.8% males) and 15% students (almost equal number of males and females) used the computer for recreational purpose for more than two hours in a day. Physical activity of youth in the 2015 YRBS report differed from our study as more students (35%) watched television for three or more hours per day.^{11, 15}

42% used a computer for things other than academic work in 2015 YRBS study and 31.1% had played video or computer games for three or more hours on an average working day in YRBS 2011 study. These findings were much more than in our study.^{2, 11, 15}

Conclusion

Risk taking behaviour was predominant with regard to unhealthy diet and lack of physical activity.

In spite of legislations, 26-28% students did not adhere to safety measures while driving a two wheeler or four wheeler.

Substance use was found to be 3% (narcotic drugs), 5% (tobacco) 10% (alcohol).

Early detection and behaviour change communication of health risk behaviours among the future doctors will go a long way in bringing a change in the community as they will be the role models.

Ethical Clearance- taken from Institutional Ethical Committee, Rajarajeswari Medical College and Hospital, 2016.

Source Of Funding- Self

Conflict Of Interest- None

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Study of Pre-loading and Vasoconstrictors as Combined Prophylaxis for Hypotension During Sub-Arachnoid Anaesthesia

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Abstract

Background: Hypotension following spinal anaesthesia is common physiological complications associated with nausea, vomiting, dizziness aspiration, syncope and cardiac arrhythmias. Hence proper prophylaxis for hypotension is essential in lower abdominal and lower limb surgeries.

Method: Total sixty patients aged between 35 to 65 years undergoing lower abdominal and inferior extremities were studied. Patients were randomly classified into three groups 20 patients in each group. Group-I patients crystalloid group received RL and placebo. Group-II (Vasoconstrictor) group received Ephedrine and Group-III (combination group) received RL (ringer lactate) and Ephedrine. Hemodynamic parameters and side effects of each group was noted and compared.

Results: There was significant prophylaxis in all three groups at different intervals of 5, 10, 15, 20, 25 and 30 minutes ($p < 0.001$) highly significant P and F values and 1 (5%) hypotension was observed in group-III, followed by 4 (20%) in group-II and 9 (45%) highest hypotension in group-I and least side effects were also observed in group-III patients.

Conclusion: It is concluded that group-III (combination groups) preloaded with RL solution and Ephedrine after the injection of spinal anaesthetic drug proved ideal prophylaxis for hypotension during subarachnoid anaesthesia.

Keywords: Ringer lactate, Ephedrine, Hypotension, Vasoconstrictor

Introduction

Hypotension following spinal anaesthesia is a common physiological complication with an incident of ranging from 25-75% among general population and a little higher in patients undergoing caesarean section occasionally spinal anaesthesia induced

hypotension can be significantly severe, more so in pregnant females which can increase intra-operative or post-operative morbidity⁽¹⁾⁽²⁾. The spectrum of morbidity associated with hypotension may include vomiting, nausea, dizziness, aspiration, syncope and cardiac arrhythmias⁽³⁾. Hypotension following spinal

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anaesthesia is mainly due to sympathetic blockade leading to peripheral vasodilatation and venous pooling of blood. As a result there is decreased venous return and cardiac output leading to hypotension⁽⁴⁾. There are various methods to prevent this hypotension following spinal anaesthesia in both pregnant and non-pregnant females and males undergoing lower abdominal and lower extremity patients. Hence attempt was made to evaluate pre-loading and vasoconstrictors as combined prophylaxis for hypotension during subarachnoid anaesthesia.

Material and Method

Sixty patients aged between 35 to 60 years admitted at GSL Medical College hospital Rajamundry Andhra Pradesh were studied.

Inclusive Criteria: ASA grade-I and II scheduled to undergo elective and surgical procedures on the lower extremity or lower abdomen under spinal anaesthesia were selected for study.

Exclusion Criteria: Patients with cardiovascular, respiratory disorders, congenital heart anomalies, Hypertension, preeclampsia, diabetes mellitus, electrolyte imbalance, Hb% less than 10 gm% weight more than 80 Kg fasting less than six hours. Patients already on antihypertensive treatment were excluded from the study.

Method

Patients were randomly classified into 3 groups (20 patients in each group). Group-I patients (crystalloid) group received 15 ml/kg Ringer lactate over 20 minutes preceding the subarachnoid block, followed by intravenous injection of placebo for next 20 minutes after the delivery of spinal anaesthetic drug. Group-II patient (vasoconstrictor group) received intravenous bolus of 5 mg ephedrine in the first and second minute, followed by 1 mg ephedrine at the end of each minute for next 18 minutes following anaesthesia. Group-III patients (combination group) received pre-loading 7.5 ml/kg of ringer lactate over 10 minutes period preceding the spinal block followed by intravenous bolus of 2.5 mg Ephedrine in the first and second minutes and

0.5 mg Ephedrine at the end of each minute for next 18 minutes after the injection of spinal anaesthesia on arrival at operation theatre two IV lines were secured An 18 gauze canula with triway kept open with ringer lactate solution was used to preloading and giving additional boluses of IV fluid during an event of hypotension. Another 20 gauge canula with tri-way was used for injecting ephedrine and for infusion of fluids during anaesthesia.

No pre-medication was given and subarachnoid puncture was performed using 23 gauge spinal needles at L_{3/4} inter-space with patients in sitting position. 2.5 ml of hyperbaric bupivacaine 0.5% was injected intrathecally and patient returned to supine position. A wedge was placed under the right hip for left uterine displacement in the patients undergoing caesarean section supplemental oxygen / 5L / minute was given through face mask. The level of loss to pin prick sensation was assessed and surgery was started when sensory loss of T6 was achieved. An infusion of lacteal ringer solution at the rate of 2m / Kg per hour was administrated during anaesthesia and the rate was not altered during the study period.

In each patient a baseline recoding of arterial pressure and pulse rate was made before pre-loading the patients I group-I and III and before positioning the patients for subarachnoid block in group-II. Subsequently the recordings were done at 5, 10, 15, 20, 25 and 30 minutes after the subarachnoid injection of the anaesthetic drug. However every minute monitoring was done to assess any haemodynamic changes and institution corrective therapy. A sphygmomanometer was cultured around the arm and brachial artery pressure was recorded in the form of systolic Arterial pressure (SAP) Hypotension was defined as decreased in SAP more than 30% of the baseline or less than 90 mm / Hg. During the episodes of Hypotension addition bolus of 2m/kg of lactated Ringer solution was given. A maximum three boluses were given. However supplementation of IV fluids failed to reverse hypotension, bolus dose of ephedrine 6mg was given intravenously and solution repeated if necessary. Pulse oximetre was used to record the pulse rate. The patents were monitored for any reactive hypertension (SAP more than 30% of the base line values), Nausea and vomiting.

Duration of study was June-2021 to July-2022

Statistical analysis: Comparison pre-loading and vasoconstrictors for Hypotension, comparative study in management of Hypotension in all three groups and incidence of Hypotension, Nausea and vomiting in all three groups were compared with ANOVA test, chi-square test p value. The statistical analysis was carried out in SPSS software. The ratio of male and female was 1:2.

Observation and Results

Table 1: Comparative study of preloading and vasoconstrictors as combined prophylaxis for Hypotension during subarachnoid Anaesthesia.

- In Baseline - 125.3 (± 32) in group-I, 127.2 (± 10.07) in group-II, 125.65 (± 12.02) in group-III F=0.147 and P=0.863, p value is insignificant
- At 5 minutes 108.9 (± 15.94) in group-I, 127.9 (± 14.7) in group-II, 122.70 (± 12.7) in group-III F=9.31 p<0.003, p value is highly significant
- At the interval of 10 minutes 104.6 (± 17.8) in group-I, 118.2 (± 15.7) in group-II, 120.65 (± 15.3) in group-III, F=5.54, p<0.006 (p value is highly significant)
- At the interval of 15 minutes 108.8 (± 15.5) in group-I, 120.4 (± 15.86) in group-II, 118.8 (± 13.4) in group-III, F=3.503 and p<0.03 (p value is highly significant)
- At the interval of 20 minutes 109.6 (± 15.34) in group-I, 123.8 (± 15.86) in group-II, 121.4 (± 11.8) in group-III, F=5.70 and p<0.005 (p value is highly significant)
- At the interval of 25 minutes 111.6 (± 14.1) in group-I, 124.3 (± 13.3) in group-II, 121.32 (± 12.30) in group-III, F=4.97 and p<0.02 (p value is highly significant)

- At the interval of 30 minutes 114.4 (± 13.02) in group-I, 125.2 (± 11.90) in group-II, 121.10 (± 12.3) in group-III, F=3.81 and p<0.02 (p value is highly significant)

Table 2: Comparative study of Hypotension and its management

- No. of Hypotension patient 9 in group-I, 4 in group-II, 1 in group-III, chi-square 9.13 and p<0.001 (p value is highly significant).
- Number of Episodes Hypotension - 11 in group-I, 4 in group-II, 1 in group-III, chi-sq 13.46 and p<0.001 (p value is highly significant).
- Number of boluses of IV fluid (%) - 4 in group-I, 2 in group-II, 1 in group-III, chi-sq 2.26 and p>0.005 (p value is insignificant).
- Number of boluses of IV fluid - 9 in group-I, 5 in group-II, 2 in group-III
- Percentage of patients required 6 mg Ephedrine 6 in group-I, 2 in group-II, 0 (zero) in group-III
- Number of boluses of 6 mg Ephedrine - 7 in group-I, 2 in group-II, 0 in group-III, chi-sq 10.19 and p<0.006 (p value is highly significant).

Table 3: Comparative incidences of Hypotension Nausea and Vomiting

- Hypotension 0 (zero) in group-I, 1 (5%) in group-II, 0 (zero) in group-III chi-sq 2.033, p<0.36 (p value is Insignificant)
- Nausea 3 (10%) in group-I, 1 (5%) in group-II, 0 (zero) in group-III chi-sq 2.10, p<0.34 (p value is Insignificant)

Table-1 (ANOVA TEST) Mean Systolic Blood Pressure

Mean systolic BP	Group-I (20)	Group-II (20)	Group-III (20)	Test statistic P value
Baseline	125.32 (±12.85)	127.2 (±10.07)	125.65 (±12.02)	F=0.1471 P=0.8635
5 Minutes	108.91 (±15.94)	127.9 (±14.78)	122.70 (±12.17)	F=9.3101 P=0.0003**

Continue.....

Mean systolic BP	Group-I (20)	Group-II (20)	Group-III (20)	Test statistic P value
10 Minutes	104.65 (±17.88)	118.2 (±15.77)	120.65 (±15.32)	F=5.5486 P=0.0063**
15 Minutes	108.85 (±15.54)	120.4 (±15.86)	118.85 (±13.42)	F=3.5031 P=0.0367*
20 Minutes	109.65 (±15.34)	123.82 (±15.11)	121.4 (±11.86)	F=5.7044 P=0.0055**
25 Minutes	111.64 (±14.16)	124.30 (±13.30)	121.32 (±12.30)	F=4.9719 P=0.0102**
30 Minutes	114.44 (±13.02)	125.25 (±11.90)	121.10 (±12.5)	F=3.8178 P=0.0278*

* indicates significant and

**indicates highly significant

On comparison of systolic blood pressure values among Group I, Group II and Group III initially at baseline no significant difference observed i.e they are comparable with each other.

After every 5 minutes follow up systolic blood pressure values are increasing in all three groups and on comparison of average values statistically significant difference observed (P<0.01).

Comparative study of Hypotension during and its management

Table-2 (ANOVA TEST)

Details	Group-I (20)	Group-II (20)	Group-III (20)	P value
No. of Hypotension patients	9	4	1	Chi-square=9.13 P=0.010**
No. of Episodes of Hypotension	11	4	1	Chi-square=13.4659 P=0.0011**
No. of patents Managed by IV fluids (%)	4	2	1	Chi-square=2.2641 P>0.05
No. of boluses of IV fluid	9	5	2	Chi-square=6.3068 P=0.0427*
Patients required 6mgEphedrine	6	2	0	Chi-square=8.076 P=0.0176*
No. of Boluses of 6mg Ephedrine	7	2	0	Chi-square=10.1960 P=0.0061**

*indicates significant and

**indicates highly significant

On comparison of proportions of Hypotension, Episodes of Hypotension, boluses of IV fluid of IV, patients required 1mg Ephedrine and patients required 6mg Ephedrine significant difference

observed among there groups ($p < 0.05$) while no significant difference observed in proportions of patients Managed by IV fluids ($P > 0.05$) among three groups.

Table-3 (ANOVA TEST)

Comparative Incidence of Hypotension, Nausea and Vomiting

Incidences	Group-I (20)	Group-II (20)	Group-III (20)	Test statistic P value
Hypotension	0	1 (5%)	0	Chi-square=2.033 P=0.3616
Nausea	3 (15%)	1 (5%)	1 (5%)	Chi-square=1.7454 P=0.4178
Vomiting	2 (10%)	1 (5%)	0	Chi-square=2.1052 P=0.3490

Comparison of incidences of Hypotension, Nausea and Vomiting statistically no significant difference observed among three groups ($P > 0.05$).

Discussion

Present comparative study of pre-loading and vasoconstrictors as combined prophylaxis for hypotension during subarachnoid anaesthesia. Three groups were evaluated at different intervals of 5, 10, 15, 20, 25 and 30 minutes and ANOVA test and p value were highly significant (Table-1). Number of patients of hypotension were compared in all three groups least number of hypotension was observed in group-III 1 (5%), followed by 4 (20%) in group-II and maximum number of hypotension were observed in group-I was 9 (45%) and highest episodes of hypotension was also observed in group-I-II and least in group-III and maximum number of boluses of I. V. 9 (45%) and boluses of Ephedrine 7 (35%) was also given to group-I (Table-2). Incidence of Nausea 3 (15%) patients and vomiting 2 (10%) was observed in group-I, 1 (5%) Nausea in group-II and III and 0 (zero) vomiting was observed in Group-I patients (Table-3). These finding are more or less in agreement with previous studies ⁽⁶⁾⁽⁷⁾⁽⁸⁾.

preferred over colloids for preloading as latter was more expensive and some solutions had a significant risk of anaphylaxis⁽⁹⁾. However large quantity of I.V. fluids may be dangerous in elderly patients and parturient ⁽¹⁰⁾. Ephedrine has both alpha and beta actions hence it is ideal vasoconstrictor. Ephedrine may cause tachycardia and hypertension hence it must be used cautiously in IHD and hypertensive patients.

Combination of preloading and vasoconstrictor had maximum effect in preventing spinal hypotension, followed by sole use of vasoconstrictor Hypotension was defined as decreased I systolic arterial pressure (SAP) present study SAP was 30% of base line or less than 90 mm/Hg. The change in SAP is related to the level of block and risk of hypotension increases the height of block. Hypotension following spinal or combined spinal epidural anaesthesia at caesarean section causes both maternal and fetal or neonatal adverse effects.

The most common definitions of hypotension is $< 80\%$ base line or < 100 mm Hg or $< 80\%$ base line. It was also observed by most obstetric anaesthetist use a threshold of either 100 or 90 mm Hg SAP is a less important than mean arterial pressure (MAP) as a determinant of organ perfusion however, because methods used to measure blood pressure in routine clinical practice did not include the mean arterial pressure.

Group-I was crystalloid, Group-II was (vasoconstrictor) and Group-III was (combination) group when efficacy three regimens were evaluate din prevention of spinal hypotension. Crystalloids were

Acute hypotension reduces cerebral perfusion induces transient brainstem ischemia and activates vomiting centre transient cerebral hypoxia may occur. Spinal anaesthesia decreases splanchnic blood flow by approximately 20% which leads to systemic hypotension.

Summary and Conclusion

Present comparative study of three groups concludes that, combined use of volume preloading and vasoconstrictors is very effective method to manage the hypo-tensive during spinal anaesthesia because this combined use of both preloading and vasoconstrictors maintained the haemodynamic stability as compared to crystalloid and vasoconstrictors individual groups. The present study demands ideal pharmacological profile for α - agonist or alternately role of combined agent so that there will not be any risk factors to mother and neonates during caesarean section moreover on IHD or hypertensive patients.

Limitation of study - Owing to the tertiary location of research centre small number of patients and lack of latest, technologies we have limited findings and results.

This research paper was approved by Ethical committeeGSL Government Medical College and hospital Rajanagaram, Rajahmundry, Andhra Pradesh.

Conflict of interest: No

Source of funding: No

Comparativestudyofpreloadingandvasoconstrictors as combined prophylaxis for Hypotension during Subarachnoid Anaesthesia

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Body Mass Index as a Predictor of Quality of life of Patients with Chronic Obstructive Pulmonary Disease

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Abstract

Background and Aim: Studies have reported that excessive weight and obesity are common in the early stages of COPD, and malnutrition is common in moderate and severe COPD. COPD is known to show “obesity paradox” i.e., obese and overweight COPD patients have better outcome of disease as compared to underweights. The aim of the study was to assess the BMI of COPD patients, its distribution and relationship with various factors.

Material and Methods: Present study was conducted at tertiary care institute of India for the duration of one year. Total 400 COPD patients were selected to assess their body mass index (BMI) using Quetelet’s formula. Study subjects were selected using a systematic random sampling method. Study subjects were categorized as per WHO’s classification of BMI for Asian populations.

Results: Out of a total of 400 subjects enrolled in the study, majority (49%) were obese followed by 35% overweights and 7% underweights. Health-related quality of life of undernourished patients was most affected. A statistically significant relation was seen across all the components of SGRQ.

Conclusion: Present research established that, the disease related malnutrition is common in COPD patients, therefore, BMI might be a useful indicator to predict the prognosis of disease. This calls for an urgent need by our primary care physicians to provide simultaneous weight management interventions in COPD patients so as to improve their nutritional status, enhance the strength of respiratory muscles and reduce the inflammation which will be effective in long-term management of the disease.

Key Words: BMI, COPD, Malnutrition, Obesity

Introduction

Chronic obstructive pulmonary disease (COPD) is a multifactorial disease of lungs with systemic manifestations that alter the course and outcome of the disease. It is an under-diagnosed, life-threatening condition, accounting more than 3 million deaths

globally, which is 6% of all deaths worldwide.¹ More than 90% of deaths are observed to occur in low- and middle-income countries (LMIC).² Current evidence showed some drugs and interventions could partially delay COPD progression. So it is essential to find indicators to predict the prognosis and outcome

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of COPD. Depending on the stage of the disease, dyspnea and fatigue are the leading symptoms restricting the daily life activities of individuals and seriously affecting their social life.³⁻⁵ It is reported in the literature that dyspnea has a prevalence between 69%-98% and fatigue between 43%-97% in individuals with COPD.⁶⁻⁸

Studies have reported that excessive weight and obesity are common in the early stages of COPD, and malnutrition is common in moderate and severe COPD.^{8,9} In COPD, as a result of malnutrition, muscle atrophy, and respiratory weakness are observed, and low Body Mass Index (BMI) values negatively affect the prognosis of the disease.^{8,10} In addition, although the cause of obesity in the early stages of COPD is not known exactly, it is thought that the reason for the increase in obesity is the decrease in daily living activities due to fatigue.⁸ Since obesity or malnutrition leads to fatigue in patients with COPD, it is predicted that the addition of dyspnea may aggravate the situation. Body mass index is one of the factors which determines the prognosis of the disease. COPD is known to show "obesity paradox" i.e., obese and overweight COPD patients have better outcome of disease as compared to underweights.² Severity of disease increases with decreasing body mass index. The most common symptoms of COPD are breathlessness or air hunger, excessive sputum production and chronic cough that persists for prolonged duration causing respiratory muscle weakness and impaired immune system.

Considering the impact of nutritional status on prognosis of COPD this study holds much importance in public health domains to provide data on BMI and quality of life of patients with COPD. The aim of the study was to assess the BMI of COPD patients, its distribution and relationship with various factors.

Material and Methods

Present study was conducted at tertiary care institute of India for the duration of one year.

Inclusion criteria

Subjects above 18 years, diagnosed with COPD for ≥ 3 months and residents of Lucknow for ≥ 6 months were included in the study.

Exclusion criteria

Those with severe mental illness and/or vocal disability or mental retardation, acute exacerbation, organ failure, and those currently on treatment for pulmonary tuberculosis were excluded from the study.

A systematic random sampling method was used to select the patients for the study and a target to enroll five patients per day was set. Every fourth COPD diagnosed patient attending respiratory medicine OPD for follow up was included in the study and, if the selected subject didn't fulfil the inclusion criteria, then the next COPD diagnosed patient was considered. Study subjects were approached considering the inclusion criteria. Purpose and objective of the study were clearly explained before starting the interview. BMI was calculated by using Quetelet's index $\{BMI = \text{weight (kg)} / \text{height (m}^2)\}$. Study subjects were categorized as per WHO's classification of BMI for Asian populations. Written informed consent was taken from the patients as well as their queries were addressed at the end of the interview.

The designed interview schedule was pretested on 10% of the total sample. Relevant modifications were made in the schedule to overcome the shortcomings and difficulties faced during pre-testing.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Out of a total of 400 subjects enrolled in the study, majority (49%) were obese followed by 35% overweights and 7% underweights. The mean BMI among study subjects was 24.80 ± 4.10 kg/m² (Table 1).

Descriptive statistics of HRQL shows the mean SGRQ scores across all components were higher in undernourished subjects, indicating comparatively

poor health-related quality of life. A statistically significant relation was seen between BMI and all the components of HRQOL ($p < 0.001$) (Table 2). In the association between BMI and other variables of study subjects (Table 2), BMI was found to have a statistically significant association with airflow limitation severity of the study subjects. Multiple linear regression model showed that FEV1, BMI, non-working status, history of hospitalization due to exacerbation of COPD, female gender, age, exposure to biomass smoke, rural area of residence, Hindu religion and smoking can predict 55.6% of variability

in the prediction of total score of health-related quality of life. BMI was the strongest factor to predict the total score of SGRQ.

Table 1: Distribution of BMI among the study subjects, (n=400)

BMI (kg/m ²)	Number	Percentage
Underweight (<18.5)	28	7
Normal (≥18.5-22.9)	36	9
Overweight (≥23.0- 24.9)	140	35
Obese (≥ 25)	196	49
Mean ± SD	24.80±4.10	

Table 2: Relation of BMI of study subjects with airflow limitation severity, (n=400)

Airflow limitation severity	BMI				P value
	Underweight N=28	Normal N=36	Overweight N=140	Obese N=196	
Mild	0	2	6	20	0.001*
Moderate	9	16	80	95	
Severe	5	15	54	75	
Very severe	14	3	0	6	

Discussion

The effect of BMI in the progression of COPD drew lots of attention.¹¹ It is generally accepted that improving nutrition status, enhancing respiratory muscles strength and reducing inflammation level are effective on long-term management of COPD.¹² BMI was considered as an accurate indicator of nutrition in some degree.

It is generally accepted that improving nutrition status, enhancing respiratory muscles strength and reducing inflammation level are effective on long-term management of COPD.¹² BMI was considered as an accurate indicator of nutrition in some degree. The prevalence of sarcopenia was common in COPD patients, especially in severe, elder or underweight patients.¹³

The present study showed the mean BMI of study subjects as 24.80±4.10 kg/m² that ranged from a minimum of 12.08 to a maximum of 37.40 which was consistent with the results of the study conducted by various authors.¹⁴⁻¹⁶ Negi et al in their study showed that lower BMI was associated with higher SGRQ total score (or worse HRQOL) which is consistent

with the results of the present study.¹⁷ Varied results have been shown by different researchers in this regard.¹⁸ Majority of underweight participants had very severe airflow obstruction which is also demonstrated by studies done in the past. BMI was the significant predictor of HRQOL. Overall results indicated a better prognosis of disease in patients with a higher BMI.^{16,17}

It is acknowledged that low BMI is largely associated with an increased risk of mortality among COPD cases.¹⁹ A significant relationship was found between individuals' BMI and fatigue and dyspnea scores. Low BMI is interpreted as a risk factor for being diagnosed with COPD. A study revealed that underweight and obese patients experience more severe fatigue compared to normal weight or overweight patients.²⁰ When there is insufficient energy, muscle proteins are destroyed, and weight loss and cachexia are experienced.²¹ On the other hand, excessive energy and increased BMI causes excessive CO₂ production and thus dyspnea.²² The decrease in body weight occurs due to eating disorders, which causes an increase in muscle loss in later times. The development of malnutrition due to

loss of body muscle and respiratory muscles leads to progressive respiratory disorders.

Based on our research findings and literature review, it can be stated that some prospective studies with a sampling procedure including a wider age range are needed to examine the relationship between individuals' body mass index, fatigue, and dyspnea.

Conclusion

Present research established that, the disease related malnutrition is common in COPD patients, therefore, BMI might be a useful indicator to predict the prognosis of disease. This calls for an urgent need by our primary care physicians to provide simultaneous weight management interventions in COPD patients so as to improve their nutritional status, enhance the strength of respiratory muscles and reduce the inflammation which will be effective in long-term management of the disease.

Ethical approval was taken from the institutional ethical committee and written Informed

Consent was taken from all the participants.

Source of funding: Nil

Conflict of Interest: None declared

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Assessment of Knowledge Regarding Menstruation and Sanitary Absorbents among Young Women

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Abstract

Background and Aim: Menstrual problems are common during adolescence which may cause significant anxiety for adolescent and their families. Even individuals with knowledge tend to use inappropriate menstrual hygiene management due to difficulties such as insufficient menstruation sanitary products and a lack of mental or physical support. Hence the aim of the present study was to assess the knowledge of the urban & rural high School teachers on menstrual hygiene practices.

Materials and Method: For the present study three Urban school and four Rural schools located in rural areas were selected for conducting the study. The target population were all the female teachers working in the selected urban and rural area. Randomly selected 100 female teachers were taken as sample of the study from the urban and rural areas. Simple random sample technique was used for selecting sample for this study.

Results: It was shown that there is significant association between pre test knowledge scores and selected variables it indicates that the knowledge level on menstrual hygiene in dependant of economic status, education Indus, experience, age of the respondents.

Conclusion: After structured teaching programme their knowledge on menstruation and menstrual hygiene had improved. Educating teachers in turn help us to educate the adolescent girls to adopt healthy behaviour,

Keywords: Menstruation, Hygiene, Teachers, Sanitary products

Introduction

The word 'adolescent' is derived from the Latin word 'adolesere' means to grow to maturity. The period of transition from childhood to adulthood is called adolescence, with an accelerated physical, biochemical and emotional development, adolescent represents one of the critical transition phase in the life span and is characterized by a tremendous pace

in growth and development. Biological processes drive many aspects of this growth and development, with the onset of puberty and marking the passage from childhood to adolescence.^{1,2}

The changes may start from 10 or 11 years, but they might start as young as eight years or as old as 13 years. Physical changes around puberty include, breast 2 development, changes in body shape and

height, growth of pubic and body hair and attainment of menarche. The onset of menstruation (menarche) is one of the most important changes occurring among girls during the adolescent years. The menstruation is normal physiological process that is characterized by shedding of endometrium accompanied by loss of blood which occurs every month as a menstrual cycle with a duration of 3-5 days with an average interval of 28 days ranging from 21-35 days.^{3,4}

Women have indirectly, if not directly, absorbed the messages that menstrual blood is dirty, smelly, unhygienic and unclean. This message may be perpetuated by advertisements for menstrual products or "feminine hygiene" products. Even the term "feminine hygiene" implies that help is needed with hygiene. With all these negative messages it is natural for women to want to hide their blood and throw it away as garbage. To do otherwise is to go against what they have been taught as women. But menstruation is a natural physical process - a harmless by-product of a biological event.^{5,6}

Adolescent girls who are fortunate enough to be given relevant textbooks and health education materials by their teachers gain some information about reproductive functioning and reproductive health problems from school sources. The events and experiences surrounding menarche can be a significant influence on young girls, view themselves as well as on their understanding of reproductive health issues and on appropriate behaviour for hygienic management of menstruation.⁷⁻⁹

Menstrual problems are common during adolescence which may cause significant anxiety for adolescent and their families. The common menstrual disorders of female adolescent are amenorrhea, abnormal/excessive uterine bleeding, dysmenorrhoea and premenstrual syndrome. Menstrual problems are generally perceived as only minor health concern and thus irrelevant to the public health agenda, particularly for the women in developing countries.^{10,11}

Due to societal prohibitions, rural teenagers do not have access to accurate information, and their parents do not discuss these concerns openly. It frequently results in a loss of self-expression and mobility. According to a study, the majority

of adolescents have incorrect information and views about menstruation. Even individuals with knowledge tend to use inappropriate menstrual hygiene management due to difficulties such as insufficient menstruation sanitary products and a lack of mental or physical support.¹² Hence the aim of the present study was to assess the knowledge of the urban & rural high School teachers on menstrual hygiene practices.

Material and Methods

For the present study three Urban school and four Rural schools located in rural areas were selected for conducting the study. Initially the number of teachers, their education qualification, their degree were assessed to get homogenous group for conducting study were recorded. All these Urban and Rural school were functioning under Government sector.

The target population were all the female teachers working in the selected urban and rural area. Randomly selected 100 female teachers were taken as sample of the study from the urban and rural areas. Simple random sample technique was used for selecting sample for this study.

Inclusive Criteria

Teachers working in Private & Govt., High schools and who had experience of 1 to 25 years. Those who have got Professional qualification of professional Education.

Selection and Development of Instrument:

Considering the purpose of the study number of participants and availability of time for data collection a structured interview schedule was developed.

The purposes of the tool were formulated before stepping towards the construction of it as follows.

1. Assess the existing knowledge on menstrual hygiene its management.
2. Identify the areas of Health education need from the collected data.
3. To create awareness regarding menstrual hygiene by planning and implementing the structure teaching.
4. To evaluate the effectiveness of teaching.

The following steps were carried out in preparing the tool.

- a. Related literature were reviewed.
- b. Construction of the subject experts and statistician for approval.
- c. Test-retest was done for reliability.

Interview schedule developed by reviewing literature and taking experts opinion. The interview schedule consists of the following parts.

Part I

This part seeks information on selected demographic variables of the teachers. Who are the study samples. This includes information on age, religion, Education, Marital status, Income, Type of the family teaching experience and type of the institution in which they work.

Part II

Part II consists of section A,B,C,

Section A

Section A contains 21 questions this seeks the information on relating to anatomy and physiology of menstruation. Questions like hormones influencing age at menarche, meaning of menstruation changes occurred during menstrual cycle. Normal menstrual flow length of the menstrual cycle, premenstrual syndromes are included in this section.

Section B

Consists of 14 questions related to practice includes usage of sanitary pads bath cleanliness, disposing of pads, days of separation during the menstrual cycle etc.

Section C

Section C consists of 15 question this consists of question related to menstruation, cleanliness, separation, foul smelling discharge, attaining menarche etc.

Questions were framed about socio-economic and personal profile of respondents, knowledge about menstruation and sanitary products. Respondents were selected randomly in three age

groups viz., 15-18 years, 19-24 years and 25-30 years so that data can be collected from young women of different age groups. Verbally consent of information was provided by each participant.

Data were analyzed by using MS-Excel. To assess the knowledge of participants, frequency and percentage were used. Knowledge of participants was assessed on a three-point scale of full knowledge, partial knowledge and no knowledge. Chi-square test was used to analyze the association between socio-economic variables and level of knowledge of women regarding menstruation. Pearson's correlation was used to find the correlation between knowledge and other aspects of menstruation.

Results

Distribution of respondents was done based on their age, religion, marital status and Education. Among 100 respondents 44 women were of the age of 31-35 years. Most of the respondents did belong to Hindu Religion i.e. 84 women out of 100. Regarding the marital status of them 84 respondents was married and 16 women were only single. Regarding Educational Qualification out of 100 respondents; 90 respondents have B.Ed and 10 respondents have M.Ed Qualification. On the basis of distribution of respondents based on the sex it was done that all the respondents were females.

On the different aspects in pre test mean knowledge on Menstrual hygiene, it was found that General concept in relation to knowledge of menstruation was found in mean of 48.7%. Practice of Menstrual cycle knowledge among the respondent has the mean of 42.3%. Attitude and belief regarding the Menstruation knowledge has the mean of 58.5% and combined knowledge regarding menstrual hygiene mean score was found to be 48.8% among the respondent.

It was shown that there is significant association between pre test knowledge scores and selected variables it indicates that the knowledge level on menstrual hygiene in dependant of economic status, education, experience, age of the respondents. The pretest knowledge scores was 29.8% and the effectiveness of the structured programme in terms & knowledge gain was more in post test. The rural

teachers (respondents) showed better performance than urban teachers (respondents) because of the under educational facilities and health awareness.

If the teachers are educated on menstrual hygiene they definitely develop and inculcate the positive attitude lead to coping physical and psychological changes of the girls. Further they enable the students to develop a healthy attitude towards menstruation and this adopt hygienic practices during menstruation periods.

Discussion

The present study was done to assess the impact of a structured teaching programme on menstrual hygiene among the female high school teachers. Few schools of urban and rural areas of Hassan district were taken for conducting this present study.¹²⁻¹⁴

The first objective of this study was to assess the knowledge of the urban and rural school teachers of selected schools. It was found that the teachers knowledge level on practice relating menstrual hygiene was comparatively lower than other areas of menstruation, like general concept of menstruation, attitudes and beliefs on menstruation.

At the same time teachers were found to be having inadequate knowledge on menstrual hygiene. The mean score obtained during pre test on knowledge regarding general concept of menstruation and attitude and beliefs on menstruation was 49.71% and 56.8% respectively. The same mean score showed very good improvement after health education. This clearly reveals that the health education have an impact on teacher's knowledge on menstruation, paired T- value of 16.73 was statistically significant at 5% level,

In our Indian culture hardly mothers teach their daughters about menarche and menstrual hygiene, Only few educated mothers are involved teaching their daughters on menarche and menstrual hygiene so it can be conveniently taught by teachers in the school so that they can avoid the prevalence of gynecological infections among the adolescent girls.¹⁵

The level of knowledge regarding menstruation and menstrual hygiene was found significantly associated with age, educational qualification

of respondents and their mothers, educational qualification of respondent's father/husband, occupation of respondent, socioeconomic status, mass media exposure and religion in the present study. The results were in accordance with the findings of a study which revealed that there was significant positive association between good knowledge of menstruation and educational status of mothers, having mass-media exposure and vice-versa.

Knowledge of women regarding menstruation and menstrual hygiene in the present study was found positively correlated with menstrual hygiene practices and general perception of women regarding menstruation. The findings of the study were in accordance with the results given by various other researchers who reported that poor level of knowledge of menstruation was significantly correlated with poor menstrual hygiene practices and perceptions regarding menstruation and vice-versa.

Conclusions

After structured teaching programme their knowledge on menstruation and menstrual hygiene had improved. Educating teachers in turn help us to educate the adolescent girls to adopt healthy behavior, it is suggested that school going girls should be imparted knowledge through school curriculum about menstruation and good menstrual hygiene practices. Parental support should be provided to young girls in managing the menstruation with ease and safety.

Ethical approval was taken from the institutional ethical committee and written Informed Consent was taken from all the participants.

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Perception of E-learning among Medical Students of VIMS, Ballari, Karnataka: A Cross Sectional Study

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Abstract

With COVID-19 pandemic disrupting the educational system, the professional medical teaching has been shifted to online mode soon after the Government's decision to impose nation-wide lock-down.

A cross sectional study was carried out among medical undergraduate in VIMS to know their perception on e-learning. The questionnaire was administered through google forms and the results were analysed using descriptive statistics. Among 340 study subjects, the mean age was found to be 20.47 and the majority of responders were first year undergraduates. Most students depended on smartphones for attending classes. The maximum satisfaction index (55.47%) observed with more time spend on homework and the minimum (39.85%) with greater ability to concentrate in online class. On a Likert scale of perception assessment 32.9% of students disagreed with conducting online classes followed by 31.2% remained neutral. Overall experience recorded bad with 57.6%. Online learning has been the need of the hour but it should be backed up with traditional learning for effective results.

Key-words: E-learning, COVID-19 pandemic, medical undergraduate, Google forms, satisfaction index, Likert scale.

Introduction:

On March 11, 2020, the World Health Organization (WHO) declared that the COVID-19 outbreak had reached a global pandemic level^{1,2}. Educational institutes across the world have closed due to the COVID-19 pandemic jeopardizing the academic calendars³. Among those affected were medical schools and universities who were challenged to adapt by providing distance medical education opportunities¹.

Online/e-learning has been an optional and valuable tool for a long period but with the

advances in technology and easier ways to interact with telecommunication, the education system has changed drastically and there was an immense rise in online learning via various digital platforms which has proved that distance learning is a viable option at present times^{4,5,6,7,8,9}. Educational researchers and academic institutions' efforts focused on instituting effective and applicable curricula. However, medical education settings' diversity requires additional collaborative academic efforts to develop and advance the experience continuously¹.

No previous time in the history had such a vast

sudden shift to e-learning. This paradigm shift in education had grave implications for all institutions¹⁰. The online learning environment varies profoundly from the traditional classroom situation when it comes to learner's motivation, satisfaction and interaction³.

The advantages of using online learning in medical education include improved accessibility of information, ease of standardizing and updating content, cost-effectiveness, accountability, and enhancement of the learning process, wherein students are motivated to be active learners^{11,12,13}.

The major concern is about the quality of learning which is how well the content is designed and executed. The study is even more relevant considering that in India the system of online education has never been tried at this scale and this is like a massive social experiment. Educational institutions in India have also made a transition to online teaching environment soon after Union Government's decision to impose nationwide lock-down for 21 days from 25th March, 2020 which was later extended for 19 more days³. Forced to abruptly transition to an online curriculum, each medical school crafted its own guidelines on learning activities, revised assessment measures, and set promotion policies based on their affiliated university guidelines¹⁰.

For the same, online teaching program was initiated in VIMS, Ballari, for the undergraduate students. It is students whose opinion matters most in the education system.

Objective

- To know the perception of e-learning among medical undergraduate in VIMS, Ballari.

Subjects and Methods

Study design:

A descriptive cross sectional study.

Study area:

Vijayanagar Institute of Medical Sciences, Ballari, Karnataka.

Study subject:

First to final year MBBS students.

Study tool:

Web based Google forms questionnaire containing information of the student and questions regarding how online teaching affected their learning.

Study duration:

3 months.

Sampling technique:

All the responses were collected for the duration wherein the platform was kept open.

Sample size:

340 students who replied to the questionnaire.

Inclusion criteria:

- All the undergraduates

Exclusion criteria:

- Those who not willing to participate.
- Incomplete responses.

Method of collection of data:

The questionnaire was prepared and disseminated through online mode with the help of google forms and the link was shared to the study subjects. The questionnaire was kept open for responses for a duration of 10 - 15 days and each student were allowed to complete the questionnaire once voluntarily.

Statistical analysis:

The study responses were analysed using descriptive statistics.

Ethical consideration:

Ethical approval obtained from Institutional Ethical Committee.

Results

Table 1: Basic details and Take away of online class (N = 340)

Variables	Frequency	Percent
Age (years)		
18 - 20	169	49.7
21 - 23	170	50.0
24 - 28	1	0.3
Mean age : 20.47, SD: +-1.293		
Gender		
Male	194	57.1
Female	146	42.9
Year of study		
1 st yr. MBBS	116	34.1
2 nd yr. MBBS	71	20.9
3 rd yr. MBBS	81	23.8
4 th yr. MBBS	72	21.2
Place of stay		
Hostel	258	75.9
Home	82	24.1
Previous experience		
Have attended online course before	109	32.1
Have not attended online course before	231	67.9
Overall experience		
Good	40	11.8
Bad	196	57.6
Not much of a difference	104	30.6
Distractions		
Yes	265	77.9
No	29	8.5
Maybe	46	13.5
Lessons learnt should be used in future curriculum		
Yes	263	77.4
No	77	22.6

Table 1: 50% of the undergraduates belonged to the age group of 21 to 23 years and the mean age was found to be 20.47 with SD of ± 1.293 . Out of 340 students responded 57.1% were males and 42.9% belonged to females. The 1st, 2nd, 3rd and 4th year students represented 34.1%, 20.9%, 23.8%, 21.2% respectively. Among them only 32.1% had previous experience of any online course. The overall experience of the students regarding online learning remained bad with 57.6%. Almost majority (77.9%) of the students responded they had been affected by distraction during the classes. 77.4% of the students responded the lessons learnt during Covid-19 times through online teaching should be used for the future curriculum.

Table 2: Technical requirements and structure of online classes

Variables	Frequency	Percent
Device used by the students		
Smartphones	263	77.4
Tablets	42	12.4
Laptop	34	10.0
PC	1	0.3
Format of class being conducted		
Live class that can be recorded	127	37.4
Live online class	125	36.8
Recorded class that is uploaded to the college website/any other platform	88	25.9
Nature of the content		
PowerPoint presentations along with black board teaching	144	42.4
PowerPoint presentations/pdf	139	40.9
Black board teaching	46	13.5
Lecture only	11	3.2
Ofteness of the class		
As per the schedule to complete the syllabus	235	69.1
Alternative days	80	23.5
Weekly twice	13	3.8
Weekly once	12	3.5

The table 2 comprise of technical requirements and structure of online classes. Majority (77.4%) of the students used smartphones as the preferred device for classes. 7.4% of the students wanted live classes that can be recorded whereas 36.5% of the students wanted just live classes, among the students 25.9% of the students preferred recorded classes uploaded

to the college website or any other platform. 42.4% of the students wanted to included black board teaching with PowerPoint presentations. The response towards the oftenness of the class was reported as 69.1% of students wanted the classes as per the schedule to complete the syllabus were, 23.5% wanted an alternative day class.

Table 3: Perception of online learning (N = 340)

	SD	D	N	A	SA
I prefer online class as they are very structured with set due dates similar to the face to face classes	70(20.6%)	112(32.9%)	106(31.2%)	47(13.8%)	5(1.5%)
Online classes help me to comprehend the course materials compared to class room learning	67(19.7%)	138(40.6%)	101(29.7%)	27(7.9%)	7(2.1%)
Online environment makes it easier for me to communicate with the instructor than class room environment	66(19.4%)	117(34.4%)	83(24.4%)	63(18.5%)	11(3.2%)
I am more comfortable responding to the questions by messages than orally	28(8.2%)	72(21.2%)	88(25.9%)	119(35.0%)	33(9.7%)
I spent more time on my home work in comparison with regular classroom learning	27(7.9%)	91(26.8%)	137(40.3%)	71(20.9%)	14(4.1%)
Instructor understands the online environment and makes it easy for us to learn	51(15.0%)	80(23.5%)	123(36.2%)	78(22.9%)	8(2.4%)
SD - strongly disagree, D - disagree, N - neutral, A - agree, SA - strongly agree.					

Table 3 shows the Likert scale assessment, 32.9% of students disagreed that they prefer online classes than face to face classes were 31.2% remained neutral on their. 40.6% of the students disagree that the online classes helped them to comprehend the course materials compared to classroom learning. A comment on online environment makes it easier for me to communicate with instructor than classroom environment, disagreement was about 34.4%, 24.4% remained neutral and 18.5% agreed to the

comment. About 35% of students agreed that they are comfortable responding to the questions by messages than orally. 40.3% of students did not find any change in spending their time on homework, 26.8% of students agreed that they spend more time on homework. 36.2% of the students remained neutral that instructor understands the online environment and makes it easy for the students to learn, 23.5% of students agreed to the comment and 22.9% of students disagreed.

Table 4: Perception among undergraduates

Perception	Disagree	Agree	Total	
Male	108(78.8%)	29(21.2%)	137(100.0%)	Pearson Chi-Square =0.213 df = 1 P value=0.645
Female	74(76.3%)	23(23.7%)	97(100.0%)	
Total	182(77.8%)	52(22.2%)	234(100.0%)	
1 st year	66(80.5%)	16(19.5%)	82(100.0%)	Pearson Chi-Square = 1.762 ^a df = 3 P value=0.623
2 nd year	38(79.2%)	10(20.8%)	48(100.0%)	
3 rd year	44(78.6%)	12(21.4%)	56(100.0%)	
4 th year	34(70.8%)	14(29.2%)	48(100.0%)	
Total	182(77.8%)	52(22.2%)	234(100.0%)	
Attended priorly	51(70.8%)	21(29.2%)	72(100.0%)	Pearson Chi-Square =2.902 ^a df = 1 P value=0.088
Not attended priorly	131(80.9%)	31(19.1%)	162(100.0%)	
Total	182(77.8%)	52(22.2%)	234(100.0%)	

Table 4 shows perception among undergraduates, were majority of the students disagreed that online teaching has an upper hand to traditional teaching with male preponderance of 78.8%. The majority of response was obtained from first year undergraduates. Almost majority 77.8% of

undergraduates disagreed and the majority of each year was none the less disagreed. 80.5% of the first years disagreed followed by second years. Perception among who are previously familiar with online form of learning even showed that they disagree with it by 70.8%. None of these were significant.

Table 5: Evaluation and Benefits of online learning

Variables	Frequency	Percent
Quiz after each class		
Yes	274	80.6
No	66	19.4
Assignments after the class		
Yes	207	60.9
No	133	39.1
Deadline for submitting assignments		
1 week	117	34.4
2 -3 days	104	30.6
Before the next scheduled class of the subject	83	24.4
The very next day	36	10.6
Online exam to be conducted		
Yes	128	37.6
No	212	62.4
Clarification of doubts		
Live chat after the session	173	50.9
Messages to the course instructor	167	49.1
Flexible & convenient		
Yes	141	41.5
No	199	58.5
Self- discipline		
Yes	205	60.3
No	135	39.7

The table 5 shows the preferences of evaluation methods. 80.6% of the students agreed on conducting quiz after each class as a part of their evaluation. Regarding the assignments after class, 60.9% of the students were agreeing and 39.1% did not want any assignments. For the given assignments 34.4% of the students agreed that the submission deadline should be within a week time, whereas 30.6% responded the submission should be within 2 or 3 days. Among the students 62.4% did not want online exams and 37.6%

agreed on conducting online exams. For clarification of doubts 50.9% of the students agreed on having a live session after the class and 49.1% wanted to message the course instructor and clarify their doubts. 58.5% of the students responded that the online classes were not flexible and convenient for them whereas 41.5% agreed on the comment. 60.3% students agreed that much of self-discipline is needed for attending online classes.



Graph 1: Satisfaction Index of the students regarding their perception of certain characteristics of online learning

Graph: 1 depicts the satisfaction indexes of the students regarding their perception of certain characteristics that belonged to online class. The maximum satisfaction index, 55.47% was observed with more time spend on homework followed by improved self-discipline and responsibility 52.7%. The minimum satisfaction index 39.85% is found to be with greater ability to concentrate in online class.

Discussion:

The challenges bought by Covid-19 pandemic to medical education had devastating impacts on academics. In our study 50% of the students belonged to 21 to 23 years and the mean age was 20.47 years which was similar to Dutta et al study were 54% of the students belonged to the respective age group. In the same study the majority of students participated were second professional year but in case of our study

first year professional students (34.1%) responded well followed by third year (23.8%)⁴.

The International Association of Universities (IAU) - COVID-19 Global Impact Survey observed that about 90% of institutes observed major disruption or were completely closed during this pandemic and nearly two-thirds of institutes transformed their classroom teaching activities with virtual teaching via platforms such as e-Classrooms, Google meet, Zoom video communications, etc.^{4,14}. Study done among medical undergraduate students of Hamdard Institute of Medical Sciences and Research, New Delhi, India vouched that live online lectures were ranked in the first position¹⁵. In Muthuprasad T et al study majority of students chose for recorded classes which is uploaded to the website/ YouTube. In our study it is observed that most of them wanted live classes that can be recorded which would give them

flexibility and convenience in learning. Also the students voted for powerpoint presentations with blackboard teaching for the nature of video content which was even similar to the later study. Even the study conducted by N K Ibrahim et al showed that students chose blackboard and then zoom meeting for the easiness to use¹⁰.

The preferred device for online class was found to be smartphones with 77.4%, even various other studies also had the same findings^{1,3,4}. In the present study we have seen that 67.6% of the students have not attended online course before which is similar in case of Muthuprasad T et al study, were 52.77% of students did not have any prior experience³.

We have also analyzed the student's satisfaction with online classes and it was found to be bare minimum. Traditional face-to-face teaching is considered as a habitual pattern of routine learning particularly in professional courses⁴.

A rapid transition from physical to virtual classes without addressing various shortcomings related to technology/infrastructure barriers, teacher training, and student learning might result in less satisfactory outcomes. Implementation of virtual or e-learning in medical education is a strenuous task especially in low-middle-income countries like India because infrastructure and technological issues affect the transition from lecture-based teaching to self-directed online learning^{4,16,17}.

Regarding how oftenness to conduct the class the students opted to have classes as per the schedule to complete the syllabus. The study conducted by Muthuprasad T et al reported that most of them chose weekly two classes³. Our students disagreed with online classes and favoured physical classes even various other studies have also reported the same response^{1,4,13,18}.

Regarding evaluation of the classes conducted, majority of the undergraduates vouched that quiz after the class will be helpful of them to retain better knowledge which was similar to Muthuprasad T et al study. The later study also reported that most of the students felt assignments at the end of every class are necessary even our study over similar results³.

Even in countries with little digital divide, unlike

India, and has better internet connectivity has never shifted to complete online mode before this pandemic. Reasons could be varied including the advantage of face to face interactivity, immediate feedback and sense of community amongst many other. One reason could also be related to difficulty in teaching skills, as in practical classes. In the immediate future, the universities may resort to a hybrid mode³.

Conclusion

The study finds that the overall experience of online learning among students were bad and satisfaction indices were mostly below the fifty percentage.

Limitation:

The students have been suddenly exposed to this new system of learning hence comparison with traditional system cannot be made very objectively. The findings cannot be generalized because of less number of participants.

Conflict of interest: Nil.

Source of funding: Self.

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Observational Study, on Trend of Hand-Hygiene Amongst Staff of Tertiary Care setting of Division Kashmir, J&K

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Abstract

Background: Hospital acquired infection is a major cause of morbidity & mortality in hospitalized patients. Hand-hygiene is an essential practice for infection prevention & control in hospitals(IPC). WHO has identified 5 essential 'moments' for hand hygiene to be met during the sequence of healthcare service delivery. These include before touching a patient, before clean/aseptic procedure, after body fluid exposure risk, after touching a patient & after touching patients surroundings.

Material and Methods: It was a cross-sectional study conducted from Jan 2020 to March 2020 using the WHO observation form for Hand Hygiene. Convenience sampling was applied to the sample frame of all Health care Personnel at SKIMS Medical College Hospital. The sample included all the available staffs present at the time of study. The trained research team made a keen observation of the hand hygiene practices before/after the 5 moments for hand hygiene.

Result: 46.2% compliance to one or other hand-hygiene practice was observed. Majority showing compliance were dressers (33.3%) followed by doctors (including Intern students) (39.8%) & nurses (26.1%). The most commonly used mode for hand-hygiene was use of gloves (45.8%) followed by hand-wash (34%).

Keywords: Hand hygiene, Hand Rub, infection control measures

Introduction

Hospital acquired infection is a major cause of morbidity & mortality in hospitalized patients. Hand-hygiene is an essential practice for infection prevention & control in hospitals(IPC). One of the important methods of preventing hospital acquired infection is by adopting strict hand-hygiene protocols by the hospital staff. WHO also has emphasized

on hand hygiene practice and started with Global Patient safety challenge in Oct 2005 which was aimed at reducing health care associated infection⁽¹⁾. Hands of hospital personnel is considered as a huge source of infection which can transmit microorganisms from one patient to another. But unfortunately low level of compliance has been seen in health care workers in following hand-hygiene practices.

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WHO has identified 5 essential 'moments' for hand hygiene to be met during the sequence of healthcare service delivery. These include before touching a patient, before clean/aseptic procedure, after body fluid exposure risk, after touching a patient & after touching patients surroundings⁽²⁾. In the recent times when the new strain of Corona virus (COVID-19) outbreak was observed around the world; several structural and behavioural changes were made to the hospitals around the globe to ensure infection prevention., and one of the most frequently reported strategies that has been implemented in hospitals is frequent washing of hands and hand rub by HCWs. The present study was conducted in the various departments of a Tertiary Health Care settings to have an idea about the hand-hygiene practices prevalent there. The study aimed to determine the extent of hand hygiene practices in terms of either hand-rub or hand wash or use of gloves with HR/HW at the time of any of the "Five Moments of Hand hygiene".

Methodology

It was a Cross-Sectional study conducted from June 2022 to August 2022 using the WHO observation form for Hand Hygiene. Convenience sampling was applied to the sample frame of all Health care personnel at SKIMS Medical College Hospital. The sample included all the available staff present at the time of study.

Prior to study formal approval of scientific committee, IEC & Hospital administration for

conducting the study was sought. Following this formal verbal consent for the study was taken from HOD, HOU, and Nursing Supervisors. The research team was trained for the conduct of study by faculty trainers. The trained research team made a keen observation of the hand hygiene practices before and after the 5 moments for hand hygiene. Any of the five moments was considered as an indication of one opportunity & hand hygiene practices of either Hand wash or Hand Rub or glove use with Hand Wash/ Hand Rub was noted down in the WHO structured proforma. Each WHO proforma has space for dealing with 4 categories of health personnel & people from each category. The data thus collected, was analyzed using frequency tables in form of percentages.

Result and Discussion

The data obtained from all the departments was homogenized under 3 categories to reduce the bias. These included Surgical Departments as G-Surgery, Orthopedics, ENT, Ophthalmology, Gynae & Obstetrics.

The Non-Surgical Medical Departments included General Medicine, Chest medicine, Dermatology, Psychiatry.

The other department as a category in itself included the Accident Emergency of the hospital. Total of 638 opportunities was available for the Observation of Hand-Hygiene, 322 from Surgical departments, 192 from Nonsurgical department & 124 from Accidental Emergency.

Table 1: Hand hygiene practices in Surgical Departments.

N : 322

Hand hygiene practices	Doctor	Nurse	Medical Intern	Nursing orderly	Dresser	Total
Hand rub	09(16.9%)	14(31.8%)	1(7.1%)	Nil	8(14.2%)	32(19%)
Hand-wash	33(62.2%)	22(50%)	12(85.7%)	Nil	22(39.2%)	89(52.9%)
Use of gloves	11(20.7%)	08(18.1%)	01(7.1%)	1(100%)	26(46.4%)	47(27.9%)
Total	53(31.5%)	44(26.1%)	14(8.3%)	1(0.5%)	56(33.3%)	168(46.2%)

46.2% compliance to one or other hand-hygiene practice was observed. Majority showing compliance were dressers (33.3%) followed by doctors (including Intern students) (39.8%) & nurses (26.1%). Majority of the staff in surgical departments were resorting

to hand wash as method of hand hygiene. Whereas majority of subcategory of dressers (33.3%) & nursing orderly (0.5%) were resorting to use of gloves with Hand Wash / Hand Rub.

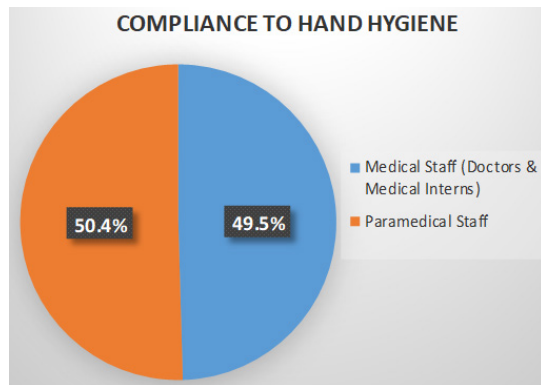
Table 2: Hand-hygiene practices in Non-surgical Department

N=192

Hand Hygiene practice	Doctor	Nurse	Medical Intern	Nursing Orderly	Total
Hand Rub	31(91.1%)	27(87%)	21(80.7%)	7(100%)	91(88.3%)
Hand Wash	03(8.8%)	04(12.9%)	05(19.2%)	-	15(14.5%)
Total	34(33%)	31(31.6%)	26(26.5%)	7(7.1%)	98 (51%)

51% compliance to one or other hand-hygiene was observed. Majority were doctors (33%) followed by nurse(31.6%) & medical interns (26.5%) compliance by Nursing orderly was low at 7.1% Most common method of hand-hygiene was by use of hand-rub (88.3%). Gloves was not used by any category of health care personnel in non-surgical departments.

In Accident Emergency, of the total 124 opportunities for hand hygiene only 37.9% were utilized .Majority of those showing compliance were doctors (34.0%) followed by Medical Interns (25.5%) & Nurses (23.4%). The most commonly used mode for hand-hygiene was use of gloves (45.8%) followed by hand-wash(34%).



In our study hand hygiene practices, (washing with soap and water, use of alcohol based rubs and use of gloves) was 46.2%. Similar results have been shown by *Agarwal A(et al)* in 2021 ⁽³⁾ where he demonstrated 52.8% followed the proper steps of hand-hygiene. This rate differed with some categories of HCW showing 55.0% compliance in doctors, 42 % in nurses, 30.7% in Medical Interns & 56% in dressers. Study by *Bhatt A Sharma A* revealed 70% average level of compliance in staff nurses. ⁽⁴⁾ Study done by *Majeed etal* showed 91% compliance to the

WHO guidelines regarding adequate hand hygiene ⁽⁵⁾. A study by *Patwardhan et al* has revealed highest compliance 94% in housekeepers followed by technicians (92.%) doctors (91%) & Nurses (91%)⁽⁶⁾. Lower compliance to hand hygiene practices in our study could be explained due to the lack of availability of hand rubs at nearly every table, forgetfulness on the part of health care workers, due to very less time and also due to lack of complete understanding of the guidelines of WHO with some health care workers perceiving it as non essential. Study by *MuktaTyagi et* has revealed that the hand-hygiene compliance ranged from 12 to 33% in secondary and tertiary facilities⁽⁷⁾. They also found that there was no evidence of a difference for low, medium, & high load facilities showing 28%, 14% & 24% respectively compliance. Our study reveals 37.9% compliance in Accident Emergency. Other study by *Shobwale et al* has also revealed a compliance rate of 55 % ⁽⁸⁾.

Though the compliance percentage to hand hygiene practices is varied in various sections within our hospital, similar varied compliance rates are seen across institutions as has been discussed. Nevertheless Education & more importantly feedback intervention (for reasons of non-compliance) will help in improving the conformance. Addressing issues as (limited access to hand hygiene supplies as soap, alcohol based rub, inconvenient location of hand wash and sinks) by Hospital Infection Prevention Control committee will help a great deal in streamlining the procedure. A study by *Ling ML et al* adapting a multipronged approach on hand hygiene education has shown that system change, feedback analysis & intervention as well as continuous reminders can improve hand-hygiene compliance rates upto 60 % ⁽⁹⁾.

Conclusion

1. Hospital Infection prevention & control practices in terms of hand hygiene need to be promoted by way of in place education & reinforcement along with feedback intervention to gain trust of hospital staff.
2. Further surveillance studies covert or overt need to be taken up regularly to check for improvement in hand-hygiene practices following an in place education.

Limitation

Some of the sections as sample collection centers, OPD were excluded. Their inclusion in further studies needs to be taken up to get a broader vision of the compliance to Hand hygiene practices.

The major limitation of the study was the **Hawthorne Effect** that was noticed from the other health care workers once observed staff was being counselled.

Ethical Clearance: Taken from Institution Ethics Committee, SKIMS MCH, Bemina.

Source of funding: Self

Conflict of interest: Nil

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Awareness, Preferences, and Consequences of Mask Usage among MBBS Students

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Abstract

Background: Research studies have shown that the wearing mask for more than 4 hours could lead to Nasal, Skin, Pressure, and other miscellaneous symptoms.

MBBS students tend to use masks for longer duration than any other set of people.

There is limited evidence of adverse effects of prolonged mask usage among MBBS students. This study was conducted with objectives to: To assess the knowledge, practice and preferences of mask usage, to estimate the prevalence and determine the adverse effects of prolonged mask wearing among MBBS students.

Material and Methods: This is a Cross sectional study conducted among 313 MBBS Students of ESIC Medical College and Hospital, Kalaburagi, through an online semi-structured Questionnaire. The collected information is analyzed using MS Excel and SPSS software.

Conclusion: In this study it was observed that the knowledge and practice among participants were positively correlated and most of the consequences were negatively correlated with the practice. Thus, participants with good knowledge and practice scores had few complaints while wearing mask for prolonged hours.

Key words: Mask usage, Knowledge, Preference, Adverse effects, Prevalence.

Introduction

For the first time Mikulicz introduced a single layered mask which was made of gauze. Later, in the year 1920 surgical masks were introduced in operation theatres of Germany and USA^[1].

Moreover, considering that the mode of transmission of COVID-19 and several other infections is through air droplets and organs like nose and mouth being the route of entry, it is recommended to cover it appropriately. The era of COVID-19 since

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its declaration as a pandemic by WHO on 11 March 2020 has brought several changes in the lifestyle of people universally. Public is aware of the importance of wearing mask more than ever.

There is diversity in type of masks, WHO recommends usage of three-layered masks, inner layer made of absorbent fabric like cotton, middle layer like polypropylene, outer layer made of polyester blend. Every person has an option of mask which suits their comfort.

Research studies have shown that the prolonged mask wearing could lead to headaches, skin breakdowns, itching, ear pain, discomfort, redness, dryness, rash, nasal bridge scarring also, there is evidence that the prolonged use of masks i.e., more than 4 hours may cause inconvenience [2-6]. Since the beginning of COVID-19 infection, MBBS students tend to use masks for longer duration due to their visits to hospitals and classes at college, hence they are expected to be well versed with the mask usage to avoid adverse effects on health due to wearing of mask.

There is limited information regarding adverse effects of prolonged mask usage among MBBS students and its association with their awareness and practice, thus this study aims to assess the knowledge, practice of mask wearing habits among the MBBS students and to determine their preferences and the various adverse effects of mask wearing among MBBS students.

Material and Methods

This is a Cross sectional study conducted among MBBS Students of ESIC Medical College and Hospital, Kalaburagi; through an online semi-structured Questionnaire prepared in Google form and circulated among students via Whatsapp. It comprised of questions related to socio-demographic details, knowledge regarding mask and its usage, practice followed for wearing mask, preferences for mask usage and the consequences faced due to prolonged wearing of a mask.

After obtaining Institutional ethical clearance and seeking permission from teaching staff, the students

of MBBS were approached at end of their subject class and were briefed with the study details. The link for the predesigned semi-structured questionnaire was shared with the students, with a setting such that the questions could be accessed only after obtaining the participants consent.

Students unavailable for three consecutive attempts to connect were not included in the study, and thus a total of 313 responses were obtained over a period of 3 months. Total duration of study was 6 months (March-August, 2022).

The collected information was then analyzed using MS Excel and SPSS software version 21. Descriptive analysis was used to describe the socio-demographic information, and other parameters. Pearson's correlation was used to assess associations between the variables.

Results

Table 1: Socio-demographic details of the study participants.

Variable		Frequency (N=313)	Percent
Age group	Less than 20 years	135	43.1
	20 to 22 years	149	47.6
	22 to 25 years	25	8.0
	More than 25 years	4	1.3
MBBS Year	1	43	13.7
	2	155	49.5
	3 Part I	82	26.2
	3 Part II	33	10.6
Gender	Female	176	56.2
	Male	137	43.8
Current living place	Home	37	11.8
	Hostel	269	85.9
	Paying Guest	7	2.2

In addition to the information in table 1, it was observed that almost 36% (112) of the participants had refractive error while 11.2% (35) have acne prone and sensitive skin.

Table 2: Distribution of study participants according to knowledge based questions.

Statement with correct response	Frequency (N-313)	Percent
Able to distinguish external and inner surface of a mask	303	96.8
Able to distinguish upper and lower edge of a mask	307	98.1
A surgical mask has 3 layers	241	77.0
Middle layer of surgical mask acts as a filter media barrier from COVID 19 virus	226	72.2
A surgical mask is recommended to be worn for not more than 4 hours.	125	39.9
Surgical mask should cover nose and mouth and chin when worn.	280	89.5
The metal strip on a surgical mask should fit on the nose	307	98.1

In this study, 93.3% (292) of the participants believed that 'single use mask' would mean 'a mask once worn by a person has to be discarded after it is removed.'

Awareness of study participants regarding

different types of masks is shown in Figure 1, but regarding practice, it was noted that 23% (72) of the participants would use cloth mask, 70% (219) preferred using a single use surgical mask, whereas 7% (22) use several types of masks in a day.

Table 3: Distribution of Participants according to Practice based questions.

Statement with recommended Practice	Frequency (N=313)	Percent
Continue wearing your mask while coughing and sneezing	263	84.0
Do not store the used mask in a bag for later use	218	69.6
Do not Eat/drink while wearing the mask	252	80.5
Remove the mask from the face by touching only the bands	262	83.7
Do not pull the mask up over the forehead or down over the chin	188	60.1
Clean hands after taking off the mask	229	73.2

The practice of study participants related to wearing mask is depicted in table 3 and figure 3a&b.

The study also reveals that the participants were aware of cleaning a reusable mask every day (36%, 111) or after every use (56%, 175), there were also 3% (8) participants who thought that a reusable mask should be washed once it is visibly dirty.

On further analysis, it was noted that almost 88%

(275) of the participants had adequate knowledge regarding types of masks and its usage (Mean score = 9), and 82% (257) of the participants had good practices while using a mask (Mean score = 7).

On further analysis positive correlation was noted between the Knowledge and Practice scores with $R^2=0.1868$, meaning that participants with good knowledge regarding mask usage had better practice.

Significant association was determined between the gender and the practice among the study participants. Better mask wearing practices were found among female participants ($p = 0.0066$, at 95% CI and z -value = 2.74). It was also noted that there was significant association among practice and academic year of the study participants ($p = 0.03$, at 95% CI and F -value = 2.64).

In this study it was noted that 70% (217) of the participants wouldn't compromise the quality of mask but the other 30% (96) would compromise the quality of mask for its cost.

The study participants had various complaints due to prolonged wearing of mask. There were about 66% (206) participants who had nasal complaints like feeling of dry nose, burning sensation in nose, blockage; about 54% (168) of the participants suffered with Pressure symptoms like pain behind the ear, on

the nasal bridge; there were 170 (54%) participants who had skin related problems due to wearing of mask whereas about 98 (31%) of the participants had disturbance in vision while wearing the mask. There were 143 (46%) participants who suffered with hypercapnia symptoms like suffocation/ breathless and feeling drowsy while wearing mask.

It was also noted that 68% (213) of the study participants agreed that their symptoms would gradually subside after removing the mask.

Detailed analysis related to consequences of prolonged wearing of mask reveals that among the study participants, excessive sweating was the most common consequence which would initiate within 1 hour of wearing mask among 34% (77) of the participants and by end of 3 hours approximately 49% (191) of the participants had complaints of skin irritation.

Table 4: Correlation table between Practice, Knowledge, and the symptoms due to prolonged wearing of mask.

		Nasal symptoms	Skin symptoms	Pressure symptoms	Optical symptoms	Hypercapnia symptoms	Practice	Knowledge
Practice	Pearson Correlation	-.130*	-0.054	-0.054	-.124*	-0.083	1	.282**
	Sig. (2-tailed)	0.021	0.345	0.345	0.028	0.141		0
	N	313	313	313	313	313	313	313
Knowledge	Pearson Correlation	-0.019	0.011	0.011	0.014	0.06	.282**	1
	Sig. (2-tailed)	0.734	0.844	0.844	0.807	0.287	0	
	N	313	313	313	313	313	313	313
** Correlation is significant at the 0.01 level (2-tailed).								
* Correlation is significant at the 0.05 level (2-tailed).								

The above-mentioned sufferings due to mask usage were found to be negatively correlated with the knowledge and practice of study participants (depicted in Table 4), meaning that among the participants with good knowledge and practice, the number of symptoms due to prolonged mask usage were less.

Discussion

For a face mask to provide effective protection against micro-organisms, the Health Care Worker must have an intimate knowledge of wearing and disposing masks, however, a study conducted

among Wachemo University Students revealed that the overall knowledge of the students having good knowledge (AOR = 4.40; 95%CI; 2.13, 9.14) were found to be independently associated with face mask utilization.^[7] In another study conducted by Kumar J et al, 88.5% of participants thought that they knew the proper steps of wearing a surgical face mask only 35% obtained a good score by answering the procedural questions correctly.^[8]

In a study conducted by Oleg V. Mitrokhin, it was observed that about 2/3rd of their study participants were aware of rules for using masks.^[9] In a study conducted by Larebo in Southern Ethiopia showed

that the 89.9% of their participants were aware of the correct use of surgical mask^[7]. Similarly in our current study it was found that 88% of the participants had adequate knowledge regarding masks and its usage.

In a study conducted among health care workers it was found that around 43.6% of the study participants knew about the correct method of wearing the masks, 68.9% knew that there are three layers, 53% stated that the middle layer act as a filter media barrier, and 75.5% knew the recommended maximum duration of wearing it.^[8]In our study it was noted that 77% knew that there are three layers, 72.2% stated that the middle layer act as a filter media barrier, and 39.9% knew the recommended maximum duration of wearing it.

In a study conducted at Shanghai it was noted that 41.61% of the study participants had selected both disposal surgical mask and N95 masks for usage, and 96.67% of the respondents replied that they would wear mask in public places.^[10]Results of a study among university students in Vietnam showed that, the most common type of mask used were surgical mask (57.6%, 419/728), followed by non-antibacterial cloth mask (23.1%, 168/728). Among 168 participants using non-antibacterial cloth mask, 43.5% reused masks (73/168), of whom 6.8% (5/73) did not wash their masks at least daily.^[11]In study conducted by Ekaterina A Shashina et al revealed that 89.1% of their participant used disposable medical face masks, 27.4% used reusable cloth face masks and 13.2% used respirators.^[12] But in our study, cloth mask (91%) was more popular among the participants followed by respirators (N95) (88%), and 70% of the study participants would use single use surgical mask and 23% preferred using cloth mask.

In our current study it was observed that 40% of the study Participants rightly believed that WHO recommends to wear a surgical mask for not more than 4 hours, this finding is similar to an article published in BMJ which revealed that the accuracy of the mask replacement time was 25.63% (316/1223).^[10]In a study conducted by Ekaterina A Shashina et al, it was noted that 25.1% of their respondents changed their disposable mask after 2-3h of wearing, while 13% decontaminated and used it several times, most of them being cloth face mask users who would decontaminate the mask daily (55.7%).^[12]In our study

it was also noted that there were about 36% and 56% of the participants who believed in cleaning a reusable mask every day and after every use respectively.

In our current study, Statistically significance was determined between the gender and the practice among the study participants. Better mask wearing practices were found among female participants. Which is similar to a study conducted by Bhawna Sayare, wherein the mean knowledge score was higher among female participants (5.07%) as compared to male participants (4.93%) and the difference was statistically significant.^[13] But in studies conducted by Howard M C and by Mitrokhin, though the men were less likely to wear face mask no significant gender differences were noted.^[14, 9] It was also noted that there was significant association among practice and academic year of the study participants ($p = 0.03$, at 95% CI and F-value = 2.64), this finding is similar to finding of our current study.

The facemask properties related to users comfort are important, some of which noted in our current study are: easy to breathe through material, material protects from splashes, non-breakable material of mask, odourless mask, soft and thin mask, biodegradable material, material that does not cause sweating, material that is reusable. Similar findings were observed in a study conducted by Venesoja A et al.^[15]

In a study among medical university students it was found that the most common side effects were redness, dryness, and itching of the skin, and also appearance of rashes.^[9] another study among healthcare workers reveal similar findings of adverse effects due to prolonged use of mask, headache being the most common complaint (n=245), followed by: skin breakdown (n=175), acne (n=182), impaired cognition (n=81).^[2]In our current study similar findings were observed, 66% of the participants suffered with nasal symptoms, 54% suffered with Pressure symptoms, 54% participants had skin related problems, 31% of the participants had disturbance in vision and 46% of the participants had hypercapnia symptoms due to prolonged wearing of mask.

Conclusions

Awareness regarding types of mask and it usage is the need of today for well-being. As observed in

this study, people with better knowledge tend to have better mask usage and thus fewer complaints despite wearing mask for longer duration. Most common complaint related to mask usage was excessive sweating and skin irritation. There was preference for a breathable and eco-friendly mask.

More research is needed, to assess and optimize the facemask for different operating environments, and for different purposes in healthcare settings. People should be encouraged to implement the knowledge while using the mask, in this way healthcare professionals would perform better even during epidemics without compromising their own safety or their patients.

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Conflict of interest: none

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Comorbidities and Clinical Outcomes of Patients with COVID 19 in a Tertiary Care Center at Goa: A Prospective Observational Study

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Abstract

Background: It is believed that COVID-19, in those with comorbidities, has an increasingly rapid and severe progression, often resulting in mortality. This study explores various comorbid conditions, disease severity, and clinical outcomes in patients infected with COVID-19.

Methods: This is a prospective observational study. Clinical data of COVID-19 patients admitted at Goa Medical College between November 23, 2020, to December 23, 2020, are summarized and analyzed using Google forms, spreadsheets, and R programming language.

Results: A total of 100 patient data was collected, including 5% mild, 61% moderate, and 34% severe cases. Fever (83%) was the most common symptom, followed by dry cough (83%), dyspnoea (79%), and fatigue (32%). The most common comorbidities identified were diabetes (66%), hypertension (57%), and cardiovascular and cerebrovascular conditions (27%). Clinical outcome in patients was pneumonia (84%), ARDS (40%), bronchiolitis (10%), and shock (3%).

Conclusion: Our study estimated that older men with underlying hypertension, diabetes, cardiovascular, and cerebrovascular conditions are at higher risk for severe clinical form. Fever, cough, and dyspnea were the most common signs on admission. The laboratory parameters showed a significant increase in CRP, ferritin, LDH, procalcitonin, ESR, and d-dimer in the case of SARS-CoV-2 infection.

Keywords: COVID-19, Comorbidity, Non-invasive Ventilation, Diabetes Mellitus, Hypertension.

Introduction

The COVID-19 outbreak in December 2019 has

hit more than 200 countries with over 62.8 crore cases and 65.8 lakhs deaths globally, as of October 2022^{2,3}. The clinical manifestations range from a common cold

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to more severe diseases like bronchitis, pneumonia, severe acute respiratory distress syndrome (ARDS), multi-organ failure, and even death. It is believed that COVID-19, in those with underlying health conditions or comorbidities, has an increasingly rapid and severe progression, often resulting in mortality. Older adults and people of any age who have underlying medical conditions, like hypertension, and diabetes, have shown worse prognosis. Diabetic patients have increased morbidity and mortality rates and have been linked to more hospitalization and intensive care unit (ICU) admissions⁴. Also, the clinically vulnerable group includes patients with chronic kidney disease, chronic liver disease, chronic neurological conditions, obesity, and pregnancy who are at high risk^{5, 6}. Patients with comorbidities should take all necessary precautions to avoid getting infected with SARS-CoV-2, as they usually have the worst prognosis. This paper examined the comorbid conditions, the progression of the disease, and mortality rates in patients of all ages infected with the ongoing COVID-19 disease at Goa Medical College.

Objectives

- Estimate the association between comorbidities and other risk factors to the severity of COVID-19 infection.
- Study results will help develop targeted prevention and control strategies to combat COVID-19 in Goa state.

Materials and methods

Participants

All participants were laboratory-confirmed cases of SARS-CoV-2 infection and got admitted to Goa Medical College Hospital. The analysis was done for three months (from November 23, 2020, to December 23, 2020). The first 100 patients who agreed to participate in the study were selected.

Case definition

The hospitalized patients were divided into three groups according to severity based on the Ministry of Health and Family Welfare (MOHFW) National Clinical Management Protocol COVID-19.^{7,8} The first group, "Mild," were cases with mild clinical

forms. The definition of "Moderate" were cases with moderate clinical conditions (Pneumonia with no signs of severe disease, RR >24/min, SpO₂ <94% on room air). Definition for severe—patients with clinical signs of pneumonia plus one of the following, RR >30 breaths/min, severe respiratory distress, or SpO₂ < 90% on room air.

Inclusion criteria

(1) people older than 18 years, (2) laboratory-confirmed infection with SARS-CoV-2, and (3) patients with clinical presentation of COVID-19.

Ethics statement

The study was performed by the principles of the Declaration of Helsinki. The Institutional Ethics Committee of Goa Medical College, Goa, approved this study.

Statistical analysis: was performed by Google Sheets and R program. A p-value < 0.05 was considered statistically significant. Shapiro-Wilk test was done for each lab variable. We did Welch Two Sample t-test for normal distribution and Wilcoxon rank-sum test with continuity correction for others. We performed generalized linear model (GLM) regression analysis to infer causal relationships between covid 19 disease severity (independent variable) and lab values (dependent variables). Association between comorbidities and disease severity SARS-CoV-2 positive cases were compared by Chi-square test.

Results

Demographic characteristics

One hundred patients with laboratory-confirmed SARS-CoV-2 infection were enrolled in the study for the analyzed period. 48% of all patients belonged to 50–69 years. The female sex dominated among analyzed COVID-19 patients (sex ratio: male/female = 44/66). The mean length of hospital stay was 10.42 days. The exposure history noted 20% of familiar/cluster cases and 79% unknown. Only 12% of participants have a job with more interaction with people. Based on severity, 5 mild, 61 moderate, and 34 patients had severe disease.

Clinical symptoms

The leading clinical signs on hospital admission were fever, cough, and dyspnoea (Figure 1). Patients rarely mentioned gastrointestinal disorders. On

hospital admission, 83% of patients had body temperatures above 100.4 degrees Fahrenheit. On admission, oxygen saturation below 93% was found in 39.9% of patients using a pulse oximeter.

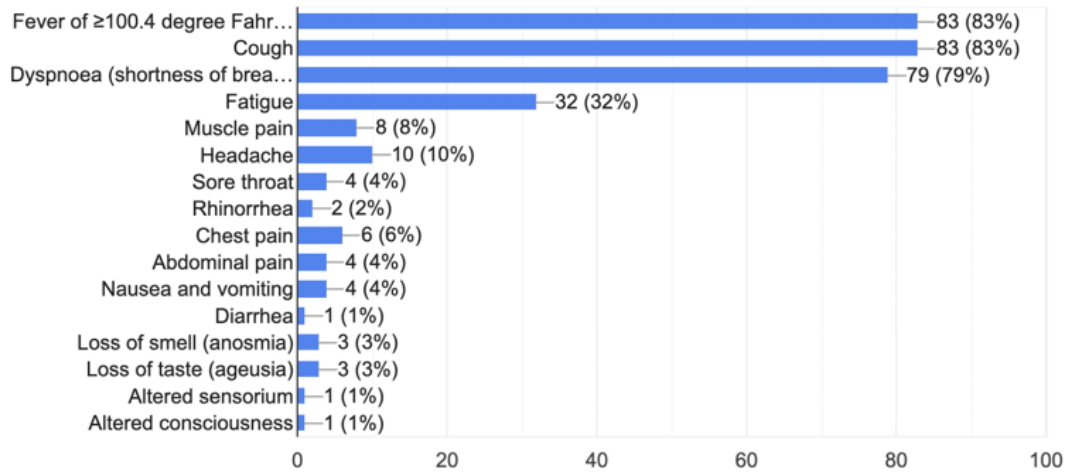


Figure 1: Clinical symptoms on hospital admission

Laboratory results

Elevation of acute phase reactants was observed (CRP, ESR, D-dimer, ferritin, LDH, and procalcitonin). We combined mild covid 19 disease patients with moderate disease category as patients with mild disease were few in number since it was a hospital-

based study. Most of the admitted patients were with moderate or severe diseases. We found that acute-phase reactants showed significant differences between severe and mild-moderated disease groups (p-value < 0.05). Urea and lymphocyte also showed a significant increase in groups with severe covid 19 diseases. (Table 1).

Table 1: Laboratory results of all study participants, and comparison between severe and mild to moderate groups.

Parameter (Unit)	Reference range	Total (n=100) Mean (SD)	Severe (n=100) Mean (SD)	Mild to moderate (n=100) Mean (SD)	P value (Welch Two Sample t-test or Wilcoxon rank-sum test with continuity correction based on Shapiro-Wilk test)
Urea (mg/dL)	5-20	52.01 (43.36)	63.15 (50.43)	46 (38.12)	W = 752.5, p-value = 0.02
Procalcitonin (ng/mL)	<0.1	6.03 (22.11)	10.36 (29.81)	3.45 (15.63)	W = 727.5, p-value = 0.05
Creatinine kinase (U/L)	22-198	10.08 (16.47)	2.6 (0.548)	17.56 (21.68)	W = 16, p-value = 0.52
ESR (mm/hr)	0-22 (M), 0-29 (F)	34.28 (13.72)	46.71 (12.019)	28 (23-32)	W = 242.5, p-value < 0.001
CRP (mg/L)	<10	39.81 (12.81)	47.38 (9.40)	35.91 (12.63)	t = -5.1221, df = 85.434, p-value < 0.001
LDH (U/L)	140-280	662.04 (255.48)	808.35 (205.76)	586.67 (246.88)	W = 443.5, p-value = < 0.001
D-dimer (ng/mL)	0-198	4095.01 (3141.48)	6261.03 (2831.48)	2979.19 (2691.18)	W = 431, p-value = < 0.001
Ferritin (ng/mL)	10-300	2450.72 (2065.96)	3256.50 (2025.33)	2035.63 (1975.78)	W = 614, p-value = < 0.001

On comparative analysis, lab results show significant variation in mild, moderate, and severe disease (Figure 2). It is elevated respective of the clinical severity. We also found a similar observation in our predictive analysis of various laboratory

indicators and the outcome variable as disease severity. (Table 2). We used a generalized linear model (GLM) for regression analysis. We found that D-dimer, Ferritin, ESR, and lymphocyte values predict the Covid 19 disease severity.

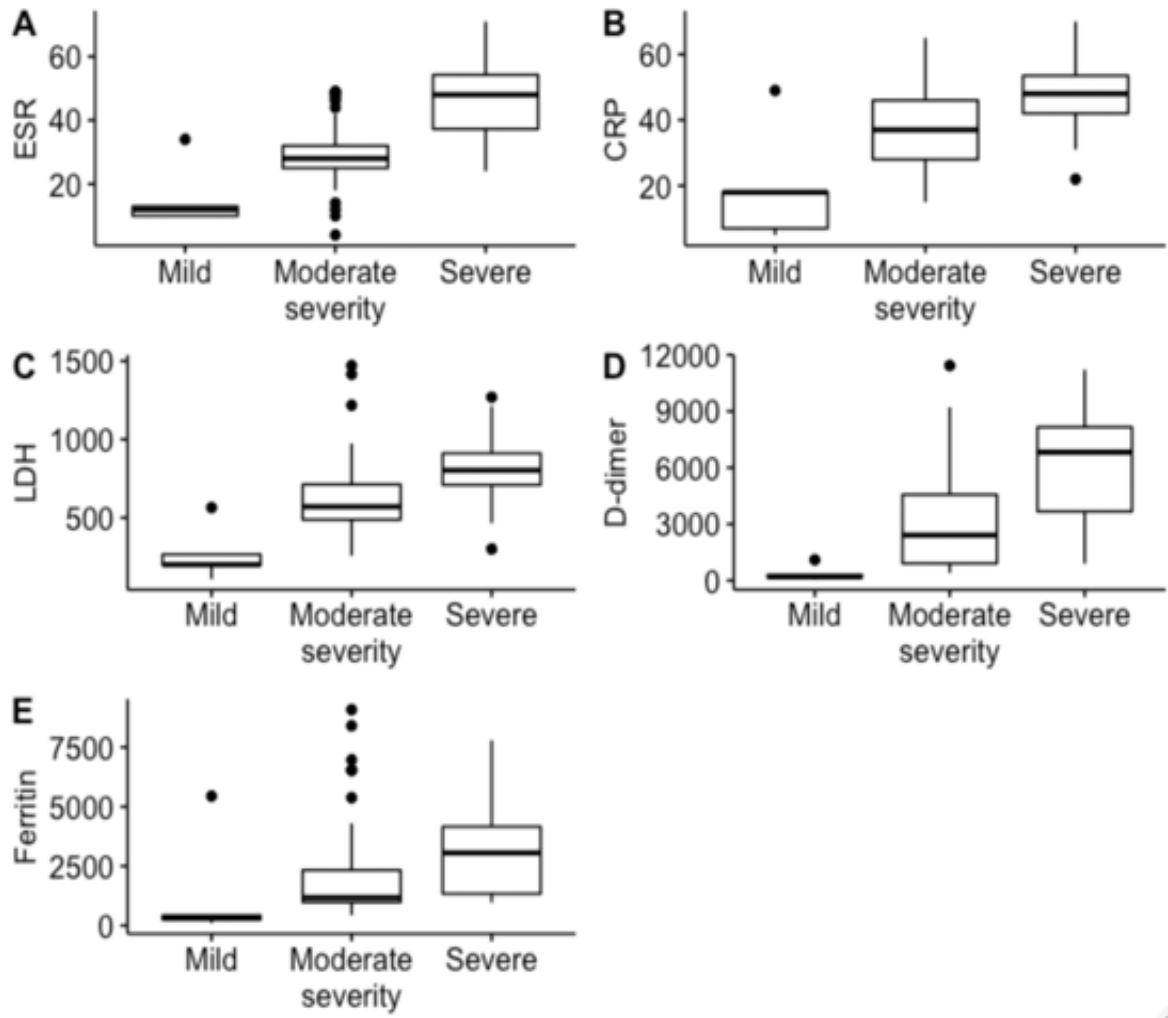


Figure 2: Boxplots of selected laboratory indicators vs. disease severity

Table 2: Logistic Regression analysis showing the causal relationship between the severity of SARS-CoV-2 infection and laboratory parameters.

	Estimate	Std. Error	z-value	Pr(> z)
Lymphocyte	-0.102	0.031	-3.264	0.001 **
ESR	0.076	0.029	2.577	0.009 **
CRP	-0.022	0.030	-0.732	0.46
LDH	-0.002	0.000	-1.098	0.27
'D-dimer'	0.000	0.000	2.766	0.006 **
Ferritin	-0.000	0.000	-1.993	0.046 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Imaging procedures

On admission, a chest x-ray was performed in 64% of patients. Lung infiltrates were observed in 61% and were absent in 3 %. Chest-computed tomography (CT) was performed in 39 % of patients during the hospital stay. Chest CT showed ground-glass opacity of 36 %.

Therapy

All patients were treated in hospital isolation. The following antiviral treatment was given (figure 3)

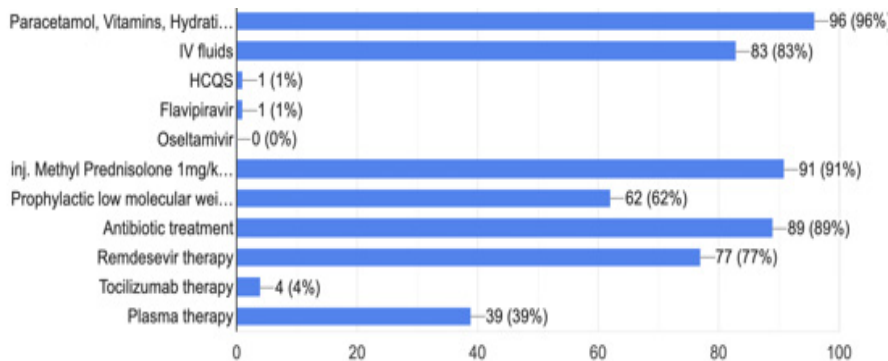


Figure 3: The treatment has given

Supportive measures

Out of 100 patients, 85 had supportive measures like oxygen therapy (38%), non-invasive ventilation (51%), and invasive ventilation (4%). Intensive Care Unit admission was needed in 38% and underwent dialysis in 4% of patients.

Association with comorbidities

The most common comorbidities identified were diabetes (66%), hypertension (57%), and cardiovascular and cerebrovascular conditions (27%). The less common comorbidities were respiratory illnesses (7%), renal disorders (11%), malignancy (3%), and liver disorders (1%).

Patients with COVID-19 disease with comorbidities such as hypertension, diabetes mellitus, and cardiovascular and cerebrovascular conditions are more likely to develop a more severe course and progression of the disease ($p < 0.05$). Malignancy, renal disorders, and respiratory illness show more minor associations between COVID-19 disease severity in our study ($p > 0.05$).

Clinical outcomes

Discharged with improvement was 96% of patients, and lethal outcomes 4%. Nineteen patients passed through the intensive care unit (five patients were intubated). All dead patients had underlying comorbidity. Discharge from the hospital was performed after a negative RT-PCR test in case of severe COVID infection and/or clinical symptoms of improvement in case of mild or moderate disease, as per guidelines.⁹

Discussion

In the current study, the mean age of all 100 patients was 52.9 years, and 63% prevalence of male sex. Zheng et al.⁹ found a mean age of 49.4 years, and 51.5% of patients were men in their hospital study. Liu et al.⁶ reported 57 years as the mean age and 55.5% female. Li et al.¹⁰ found a mean age of 50 years, and 53.3% were male patients. Wang et al.¹¹ reported 49.4 years as the mean age of critical patients and 56.8% were female patients. In their retrospective study, Tian et al.¹² found the mean age of 61.4 years of severe patients, and 51.5% (135/262) of all patients were female. A study in India by Ravi et al. reported median age of 49 years, 58.66% of males. We supposed that demographic characteristics and national features influence these slight differences.

The present study showed significant morbidity with severe form in older age groups, male gender, and comorbidities such as hypertension, heart diseases, malignancy, and kidney disorders. It is similar to data from other authors (Colaneri et al. 2020¹³, Petrilli et al. 2020¹⁴, Wang et al.¹⁵, Zheng et al.,⁹).

Similar to our study, fever, cough, and dyspnea were the most common signs of admission in Italian patients (Colaneri et al.¹³). Chinese patients noted fever, cough, and fatigue (Liu et al.⁶, Wang et al.¹⁵, Zhang et al.¹⁶, Zheng et al.⁹). Zheng et al.¹⁷ reported the following clinical signs-fever (75.8%; 122/161), cough (62.7%; 101/161), fatigue (39.8%; 64/161), and dyspnea (14.3%; 23/161). Our research assessed the presentation of dyspnea/chest tightness as the factor for severe clinical form. Dyspnea was a risk factor for aggravation of illness by Wang et al.¹⁵

Acute phase reactants like CRP, ESR, D-dimer, ferritin, LDH, and procalcitonin showed a significant difference between severe and mild-moderate disease groups (p -value < 0.05). The ferritin is abnormal with the severity of covid-19 disease, but its value remains to be explored.¹⁸ Even though we classified the patients as mild, moderate, and severe groups based on the clinical presentation during admission according to the Ministry of Health and Family Welfare (MOHFW) National Clinical Management Protocol COVID-19^{7,8}, later the lab results also supported the same.

Zhang et al.¹⁶ estimated the significant meaning of elevated CRP (increased—91.9%, 125/136 of patients; $p < 0.001$) and d-dimer (increased—43.2%, 35/81 of patients; $p < 0.001$), lower lymphocyte percentage in severe cases (12.7%) than in non-severe cases (20.0%). Colaneri et al.¹³ found significantly higher odds of severe disease associated with an increased level of LDH (OR = 1.090; 95% CI: 1.022–1.163; $p = 0.008$). Petrilli et al.¹⁴ estimated association with critical illness and elevation of CRP (>200 mg/L; hazard ratio = 5.07; $p < 0.001$), and d-dimer (>2500 lg/L; hazard ratio = 2.16; $p < 0.001$).

Our therapy was based on worldwide recommendations, national protocol, and researchers' experience.⁷ No significant data were found on antiviral treatment in the current survey. In the present study, the estimated mortality rate (4%) was higher than at the national level—0.014% (146,756/10,123,778) up to date December 24, 2020¹⁹. A study by Khedar et al. in Jaipur, India, showed 98 (11.5%) higher mortality in hospitalized patients during the first wave.²⁰ Our explanation for this statement is the individual approach to each patient. Wang et al.¹⁵ reported the same mortality (4.3%). The Italian experience of the first week in a European outbreak estimated a 4.5% mortality rate among 44 hospitalized patients in a single hospital in Pavia, Italy (Colaneri et al.¹³). Many factors influenced this indicator, so various reasons influence the values. Therefore, in our opinion, it is appropriate to search for prognostic factors like comorbidity for a severe clinical form to take timely measures.

Limitations

It was single-center research; a short follow-up, and few participants. A larger sample size may give more insight into the relationship between these lab values and the severity of COVID-19 infection. Despite these limitations, this is the first study for Goa hospitalized patients with COVID-19, giving valid scientific evidence into this infection.

Conclusion

Our study estimated that older men with underlying hypertension, diabetes mellitus, and cardiovascular and cerebrovascular conditions are at higher risk for severe clinical form. Malignancy, renal disorders, and respiratory illness show more minor associations between COVID-19 disease severity. Fever, cough, and dyspnea were the most common signs on admission. The laboratory parameters showed a significant increase in CRP, ferritin, LDH, ESR, d-dimer, and procalcitonin in the case of SARS-CoV-2 infection. All these inflammatory markers showed a significant increase in disease severity. Our therapy was based on the clinical management protocol of MOHFW. In the present study, the estimated mortality rate was higher than at the national level. These study findings support the current knowledge on COVID-19, that comorbidities have a significant relation with the severity of covid 19 infection.

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Conflict of interest: no

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Study of Bacteriological and Microbial Susceptibility in Critically Ill Children of Karnataka: Retrospective study

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Abstract

Background: Due to indiscriminate usage of antimicrobial agents among critically ill children is extremely imperative to monitor the sensitivity and resistance of antimicrobial agents (AMA). If neglected may cause unsafe treatment exacerbation of adverse drug reactions and increase the length of hospital stay.

Method: Children aged between 2 to 6 year of age admitted at ICU were studied out of 92, 69 (Sixty Nine) encountered positive. Samples collected for culture and Kirby Bayers Disc diffusion technique. MRSA tested by Oxacillin screening agar method, ESBL were tested for phenotypic confirmation test.

Results: Highest distribution were gram negative pseudomonas aeruginosa 15(21.7%) and least were 1(1.44%) included NFGNB, Moraxella, Enterococci, Coagulase-ve Staphylococci, S. aureus. The highest MDR was 6(54.5%) Acinetobacter.

Conclusion: This pragmatic Bacteriological and microbial findings will be tools for the pediatricians to treat critically ill patients admitted at ICU efficiently.

Keywords: ICU, Kirby Bauer's Disc, MRSA, ESBL, CDC, MDR.

Introduction

Antimicrobial agents are one of the most commonly prescribed drugs to patients in the intensive care units (ICU). The total antimicrobial consumption is approximately tenfold greater in ICU than in a general hospital wards⁽¹⁾. The paradox remains where the antibiotics are needed the most (ICU), there resistance is the highest. Since the discovery of very first antibiotics in the 1930's and 1940's these medications have played a revolutionary

role by fighting against various lethal infectious diseases and have saved countless lives⁽²⁾, However still the menace of infectious diseases account for 20% of the death in INDIA and Globally (11 Millions) every yearly⁽³⁾. This is due to the development of Anti-Microbial Resistance (AMR), a threat that was first observed in 1947, when staphylococcus showed resistance against penicillin⁽⁴⁾. The rapidly emerging Drug resistant microbial species make the treatment options very meager and costlier. Although a number

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of factors are thought to contribute to the increasing prevalence of AMR, but a large of studies support the claim that inappropriate use of antibiotics is the main determinant of AMR.⁽⁵⁾ Indiscriminate prescribing of Antimicrobial agents (AMA) leads to unsafe treatment exacerbation of adverse drug reactions and increase the length of stay and health care expenditure.

Prevalent pathogens and microbial resistance pattern may differ amongst various hospitals depending upon the antibiotic pressure in that region. Hence knowledge of common bacterial isolates. Their antibiotic susceptibility pattern facilitates in choosing the most appropriate antibiotic therapy.

Hence antimicrobial agents susceptibility in critically ill-children was evaluated because children have less immunity as compare to adults.

Material and Method

92 (Ninety two) children aged between 2 to 6 years admitted at Siddaganga Medical College and Research Institute, Tumakuru, Karnataka were studied.

- **Inclusive Criteria-** Clinically suspected critically-ill (Children) patients were selected for study.
- **Exclusion Criteria -** The patients who shifted to general ward from ICU. The patients discharged within 24 hours of admission were excluded from study.

Method

After detailed clinical evaluation, microbiological samples were collected from suspected sites of infection. Samples for culture were tested by Kirby Bauer's Disc diffusion technique. Methicillin Resistant *Staphylococcus aureus* (MRSA) samples were tested by oxacillin screening agar methods. Penicillin resistant streptococci were tested by agar dilution method. Out of 92 patient 69 found to be positive and 23 patients samples found to be sterile. ESBL were tested for phenotypic confirmatory test with combination test cases were subsequently classified based on CDC case definitions. Duration of study was Nov 2017 to Apr 2019.

Statistical analysis - Collections of samples from various sites, distribution of different isolates and prevalence of Multi Drug Resistance (MDR) organism were classified with percentage. The statistical analysis was carried out in SPSS Software. The ratio of male and female children was 2:1.

Observation and Results

Table-1 Collections of Various samples from critically ill children - 32(34.7%) Sputum, 23(25%) Blood, 14(15.2%) CSF, 9(9.7%) PUS, 6(6.5%) Wound Swab, 5(5.4%) Urine, 4(4.3%) Pleural fluid.

Table-2 Distribution isolates in different organism in Bacteriological and microbial susceptibility of critically ill-children - 15(21.7%) *pseudomonas aeruginosa*, 12(17.3%) *Klebsiella SPP*, 9(13.04%) *E.coli*, 11(15.9%) *Acinetobacter*, 6(8.69%) *S. aureus*, 3(4.3%) *Candida*, 3(4.3%) *Diphtheroids*, 2(2.89%) *Citrobacter*, 1(1.44%) *Coagulase Negative staphylococci*, 2(2.89%) *Streptococcus SPP*, 2(2.89%) *P.Mirabilis*, 1(1.44%) *Enterobacter*, 1(1.44%) *Enterococci*, 1(1.44%) *Moraxella*, 1(1.44%) *NFGNB*.

Table-3 Prevalence of Multidrug Resistant among common isolates - 3(33.3%) *E.coli*, 5(41.6%) *Klebsiella SPP*, 3(20%) *Pseudomonas*, 6(54.5%) *Acinetobacter*.

Table-4 The present drug resistance profile is 71.8% ESBL rate, 70% MRSA rate, 67% *Fluroquinolones*, 72% 3rd Generation cephalosporins, 10% *Betalactam inhibitor*, 43.3% *Amino glycosides*, 22% *Carbapenems*, 0% *Vancomycin*. These findings are compared with previous workers of INDIA and Abroad.

Discussion

The present study of bacteriological and microbial susceptibility in critically ill- children of Karnataka - Collections of samples from the affected areas - 32(34.7%) Sputum, 23(25%) Blood, 14(15.2%) CSF, 9(9.7%) PUS, 6(6.5%) Wound Swab, 5(5.4%) Urine, 4(4.3%) Pleural Fluid (Table-1) The distribution of different isolates in Bacteriological and microbial susceptibility were 15(21.7%) *pseudomonas aeruginosa*, 12(17.3%) *Klebsiella SPP*, 9(13.4%) *E.Coli*, 11(15.9%) *Acinetobacter*, 6(8.69%) *S.aures*, 3(4.34%) *Candida*, 3(4.3%) *Diphtheroids*, 2(2.89%) *Citrobacter*, 2(2.89%) *Streptococcus SPP*, 2(2.89%) *P.Mirabilis*,

1(1.44%) Coagulase Negative Staphylococci, S aureus, enterobacter, Enterococci, Moraxella and NFGNB (Table-2).

Prevalance of MDR among common isolates were 3(33.3%) E.coli, 5(41.6%) Klebsiella SPP, 3(20%) Pseudomonas, 6(54.5%) Acinetobacter, (Table-3). The drug resistance profile - 71.8% ESBL, 70% MRSA rate, 67% Fluroquinolones, 72% 3rd generation cephalosporins, 10% Beta lactam inhibitor, 43.3% Aminoglycosides, 22% carbapenems and 0% Vancomycin (Table-4). These findings are more or less comparable with previous studies.⁽⁶⁾⁽⁷⁾⁽⁸⁾ Infections continue to play a dominant role in the global mortality and morbidity in developing countries.⁽⁹⁾ The presence of extremely vulnerable patients with diminished host defenses and reduced immune responses, undergoing multiple procedures and use of invasive devices distorting the anatomical integrity and protective barriers of the patients, render the ICUs as a hub for antimicrobial resistance.⁽¹⁰⁾ Hence seriously monitoring the appropriate utilization of antibiotics in ICU's is crucial, preserve the power of almost exhausted antimicrobial armamentarium to fight against fatal infections.

Studies done decade back on the prescription of Antimicrobial agents (AMA) in ICU's were penicillin and amino glycosides as the most commonly used AMA but recent studies documented that 3rd generation cephalosporins are frequently prescribed AMA's. The reason for such an extensive use of cephalosporins may be because of their broad spectrum anti-microbial activity against majority of bacteria, better patient tolerability and compliance.

The most common gram positive bacteria identified was S.aureus. which causes most of the bacterial infections like endo-cardiatis, skin and soft tissue infections, septic arthritis, meningitis, pneumonia, empyma, gastro-enteritis and UTI.

Summary and Conclusion

In the present study gram negative organism were the most common organism isolated. Antimicrobial

resistance has always been a reflection of antibiotic use. (High degree of resistance to third generation cephalosporins and aminoglycosides). Based on the results It is recommended that, the prescribing pattern could be improved by adhering to the WHO prescribing indicators moreover an anti-biogram specific to institute, based on the local profile of the prevalent strains of micro organisms needs to be framed and followed to promote the rational use of antimicrobial resistance.

Limitation of Study - Owing to tertiary location of present hospital, small number of patients and lack of latest techniques we have limited findings and

Results

- This research paper is approved by Ethical Committee of Siddaganga Medical College and Research Institute, Tumakuru, Karnataka.
- No conflict of interest.
- No funding.

Table 1: Collections of various samples in Bacteriological and Microbiological Susceptibility in Critically ill-children

Total No. of patients 92			
Sl No.	Name of the sample	No. of Patients	Percentage (%)
1	Sputum	32	34.7
2	Blood	22	23.9
3	CSF	14	15.2
4	PUS	09	9.7
5	Wound swab	06	6.5
6	Urine	05	5.4
7	Pleural fluid	04	4.3

Table 2: Distribution of isolates in different organism in Bacteriological and microbial susceptibility in critically in children **Total No. of patients 69**

SI No.	Name of Organism	No. of Patients	Percentage(%)
1	pseudomonas aeruginosa	15	21.7
2	Klebsiella	12	17.3
3	E.coli SPP	09	13.04
4	Acinetobacter	11	15.9
5	Staphylococcus aureus	6	8.69
6	Candida	3	4.34
7	Diphtheroids	3	4.34
8	Citrobacter	2	2.89
9	Coagulase Negative Staphylococcus aures	1	1.44
10	Streptococcus SPP	2	2.89
11	Proteus Mirabilis	2	2.89
12	Enterobacter	1	1.44
13	Enterococci	1	1.44
14	Moraxella	1	1.44
15	Non-fermenting gram Negative bacilli (NFGNB)	1	1.44

Highest distribution was 15(21.7%) P.aeruginosa and least were 1(1.44%) included NFGNB, Moraxella, Enterococcus and coagulase negative staphyococci.

Table 3: Prevalence of Multi drug Resistant among the common isolates**Total No. of patients 69**

SI No.	Organism	Total No.of patients	No.of MDR	% of MDR
1	E Coli	9	3	33.3
2	Klebsiella SPP	12	5	41.6
3	Pseudomonas	15	3	20
4	Acinetobacter	11	6	54.5

Table 4: Comparison of Present resistant profile with previous workers

Name of the Worker with year	No.of Samples	ESBL rate %	MRSA rate %	Resistance Rate of gram negative organism/S.aureus					
				Fluroquinolones	3 rd generation Cephalosporian	Betalactam inhibitor	Aminoglycosides	Carbapenems	Vancomycin
MamaimAbdissa A 2014	150			24.7%	64.9%		41.6%		
Dewans. etal 2013	2796	78%							
Radjimetal 2011	312			20%	73%	50%	50%	72%	100%
Pattanayak C etal 2013	24.9			56%	64%		15%	24%	
SweSweetal 2010		83%	4.8%						
VeenaKumari HB 2007	489						48.5%		
Present Study 2019	92	71.8%	70%	67%	72%	10%	43.3%	22%	0%

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Study of Micro Organisms in Diabetic Foot and its Management

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Abstract

Background and Aim: Diabetic foot ulcers (DFUs) and diabetic foot infections (DFIs) are associated with reduced patient quality of life, lower-extremity amputation, hospitalization, and high morbidity and mortality. Diverse bacterial communities have been identified in DFUs, playing a significant role in infection prognosis. Hence this review done to evaluate the current state of play in etiology of DFUs by culture methods to Improve prognosis and reduce burden of diabetic foot in form of decreasing hospital stay and health cost.

Materials and Methods: A retrospective analysis was done for the patients with diabetic foot ulcer. A total of 292 samples were included in the study among which 160 male and 132 female, attending the surgery department outpatient and indoor were included. Institutional ethical clearance was taken and informed consent was obtained from the subjects in their own language.

Results: 310 samples were collected from patients with diabetic foot ulcers. From these samples, 292 having positive cultures. Overall, 91 culture results (31.18 per cent) were gram-positive, 149 culture results (51.02 per cent) were gram-negative and 52 culture results (17.80 percent) were poly-microbial.

Conclusion: Proper tissue sampling, advanced culture and sensitivity methods for diagnosis, targeted antibiotics, surgical procedures, and sugar control with regular medications can prevent infection progression and more importantly, the risk of lower extremity amputation.

Keywords: Diabetic foot ulcers; Diabetic foot infections; microbiology; culture; prognosis.

Introduction

The number of people with diabetes is expected to increase rapidly – from 450 million in 2020 to a predicted value of 600 million by 2030. More than one-third of people with diabetes develop diabetic

foot ulcers (DFUs) during their lifetime, with half of these becoming infected and causing diabetic foot infections (DFIs). Fifteen percent of patients with DFIs require lower limb amputation to prevent progression of the infection.¹

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Diabetic foot care is very expensive, with an estimated INR 1.5 to 2 lakh annual cost per patient, thus emphasizing the importance of early diagnosis and treatment of DFUs/DFIs.² Treatment consists of improving patient intrinsic factors, such as improving glucose control, as well as targeting extrinsic factors, the principal being the removal of bacterial contamination/infection. However, DFUs/DFIs harbor diverse bacterial communities, which increase the difficulty in treatment choice.

There are several laboratory techniques available with different sensitivities and specificities to determine the bacterial composition of DFUs/DFIs. Nonetheless, the characterization of the entire polymicrobial community at different severity stages ranging from mild to severe is still a major challenge.³ Although culture-based methods are the principal method of bacterial identification, they often produce false-negative results in patients who have received antibiotics; fail to identify slow-growing, fastidious, anaerobic, and unknown pathogens; and are time-consuming, hindering proper and early detection of the bacterial community in DFUs/DFIs. Recent advances in molecular technologies overcome many of the mentioned inadequacies and provide new insights into the bacterial diversity of DFUs/DFIs.

This review done to evaluate the current state of play in etiology of DFUs by culture methods to improve prognosis.

The first and most critical step, not only in culture-based methods but also in advanced molecular-based approaches, is sample collection. Historically, curettage, biopsies, swabs, and wound aspirations have been the principal routine samples taken by wound care providers.⁴ As the Infection Disease Society of America (IDSA) advises that samples be taken from the base of wounds, tissue biopsies have been proposed as a gold standard method.⁵ Swab cultures of the wound surface are also commonly used, but due to a high number of commensal microflora inhabiting healthy skin, swab culture results may not be as reliable as tissue samples.⁶ For instance, coagulase-negative staphylococci (CoNS),

Micrococcus, *Bacillus* spp., and *Corynebacterium*, which are a part of normal skin flora and have been frequently isolated from DFIs swabs, are not usually considered as pathogenic bacteria, unless the samples are taken from deep tissues.⁷ Even though the collection of swab samples is easier than tissue samples, some studies have shown that swab culture results are less specific and sensitive.⁸

Swab samples are less reliable in isolating Gram-negative bacteria such as *E. coli* and *Citrobacter*. Moreover, some Gram-negative bacteria, such as *Ralstonia pickettii* and *Serratia*, were only identified in deep tissue sample.⁸

Deep tissue samples also showed higher sensitivity for the monitoring of bacterial species that have been previously reported as antibiotic-resistant strains.⁷

Based on the aforementioned studies that compared the efficiency of bacterial culture using tissue and swab samples, it can be stated that tissue samples provide more reliable results for bacterial identification and monitoring of bacterial population in DFIs.

Materials and Method

This retrospective study was conducted at the Department of Surgery, in the medical college and associated hospital. 292 samples from diabetic foot ulcer among which 160 male and 132 female, attending the surgery department outpatient and indoor were included. Informed consent was obtained from the subjects in their own language.

All patients having diabetic foot ulcers where ulcer duration is greater than three weeks were included in the study. These patients had received antibiotics earlier.

The patients were assessed through detailed history and clinical examination. Surgeons assessed the ulcers, and after debridement material for culture was collected with a cotton-tipped sterile swab from the deeper parts of the foot ulcer.

We have divided ulcers in 3 grades.

Table no. 1 Grading of Wound

GRADE I (MILD)	Localised, superficial ulcer	134
GRADE II (MODERATE)	Deep ulcer to bone, ligament and joint	112
GRADE III (SEVERE)	Deep abscess, gangrene of toes, forefoot and foot	46

Results

A total of 292 patients who meet the inclusion criteria were included in the study. The study was conducted over the duration of one year. The included patient’s age ranged from 35 years to 80 years. Maximum numbers of patients were in the age group of 50 to 60 years. Minimum numbers of patients were in age under 45 years. Out of the total 292 patients there were 132 females and 160 males. The complete history was recorded.

WOUND GRADE	Total	(Mono vs Poly microbial)
GRADE I (MILD)	134	132 + 02
GRADE II (MODERATE)	112	104 + 08
GRADE III (SEVERE)	46	04 + 42

Overall, 91 culture results (31.18 per cent) were gram-positive, 149 culture results (51.02 per cent) were gram-negative and 52 culture results (17.80 percent) were poly-microbial. *Staphylococcus aureus* and *Escherichia coli* were the most commonly isolated organisms (24.1 and 20.8 per cent respectively) followed by *Pseudomonas aeruginosa* (18.1 per cent), *Citrobacter sp.* (12.1 per cent), *Klebsiella oxytoca* (11.1 per cent), and *Proteus sp.* (9.8 per cent). Other uncommon bacterial species (3-4 percent) were also isolated.

Out of 134 patients with Grade I ulcer, 132 were mono microbial and 2 having poly microbial; from 112 grade II, 104 isolates were mono as compared to 8 poly microbial, and 46 Grade III comprises of 04 mono microbial and 42 poly microbial isolates.

Table no. 2 Mono microbial vs Poly microbial

Out of 292 patients 26 patients having newly diagnosed diabetes mellitus, 22 patients were off treatment and 46 patients reported with irregularity in taking OHA. Majority of patients having history of trauma or itching at site of ulcer. Out of 22 patients who are off treatment; 15 patients fall in to grade II category, out of which 04 patients ends in to grade III. Out of 46 patients who are off treatment; 26 patients fall in to grade II category, out of which 2 patients ends in to grade III category.

Table no. 3 Treatment Protocol

WOUND GRADE	Treatment Protocol
GRADE I (MILD)	Dressing, Oral and targeted Antibiotics
GRADE II (MODERATE)	Dressing & Broad spectrum parenteral Antibiotics
GRADE III (SEVERE)	Broad spectrum antibiotics + daily dressing + Amputation

Discussion

292 samples were collected from patients with diabetic foot ulcers. Overall, 91 culture results (31.18 per cent) were gram-positive, These results are relatively similar to the number of Gram-positive bacteria in Al Benwan’s study (32.3% of isolates)⁹, which applied culturomic methods to isolate bacterial species, which was quite low compared to the number of Gram-positive species in Jneid’s study (54.7% of isolates). 149 culture results (51.02 per cent) were gram-negative, which was quite high compared to the number of Gram-negative species in Jneid’s study (26.4 % of isolates)¹⁰. and 52 culture results (17.80 percent) were polymicrobial which was relatively lower compared to Sánchez’s study¹¹ (48.3%); which was opposite to Citron’s study¹² with 83.8% of positive cultures were polymicrobial with a mixed population of Gram-positive and Gram-negative species.

As noted; with increasing grade of the wound significant increase in number of poly-microbial isolates found.

Although culture-based methods have been the gold standard for bacterial identification for many years, this approach may not necessarily reflect all

the clinically important pathogenic bacteria in DFIs, particularly anaerobes and uncommon species. The study of slow-growing, fastidious, anaerobic, and unknown pathogens, which normally have been underestimated by culture-based methods will provide an early warning system necessary for modification and alteration of antibiotic therapy.

Conclusions

There have been many studies on the bacteriology of DFUs/DFIs over the past decades with varying, and sometimes inconsistent results. These discrepancies might be due to demographical and geographical differences, various processes of sampling, human errors, sample size, and different bacterial identification methods used.

While antibiotic treatment for DFIs is initially prescribed empirically, accurate bacterial identification of DFIs can improve therapeutic approaches. The selection of the most effective antibiotic is a vital step to reduce the treatment period, prevent the expansion of resistant bacterial strains, and limit health costs.¹³

It may be concluded that from clinician side; proper tissue sampling and advanced culture and sensitivity methods should be used so that one can give targeted antibiotics according to sensitivity and promote healing of wound; which can also be improved by proper surgical debridement and dressing techniques.

And With patients role in effective foot care, anti-diabetic diet, adequate sugar control and regular anti diabetic medication can reduce burden of diabetic foot in form of decreasing hospital stay and health cost.

Ethical Clearance: Taken from IRB

Source of funding: Self

Conflict of Interest: Nil

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Placental Laterality as a Predictor for Development of Preeclampsia

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Abstract

Background: Preeclampsia is a pregnancy-related condition characterized by high blood pressure and proteinuria after 20 weeks of pregnancy. It's a multiorgan disorder with no recognized cause. It's one of the most prevalent pregnancy problems, and it's a leading cause of maternal and foetal mortality and morbidity

Objectives: To determine the placental laterality as a predictor for development of pre-eclampsia.

Methods: 100 pregnant women with gestational age between 18 to 24 weeks with h/o pre-eclampsia were included. ultrasonography was used to determine the position of the placenta in all 100 women. When the placenta was evenly divided across the right and left sides of the uterus, regardless of anterior, posterior, or fundal location, it was categorized as central.

Results: The mean age group was 23.53 ± 3.15 yrs. The prevalence of pre-eclampsia in this study was 14%. This screening test has Sensitivity of 81%, Specificity of 85.3%, Positive predictive value of 47.2%, Negative predictive value of 96.43%, p value <0.001 which is significant.

Conclusion: Placental laterality is an excellent screening tool for the prediction of pre-eclampsia aids in the identification of the individuals particularly at risk, allowing them to be included in a primary prevention programmes.

Keywords: Placenta, Pre-eclampsia, Unilateral placenta, Central placenta

Introduction

Preeclampsia is a pregnancy-related condition characterized by high blood pressure and proteinuria after 20 weeks of pregnancy.¹ It's a multiorgan disorder with no recognized cause.² It's one of the most prevalent pregnancy problems, and it's a leading cause of maternal and foetal mortality and

morbidity.³ It is the 2nd significant cause of maternal mortality and morbidity in underdeveloped nations, complicating 7-10% of all pregnancies.⁴

In patients with hypertension with a normal heart, cardiac failure with pulmonary edoema can develop. Pregnant women, especially those who are pre-eclamptic, are more likely than non-pregnant

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women to suffer pulmonary edoema. Preeclampsia is also known to be a risk factor for peripartum cardiomyopathy and subsequent cardiovascular disease.⁵

Only the presence of a placenta causes preeclampsia. Abnormal wave patterns suggesting inadequate uterine perfusion are largely a result of placental implantation when one uterine artery is the primary source of the intervillous flow, according to noninvasive doppler velocimetric examinations of the uterine arteries in the second trimester.⁶

In the majority of individuals with aberrant flow velocity waveforms, the placenta is positioned laterally. In light of these findings, we devised prospective research to observe if the lateral placement of the placenta as detected by ultrasound at 18-24 weeks of pregnancy may be used to predict preeclampsia.⁷

To be effective, a screening test must be accurate, inexpensive, and easy to administer. It should improve the prediction value, and preventative actions should be effective. Good prenatal care, followed by appropriate treatment, will undoubtedly aid the mother and the baby in achieving a positive outcome.

Materials and Methods

Study design: Random prospective observational study

Study Setting: Department of Obstetrics and Gynaecology, Shadan Institute of Medical Sciences and Research Centre

Study Duration: 14 February 2022 to 30 August 2021

Study population and Size: 100 Pregnant women attending the Obstetrics and gynecology department.

Inclusion Criteria:

- Patients with gestational age between 18 to 24 weeks.

Exclusion Criteria:

- h/o chronic hypertension, Diabetes Mellitus, Renal disease

- BP >140/90 mm Hg
- Evidence of proteinuria

Pregnant women with Rh Negative, past h/o pre-eclampsia, and family members with h/o pre-eclampsia were also included in the research.

At 18-24 weeks, ultrasonography was used to determine the position of the placenta in all 100 women. When the placenta was evenly divided across the right and left sides of the uterus, regardless of anterior, posterior, or fundal location, it was categorized as central.

It was defined as unilateral right or left placenta when 75 % or more of the placental mass was on one side of the midline. The study's end point was either the onset of hypertension according to ACOG guidelines or the delivery.

Routine prenatal appointments were followed up on for signs and symptoms of pre-eclampsia, including blood pressure, serial weight, edoema, and pre-eclampsia investigations where necessary, with the results recorded. The mode of delivery as well as the foetal fate were documented.

Statistical Analysis: The SPSS 22 software was used for statistical analysis. The data was presented in the form of means and percentages.

Observation and Results

Table 1: Distribution based on Age group

Age in years	Frequency	Percentage
≤ 20	20	20%
21-25	52	52%
26-30	20	20%
>31	8	8%
Total	100	100%
Mean ± SD	23.53 ± 3.15 yrs	

The majority of the patients belonged to the age group of 21 to 25 yrs with incidence of 52%, followed by <20 yrs and 26 to 30 yrs age group in 20% of the cases each, least belonged to the age group of >31yrs with 8% cases. The mean age group was 23.53 ± 3.15 yrs.

The association between maternal age and the

incidence of pre-eclampsia demonstrates that young primigravida have a greater incidence than older primigravida. Preeclampsia was common in the research group between the ages of 20 and 25, and it was prevalent above the age of 30.

High incidence of pre-eclampsia in primigravida (81%) than in multigravida (19%)

Table 2: Distribution of patients according to severity of pre-eclampsia in study and control group

Type of pre-eclampsia	Study group	Percentage
Mild Pre-eclampsia	13	92.85%
Severe Pre-eclampsia	1	7.14%
Total	14	
Eclampsia according to Risk		
Low risk	9	64%
High risk	5	26%

According to the severity of pre-eclampsia, In the study group, 13 patients had mild preeclampsia and 1 patient had severe preeclampsia.

Out of 14 patients with preeclampsia, 64% pre-eclampsia was seen in low risk patients and 26% pre-eclampsia was seen in high risk patients.

Table 3: Relationship of placental position and development of pre-eclampsia in high and low risk women

Placental Position	Developed pre-eclampsia	Normotensive
Central (n=76)	3(21.42%)	73(84.88%)
Lateral (n=24)	11(78.57%)	13(15.11%)
Placental Position in high risk		
Central (n=18)	1(20%)	17(94.44%)
Lateral (n=5)	4(80%)	1(5.55%)
Placental Position in low risk		
Central (n=58)	2(22.22%)	56(82.35%)
Lateral (n=19)	7(77.77%)	12(17.64%)

Around 11 patients in the lateral placenta group developed pre-eclampsia which accounted for 78.57% of all pre-eclamptics. 4(80%) patients in the

lateral placenta group developed pre-eclampsia in the high risk group. 5(77.77%) patients in the lateral placenta group developed pre-eclampsia in the low risk group. p-value is <0.001 and is highly significant. Most patients developed pre-eclampsia between gestational age of 36 to 40 weeks indicating that the incidence is higher in later part of gestation

Table 4: Distribution based on sensitivity and specificity

Statistic	Value
Sensitivity	81%
Specificity	85%
Positive Likelihood Ratio	5.4
Negative Likelihood Ratio	0.223
Positive Predictive Value (*)	47.2%
Negative Predictive Value (*)	96.43%
Accuracy (*)	81.27%

This screening test has Sensitivity of 81%, Specificity of 85.3%, Positive predictive value of 47.2%, Negative predictive value of 96.43%, p value <0.001 which is significant.

Discussion

Preeclampsia is a multi-organ systemic clinical condition that continues to be the leading cause of maternal and neonatal mortality and morbidity. The quest for the perfect prediction test and preventative strategy continues to be arduous.

Unfortunately, compared to advancements achieved in eradicating other catastrophic medical conditions, there has been little success in predicting this disorder. The scope of the problem, as well as the repercussions for the mother and the newborn, must be highlighted and updated, particularly in developing nations where the occurrences are high. The enormous expense of critical care for the mother, the infant, and the long-term complications in the preterm or intrauterine growth restricted baby will tend to have an impact on health systems unless effective preventative strategies are developed and implemented. The quest for the optimum prediction test and preventative measures continues to be arduous. Regardless of whether the placenta is laterally placed, the majority of the time, one of the uterine arteries meets the uteroplacental blood

flow demands, with some help from the other uterine artery via collateral circulation. The degree of collateral circulation may not be the same in all women, and a lack of contribution may render preeclampsia, IUGR, or both quite probable.⁸ Normal placentation is critical for cytotrophoblastic invasion, because cytotrophoblasts in preeclampsia do not develop a vascular adhesion phenotype. When the uteroplacental blood flow demands are mostly satisfied by one side uterine artery, this might explain why trophoblastic invasion is minimized in laterally located placentas.

The prevalence of pre-eclampsia in this study was 14% which is similar to previous studies with 14%,⁹ and another study with 13.6% prevalence of pre-eclampsia.¹⁰

This study result concurs with Kofinas et al., who observed that women with a unilateral placenta had a 2.8-fold higher risk of preeclampsia than those with a centrally located placenta.¹¹ The current study's findings were also comparable to those of Kalanithi et al., who reported that the development of PIH and IUGR pregnancies was about fourfold higher in lateral placentation.¹²

Females with a laterally placed placenta are five times more likely to develop PIH, therefore these pregnancies may require circumspect obstetric management to obtain a better outcome and minimize preeclampsia-related maternal and neonatal illness and mortality.

Conclusion

The study concludes that, among several screening tests, placental position assessed by ultrasonogram between 18 and 24 weeks of pregnancy is a good screening technique for the prediction of pre-eclampsia since it is simple and easy to conduct, inexpensive, and included in the anomalies scan. The procedure is painless and convenient for the patient.

Lateral placentation aids in the identification of the individuals particularly at risk, allowing them to be included in a primary prevention programmes.

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Antimicrobial Susceptibility Profile of Methicillin Resistant *Staphylococcus Aureus* (MRSA) Isolates in a Tertiary Care Hospital, Mysuru, India

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Abstract

Background: MRSA strains are the most common causes of community and hospital acquired infections. Antimicrobial medications have become a significant issue in the healthcare sector as a result of the increased death rate from *Staphylococcus aureus* infections, the appearance of methicillin-resistant and other multi-drug resistant strains. The study's goals and objectives were determining the prevalence of MRSA and assessing the antibiotic efficacy of MRSA isolates from various clinical samples.

Materials and Methods: A total of 395 MRSA were isolated from various clinical specimens and identified by using standard microbiological techniques at tertiary care hospital of Mysore, South India. Methicillin resistance was determined by standard Kirby-Bauer disc diffusion test using cefoxitin 30µg disk.

Antimicrobial resistance patterns were determined by automated Vitek2 system.

Results: A total of 246 (62.27%) isolates were identified as MRSA out of 395 *S. aureus* isolates collected from various clinical samples such as pus samples (86.17%), blood (3.65%), Et swabs (3.65%), ear swabs (2.84%), sputum (1.6%), urine (0.81%), and other sterile body fluids (1.21%). All MRSA isolates were susceptible (100%) to vancomycin, linezolid and daptomycin followed by other antibiotics like rifampicin (99%), tigecycline (96.74%), tetracycline (95.93%), teicoplanin (95.5%), gentamicin (73.17%). Most of the MRSA isolates were resistant to oxacillin (97.15%), trimethoprim/sulfamethoxazole (95.12%), Levofloxacin (93.49%), ciprofloxacin (92.68%), clindamycin (87.80%), erythromycin (63.41%).

Conclusion: In our study, we found MRSA isolates were susceptible to most active and reliable routinely used antibiotics. Good infection control procedures like thorough hand washing, identifying and treating MRSA carriers, and prudent use of antimicrobial medicines are advised to prevent the formation of drug-resistant isolates. In addition to the Vitek 2 approach, we may conclude that cefoxitin disc diffusion is an essential test to diagnose MRSA.

Keywords: Antibiotic resistance, Methicillin resistant *Staphylococcus aureus*, Cefoxitin.

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Introduction

MRSA has become one of the most significant multi-resistant pathogen worldwide, in hospitals and community, shortly after the introduction of methicillin in 1961.^[1] A wide range of antibiotics are used to treat staphylococcal infection including penicillin, cephalosporin, macrolide, fluoroquinolone and glycopeptide group of antibiotics.^[2]

In early nineties, the major treatment available to combat this organism was penicillin. Over the past 50 years, *S. aureus* has undergone genetic modification that has resulted in antibiotic-resistant strains. Resistance to these drugs occurs because of the acquisition of genes that encode drug inactivating enzymes, initially known as penicillinase and now called β -lactamase that hydrolyse the penicillin.

Resistance to oxacillin is mediated by penicillin-binding protein, in short PBP2a, with low affinity to β -lactams, encoded primarily by the *mecA* gene and are clinically resistant to all available β -lactams.^[3] Isolates containing the PBP2a-mediated resistance mechanism are clinically resistant to all available β -Lactams. PBP2a is capable of substituting the biosynthetic functions of the normal PBPs even in the presence of the β -lactams and preventing cell lysis.^[4,5]

MRSA strains associated with community infection are usually resistant to beta-lactams but susceptible to other antimicrobial classes, where, hospital associated MRSA strains are usually resistant to all classes of antibiotics.^[6] These methicillin resistance staphylococci possesses a great challenge to the clinicians as these microbes are also resistant to other higher β -lactam group of antibiotics and have a tremendous impact on the morbidity, mortality and cost of hospitalization.

Therefore it is important to restrict the spread of MRSA.^[7]

To control the spread of MRSA in the human population requires the identification of MRSA isolates. *S. aureus* strains harboring *mecA* gene shows higher MIC to oxacillin than those strains carrying other *mec*-gene (*mecC* or *mecB* gene). Susceptibility testing studies have shown that some MRSA typically tests as cefoxitin resistant but oxacillin susceptible.^[3]

As per CLSI, standardized methods need incubation at temperatures not greater than 35°C and require reading to be obtained after a full 24hr of incubation for MIC tests and after 16–18hr for cefoxitin-based tests.^[8, 9] Disc diffusion method requires 16-18 hrs incubation which is a disadvantage, where Vitek can classify the isolate within 8hrs and also combines an oxacillin screen and MICs to detect MRSA or MSSA.^[10]

Materials and Methods

This study was conducted on 395 *S. aureus* isolates collected in the department of microbiology from various clinical samples that were received for routine diagnosis of culture and sensitivity. Clinical samples that were included in the study were pus, blood, endotracheal aspirates, ear swabs, sputum, urine, and other sterile body fluids, from all age groups and both the sexes.

Samples were processed and identified by standard microbiological methods and also by Vitek 2 system. In brief, the clinical samples were inoculated on to Blood agar and Mac Conkey agar for isolation of the pathogens. Those samples yielded the growth of *Staphylococcus aureus* that were identified by standard procedures like catalase test, coagulase test and Vitek 2 ID were further included for the study. Resistance patterns of the isolates were documented from Vitek 2 system.

Methicillin resistance was detected by disc diffusion method (Kirby Bauer) using cefoxitin(30 μ g) and oxacillin(1 μ g) disk. *S. aureus* isolates were lawn cultured onto Muller Hinton agar and the plates were incubated at 37°C for overnight. Strain with zones of inhibition \leq 21mm on MHA around cefoxitin

30 μ g (HiMedia) disk and \leq 10mm around Oxacillin disk was considered as MRSA, as per CLSI guidelines 2021.

Results

Among 395 *S. aureus* isolates collected from various clinical specimens such as pus samples (n=212;86.17%) followed by blood (n=9;3.65%), Ear swabs (n=9;3.65%), ear swabs (n=7;2.84%), sputum (n=4;1.6%), urine (n=2;0.81%), and other sterile body fluids (n=3;1.21%), 246 (62.27%) isolates were

identified as methicillin resistant by cefoxitin disc diffusion method. Disk diffusion method showed only 187(76.16%) were resistant to both cefoxitin and oxacillin disk, out of 246 (62.27%) MRSA isolates. 36 (14.63%) isolates were oxacillin sensitive and 23 (9.34%) isolates were oxacillin intermediate sensitive (Table 1).

All the 246 MRSA isolates detected by cefoxitin disc diffusion method were resistant to oxacillin

(97.15%), Trimethoprim/sulfamethoxazole (95.12%), Levofloxacin (93.49%), ciprofloxacin (92.68%), clindamycin (87.80%), erythromycin (63.41%) and gentamicin (21.54%) respectively by Vitek 2 system. All MRSA isolates were susceptible (100%) to vancomycin, linezolid and daptomycin followed by other antibiotics such as rifampicin (99%), tigecycline (96.74%), tetracycline (95.93%), teicoplanin (95.5%), gentamicin (73.17%). (Table 2)

Table 1: Showing Cefoxitin and Oxacillin susceptibility testing of MRSA isolates.

Method	Resistant	Intermediate	Sensitive
Cefoxitin disc (30mg)	246 (62.27%)	-	149 (37.72%)
Oxacillin disc (1mg)	187 (76.16%)	23 (9.34%)	36 (14.63%)
Vitek 2 System	395	-	-

Table 2: Antimicrobial susceptibility profile of MRSA isolates by Vitek 2 system.

Antibiotics	Resistant	Intermediate	Sensitive
Ciprofloxacin	228 (92.68%)	3 (1.21%)	15 (6.09)
Clindamycin	216 (87.80%)	-	30 (12.2%)
Erythromycin	156 (63.41%)	16 (6.5%)	74 (30%)
Oxacillin	239 (97.15%)	-	7 (2.85%)
Levofloxacin	230 (93.49%)	-	16 (6.51%)
Linezolid	-	-	246 (100%)
Rifampicin	2 (1%)	-	244 (99%)
Teicoplanin	11 (4.9%)	-	235 (95.5%)
Tetracycline	10 (4.7%)	-	236 (95.93%)
Tigecycline	8(3.25%)	-	238(96.74%)
Trimethoprim/ Sulfamethoxazole	234 (95.12%)	-	12 (4.88%)
Vancomycin	-	-	246 (100%)
Gentamicin	53 (21.54%)	13 (5.29%)	180 (73.17%)
Daptomycin	-	-	246 (100%)

Discussion

Staphylococcus aureus is currently a significant health concern for the general public. The current study was confined to prevalence and antibiogram of MRSA isolates. In this study, total 395 samples were detected as MRSA by Vitek 2 system, out of which 62.27% (n=246) isolates were resistant to cefoxitin. Total of 76.16% (n=187) isolates were resistant by both cefoxitin and oxacillin by disk diffusion method, which is a great variation with vitek2 system result. A similar study by Sandrine Roisin et al., found the

overall sensitivities for oxacillin resistance detection were 97.5% for the Vitek 2 automated system, and 99.6% for 30µg cefoxitin disks diffusion method.^[11]

Our study showed 76.16% (n=187) MRSA isolates were resistant to cefoxitin and oxacillin both and 23.9% (n=59) of the MRSA isolates were cefoxitin resistant but oxacillin sensitive, similar result reported by Liu J-L et al., where 95.49% MRSA isolates were resistant to both cefoxitin disk diffusion and oxacillin broth micro-dilution method and 2.91% were cefoxitin resistant but oxacillin sensitive.^[12]

In a large-sample study by Nicole M. Broekema et al., also reported cefoxitin sensitivity and specificity compared to those of oxacillin were 97.3% and 100%, respectively.^[13] Cefoxitin disc diffusion results are easier to interpret than oxacillin results due to the frequent hazy oxacillin zones, which are commonly misinterpreted as evidence of oxacillin susceptibility. Cefoxitin is more sensitive for the detection of resistance as it is a better inducer of PBP-2a encoding mec-A gene. In the present study total 62.27% (n=246) MRSA isolates were detected by both disc diffusion and Vitek2 system, which is similar to the study of V. Vasuki et al., Sapkota et al., and Singh et al., where prevalence of MRSA was 54.2% (n=45), 70.6% (n=94), and 53.6% (n=180) respectively. ^[14,15] MRSA isolates processed by Vitek 2 system were 100% susceptible to Vancomycin, linezolid and daptomycin in the present study which is very much similar to the study of V. Vasuki et al., where all the MRSA isolates were susceptible to vancomycin, teicoplanin, tigecycline and linezolid. ^[14] Among other antibiotics rifampicin (99%), tigecycline (96.74%), tetracycline (95.93%), teicoplanin (95.5%), gentamicin (73.17%) were also active against MRSA isolates. A number of earlier reports from the Indian subcontinent and foreign groups also can be compared to the current study where susceptible to tetracycline reported as 86.2% by Brown et al., in 2007, 87.2% by Adhikari et al., in 2017, 79.3% by Raut et al., in 2017, and 92% by Sanjana et al., in 2010.^[16-19] Gentamicin susceptibility reported as 58.15% by Rajadurai pandi et al., in 2006, 73.3% by Khanal et al. in 2018 and 69% by Sanjana et al., in 2010, in their studies.^[19-21]

The rapid evolution of antibiotic resistance in *S. aureus* is of considerable concern. In the current study all the 246 MRSA isolates detected by Vitek 2 system were resistant to oxacillin (Ox97.15%), trimethoprim/sulfamethoxazole (95.12%), Levofloxacin (L-93.49%), ciprofloxacin (Cip92.68%), clindamycin (Cd-87.80%), erythromycin (E-63.41%), which indicate the emergence of multiple drug resistant *S. aureus* strains. Antibiotic-resistant pattern of all the MRSA isolates according to vitek 2 method can be compared to a various national and international studies. The high resistant pattern of oxacillin (97.15%) can be compared to Khadri et al., Suzanne et al., and Bala et al., (100%).^[22-24] In

contrast, resistant pattern of ciprofloxacin (92.68%), clindamycin (87.80%), erythromycin (63.41%) can be comparable to the studies of Anupurba et al (CIP-84.1%, E-80.1%), Subedi et al (CIP-94.4%, E-83.4%), Kumari et al. (E-70.41%, CIP-67.35%), Sanjana et al. (CIP71.08%, E-58.06%), Arora et al (CIP-67.8%, E-61.7%), Bala et al. (CIP-98.68%, E58.63%), Mulla et al.(CD-68.4%, E-63.1%), Ahmed et al. (CD-81.4%, E-77.7%), Orret et al. (E86.7%, CD-75.3%, T-78.7%, CIP-59.1%), Khadri et al.(E-83%), and Onwubika et al.(E-100%), respectively.^[23,25-32] In the present study gentamicin resistant rate is 21.54%, similar pattern also found in the study of Suzanne et al., (10.2%), and Eyob Yohannes et al., (1.2%).^[29, 33]

Conclusion

Methicillin resistant *S. aureus* is one of the most important pathogens, causing severe morbidity and fatal infections. Most active and reliable antibiotics are vancomycin, daptomycin, tigecycline, teicoplanin and linezolid etc. used for infections caused by the MRSA. In our investigation, increased susceptibility to routinely used antibiotics was discovered. The findings of our study's Vitek 2 system and cefoxitin disc diffusion methods demonstrated a remarkable disagreement. The use of cefoxitin disc diffusion as a superior approach to oxacillin disc diffusion for MRSA detection, however, is also in conflict with this. Our findings show that some MRSA strains were incorrectly categorised as susceptible by the disc diffusion approach or resistant by the vitek 2 system. It emphasizes the value of utilizing automated microbial identification and sensitivity techniques that give the microbiologist greater information. Therefore, given that cefoxitin disc diffusion has already been indicated as a surrogate test, we can draw the conclusion that in addition to the Vitek 2 method, it is also a crucial test to diagnose MRSA. In our study, it was also observed that several MRSA isolates had high levels of resistance to oxacillin, trimethoprim/sulfamethoxazole, Levofloxacin, ciprofloxacin, clindamycin, and erythromycin. Hence, good infection control procedures like thorough hand washing, identifying and treating MRSA carriers, and prudent use of antimicrobial medicines are advised to prevent the formation of drug-resistant isolates.

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Risk Factors of Diabetic Foot Ulcers in Type 2 Diabetes Mellitus Patients: Basis for Foot Care Education

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Abstract

Background:The rising incidence of diabetes mellitus has become a major problem worldwide. Indonesia has the seventh largest number of diabetic patients and diabetes is also the third cause of death after stroke and hypertension. Diabetic Foot Ulcers (DFU) are common cause of diabetes mellitus complications. Foot problems often receive less attention and it is not the priority for many health professionals in Indonesia. Diabetic foot ulcers are preventable through Diabetes Foot Care Education.

Aim:The study aimed to assess risk factors of Diabetic Foot Ulcers in patients with Type 2 Diabetes Mellitus and develop an appropriate diabetic foot care education.

Methodology: This study used prospective research design and conducted at Wocare Diabetic Clinic in Bogor Indonesia. Study populations will be all Type 2 Diabetes Mellitus patients with a total sample of 48 patients. Ordinal and nominal data were described by absolute values and percentage while continuous data was reported as mean and standard deviation. Univariate data was analyzed by χ^2 test or Fisher exact test for categorical and Wilcoxon test for continuous data. The significance level will be set at 95% with p -value=0.05.

Result:There was an increase in the average diabetic foot care behavior before and after education with a mean value of 79.6 to 79.9. The results of the Wilcoxon test showed a p -value of 0.000.

Conclusion:There was a significant difference between behavioral scores before and after intervention with foot care education.

Keywords: Diabetic Foot Ulcers, Foot Care Education, Type 2 Diabetes Mellitus

Introduction

The rising problem of diabetes has become a major problem worldwide and affects more than 132.2 million in the Western Pacific region and more

people in any other region. ⁽¹⁾

Indonesia has the seventh largest number of diabetic patients (7.6 million) and is the third cause of death after stroke and hypertension. ⁽²⁾Prevalence

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of Diabetes Mellitus in Indonesia was equal to 8.5 million in 2013 and will be 14.1 million patients in 2035.⁽³⁾ Non-communicable diseases including diabetes in the Philippines account for 6 out of the top ten causes of mortality.⁽⁴⁾

In the 2013, it was estimated that there were 3.2 million cases of Type 2 Diabetes Mellitus, with a 5.9 prevalence rate in adults between the ages of 20 and 79 years.⁽⁵⁾ Around 1.7 million of people with type 2 Diabetes Mellitus remain undiagnosed. Recent research by International Diabetes Federation revealed that 6.2 % prevalence rate of diabetes found in adults and over 3.721.900 cases of diabetes remained in 2017.⁽⁶⁾ One of the major Diabetes Mellitus complications is the development of Diabetic Foot Ulcer (DFU). Foot ulcers and amputation are consequences of diabetic neuropathy and or peripheral arterial disease (PAD). These conditions are commonly found and represent major causes of morbidity and mortality in people with diabetes.⁽⁷⁾

International Working Group on Diabetic Foot⁽⁸⁾ has proposed neuropathy and angiopathy as the main risk factors for the development of Diabetic Foot Ulcers. In terms of risk factors, studies identified history of DFU or amputation, insulin usage, gender, distal neuropathy and foot deformity. However, limited studies in Indonesia would describe risk factors of Diabetic Foot Ulcers in patients with type 2 Diabetes Mellitus.

Assessment of risk factors related to the development of Diabetic Foot Ulcers in patients with Diabetes Mellitus is essential in the development of diabetes foot care education. All patients and their families with diabetes and particularly those with high-risk foot conditions (history of ulcer or amputation, deformity, loss of protective sensation or peripheral arterial disease) should receive general education about risk factors and appropriate management.⁽⁷⁾

Diabetic foot ulcers are preventable through Diabetes Foot Care Education. Diabetes foot care education is an effective means to improve foot care knowledge and practice in patients with diabetes⁽⁹⁾ and reducing the burden of diabetic foot ulcer.⁽¹⁰⁾ Several studies showed effectivity of foot care education to cognitive and behavioral changes as well as decrease in foot ulcer incidence. Thus, this study

aimed to assess risk factors of diabetic foot ulcers in patients with type 2 diabetes mellitus to develop a superior diabetes foot care education.

The study aims to determine the risk factors of diabetic foot ulcers in patients with Type 2 diabetes mellitus and develop appropriate diabetic foot care education.

Methodology

The prospective research design will be used to determine risk factors of diabetic foot ulcers in patients with type 2 Diabetes Mellitus to develop appropriate diabetic foot care education. The study will be conducted at Wocare Diabetic Clinic in Bogor, Indonesia. Study populations will be type 2 Diabetes Mellitus patients with diabetic foot ulcers and sample size was determined using power analysis equation. Inclusion criteria involved patients with type 2 Diabetes Mellitus diagnosed by the physician and written in the medical records, with presence of diabetic foot ulcers and attended diabetic clinic. All patients who attended endocrine outpatient clinic or recently diagnosed with Diabetes Mellitus in the hospital were excluded in the study.

Independent variables will be demographic profile of the patients that include age, gender, marital status, education, socio economic status, occupation, and ethnic origin. The demographic variables will be collected through an interview using a checklist. Dependent variables include risk factors of Diabetic Foot Ulcers and this data were collected through the review of the patient's medical record.

Foot care behavior includes foot inspection, foot washing, nail trim, foot wear inspection and foot wear practice. Patient's cultural and spiritual beliefs related to their foot care behavior will be gathered through interview using yes or no questions. To assess and classify diabetic foot ulcers, Wagner Diabetic Foot Ulcer Grade Classification System was utilized. The Wagner diabetic foot ulcer classification system assesses ulcer depth and the presence of osteomyelitis or gangrene by using grade 0-5. Grade 0 means intact skin, grade 1 means superficial ulcer of skin or subcutaneous tissue, grade 2 means extension into tendon bone or capsule, grade 3 means deep ulcer with osteomyelitis or abscess, grade 4 means

partial foot gangrene and grade 5 means whole foot gangrene. To prevent bias, foot assessments will be done by two diabetic foot experts and average means scores will be considered to be the grading of diabetic foot ulcers.

Ordinal and nominal data were described by absolute values and percentage while continuous data will be reported as mean and standard deviation. Univariate data will be analyzed by χ^2 test or Fisher exact test for categorical and independent t-test for continuous data. The significance level will be set at 95% with p-value =0.05. All data were analyzed with SPSS version 25 software.

Results

The results of the study were divided into univariate analysis and bivariate analysis. The results of data processing are presented in the form of an explanation table.

Table 1. Frequency Distribution of Respondents Characteristics Based on Age, Gender, risk factors for diabetic foot ulcers based on history of DFU, pre-ulcerative callus or corns, Foot Care Behavior and Classification of DFU Based on Wagner’s Scale in Type 2 Diabetes Patients

Characteristics	Frequency	Percentage(%)
Age		
0-35yearsold	2	4.2
36-51yearsold	10	20.8
52-67yearsold	29	60.42
68-83 yearsold	7	14.58
Gender		
Male	31	64.6
Female	17	35.4
History of DFU		
DFU	33	68.7
No DFU	15	31.3
Pre-ulcerative callus or corns		
Yes	45	93.75
No	3	6.25
Foot Care Behavior		
Good	34	70.83
Less	14	29.17

Based on table 1 above, it could be seen that from 48 participants, 29 participants (65.9%) were aged 52-67 years old, 31 participants (64.6%) were male, 30 participants (62.5%) completed senior high school, 25 participants (52.1%) had middle socio-economic status, 22 participants (45.8%) worked in private companies, 33 participants (68.7%) were married, 28 participants (58.3%) were Sundanese ethnic origin.

Table 2. Relationship Between DM Ulcer Risk Factors with DFU Classification

Risk Factors	OR	95% CI	P value
Age	2,35	4,25-7,29	0,017*
History of DFU	0,4	0,23-1,27	0,000*
Pre-ulcerative callus or corn	2,3	0,76-8,45	0,000*
Foot Care Behavior	2,76	4,76-8,93	0,014*

Table 2 showed that out of 48 participants, 33 participants (68.7%) had a history of DFU, 44 participants (91.7%) used insulin therapy, 35 participants (72.92%) had neuropathy, 40 participants (83.33%) had foot deformities/deformities, 44 participants (91.67%) with controlled glycemic status (HbA1c < 8%), 30 participants (62.5%) with non-smoking status, 45 participants (93.75%) had callus or pre-ulcerative corns, 42 participants (87, 5%) experienced visual disturbances, 33 participants (68.75%) accompanied by Chronic Kidney Disease, 32 participants (66.67%) with Class 1 Obesity (BMI 30 - 34.9), and 34 participants (70.83%) had hypertension ($\geq 140/90$ mmHg).

Based on Table 3 above, out of 48 participants, 20 participants (45.5%) had Level 3 Diabetic Foot based on the Wagner scale.

Table 4. Relationship Between Patient Profile and Risk Factors for DFU and Wagner Classification

Risk Factors	OR	95% CI	P value
Age	2,35	4,25-7,29	0,017*
History of DFU	0,4	0,23-1,27	0,000*
Pre-ulcerative callus or corn	2,3	0,76-8,45	0,000*
Foot Care Behavior	2,76	4,76-8,93	0,014*

Table 4 showed that the age factor had a relationship statistically with the Diabetic Foot Ulcers classification, where the p-value = 0.017 (p-value < 0.05). Meanwhile, gender, education, socioeconomic

status, employment, marital status, and ethnic origin did not have a statistical relationship with the

Diabetic Foot Ulcers classification, because it had p- value > 0.05.

Table 5. Relationship between Diabetes Mellitus Ulcer Risk Factors with Diabetic Foot Ulcers Classification

No	Risk Factors	OR	95% CI	P value
1.	History of Diabetic Foot Ulcers	0,4	0,23-1,27	0,000*
2.	Use of Diabetes Mellitus Therapy	1,3	1,75-2,89	0,207
3.	Neuropathy	2,3	0,89-1,78	0,000*
4.	Foot Deformities	3,5	1,96-4,23	0,003*
5.	Glycemic Status	2,4	0,96-1,78	0,509
6.	Smoking	3,7	1,34-6,72	0,113
7.	Pre-ulcerative callus or corn	2,3	0,76-8,45	0,000*
8.	Visual impairment	3,1	0,92-2,61	0,024*
9.	Chronic Kidney Disease	2,7	1,69-7,25	0,039*
10.	Obesity / BMI	1,7	0,45-3,72	0,240
11.	Blood Pressure	2,05	0,87-7,25	0,029*

Based on table 5 above, risk factors for Diabetes Mellitus ulcers which include history of Diabetic Foot Ulcers, neuropathy, foot deformity, callus, visual disturbances, chronic kidney disease, and blood pressure, statistically affect the DFU classification,

with p-value < 0, 05. Meanwhile, the use of Diabetes Mellitus therapy, glycemic status, smoking, and obesity did not have a statistical relationship with the DFU classification, since it had a p-value > 0.05.

Table 6. Variables for Final Model In Multivariate Analysis With Multiple Logistic Regression Test

No	Variabel	B	Wald	P value	Exp (B)	95% CI
1.	Age	2,453	13,275	0,001	19,27	1,24-189,45
2.	Foot deformity	5,218	14,547	0,001	36,18	1,89-215,42
3.	History of DFU	3,274	12,156	0,000	25,19	4,25-210,14
4.	Callus or corn pre-ulcerative	2,649	11,513	0,000	15,28	3,25-119,28
5.	Blood Pressure	2,375	12,316	0,001	13,72	3,89-115,38
6.	Foot Care Behavior	5,623	23,518	0,000	42,59	5,24-247,18
	Constant	-18,253				

The calculation results showed that patients with type 2 diabetes mellitus who are > 36 years old, had foot deformities, had a history of DFU, had callus, had a history of high blood pressure, had poor foot care behavior, had a probability or risk for developing

diabetic foot events. Diabetic foot care behavior was the most dominant variable affecting the incidence of diabetic foot ulcers (DFU) with the largest Odds Ratio value = 42.59.

Table 7. Behavior of Diabetic Foot Ulcers Before and After Education

	N	Mean	Median	Std. Deviation	95% Confidence Interval for Mean		Normality Saphiro Wilk	P-value
					Lower Bound	Upper Bound		
Pre-test	48	79,6	80	4,87	78,16	80,99	0,004	0,000
Post-test	48	79,9	100	0,77	99,63	100	0,000	

Based on table 7 above, there was an increase in the average diabetic foot care behavior before and

after education with a mean value of 79.6 to 79.9. The normality test of the data with the Shapiro Wilk test

showed a value below 0.05, so the statistical test used was non-parametric, namely the Wilcoxon rank test. The results of the Wilcoxon test showed a p value of 0.000 and that there was an effect of providing education on the behavior of diabetic foot care.

Discussion

The age variable was proven to have a significant relationship with the incidence of diabetic foot ($p=0.001$), meaning that people with type 2 diabetes mellitus aged 36 years had a risk of developing diabetic foot 19.27 times greater than their age.

Research conducted by Aimei Zhong, MD et al. found that aged 60-70 years (30.99%) had DFU. The incidence of diabetic foot in patients with type 2 diabetes mellitus increases with age.⁽¹⁷⁾ The decrease in the prevalence of diabetes mellitus in the very old age shows that those in the very old age group have a lower survival power than the previous age group. This is associated with chronic complications.⁽¹⁷⁾

The patients who suffer diabetes mellitus in old age have a higher survival rate than those who suffer from diabetes mellitus for many years. Age is also an important factor associated with the development of peripheral vascular disease, neuropathy and lower extremity amputation.⁽⁵⁾

The aging process that takes place will result in anatomical, physiological and biochemical changes as well as a decrease in quality of life by 1%.⁽¹⁶⁾

Variable foot deformity is proven to have a significant relationship with the incidence of diabetic foot ($p = 0.001$) and is a risk factor for diabetic foot in patients with type 2 diabetes mellitus (OR = 36.18; 95%CI = 1.89-215.42), meaning that type 2 diabetes mellitus sufferers who have deformities in their feet have diabetic foot 36.18 times greater than patients with type 2 diabetes mellitus who do not have foot deformities, where the results showed that foot deformity was one of the risk factors for Diabetic Foot Ulcers.

Deformity is a deformity of the foot which is characterized by hammer toe, claw toe, hallus valgus (small bunion, large bunion), pes planus, pes clavus, and destructive changes that occur in Charcot's foot. Foot deformities such as Charcot foot and claw foot

are also risk factors for diabetic foot.

The destructive changes that occur in Charcot's foot cause damage to the median longitudinal arch, which results in a biomechanical gait. Changes in the calcane pitch cause strain on the ligaments of the metatarsal, cuneiform, navicular and other small bones which increase the arch length of the foot. These degenerative changes will later change the way you walk (gait), resulting in a load-bearing pressure abnormality that causes the foot to collapse. Ulceration, infection, gangrene and limb loss are common outcomes if the process is not stopped at an early stage.

The variable of history of DFU proved to have a significant relationship with the incidence of diabetic foot ($p=0.000$) and is a risk factor for the occurrence of diabetic foot in patients with type 2 diabetes mellitus (OR=25.19; 95%CI=4.25-210.14). Previous studies have shown that the risk of developing DFU in diabetes with a previous history of DFU is 9.507 times higher when compared with diabetes without a history of DFU.⁽¹⁸⁾ This may also be related to other factors such as duration of diabetes, blood glucose control, and foot self-care performed by the patient, each diabetic.⁽¹⁹⁾

The longer a person has diabetes mellitus, the higher the risk of complications that can occur. This can occur because a prolonged state of hyperglycemia can increase oxidative stress and stimulate other pathways that cause nerve and vascular endothelial damage. The incidence of repeated ulcers in the same foot location can make foot trauma worse so that it can increase the risk of amputation.⁽¹⁹⁾

The variable having a history of ulceration on the feet was shown to have a significant relationship with the incidence of diabetic feet ($p=0.000$) and is a risk factor for diabetic foot in patients with type 2 diabetes mellitus (OR = 15.28; 95%CI = 3.25-119.28), meaning that patients with type 2 diabetes mellitus who had a history of foot ulceration may develop diabetic feet 15.28 times greater than patients with type 2 diabetes mellitus who did not have a history of foot ulceration.

Loss of sensation in the foot will lead to repetitive pressure, injury and fracture, structural abnormalities of the foot, e.g., hammer toes, callus, metatarsal deformity, or Charcot's foot, continuous pressure

and eventually soft tissue damage occurs. Not feeling hot or cold, wrong shoe pressure, damage from blunt or sharp objects can cause blistering and ulceration. These factors plus poor blood flow increase the risk of limb loss in people with diabetes.

Blood pressure variable was proven to have a significant relationship with the incidence of diabetic foot ($p=0.001$) and was a risk factor for the occurrence of diabetic foot in patients with type 2 diabetes mellitus (OR= 13.27; 95%CI= 3.89-115,38). Diabetic foot ulcers can occur 13.27 times greater in type 2 diabetes mellitus patients with hypertension than those who do not suffer from hypertension.

Hypertension ($\geq 140/90$ mmHg) in people with diabetes mellitus due to high blood viscosity will result in decreased blood flow resulting in vascular deficiency, besides hypertension with blood pressure $> 130/80$ mmHg can damage or cause lesions on the endothelium of blood vessels. Damage to the endothelium will affect macroangiopathy through the process of platelet adhesion and aggregation resulting in vascular deficiency so that tissue hypoxia can occur which will result in ulcers.⁽⁷⁾

Variable foot care behavior proved to have a significant relationship with the incidence of diabetic foot ($p = 0.000$) and is a risk factor for diabetic foot in patients with type 2 diabetes mellitus (OR = 42.59; 95%CI = 5.24 -247.18), meaning that people with type 2 diabetes mellitus with poor foot care behavior had 42.59 times greater risk of developing diabetic foot ulcers than patients with type 2 diabetes mellitus who took good care of their feet.

This is in line with Amelia's research (2018) which showed that there was a relationship between foot care behavior and the occurrence of complications of diabetic foot ulcers in type 2 Diabetes Mellitus patients at the Tuntungan Health Center in Medan with a p-value of 0.049. The results of this study also imply the importance of knowledge as a variable that determines foot care behavior and the need for education to increase knowledge of foot care which ultimately improves foot care behavior. Better foot care behavior will reduce the risk of foot ulcer complications and lead to improvement of patient's quality of life. Prevention of foot ulcers is more important because the treatment of foot ulcers takes more time and resources.⁽²⁰⁾

The Wilcoxon test results showed a p-value of 0.000 and there was an effect of providing education

on the behavior of diabetic foot care in patients with type 2 diabetes mellitus.

Furthermore, research on the effect of intensive nursing education on the prevention of diabetic foot ulceration in patients with high risk of diabetic foot proved that an emphasis on education about diabetes mellitus, diabetic foot disease, and proper guidance during treatment can reduce the development of foot ulcers. In addition, the incidence of foot ulceration in high-risk patients was significantly reduced, as well as the incidence of multiple ulcerations and the rate of amputation.

Diabetic Foot Ulcers (DFU) can be prevented through Diabetes Foot Care Education. Patients with diabetes mellitus, the patient's family and health workers should be educated in the care of diabetic feet. Diabetic foot care education is an effective way to increase knowledge and practice of foot care in patients with diabetes⁽⁹⁾ and reduce the occurrence of diabetic foot ulcers.⁽¹⁰⁾

Conclusion

Based on the results of the study, it can be concluded that there was a significant difference between behavioral scores before and after attending foot care education.

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Coping Strategies Adopted During Covid-19: A Study among Married Couples in Tamil Nadu

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Abstract

Sudden outbreak created many psychological problems, social panic and it also worsen the mental health conditions. The survey was conducted in Tamil Nadu during the pandemic period to examine the COVID-19 related coping mechanisms and associated factors in the study locations. The lockdown restrictions had impacted among the significant proportion of the study population's mental health status and among them a major proportion of were cope up by 'engaged with family members'.

Keywords: COVID-19, Coping mechanism, Family members, Practices

Introduction

The COVID lockdown related restrictions has led to disorders in most of people's routine life, their livelihood, health, social relations, their children's education, and their family food security and nutrition. Various Governments, across the world, have responded on their own strategies to this epidemic and have attained success at different levels. The controlling measures of COVID pandemic instituted by State governments such as restrictions on freedom of movement, social and physical distancing, self-isolation and quarantine measures, closure of schools and education institutions, etc., resulted in fear of getting infected, and losing

their close family members and friends^{1,2,3}. Many researches has shown that sudden outbreak created many psychological problems, social panic and it also worsen the mental health conditions⁴. It is observed by Grupe, and Nitschke⁵ and Anderson, Carleton, Diefenbach, Han⁶ that this kind of unexpected events that upset the daily life and cause uncertainty in turn it has a serious impact on the psychological wellbeing of people. Hence, the World Health Organization^{7,8} and other international agencies including Center for Disease Control and Prevention⁹ have urged the need to include mental health interventions as part of efforts to support people through this crisis. However, a very limited number of studies has

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explored the coping strategies adopted in response to the pandemic nor the factors associated with such strategies. Therefore, this study tried to examine the COVID-19 related coping mechanisms and associated factors in the study locations.

Study Design: A cross-sectional study design was used. The survey was conducted in Tamil Nadu during the pandemic period - July 2021 to October 2021. As per the direction and guidance of Central Government of India, the State government has grouped all the 38 districts into hotspots, moderate and non-hotspots districts based on COVID case loads. One-fifth of the districts (8 districts) were selected as study districts, however, the proportionate sampling method was used to select the number of districts from each of the three category districts. The simple random sampling method was adopted to select the study districts from the three category districts with consideration of the geographical representation. One district was selected from hotspot districts (Chennai), four districts were selected from moderate incidence districts (Tiruvanamalai, Madurai Tirunelveli and Trichy) and three districts were chosen from non-hotspot districts (Coimbatore, Karur and Nagapattinam). The research team has approached the Non-Governmental Organizations (NGOs) in the selected study districts to identify target households (positive patient's households and non-infected households).

Sample Population: In Chennai district, with the support of NGO's Key Informants, the research team has identified 7 locations where totally 89 COVID-19 infected households were identified. While the research team approached all the 89 households, only 18 household's heads were cooperated to complete the interview. With respect to non-infected households, 179 households were randomly selected, however 71 head of households were permitted their spouse to participate or themselves participated in the survey. In total 89 respondents were interviewed at Chennai district. Similarly, in all the remaining seven districts the target population were interviewed. The team had identified 1,627 eligible households in the study districts as the target population however 691 households were fully cooperated to complete the survey schedule, of that 87 households were categorized as COVID positive cases households and

the remaining 604 households were categorized as not infected households.

Results: Characteristics of the Study Population:

The characteristics of study populations are shown in Table-1. The average age of the respondents was 38.99 years and majority of them were female (87.2%) and Hindu religion (89.7%). The average marital duration was 16.55 years and 69.3 percent of respondents were live in nuclear families. Overwhelming majority of the respondents were literates (94.6%), of them one-third (33.6%) were completed Diplomas/Degrees.

Table No. 1 Percentage distribution of Respondents by Characteristics

Characteristics of the Study Population	Respondents	
	Number	Percentage
Residence		
Rural	356	51.5
Urban	335	48.5
Age		
Less than 30	83	12.0
30-39	282	40.8
40-49	253	36.6
Above 50	73	10.6
Sex		
Male	88	12.8
Female	603	87.2
Religion		
Hindu	620	89.7
Muslim	16	2.3
Christian	55	8.0
Caste		
SC/ST	107	15.5
BC	232	41.4
MBC	286	33.6
FC	66	9.6
Family Type		
Nuclear	479	69.3
Joint	194	28.1
Extended	18	2.6
Educational Status		
Illiterate and primary	104	15.1
Middle	116	16.8
Secondary	150	21.7

Characteristics of the Study Population	Respondents	
	Number	Percentage
Higher Secondary	91	13.2
Diploma/ Degree	230	33.3
Occupations		
Female		
House wife	322	63.4
Agriculture and allied works	131	21.7
Business and Private sector	84	13.0
Teac., Govt emp/ Profession	66	10.9
Male		
Unemployed	8	6.8
Agriculture and allied works	29	33.0
Business and Private sector	39	44.3
Teach/Govt emp/ Professional	14	15.9
Living Arrangement		
With my spouse and children	488	70.6
with my spouse, children & others	203	29.4
Financial condition during pandemic		
Worse	489	70.8
Normal	202	29.2

More than three-fifth of the female respondents were housewives (63.4%) and more than two-fifth of male respondents involved in business and private sectors. Little above half of respondents were living in rural areas and remaining 48.5 percent were urban residents. A significant proportion of the respondents (70.6%) were living with their spouse and children. About seventy percent of the study population stated that their family financial condition get worst during the pandemic period.

Coping Mechanism: The emotional well-being of the individuals was affected largely because of panic about COVID, lack of their regular social actions and staying at home for a longer time during the pandemic period. However, there is little attention provided to the mental health status of the isolated, panicked and house-arrested people. Research has also shown that sudden outbreak can worsen the mental health conditions⁴. Therefore, there is a need to understand the possible measures to cope with the pandemic for their effective management. With this background, an attempt was made to analysis the coping mechanism adopted by the respondents to come out from the panic/stress during the pandemic period (table 2).

Table No. 2 Percentage distribution of Respondents by Coping Mechanism Practice during Lockdown

Cope Mechanism	Respondents		
	Not at all	Occasionally	Often / Very often
Through Physical Exercise			
Regular exercise	75.1	15.1	9.8
Yoga/ meditation	83.8	11.1	5.1
Breathing exercise	79.7	15.0	6.2
Physical activities	46.7	35.7	17.5
Good self-care strategies	9.6	51.2	39.2
Practice self-sympathy	24.6	43.3	32.1
With participation of Family Members			
Playing with kids/ pets	28.4	33.0	38.6
Caring children	4.6	23.2	72.2
Teaching to children	29.4	33.0	37.6
Talk to others	2.7	44.4	52.8
Connect with family & friends	6.8	30.1	63.1

Continue

Cope Mechanism	Respondents		
	Not at all	Occasionally	Often / Very often
Engage in something more fun	17.4	44.3	38.4
Caring about others	4.8	37.2	58.0
Pay attention to others	19.1	30.8	50.1
Connect with Media			
Connect with online	54.1	23.0	22.9
Watching TV shows	14.9	43.7	41.4
Listening music	46.9	31.7	21.4
Personal Engagement			
Staying in bed	31.3	44.1	24.6
Plenty of rest	21.4	51.7	26.9
Reading books	68.5	18.4	13.2
Keep to a schedule	45.6	33.1	21.3
Finding other activities that interest you	18.1	41.7	40.2
Plan for future	18.7	45.6	35.7
Strengthening hobbies	48.8	34.2	17.1

Overall, it is noticed from the study area that 'caring children' (72.2%) and 'connected with family and friends' (63.1%) were the foremost strategies often/very often adopted by the respondents to cope the pandemic situation. The other prime coping mechanism frequently/very frequently stated by the respondents were 'cared about others' (58.0%), 'talk to others' (52.8%) and 'pay attention to others' (50.1%). Thus, the lockdown restrictions had impacted 'positively' on the respondents were they 'very often' engaged with family members especially with children to regulate the emotional conflict and eliminate the threat of epidemic during lockdown restrictions. A major proportion of respondents practiced 'good self-care strategies' (occasionally: 51.2% and often/very often: 39.2%) to cope the pandemic situation, followed by practice self-sympathy (occasionally: 43.3% and often/very often: 32.1%). It is also interesting to observed that regular exercise (75.1%), yoga/meditation (83.8% percent), breathing exercise (79.7%) and physical activities (46.7%) were 'not at all' practiced by a large number of the respondents to cope up their mental health during lockdown restrictions. The other interesting observation is 'use of any kind of substance abuse was 'not at all' practiced by majority of the respondents

during lockdown restrictions. Among various coping mechanism practiced related to mass media, 'watching TV shows' (41.4%) was the foremost coping mechanism practiced 'very often'. Only 22.9% of the respondents were 'very often' 'connected with online' during lockdown restrictions. An increased number of respondents reported that they 'very frequently' engaged in 'finding other activities that interested them' (40.2%) followed by 'planning for future' (35.7%) as their coping mechanism during lockdown restriction.

Level of practice of Coping mechanism by Background characteristics: It is noticed from the table 3 that urban (28.1%) residence were more likely adopted 'high coping mechanism' than rural residents (18.8%). Practice of coping mechanism was not much differed between male (21.0%) and female (21.0%) with respect to 'high coping mechanism'. Practice of high level of coping mechanism was not shown any difference with respect to age of the respondents. Diploma and Degree completed respondents (42.6%) were more likely practiced coping mechanism (high level) than the counterparts. The high level of coping strategies was adopted more by FC respondents (27.3%) than the SC/ST respondents (17.8%).

Table No. 3 Percentage distribution of Respondents by Level of Coping Mechanism and Background Characteristics

Background Characteristics	Coping Mechanism Index			Total
	Less level	Moderate level	High level	
Place of Residence ** (11.051)				
Rural	19.9	61.2	18.8	356
Urban	22.4	49.6	28.1	335
Sex^{NS}				
Male	26.1	50.0	21.0	88
Female	20.4	56.4	23.2	603
Age^{NS}				
Less than 30	10.8	61.4	27.7	83
30 to 39	19.5	58.5	22.0	282
40 to 49	25.7	51.8	22.5	253
50 And above	23.3	50.7	26.0	73
Caste^{NS}				
ST/SC	26.2	56.1	17.8	107
MBC	15.5	61.2	23.3	232
BC	23.4	52.1	24.5	286
FC	22.7	50.0	27.3	66
Education*** (89.286)				
No education and Primary	27.9	61.5	10.6	104
Middle	24.1	64.7	11.2	116
Secondary	30.0	58.0	12.0	150
Higher Secondary	25.3	51.6	23.1	91
Diploma/Degree	9.1	48.3	42.6	230
Occupation *** (61.933)				
Housewives/Unemployed	19.8	57.3	22.9	328
Agri. related	27.5	66.2	6.2	160
Business / Private	18.7	52.0	29.3	123
Professional	17.5	32.5	50.0	80
Marital duration ** (19.192)				
Up to 5 years	-	59.1	40.9	44
6-15	22.1	53.2	24.7	308
16-24	24.2	57.1	18.7	219
Above 25	20.8	57.5	21.7	120
Depression Index *** (36.264)				
No Depression	17.1	57.9	25.0	580
Any form of Depression	42.3	43.2	14.4	111
Anxiety Index *** (31.773)				
No Anxiety	15.4	60.3	24.3	481

Continue

Background Characteristics	Coping Mechanism Index			Total
	Less level	Moderate level	High level	
Any form of Anxiety	34.3	44.8	21.0	210
Stress Index ** (12.451)				
No Stress	16.8	57.5	25.7	416
Any form of Stress	27.6	52.7	19.6	275

***, **, refers to significant at 1 and 5% level respectively (Chi-square results -SED and level of coping mechanism) NS - Not significant

Marital duration of the respondents also played a vital role in adopting high level of coping mechanism - the respondents with less marital duration were more likely practiced high-level coping mechanism (40.9%) than the respondents with higher marital duration (21.7%). Similarly, a higher proportion of respondents engaged with Professional jobs were practiced a high level of coping strategies (50.0%) than the respondents involved as housewives/unemployed (22.9%). Data evident that the adoption of coping strategies has reflected in the prevalence of depression, anxiety and stress among the study population. The respondents who had less practice of any coping strategies had more any form of depression (42.3%), anxiety (34.3%) and stress (27.6%) compare to their counterparts.

Conclusion

Overall, this study observed that the lockdown restrictions had impacted among a significant proportion of the study population's mental health status and among them a major proportion of were cope up by 'engaged with family members' and 'connect with family & friends'. Overall, the study results serve to inform intervention and preventive efforts aimed at improving family relationship and reducing the risk of psychological distress in the context of a pandemic.

Ethical clearance: Since in this study humans/ animals are not used for any new intervention research, the ethical approval was waived, however the respondent's consent was got to participate in the survey.

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Conflict of Interest: Nil

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The Effect of Diabetes Mellitus on the Treatment Outcome of Tuberculosis

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Abstract

Introduction: Tuberculosis and diabetes mellitus both are the two most important public health problems in India. India is presently having the highest burden of tuberculosis and second highest burden of diabetes mellitus globally. Many studies have shown to have poorer treatment outcome of tuberculosis in diabetic patients.

Aim: To evaluate the difference in treatment outcome antitubercular regimens in diabetic patients compared to non-diabetic patients.

Materials and Methods: Active tuberculosis patients presenting to Department of Respiratory Medicine of IPGME&R, Kolkata were taken and divided into two groups- with and without diabetes mellitus (according to ADA criteria). Two groups were matched for age, sex, addiction habits, history of contact with tuberculosis and previous treatment for tuberculosis. Treatment for tuberculosis and diabetes mellitus have been given to both the groups according to standard protocol and they are followed up for glycemic control, treatment outcome for tuberculosis (according to standard outcome parameters and clinicoradiological outcome) including adverse drug reaction, need for hospitalization and mortality. Statistical analysis was also done to evaluate accuracy of HbA_{1c} at the end of treatment to predict the clinicoradiological outcome.

Results: In this outcome analysis, patients with tuberculosis and diabetes have poorer clinicoradiological outcome (36%) and unsuccessful treatment outcome (10%), higher rate of hospitalisation(OR=8.5) and mortality (4%). ROC

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curve analysis showed a cut-off $HbA_{1c} < 7.4$ to have a good clinicoradiological outcome at end of treatment.

Conclusion: Diabetes has negative effect on outcome of anti-tubercular treatment as poor glycemic control during the course of treatment often lead to poor outcome of tuberculosis. So every tuberculosis patient should be screened for diabetes mellitus at the onset of treatment and proper anti-diabetic therapy is to be given along with standard anti-tubercular treatment for favourable outcome.

Keywords: Tuberculosis, diabetes, anti-tubercular treatment, treatment outcome

Introduction

Tuberculosis and diabetes mellitus both are the two most important public health problems in India. Though there is a decline in tuberculosis notification probably due to COVID-19 pandemic, an estimated 9.9 million people fell ill with TB and 1.5 million died from tuberculosis in 2020. India accounted for 26% of global tuberculosis burden.¹

Diabetes mellitus is the most frequent chronic endocrine disorder characterized by disorder of the entire metabolism, particularly the carbohydrate metabolism. The International Diabetes Federation (IDF) estimates the total number of diabetic adults to be around 74.2 million in India in 2021 and expected to reach about 125 million by the year 2045. India is currently at the second place worldwide, next to China in this regard.²

The association between diabetes and tuberculosis has been seen by several studies. Few cohort studies have found relative risk of TB and DM to be 2.52 (95% CI: 1.53 to 4.03). The frequency of DM in tuberculosis patient was found to be 5.6%, 7.3% and 14.8% in India, Turkey and Indonesia respectively.^[3-6]

Prompt and accurate diagnosis of tuberculosis is already a major issue and the presence of coexistent diabetes mellitus adds more challenges to both diagnosis and treatment outcome of tuberculosis. Understanding the impact of DM on TB in countries that suffer from the dual burden of these diseases will be the key to introduce focused control strategies for elimination of tuberculosis. So the objective of this study is to evaluate the difference in treatment outcome in diabetic patients compared to non-diabetic patients.

Materials and Methods

This study was a prospective tertiary health care based study, which is done in OPD and IPD of Department of Respiratory Medicine, IPGME&R, Kolkata over 1.5 years. 50 patients of active tuberculosis (both pulmonary and extra-pulmonary) with known diabetes or found to have diabetes on initial screening (as per ADA guideline) were enrolled as cases and 50 patients having active tuberculosis without diabetes are enrolled as control group. Both the groups were properly matched in terms of age, sex, personal habits and history of contact with tuberculosis and ATD intake. Patients with HIV infection, having malignancy, taking systemic steroids for >2 weeks in last 6 months and with chronic kidney disease (stage G3b and above) were excluded from the study.

Treatments for both tuberculosis and diabetes mellitus have been given to both the groups according to tuberculosis treatment protocol of Govt. of India and standard diabetes treatment protocol. They are followed up for glycemic control, treatment outcome for tuberculosis (according to standard outcome parameters and clinicoradiological outcome) including adverse drug reaction, need for hospitalization and mortality. Statistical analysis was also done to evaluate accuracy of HbA_{1c} at the end of treatment to predict the clinicoradiological outcome by ROC curve analysis. The ethical committee of IPGME&R, Kolkata approved the present study.

There are seven possible outcomes of anti-tubercular treatment- cured, treatment completed, defaulted, failure, died, transferred out and switched over to MDR TB treatment.^[7, 8]

- I Cured: Initially sputum smear positive patient who has completed treatment and had negative sputum smears on two occasions, one of which is at the end of the treatment is declared as cured.
- II Treatment completed: Initially sputum smear positive patient who has completed treatment with negative smears at end of the intensive phase / two months in the continuation phase, but none at the end of treatment, the outcome is declared as treatment completed.
- Or
- Initially sputum smear negative patient who has received full course of treatment and has not become smear positive at the end of the treatment
- Or
- Extra-pulmonary TB patient, who has received full course of treatment and has not become smear positive during or at the end of treatment, is also declared as treatment completed.
- III Died: Patient who died during the course of treatment regardless of cause is declared as 'Died'.
- IV TFailure: Any TB patient who is smear positive at five months or more after starting the treatment is considered as 'Failure'.
- V Defaulted: A Patient after treatment initiation has interrupted treatment consecutively for >2 months
- VI Transferred out: A patient who has been transferred to another TU / district / state and whose treatment outcome is not available is considered as 'Transferred Out'.
- VII Switched over to MDR-TB Treatment: A patient who has been diagnosed as having MDR-TB by an RNTCP accredited laboratory, prior to being declared as "Failure", and is placed on the RNTCP MDR-TB treatment regimen is said to have switched over to MDR TB treatment.

These outcome definitions are further grouped into two groups- treatment successful and treatment

unsuccessful.

- Treatment Successful= Cured and Treatment completed
- Treatment Unsuccessful= Died, Failure, Defaulted, Transferred out and Switched over to MDR-TB treatment.

Treatment outcomes were also assessed using clinicoradiological parameters and divided into two groups-

- I. Good clinicoradiological outcome: Resolution of symptoms and signs, weight gain $\geq 5\%$ of pre-treatment body weight⁹ and radiological improvement without any new complication after full duration of ATD treatment is defined as good clinicoradiological outcome.
- II. Poor clinicoradiological outcome: Persistence of symptoms and signs, failure to gain weight $\geq 5\%$, persistence of radiological lesions or appearance of new lesions and appearance of new complications and mortality during or after full duration of ATD treatment is defined as poor clinicoradiological outcome.

Glycemic control was monitored by measuring fasting blood sugar, post-prandial blood sugar and HbA_{1c} at end of the ATD treatment.

Results

The outcome of anti-tubercular treatment was analysed in detail for the two groups. Both the groups were matched properly for the possible confounding factors as stated before and standard management for diabetes was given to the diabetic group along with anti-tubercular treatment.

We have analysed the glycemic parameters of the patients with tuberculosis and diabetes to look for adequate glycemic control after anti-diabetic therapy. Mean level of FBS, PPBS and HbA_{1c} of the patients with DM were significantly decreased at the end of treatment than that of at the onset of treatment. So, there was significant glycemic control from the glycemic status at presentation during the period of treatment.

Table 1: Age distribution of study participants

Age Group (in years)	Patients with DM (n=50)	Patients without DM (n=50)	Total
<20	1	1	2
Row %	50.0	50.0	100.0
Col %	2.0	2.0	2.0
20-29	3	3	6
Row %	50.0	50.0	100.0
Col %	6.0	6.0	6.0
30-39	8	7	15
Row %	53.3	46.7	100.0
Col %	16.0	14.0	15.0
40-49	13	15	28
Row %	46.4	53.6	100.0
Col %	26.0	30.0	28.0
50-59	14	12	26
Row %	53.8	46.2	100.0
Col %	28.0	24.0	26.0
60-69	5	8	13
Row %	38.5	61.5	100.0
Col %	10.0	16.0	13.0
≥70	6	4	10
Row %	60.0	40.0	100.0
Col %	12.0	8.0	10.0
Total	50	50	100
Row %	50.0	50.0	100.0
Col %	100.0	100.0	100.0
Mean± S.D.	48.74±14.33	49.50±13.95	

$\chi^2 = 1.45$; $p=0.96$; NS-Not Significant

The mean age (mean ± S.D.) of the patients with DM was 48.74±14.33 years with range 17-80 years and the median age was 49.5 years. The mean age (mean ± S.D.) of the patients without DM was 49.50±13.95 years with range 19-78 years and the median age was 48.5 years. T-test showed that there was no

significant difference in mean age of the patients of the two groups ($t_{98} = 0.26$; $p=0.79$). Thus the patients of the two groups were matched for their ages. Corrected Chi-square test showed that there was no significant association between age and two groups ($p=0.96$) [Table 1].

Table 2: History of contact with TB patients

History of contact with TB patients	Patients with DM (n=50)	Patients without DM (n=50)	Total
Present	8	11	19
Row %	42.1	57.9	100.0
Col %	16.0	22.0	19.0
Absent	42	39	81
Row %	51.9	48.1	100.0
Col %	84.0	78.0	81.0

Continue

History of contact with TB patients	Patients with DM (n=50)	Patients without DM (n=50)	Total
Total	50	50	100
Row %	50.0	50.0	100.0
Col %	100.0	100.0	100.0

$\chi^2 = 0.58$; $p=0.44$; NS-Not Significant

Chi-square test showed that there was no significant association between history of contact

with TB patients and two groups ($p=0.44$). Thus the patients of the two groups were comparable for history of contact with TB patients [Table 2].

Table 3: Glycemic parameters of TB-DM cases at the onset and end of treatment

Glycemic parameters of TB-DM group (Mean±S.D.)	Onset of treatment (n=50)	At the end of treatment (n=50)	t_{98} -value	p-value
FBS (mg/dl)	171.88±64.93	130.13±39.06	3.89	0.002
PPBS (mg/dl)	267.92±93.22	183.61±59.14	5.40	<0.0001
HbA _{1c} (%)	9.19±2.40	7.17±1.23	5.29	<0.0001

T-test showed that mean level of FBS, PPBS and HbA_{1c} of the patients with DM were significantly decreased at the end of treatment than that of at the

time of treatment ($p<0.01$). So, there was significant glycemic control from the glycemic status at presentation during the period of treatment [Table 3].

Table 4: Treatment outcome of tuberculosis with or without diabetes

Outcomes		TB with DM (n=50)	TB without DM (n=50)	p value
Sputum conversion at end of IP	Yes	15 (48.4%)	18 (94.7%)	0.0007
	No	16 (51.6%)	1 (5.3%)	
Treatment outcome	Treatment successful	45 (90%)	50 (100%)	0.02
	Treatment unsuccessful	5 (10%)	0 (0%)	
Clinicoradiological outcome	Good	32 (64%)	45 (90%)	0.002
	Poor	18 (36%)	5 (10%)	
Adverse drug reaction	Present	4 (8%)	3 (6%)	0.69
	Absent	46 (92%)	47 (94%)	
Need for hospitalization	Present	34 (68%)	10 (20%)	<0.0001
	Absent	16 (32%)	40 (80%)	
Mortality	Present	2 (4%)	0 (0%)	0.24
	Absent	48 (96%)	50 (100%)	

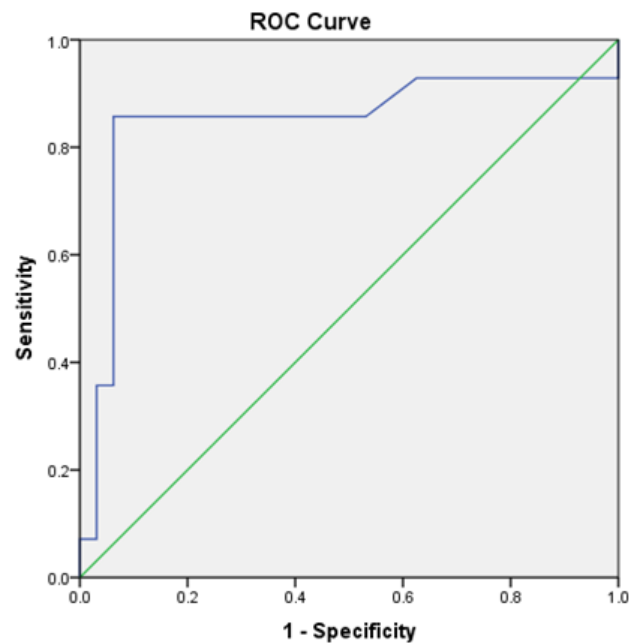
Proportion of patients with unsuccessful treatment was significantly higher for patients with DM (10.0%) than that of with DM (0%) ($Z=2.29$; $p=0.02$) Chi-square test showed that there was significant difference between clinicoradiological outcome and two groups ($p=0.002$). Proportion of patients with poor clinicoradiological outcome was significantly higher for patients with DM (36.0%) than that of patients without DM (10.0%) [Table 4].

The mean (\pm s.d.) and median HbA_{1c} of good clinicoradiological outcome group is much lower than that of poor clinicoradiological outcome group. T-test shows the difference of means between HbA_{1c} of good clinicoradiological outcome group and HbA_{1c} of poor clinicoradiological outcome group is statistically significant ($p=0.0001$) [Table 5].

Table 5: End of treatment HbA_{1c} level and clinicoradiological outcome in TB-DM group

Measure of central tendency	HbA _{1c} of good outcome category in DM group (%)	HbA _{1c} of poor outcome category in DM group (%)
Mean (±S.D.)	6.7 (±0.84)	8.1 (±1.46)
Median	6.6	7.95

Non-parametric receiver operating characteristic (ROC) curve analysis was done, and ROC curves were used to evaluate the accuracy HbA_{1c} to predict clinicoradiological outcome, indicated by the area under the curve (AUC). The “optimum cut-off point” was determined, as the cut-off point with the highest [(sensitivity + specificity)/2] ratio which is 7.35 and hence we have taken 7.4 as the cut off.



Sample size	:	46
Good clinicoradiological outcome	:	32 (69.57%)
Poor clinicoradiological outcome	:	14 (30.43%)
Area under the ROC curve (AUC)	:	0.847
Standard Error	:	0.079
95% Confidence interval	:	0.692 to 1.000
Significance level P (Area=0.5)	:	<0.0001

Figure 1: ROC curves used to evaluate the accuracy HbA_{1c} to predict clinicoradiological outcome

Patients in TB-DM group were further divided into two groups taking end treatment HbA_{1c} of 7.4 as cut off and correlation analysis with clinicoradiological outcome was done which was found to be significant. So, to achieve a good clinicoradiological outcome

after ATD treatment in a patient of TB with DM, the target HbA_{1c} should be <7.4% [Table 5/Fig. 1].

Discussion

Prompt and accurate diagnosis of tuberculosis is always an important issue and both the diagnostic and therapeutic aspects of control of tuberculosis get complicated by presence of coexistent diabetes. Proper understanding of the impact of diabetes on outcome of tuberculosis in countries that has the dual burden of these diseases will be the key to introduce focused control strategies for the control and elimination of tuberculosis.⁹ In this study, a strong association between presence of diabetes comorbidity and poor outcome of tuberculosis has been found. There was adequate glycemic control in the diabetic patients from the glycemic status at the beginning of the study.

We found that patients with unsuccessful treatment outcome and poor clinicoradiological outcome are significantly higher in tuberculosis with diabetes group compared to non-diabetic group. The patients in the non-diabetic group have higher rate of sputum conversion at the end of intensive phase compared to the diabetic patients. In a study by Fengling Mi et al in China¹⁰, it is reported that In patients with DM and new smear-positive PTB, there is a higher proportion who have positive sputum smears at 2 months (21.7% vs. 5.6%, RR 3.85, 95%CI 2.24–6.63), compared with patients without DM. In a descriptive case-control study by Mboussa J et al,¹¹ treatment failure or death was seen in 41% of the patients with tuberculosis and diabetes mellitus, but in only 13% of those with tuberculosis alone. Ali Nasir Siddiqui et al PTB patients with DM have reduced rate of sputum conversion with higher probability of poor treatment outcome, namely, default, death, failure, and shifting to MDR category, than patients without DM. (OR: 1.176, 95% CI: 0.310–4.457).¹² There was no significant association between adverse drug reaction and two groups (DM and Non-

DM) in our study. However, Ali Nasir Siddiqui et al demonstrated that DM patients were encountered with significantly higher number of adverse drug reactions as compared to non- DM patients (92% vs. 69.9%).¹²

The need of hospitalization was 8.50 times more among the TB patients with DM in this study as compared to the TB patients without DM and the risk was significant. Leonardo Gil-Santana et al showed that events of hospitalization are more in TB-DM patients than in TB patients without DM (9.2% vs. 1.1%).¹³ Increased hospitalization may be due to diabetes itself, complications resulting from DM or extensive tuberculosis or its complications.

TB patients with DM had higher proportion of mortality as compare to TB patients without DM where no death was seen during study period. Two retrospective cohort studies of patients with pulmonary tuberculosis in Maryland, USA, have shown a 6.5–6.7 times increased risk of death in diabetic patients compared to non-diabetic controls after adjustment for important cofactors.^{14, 15}

Mean (\pm S.D.) and median HbA_{1c} at the end of the treatment of good clinicoradiological outcome category in TB-DM group are much lower than that of poor clinicoradiological outcome category of the same group (6.7 \pm 0.84 & 6.6 vs. 8.1 \pm 1.46 & 7.95) and the difference between the means is statistically significant ($p=0.0001$). In TB-DM group, patients having HbA_{1c} \geq 7.4% have significantly poorer clinicoradiological outcome compared to the patients having HbA_{1c} <7.4% ($p<0.0001$). So, to have a good clinicoradiological outcome after anti-tubercular treatment in diabetic patients, the target HbA_{1c} should be <7.4%.

Conclusion

The current diabetes epidemic may lead to a resurgence of tuberculosis, especially in countries like India. There is growing evidence of one disease fuelling the other. It must become a priority to use this knowledge to initiate focused and coordinated actions like active case finding, treatment of latent tuberculosis and new research in the parts of the world where diabetes is epidemic and tuberculosis endemic to achieve adequate control of tuberculosis. Diabetes

has negative effect on outcome of anti-tubercular treatment as well and poor glycemic control during the course of treatment often lead to poor outcome of the disease. These findings emphasizes the need to improve the care of patients with concomitant diabetes mellitus and tuberculosis. Early detection of diabetes among tuberculosis patients can improve care and control of both and reduce morbidity and mortality associated with both diseases. This will ultimately help us to achieve our much desired goal-to end TB.

Conflict of Interest: None declared

Ethical clearance- Taken from Institutional Ethics Committee

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Study of Dermatological manifestations of Dengue fever in Andhra Population

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Abstract

Background: Dengue fever is a major health problem in all age groups especially in tropical countries like India. Dengue fever (DF) may present with dermatological manifestations but enough data is not available for justification hence this study was conducted to correlate DF with dermatological manifestation.

Method: 80 (Eighty) patients aged between 16 to 60 years having DF positive by ELISA test were studied to evaluate dermatological manifestation.

Results: 44 (55%) had only cutaneous involvement, 19 (23.7%) had muco-cutaneous involvement, 17 (21.7%) had no dermatological involvement. Among those with skin involvement, 38 (47.5%) had generalized rash, 27 (33.7%) truncal, 15 (18.7%) had rash in the extremities. Out of 80, 55 (68.7%) had pruritus and 25 (31.7%) had no pruritus.

Conclusion: Dermatological manifestations are common clinical feature in DF patients but not observed in all DF patients. Identification of skin involvement help the clinician in early diagnosis and better management of patients to avoid morbidity and mortality.

Keywords: DF, Petechiae, ELISA IgM, NS1 antigen, Muco-cutaneous

Introduction

It is said that, skin is the window to within the body. Hence skin can provide important clues to systemic diseases enabling the practitioner to make a tremendous contribution to the patients care if cutaneous manifestations of the disorder can be identified. As Dengue is a viral fever focus on various muco-cutaneous manifestations becomes a challenge

to the dermatologist apart from the physician.

Dengue fever (DF) is a flu-like illness that affects all population. The incubation period of DF after mosquito bite is between 2 to 8 days. The clinical features vary according to the age of patients. Infants and young children usually have only a non-specific febrile illness with rash that is difficult to distinguish from other viral illness ⁽¹⁾. The body

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temperature rapidly increases. Above 39°C (>39°C) and lasts approximately 5 to 6 days and sometimes biphasic. During the febrile period, the patient may experience severe headache, retro-orbital pain, myalgia, arthralgia, nausea, and / or vomiting. More than 50% of infected patients report rash (2). During this period initially macular or maculopapular rash appears which eventually diffusely erythematous (3) becomes. Minor hemorrhagic manifestations such as petechiae, epistaxis and gingival bleeding occur in some patients. Skin lesions could be due to viral host interaction inducing release of un-identified chemical mediators in the skin (4) and rash has nothing to do with the direct viral invasion or presence of immune complexes. Hence attempt is made to evaluate the skin manifestation in DF (5) so that dermatologist can help the clinician to confirm DF and severity of DF because many viral diseases have ambiguous manifestations.

Material and Methods

80 (Eighty) patients of different of age group admitted at Emergency ward NIMRA Institute of Medical sciences, Ibrahimpatnam, Jupudi, Vijayawada, Andhra Pradesh-521456

Inclusive Criteria: Patients aged between 16 to 60 years, having positive dengue fever test and having skin rash were selected for study.

Exclusion Criteria: Patients with negative dengue fever test, urticaria, allergy, or immune compromised patients below 16 years and above 60

years were excluded from the study.

Method: The clinical presentations were febrile illness, laboratory findings were progressive thrombocytopenia, elevated hepatic transaminase and presence of detectable dengue IgM and detectable virus-expressed soluble main-structural protein (NS1) by means of Enzyme linked immune sorbent assay (ELISA) (Panbio, Dengue duo-cassette) with other serologic being negative and blood cultures sterile or sero conversion of cavelesent sera were carried out diagnosed dengue fever (DF).

The Duration of study was August-2019 to September-2020

Statistical analysis: Dermatological involvement, distribution of rash with or without pruritis were classified with percentage. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1

Observation and Results

Table-1: Dermatological involvement of DF patients - 44 (55%) had cutaneous involvement only, 19 (23.7%) had Muco-cutaneous involvement, 17 (21.2%) had no dermatological involvement.

Table-2: Distribution of rash in DF - 38 (47.5%) generalized rash, 27 (33.7%) truncal rash, 15 (18.7%) extremities

Table-3: Rash with or without pruritis - 55 (68.7%) DF with pruritis, 25 (31.7%) without pruritis.

Table 1: Dermatological involvement in Dengue fever patients

Sl. No	Dermatological Involvement	No. of patients (80)	Percentage (%)
1	Cutaneous involvement only	44	55
2	Muco-cutaneous involvement	19	23.7
3	No dermatological Involvement	17	21.2

Table 2: Distribution of rash in patient's dengue fever

Sl. No	Distribution	No. of patients (80)	Percentage (%)
1	Generalised	38	47.5
2	Truncal	27	33.7
3	Extremities	15	18.7

Table 3: Rash with or without pruritis in patient with Dengue fever

Sl. No	Details	No. of patients (80)	Percentage (%)
1	With pruritis	55	68.7
2	Without pruritis	25	31.2

Discussion

Present study of demagogical manifestations in DF in Andhra Population 44 (55%) had only cutaneous involvement, 19 (23.7%) muco-cutaneous, 17 (21.7%) had no dermatological involvement (Table-1). 30 (47.5%) had generalized rash, 27 (33.7%) had truncal rash, 15 (18.7%) had rash in extremities (Table-2), Out 80 DF patients 55 (68.7%) had pruritis 25 (31.2%) were without pruritis (Table-3). These findings are more or less in agreement with previous studies (6)(7)(8).

Dengue fever is characterized by high grade fever, myalgia, arthralgia, headache, retro bulbar pain, skin rash. It is reported that there are four serotypes DF (DEN 1-4). Dengue virus has a single stranded RNA virus transmitted mainly through Mosquito *Aedes aegypti*. The viral replication occurs primarily in the macrophages. Although dendritic cells (Langerhans cells) present in the skin may be the early target of infection⁽⁹⁾. Dengue virus may directly infect the skin. It is hypothesized that, absence of direct viral involvement or immune complexes in the skin lesions could be due to release of interaction inducing release of un-identified chemical mediators in the skin and the rash nothing to do with the direct viral invasion or with the presence of immune complexes. Presence of DF cause Dengue hemorrhagic Fever (DHF), Dengue shock syndrome (DSS).

Tourniquet test is performed by inflating blood pressure cuff on the upper aspect of arm to point mid way, between systolic and diastolic blood pressure for five minutes. The test is considered positive when > 20 petechiae, 2.5 cm² are observed in patients having symptoms of DF. This test certainly indicates involvement of has dermatological manifestation has significant role in DF⁽¹⁰⁾. As DF is a viral infection commonly affects conjunctival and sclera, mucosa small vesicles on soft palate, erythema, such involvement of mucous membrane is observed in 50% of DF patients⁽¹¹⁾. It was interesting to note that, local skin epithelium was not involved rather small

blood vessel and endothelium was involved with edema. In DF patient's immune-fluorescence test was negative. The skin was predominantly involved due to intra-dermal hemorrhage or petechiae, otherwise skin or skin appendages have no etiological signs in DF⁽¹²⁾. It is only due to involvement of sub-mucosal or sub-dermal capillaries.

Summary and Conclusion

The present study of dermatological manifestations in DF and related dermatological involvement, i.e., intra-dermal capillaries, Petechiae, pruritis will certain help to correlate. Positive test of ELISA IgM, other clinical signs and symptoms in DF are diagnostic factors for dermatologist or clinician. But this study demands further genetic, angiological, neurological, immunological, nutritional, patho-physiological studies because exact pathogenesis DF is still unclear.

Limitation of study - Due to tertiary location of research centre, small number of patients and lack of latest techniques we have limited findings and results.

- This research paper is approved by Ethical committee of Nimra Institute of Medical

Sciences, Ibrahimpatnam, Jupudi, Vijayawada, Andhra Pradesh - 521456.

- **No Conflict of Interest**

- **No Funding**

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Assessment of Sleep Quality and Sleep Hygiene among Nursing officers during COVID pandemic in a Tertiary Care Hospital in a Southern District of Karnataka, India

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Abstract

Introduction: Nursing officers are one of the susceptible groups prone to have sleep disturbances, which may not only influence their own health but also affect the nursing quality and treatment process. During COVID Pandemic, because of high work demand, nurses were made to run more shifts than regular days which can be quite stressful for them. Our study was conducted to assess the sleep quality and sleep hygiene among Nursing officers during COVID pandemic and to determine the factors influencing the Sleep quality and Sleep Hygiene

Methods: A cross sectional study was conducted from September 2021- October 2021 among nursing officers of Kodagu district hospital attached to Kodagu Institute of Medical sciences. Pittsburgh Sleep Quality Index questionnaire was used to assess the sleep quality, Epworth Sleepiness Scale was used to determine the presence of tendency of daytime sleepiness and Sleep hygiene index was used to assess the sleep hygiene among the respondents.

Results: Poor sleep quality was high (70.4%) among nursing officers. A significant association ($p < 0.05$) of poor sleep quality was found with 31-40 years age group, nuclear family, less than 10 years of work experience and >15 nights shifts per month when logistic regression was applied. Poor sleep quality was high among the nursing officers who were practicing poor sleep hygiene (79.16 %). The assessment of daytime sleepiness showed that majority of the nursing officers (94%) were unlikely to be abnormally sleepy.

Conclusion: The prevalence of poor sleep quality was high among nurses which was done during COVID pandemic. Poor sleep quality was associated age, type of family, years of work experience and nights shifts. Recruitment of adequate number of nursing staff and scrupulously planned night shifts are needed to improve the sleep health and well being of nurses which sequentially will result in better and efficient patient care.

Keywords: COVID, Epworth Sleepiness Scale, Nurse, Pittsburgh Sleep Quality, Sleep hygiene index, Sleep quality Index

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Introduction

Sleep is a very powerful but also undervalued health wonder of all the health-related activities. Adequate sleep is not a luxury but it is biological necessity; it is also nourishing, refreshing and healing which is very obligatory for normal functioning of humans. Sleep is defined as temporary state of unconsciousness from which the subject can be aroused with appropriate sensory stimuli.^[1]

Sleep has been proven to be the single most important element in predicting longevity of human life and which is more significant than diet, exercise or heredity. Adequate and good quality sleep is critical for good cognitive, psychological and physical health of human being.^[2]

Nursing officers are one of the most vulnerable groups prone to have sleep disturbances, due to both social & biological factors. Nurses' sleep disorders may not only influence their own health but also affect the nursing quality and the patients' health and treatment process. A lower work performance and higher risk of medical error associated with poor sleep quality is a concern for patients' safety.^[3] According to a cross-sectional survey of nurses, the prevalence of insomnia was three to four times higher in nurses than that in the general population.^[4]

Sleep hygiene has been defined as those behaviors that are believed to promote improved quantity and quality of sleep.^[5] The exposure to shift works, and especially to night shift, goes against the circadian rhythmicity of the social man, which brings about a congregation of disruptive outcomes on one's health.^[6] Previous surveys concluded that working shifts was associated with high levels of sleep problems and sleepiness.^[7,8]

In addition to shift work, the nursing profession involves high work demand in pandemics like COVID 19 which can be quite stressful. Health facilities in most developing countries are highly understaffed; therefore, nurses may be made to run more shifts than necessary especially during pandemics like COVID. All these put nurses at extreme risk of poor sleep. Sleep disorders have also been associated with diseases such as hypertension, obesity, diabetes, cardiovascular diseases, and malignancies, such as

breast and colorectal cancers.^[9-11] The problem of sleepiness has not been recognized and addressed by most of the programs related to nursing profession, as the culture of patient care in the hospital often equates the number of hours on the job and without sleep, with professionalism and dedication to patient care.

Since the nursing officers play a major role in the patient care in the hospitals along with the doctors, they need enough sleep to work constantly. Literature shows only few studies have empirically assessed the sleep quality and sleep hygiene among nursing officers and none of the studies have been conducted during COVID pandemic. Thus the present study was conducted with the objectives:

- To assess the sleep quality and sleep hygiene among nursing officers during COVID pandemic.
- To determine factors influencing the Sleep quality and Sleep Hygiene.

Methods

A Cross sectional study was conducted from September 2021- October 2021 among the nursing officers who were working in the district hospital of Kodagu which is attached to Kodagu Institute of Medical sciences. The hospital is staffed with 142 nursing officers who were working for COVID. All the nursing officers who were consented to participate in the study were included in the study by using purposive sampling method. Pittsburgh Sleep Quality Index (PSQI) questionnaire was used to assess the sleep quality among the nursing officers. A PSQI total score >5 was considered diagnostic of poor sleep quality,^[12] and the Epworth Sleepiness Scale (ESS)^[13] was used to determine the presence of tendency of daytime sleepiness among the respondents; the results were construed as follows: 0-7 was considered normal, 8-9 was considered average tendency of daytime sleepiness, 10-15 meant the presence of excessive daytime sleepiness, while 16-24 represented daytime sleepiness requiring medical intervention.

Sleep Hygiene Index (SHI) was used to assess the sleep hygiene which is a validated instrument that has been established to evaluate sleep hygiene conduct. It

included 13 self-reported questions. Nursing officers were requested to show how regularly they engage in certain performances (always, frequently, sometimes, rarely, never). The total SHI score is the summation of the 13-item marks. The total score scale lies between 0 and 52. Greater scores are suggestive of poorer sleep hygiene.^[14]

Ethical consideration and Data collection:

Ethical approval was obtained from the Institutional Research Ethical Committee (protocol number: KoIMS/IEC/28/2021-22). Informed consent was obtained from the study participants after a careful explanation of the research. Data was collected using standard questionnaire. The questionnaires were mailed /sent individually at their respective workplaces and asked them to fill and submit on the same day itself.

Statistical analysis: Data was entered into Statistical Package for the Social Sciences –Version 25 (IBM Inc. Armonk, New York, United States of America). The staffs' cadre, years of working experience, hours of work shift, hours of sleep and other socio-demographic profile were summarized using frequency tables and mean. The Chi-square and Logistic regression analysis were deployed to compare categorical variables with PSQI score. $p < 0.05$ was considered as statistically significant.

Results

Out of the total 142 nursing officers, 7 declined to participate. Hence, a total of 135 nursing officers responded with filled Google form, giving an effective response rate of 95%.

Table 1. Characteristics of the participants

Sl.No.	Sample characteristics	Frequency(percentage)	
	Age	21-30	32(23.7%)
		31-40	61(45.2%)
		41-50	25(18.5%)
		>51	17(12.6%)
2.	Gender	Female	121(89.6%)
		Male	14(10.4%)
3.	Marital status	Married	122(90.4%)
		Unmarried	13(9.6%)
4.	Family type	Nuclear family	122(90.4%)
		Joint family	13(9.6%)
5.	Qualification	Masters of science in Nursing	9(6.7%)
		Bachelor of science in Nursing	76(56.3%)
		General nursing and Midwifery	50(37.0%)
6.	No. of years of work experience	6-10 years	79(58.5%)
		11-15 years	13(9.6%)
		16-20 years	20(14.8%)
		>21 years	23(17.0%)
7.	Night shift	Yes	126(93.3%)
		No	9(6.7%)
8.	Work injury	Yes	27(20.0%)
		No	108(80.0%)
9.	Department	Emergency and casualty	40(29.6%)
		Intensive care unit	32(23.7%)
		Wards	63(46.7%)

Continue

Sl.No.	Sample characteristics	Frequency(percentage)	
10.	Any present medical conditions	Yes	51(37.8%)
		No	84(62.2%)
11.	Epworth score	Unlikely	127(94.0%)
		Average	4(3.0%)
		Excessively sleepy	4(3.0%)
		Need medical help	0(0%)
12.	Pittsburg score	<5	40(29.6%)
		>5	95(70.4%)

Table 1 summarizes the characteristics of the participants. Most of the study participants belong to age group 31-40 years. Majority of the nursing officers were female 121(89.6%), married 122(90.4%) and belong to nuclear family 122 (90.4%).126(93.3%) of the nursing officers had night shift. Epworth score was used to assess the daytime sleepiness which

showed that majority of the nursing officers (94%) was unlikely to be abnormally sleepy and none of the nursing officers were excessively sleepy or needs medical attention. The prevalence of poor sleep quality according to Pittsburgh Sleep Quality Index (PSQI) was 95(70.4%).

Table 2. Association of participants' characteristics with sleep quality.

Characteristic	Sleep quality according to PQSI†		Chi square value	P value
	Good (PQSI†<5)	Poor (PQSI†>5)		
Age in years				
21-30	10(31.3%)	22(68.8%)	15.939	0.001*
31-40	9(14.8%)	52(85.2%)		
41-50	14(56.0%)	11(44.0%)		
>51	7(41.2%)	10(58.8%)		
Marital status				
Married	35(28.7%)	87(71.3%)	0.538	0.463
Unmarried	5(38.5%)	8(61.5%)		
Type of family				
Joint	10(76.9%)	3(23.1%)	15.431	0.001*
Nuclear	30(24.6%)	92(75.4%)		
Qualification				
Masters of science Nursing	5(55.6%)	4(44.4%)	6.909	0.032*
Bachelor of science Nursing	26(34.2%)	50 (65.8%)		
General nursing and Midwifery	9(18.0%)	41(82.0%)		
Years of work experience				
6-10 years	14(17.7%)	65(82.3%)	17.598	0.001*
11-15 years	3(23.1%)	10(76.9%)		
16-20 years	10(50%)	10(50%)		
>21 years	13(56.5%)	10(43.5%)		

Continue

Characteristic	Sleep quality according to PQSI†		Chi square value	P value
	Good (PQSI†<5)	Poor (PQSI†>5)		
Night shift				
Yes	34(27.0%)	92(73.0%)	6.344	0.012*
No	6(66.7%)	3(33.3%)		
Number of night shift per month				
No night shift	6(66.7%)	3(33.3%)	16.729	0.002*
3-6 per month	8(57.1%)	6(42.9%)		
7-10 per month	6(24.0%)	19(76.0%)		
11-14 per month	15(31.3%)	33(68.8%)		
>15 per month	5(12.8%)	34(87.2%)		
Department				
Emergency and casualty	6(15.0%)	34(85.0%)	8.679	0.013*
Intensive care unit	51(46.9%)	17(53.1%)		
Wards	19(30.2%)	44(69.8%)		
Any present Medical condition				
Yes	13(25.5%)	38(74.5%)	8.023	0.005*
No	27(32.0%)	57(67.9%)		

*p< 0.05, †Pittsburgh Sleep Quality Index

Table 3. Logistic regression analysis of factor influencing poor sleep quality.

Characteristic	Adjusted OR	95% Confidence interval	p value
Age			
21-30 years	0.018	0.000- 0.936	0.001*
31-40 years			
41-50 years			
>51 years			
Type of family			
Joint family	0.033	0.004-0.250	0.001*
Nuclear family			
Years of work experience			
6-10 years	0.033	0.004- 0.287	0.005*
11-15 years			
16-20 years			
>21 years			
Night shift			
Yes	0.002	0.000-0.071	0.001*
No			

Continue

Characteristic	Adjusted OR	95% Confidence interval	p value
No. of night shifts per months			
No night shift	0.029	0.0042-0.225	0.001*
3-6 per month			
7-10 per month			
11-14 per month			
>15 per month			
No night shift			
Department			
Emergency and casualty	0.310	0.031-3.063	0.316
Intensive care unit			
Wards			

*p< 0.05

Sleep quality was found to be significantly associated with age of the nursing officers, type of family, qualification, years of work experience, nights shifts, number of night shifts per month, department under which they work and presence of any medical

condition [Table 2]. But when these significant factors were adjusted in the logistic regression analysis, a significant association of poor sleep quality was found with age, type of family, years of work experience and nights shifts [Table 3].

Table 4. Association of Sleep Hygiene Index with sleep quality.

Sleep Hygiene Index	PQSI* Score <5 (Poor sleep quality)	PQSI* Score >5 (Good sleep quality)	Total
Good sleep hygiene (0-13)	5(10.0%)	45(90.0%)	50(100%)
Fairly good sleep hygiene (14-26)	6(13.04%)	40(86.96%)	46(100%)
Fairly poor sleep hygiene (27-39)	10(66.6%)	5(33.3%)	15(100%)
Poor sleep hygiene (40-52)	19(79.16%)	5(20.84%)	24(100%)
Total	40(23.0%)	95(77.0%)	135(100%)
Chi Square value: 53.427 p value: <0.0001			

*Pittsburgh Sleep Quality Index

Table 4 shows that there is significant association between the sleep hygiene index and sleep quality among the nursing officers. Poor sleep quality was high among the nursing officers who were practicing poor sleep hygiene (79.16%) and good sleep quality was high among those who were practicing good sleep hygiene (90.0%).

Discussion

The prevalence of poor sleep quality as defined by PSQI score >5 was 70.4%, which is very high compared to the results (46.31%) of the study done among the nurses of various parts of South India

[2] and also in a study done among the nurses in a tertiary care hospital in Manipur which is 43.0%. [5] This may be because our study was done during COVID pandemic during which nursing officers were made to run more shifts than normal or regular days. As many of the nursing officers were tested positive for COVID 19, the remaining staff had worked more hours to cover the duties of them. But surprisingly quite similar higher results (65%) was reported the among nursing professionals in South eastern Brazil.[15] In the present study sleep quality was significantly associated with age, and it was highest among the nursing officers with age group 31- 40 years (85.2%) which was similar to the study done among the nurses in Malaysian government

hospital which showed highest among age group 30-39 years (63.3%).^[16] Married nursing officers had poor sleep quality (60.1%) compared to the single nursing officers in a study done in Malaysia^[16] which was similar to our study (71.3%).

In a study done among the nurses of north west Nigeria^[17] and among the south Indian nurses,^[2] the results showed that the nursing officers with higher experience has good sleep quality than the nurses with lower experience which was similar to the results in our study. Our study showed significant association between the night shifts and number of night shifts per month with the sleep quality which showed that the nursing officers who had more than 15 night shifts had poor sleep quality than the nursing officers who had less than 3 night shifts per month which was similar to the results of the studies done in Nigeria and Manipur.^[17,5] The shift duties for nursing officers was more during the period of the study because of the COVID 19 pandemic and few nursing staff were infected with COVID so the remaining ones should run more shifts than normal. There was significant association between the qualification of the nursing officers and sleep quality. General nursing and Midwifery nurses have poor sleep quality which is in contrast with the study done among nurses in Manipur.^[5]

There was no significant association between the marital status of the nursing officers and the sleep quality in the present study when logistic regression applied which is similar with the study done among nursing staff of a tertiary care centre in Taiwan and Manipur.^[18,5] Our study showed that the nursing officers from nuclear family had poor sleep quality than those from the Joint family, this may be because in joint family the responsibilities of the family are widely distributed among all the family members and thus the household stress will be less in joint family than nuclear family.^[19]

Present study showed that there was significant association between the department in which the nursing officers work and the sleep quality but when logistic regression was applied it showed no significant association between the department and poor sleep quality. Even the literature showed the association is inconsistent in studies done among

nurses in china showed that working in the intensive care unit and emergency department had a higher risk for sleep disturbance^[20] in opposite to the studies done in Taiwanese^[21] nurses and Hong Kong^[22] nurses which showed no difference in the sleep quality of nurses in different departments.

In our study there was significant association between the sleep hygiene index and sleep quality among the nursing officers. Poor sleep quality was high among the nursing officers who were practicing poor sleep hygiene and good sleep quality was seen high among who were practicing good sleep hygiene practices which was similar to the results found in a study done among Primary healthcare centre nursing staff in Southwest Saudi Arabia.^[23] This shows that sleep hygiene practice play an important role in maintaining sleep quality.

Conclusion

The prevalence of poor sleep quality was high among nurses, with seven out of every ten nurses having poor sleep quality. A significant association of poor sleep quality was found with 31-40 years age group, nuclear family, less than 10 years of work experience and >15 nights shifts per month. Nursing officers who were practicing poor sleep hygiene had poor sleep quality.

Limitation: As the study done during COVID pandemic, no wonder the prevalence of poor sleep quality is very high among nursing officers but, when compared to other studies done before pandemic the results of our study are unpredictably high so comparative studies should be done to compare the prevalence rate after the pandemic and also further longitudinal studies with larger population, need to be conducted to identify the factors causing poor sleep quality.

Recommendations: The high prevalence rate poor sleep among nursing officers is a matter of concern to the administration to prepare the nursing manpower for the pandemic by recruiting needed number of nursing staff, with proper and adequate training to them, following protocol for the provision of duty offs after night shift duties and avoidance of extended shift duties, so as to promote effective sleep quality among the nurses.

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Comparative Study between Proximal Femoral Nail and Proximal Nail Antirotation Unstable Trochanteric Fractures in Andhra Population

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Abstract

Background: Intertrochanteric fractures are quite common in elderly patients. Although many devices are present to stabilize the fractures for early healing hence early healing, Ideal techniques are required because in old age bones are osteoporotic.

Method: 70 (seventy) patients aged between 50 to 70 years admitted due to intertrochanteric fracture were studied. 35 patients were inserted with proximal Femoral Nail (PFN) and 35 were inserted with proximal Nail anti rotation (PFNA). The helical blade PFN has two screws, one large which stabilizes the fractured part of femur and another is anti-rotation while PFNA has helical blade which provides stability and anti-rotation mobility. Both surgeries were similar but instrumentations and techniques were different.

Results: The mean duration time for PFN was 40.30 (± 6.11) and 35.19 (± 5.03) in PFNA, t test was 3.82 and $p < 0.004$. Blood loss was 75.76 (± 14.33) in PFN 59.39 (± 11.98) in PFNA, t test 5.18 and $p < 0.001$ Fluoroscopy images mean value 27.48 (± 3.44) in PFN, 16.28 (± 3.11) in PFNA, t test 14.2 and $p < 0.001$. Reoperation was 3 (8.57) in PFN and 1 (2.85%) in PFNA. Cut out z-effect was 4 (11.4%) in PFN and 1 (2.85%) in PFNA, loss of reduction had shortening > 1 cm were 6 (17.1%) in PFN and 3 (8.57%) in PFNA. Varus malalignment was 4 (11.4%) in PFN and 1 (2.85%) in PFNA. Postoperative final outcomes were very less in PFNA as compared to PFN surgery.

Conclusion: PFNA technique significantly reduced duration of time for surgery, loss of blood, fluoroscopy imaging usage mortality rate hence PFNA is a better option is Osteoporotic (elderly) patients.

Keywords: PFN, PFNA, Helical blade, trochanteric, Fluoroscopy

Introduction

Intertrochanteric fractures are common in the elderly population with significant mortality and

morbidity⁽¹⁾. The workhorse for fixation of the intertrochanteric fracture has shifted from Dynamic hip screw (DNS) to proximal femur Nail anti rotation

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(PFNA) especially for unstable type fractures and proximal Femoral Nail fractures (2).

The proximal femoral Nail anti-rotation (PFNA) system is an intra medullary nail implant design of PFNA and improved sliding properties of the Femoral Neck result in fewer perforations of the head, neck fragment and a better hold in osteoporotic bone (3). Hence intramedullary (IM) devices include proximal Femoral Nail (PFN) and proximal femoral Nail antirotation, PFN includes IM Nail through which two screws are inserted in the Neck of femur. One is a large screw that stabilizes the fractures allowing collapse and the other one is an anti-rotation screw used to provide rotatory stability to the fracture PFNA in which helical blade instead of two screws (4)(5). The helical blade is believed to provide stability compression and rotational control of the fracture. Hence an attempt was made to compare the both devices and the pros and cons of both techniques were evaluated.

Material and Method

70 (seventy) patients aged between 50 to 70 years admitted at Nimra Institute of Medical Sciences, Ibrahimpatnam, Jupudi, Vijayawada-521456 Andhra Pradesh were studied.

Inclusive Criteria: Acute unilateral trochanteric fractures belonged to AO/ASIF. 31-A1-A2, 31-S3 were independent ambulates, prior to injury were selected for study.

Exclusive Criteria: Patients having pathological fractures, open fractures, poly-trauma, neuro-muscular disorders were excluded from study.

Method

Out of 70 patients, 35 were selected for PFN and 35 for PFNA written consent were obtained from every patient. The surgical procedure was similar in both groups except for the techniques and instrumentation used in either system. Types of fractures assessed as per AO/ASIF classification system using orthogonal radiographs. All patients were administered spinal or epidural anaesthesia and positioned supine on the fracture table prior to closed reduction of fracture. The duration of surgery and loss of blood was noted.

Every patient received prophylactic antibiotics as pre-operative dosage. Post operatively every patient of both groups with low molecular weight heparin, first ten days postoperatively or during stay at hospital whichever is shorter duration followed aspirin for 4 weeks. All patients were allowed to touch down weight bearing ambulation using a walking frame starting from the first postoperative day till six weeks, clinical and radiological assessment of fracture union or complication for every patient was carried out pre-operatively or post-operatively at 6 weeks, 3 months, 6 months and 1 year. Functional evaluation was done at year post-operatively by using Harris Hip score.

The duration of study was June-2017 to February-2022

Statistical analysis: Comparison of operation details postoperative complications, loss of reduction details, final outcomes were carried out by using t test and classified with percentage. The statistical analysis was done in SPSS software. The ratio of male and female was 2:1.

Observation and Results

Table-1: Comparison of operation details in both groups

Duration (time in minutes) 40.30 (± 6.11) in PEN in surgery and 35.20 (± 5.03) in PENA surgery, t test is 38.2 p value $p < 0.004$, p value is highly significant

Blood loss (ml) - 75.76 (± 14.33) in PFN, 59.39 (± 11.98) in PFNA surgery, t

test was 5.18, p value, $p < 0.001$ p value is highly significant

Fluoroscopy Images - 27.48 (± 3.44) in PFN, 16.28 (± 3.11) in PFNA surgery, t test was 27.48, p value $p < 0.001$

Table-2: - Comparative study of complication

Cut out / z-effect - 4 (11.4%) in PFN and 1 (2.85%) in PFNA

Re-operation - 3 (8.57%) in PFN and 1 (2.85%) in PFNA patients

Table 3: Comparative study of loss of reduction -

Shortening > 1cm – 6 (17.1%) in PFN, 3 (8.57%) in PFNA surgery

Varus Malalignment – 4 (11.4%) in PFN, 1 (2.85%) in PFNA surgery

Table 4: Comparison of Final outcomes in both groups

Mortality 4 (11.4%) in PFN, 2 (5.71%) in PFNA surgery

Persistent pain – 5 (14.2%) in PFN and 4 (11.4%) in PFNA patients

Use of walking aids – 11 (31.4%) in PFN patients, 7 (20%) PFNA patients

Return to pre-fracture status 17 (48.5%) in PFN, 19 (54.2%) PFNA patients Harris Hip score – 86.4 (\pm 10.28) in PFN, 89.24 (\pm 6.65) in PFNA patient, t-test was 1.35, p value is $p < 0.18$ (p value is Insignificant)

Table 1: Comparison of operation details in both groups

Sl. No	Details	PEN (35)	PFNA (35)	t test	p value
1	Duration Time (in minutes)	40-30 (SD \pm 6.11)	35-19 (SD \pm 5.03)	3.82	$p < 0.004$
2	Blood loss (ml)	75.76 (SD \pm 14.33)	59.39 (SD \pm 11.98)	5.18	$p < 0.001$
3	Fluoroscopy Images	27.48 (SD \pm 3.44)	16.28 (SD \pm 3.11)	14.2	$p < 0.001$

Table 2: Comparative study of post-operative complications

Sl. No	Complications	PEN (35)	PFNA (35)
1	Cut out z-effect	4 (11.4%)	1 (2.85%)
2	Re-operation	3 (8.57%)	1 (2.85%)

Table 3: Comparative study of loss of reduction

Sl. No	Loss of reduction	PEN (35)	PFNA (35)
1	Shortening of > 1 cm	6 (17.11%)	3 (8.57%)
2	Varus Malalignment	4 (11.4%)	1 (2.85%)

Table 4: Comparative of Final outcomes in both groups

Sl. No	Final outcomes	PEN (35)	PFNA (35)
1	Mortality	4 (11.4%)	2 (5.71%)
2	Persistent pain	5 (14.2%)	4 (11.4%)
3	Use of walking aids	11 (31.4%)	7 (20%)
4	Return to pre-fracture status	17 (48.5%)	19 (54.2%)
5	Harris Hip score (1 year post-operatively) Range (Minimum to Maximum)	86.4 (SD±10.28) (50 to 95) t test 1.35	89.24 (SD±6.65) 64 to 95 P value p>0.18 (Insignificant)

Discussion

Present comparative study between PFN and PFNA intra-trochanteric fractures. Duration of surgery was 40.30 (SD± 6.11) minutes in PFN, 35.19 (SD±5.03) in PFNA, loss of Blood (in ml) 75.76 (SD± 14.33) in PFN, 59.39 (SD± 11.98) in PFNA patients. Fluoroscopy images 27.48 (SD± 3.44) in PFN, 16.28 (SD± 3.11) in PFNA patients (Table-1). Post-operative complications were cut out z-effect 4 (11.4%) in PFN, 1 (2.85%) in PFNA. Reoperation were 3 (8.57%) in PFN only, 1 (2.85%) in PFNA (Table-2). In the loss of reduction study the shortening > 1cm 6 (17.11%) in PFN, 3 (8.57%) in PFNA varus Malalignment 4 (11.4%) in PFN, 1 (2.85%) in PFNA (Table-3). The final out comes were mortality was 4 (11.4%) in PFN, 2 (5.71%) in PFNA. Persistent pain 5 (14.2%) in PFN, 4 (11.4%) in PFNA, Use of walking Aids 11 (31.4%) in PFN, 7 (20%) in PFNA, Return to pre-fracture status 17 (48.5%) in PFN, 19 (54.2%) in PFNA patients Harris HP score was 86.4 (± 10.28) in PFN, 89.24 (± 6.65) in PFNA patients, t test was 1.35 and p >0.18 (p value was insignificant)

(Table-4). These findings are more or less in agreement with previous studies⁽⁶⁾⁽⁷⁾⁽⁸⁾.

Delayed ambulation is related to the development of postoperative pneumonia, delirium and increased length of hospital stay and care time ⁽⁹⁾. Closed

fracture reduction preserves the haematoma, an essential element in fracture healing ⁽¹⁰⁾. PFNA allows surgeons to minimize soft tissue dissection, thereby reducing surgical trauma, blood loss, and infection and wound complications ⁽¹¹⁾⁽¹²⁾. This may be due to processed helical shaped PFNA blade tail which could result in reduced skin and fascia stimulation. In addition, the PFNA insertion was a simpler and less invasive surgical procedure than PFN technique. Moreover using PFN (screw) or PFNA (helical blade) instrumentation, the degree of osteoporosis has to be given a more important base line or criteria because as age advances, calcar femorale present in the neck degenerate. Hence severe osteoporosis may feel the burden of implantation of instrumentation can lead to re-fracture. Assessment functional outcome post-operatively Harrison Hip score will confirm the degree or gravity of osteoporosis.

Summary and Conclusion

Present comparative study between PFN and PFNA in unstable fractures in Andhra Pradesh Population. PFNA is associated with reduction in duration of surgery intraoperative blood loss, rate of post-fixation failure and post-operation failures were least in PFNA techniques. But this study demands further, genetic, nutritional, musculo-skeletal, pathophysiological studies because the exact mechanism of healing fractures of bone is still unclear.

Limitation of Study - Due to tertiary location of research patients, small number of patients, lack of latest techniques, we have limited findings and results.

- This research paper was approved by Ethical committee of Nimra Institute of Medical Sciences Ibrahimpatnam, Jupudi, Vijayawada-521456
- **No Conflict of Interest**
- **No Funding**

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Comparative Study of Total Intravenous Anaesthesia Using Propofol with or without Sufentanil in Laparoscopic Cholecystectomies

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Abstract

Background: Total intravenous anaesthesia (TIVA) is a ideal substitute to inhalation anaesthesia because of hemodynamic complications. TIVA with suitable combination of anaesthetic drugs will have good post-operative results.

Method: 60 patients aged between 18 to 65 years undergoing laparoscopic cholecystectomies were studied. Sixty patients classified in three groups, 20 patients in each group. Groups S1 and S2 received propofol with sufentanil added at 1 µg/ml and 2 µg/ml concentration respectively while group P received propofol without sufentanil. Additional sufentanil boluses (10 µg) were when there is an increase in the hemodynamic parameters, recovery times, and post-operation analgesia were compared in all three groups of patients.

Results: Hemodynamic parameters (HR, SBP, DBP) were not significantly different in all three groups. Fewer S2 patients required additional sufentanil boluses to maintain proper hemodynamic status. S2 group had better post-operative analgesia ($p < 0.001$) but prolonged recovery time as compared to other two groups.

Conclusion: Sufentanil mixed with propofol provides better hemodynamic stability in laparoscopic cholecystectomies where more chances of pneumothorax due to fluctuations in hemodynamic parameters which may lead to morbidity and mortality.

Keywords: TIVA, propofol, sufentanil, Bolus, Hemodynamic

Introduction

General Anaesthesia should provide quick and pleasant induction, predictable loss of consciousness, stable operating conditions, minimal adverse effects, rapid and smooth recovery of protective reflexes and psychomotor function. Total intravenous anaesthesia

(TIVA) is an evolved concept of general anaesthesia, which obviates the need for volatile anaesthetics. Propofol, a sedative - hypnotic agent with excellent recovery characteristics at the end of infusion and additional anti-emetic property, has become the drug of choice for TIVA ⁽¹⁾⁽²⁾.

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Sufentanil has been combined with propofol in total intra venous anaesthesia (TIVA) for various types of surgeries due to advent ages like synergistic action with propofol, rapid induction, less cardiovascular and respiratory depression, and rapid recovery profile better than fentanyl⁽³⁾⁽⁴⁾. These properties can make, sufentanil an excellent adjuvant to propofol in TIVA for upper abdominal Laparoscopic surgeries where the intra-operative hemodynamic fluctuations due to pneumo-peritoneum and changes in patient position are better addressed, combination of sufentanil propofol TIVA provides better recovery of consciousness at emergence compared to inhalational anaesthesia and good postoperative analgesia thus making it a useful combination for conducting upper abdominal laparoscopic surgery. However sufentanil efficacy as adjuvant to propofol in TIVA is not completely established. Hence attempt is made to evaluate the sufentanil combination with propofol at different concentration to justify the proper dosage and combination.

Material and Method

60 (sixty) patients admitted at GSL Medical College hospital Rajahmundry, Andhra Pradesh - 533296 were studied.

Inclusive Criteria: Adult patients (18 to 65 years) of ASA physical status I or II with Mallampati scores I and 2. Scheduled to undergo elective laparoscopic cholecystectomy were selected for study.

Exclusion Criteria: Body weight more than 90 Kg, history of hypertension, IHD, history of Psychiatric disorder, patients with hepatic or renal dysfunction were excluded from study.

Selected patients had pre-anaesthetic check up were randomly classified into three groups of twenty each with the help of computer generated table of random numbers. The pharmacist of operation theatre was assigned for concentration of sufentanil to be added to the propofol infusion for each group. Solution of propofol containing different concentrations of sufentanil or no sufentanil were prepared in 50 ml syringes by the operation theatre pharmacist as per the randomisation chart for each patient, immediately prior to induction. The intervention allocation was masked from the

anaesthesiologist conducting study, the patients and the Nurses monitoring the patients in the post-anaesthetic care unit and subsequently in the ward.

Before start of anaesthetic intravenous access, was secured on each patient with 18 gauge intravenous catheter for fluid and drug administration. Pre-induction measurement of heart rate (HR) systolic Blood pressure (SBP), diastolic Blood pressure (DBD), Mean Arterial pressure, peripheral oxygen saturation, (SPO₂) from anaesthesia monitor was taken as baseline measurement. Monitoring was continued throughout the period of anaesthesia and included electrocardiography, pulseoximetry non-invasive arterial pressure arterial pressure and capnography. Patients were pre-oxygenated for 3 minutes with 100% O₂ by face mask. Anaesthesia was induced with slow IV injection of sufentanil 1 µg Kg and continuous infusion of propofol 100 µg Kg min⁻¹. Loss of response to verbal commands was taken as end point induction following which intermediate acting neuromuscular blocking agent; vecuronium 0.1 mg Kg¹ was given. Trachea was Incubated after 3 minutes of mask ventilation and lungs were mechanically ventilated with O₂, Air mixture and end tidal CO₂ concentration (E+CO₂) 30-40 mm Hg, HR, SBP, DBO and SPO₂ were recorded 1, 3, 5 minutes post-induction.

HR, SBP, DBP, SPO₂ and EtCO₂ were monitored throughout the intra-operative period and recorded every 15 minutes in the observation sheet. All patients received propofol infusion titrated to clinical situation in a range of 75 to 125 Kg mint, Hypotension defined as systolic blood pressure below 60 mm µg for more than 5 minutes, was treated by reducing propofol infusion by 10 µg Kg¹min⁻¹ but within the range of 75 to 125 µg, Kg¹,min⁻¹. Additional intra venous fluids were given as deemed appropriate. Response was measured at 5 minutes intervals and the above measures continued until stabilisation of Blood pressure. Hypertension, defined as systolic Blood pressure above 95 mm/Hg for more than 5 minutes was treated by giving additional sufentanil (10µg) boluses. Sufentanil boluses 10 (µg) were also given to patients in all groups when there was increase in the heart rate by more than 20 beats per minutes or mean arterial pressure by more than 15% indicating lightening of anaesthesia. Response was reassessed at

5 minutes interval and the above measures repeated until stabilisation. Neuro muscular paralysis was prevented with timely top of doses of vecuronium. Ten minutes before the anticipated and of surgery (at the start of skin suturing) the infusion was stopped. Total volume of propofol given by infusion for each patient was recorded. Total amount of sufentanil and the number of additional boluses of sufentanil given for each patient was recorded.

Patients were shifted to the post-anaesthesia care unit where HR, SBP, DBP, RR and SPO2 were recorded every 15 minutes for 2 hours; All patients were given supplemental Oxygen with the face mask post-operating all patients received oral diclofenac 50 mg three times daily post-operative pain was assessed for 24 hours by 10-cm visual analogue scale (VAS) on which 0 mc represents no pain and 10cm represents worst imaginable pain⁽⁵⁾.

Duration of study was June-2021 to July-2022

Statistical analysis: Various parameters of three groups undergoing laparoscopic cholecystectomy and administration of anaesthetic drugs, propofol, sufentanil, with or without sufentanil were compared with hemodynamic parameters; consumption of propofol, sufentanil, (recovery time) was with Anova test and chi-square were studied. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1.

Observation and Results

S1 and S2 groups received propofol with sufentanil added at 1 µg/ml and 2 µg/ml concentrations respectively while group P received propofol without sufentanil.

Table-1: Hemodynamic parameters HR (bpm), SBP (mm/Hg) and DBP (mm/Hg) at various time periods value for mean value ±SD and p value for comparison between groups HR (Heart rate) of all time have significant differences

1. SBP (mm/Hg). DBP (mm/Hg) had significant differences in all three groups.
2. Post-Induction studies had HR, SBP, DBP HAD significant mean values (differences)
3. Intra-operative parameters like HR, SBP,

DBP also had significant differences in all three parameter.

4. Post Intubation period had also HR, SDP, DP have significant mean values.
5. Post-operation conditions also all three hemodynamic parameters HR, SBP, DBP had significant mean values.

Table-2: Total consumption of propofol and sufentanil in all groups. In group-P (propofol) 63.5 (±4.60), in S1 (propofol with sufentanil) 56.48 (± 18.49), group S2 (without sufentanil) 54.78 (± 16.38), F=1.55 and p value in insignificant (p>0.22)

- Amount of sufentanil at induction (mcg) 73.24 (± 1.4) in group P, 70.20 (± 8.5) in group S1, 64.54 (± SD) in S2, F=5.83 and p<0.00 (p value is highly significant)
- Amount sufentanil given in infusion and propofol, (mcg) 56.5 (± 18.4) in S1 group, 112.4 (± 27.2) in S2 group, F=175.3 and p<0.0001 p value was significant
- Amount of sufentanil given as in group P, 10.81 (±6.02) in S1, 12.24 (± 5.32) and F=0.609 and p>0.5 and p value was Insignificant
- Number of patients who received intra-operative bolus 10 in group and group S1 and 6 in S2 and Chi square 2.17 and p<0.33 (p value Insignificant)
- Total amount of sufentanil consumed 80.72 (± 5.7) in group p, 135.2 (± 25.1) in group s1, 182.1 (± 36.2) F=70.3 and p<0.00 (highly significant)

Table-3: Distribution of number of patients who required additional intra-operative sufentanil boluses in three groups. Total No of patients were 28 (± 4.66%), 20(± 33.3%) in group-I, 6 (± 10%) in group-II, 1 (± 1.61%) in group-III

Table-4: Anaesthesia recovery time (Mean value ±SD) in post-operative period.

- Anaesthesia recovery period (time in minutes) 15 (± 4) in group-P, 15 (± 5) in group S1, 22 (± 8) in group S2, F test -9.33 and p<0.003 (highly significant)
- No of patients required rescue analgesic, 10 in group P, 6 in group S1 and 2 in group S2 and p<0.02 (p value was highly significant)

Table 1: Hemodynamic Parameters HR (6pm) SP (mm/Hg) and DBP (mm/Hg) at various time periods value are Mean values \pm SD and P values for comparison between groups

Pre-Induction	Group P	Group S1	Group S2	PVS S1	PVS S2	S1V3S2
HR	85.15	84 \pm 10	79 \pm 11	0.80	0.10	0.17
SBP	132 \pm 11	130 \pm 16	132 \pm 14	0.66	1.00	.69
DBP	79 \pm 10	81 \pm 10	81 \pm 10	0.52	0.52	1.00
Post-Induction HR	72 \pm 1	67 \pm 2	66 \pm 2	0.42	0.13	1.00
SBP	102 \pm 3	98 \pm 3	99 \pm 2	0.96	1.00	1.00
DBP	58 \pm 2	57 \pm 3	55 \pm 3	1.00	1.00	1.00
Intra operative						
HR	69 \pm 2	72 \pm 2	70 \pm 2	0.85	1.00	1.00
SBP	112 \pm 2	112 \pm 2	111 \pm 2	1.00	1.00	1.00
DBP	70 \pm 3	69 \pm 3	65 \pm 2	1.00	0.38	0.58
Post Extubation						
HR	79 \pm 2	89 \pm 2	79 \pm 2	0.03	1.00	0.02
SBP	128 \pm 2	126 \pm 2	126 \pm 2	1.00	1.00	1.00
DBP	76 \pm 2	78 \pm 2	75 \pm 2	1.00	1.00	0.62
Post-operative						
HR	68 \pm 2	75 \pm 2	75 \pm 2	0.01	0.02	1.00
SBP	118 \pm 2	120 \pm 2	124 \pm 2	1.00	0.18	0.54
DP	75 \pm 2	74 \pm 2	75 \pm 2	1.00	1.00	1.00
SBP	118 \pm 2	120 \pm 2	124 \pm 2	1.00	0.18	0.54
DBP	75 \pm 2	74 \pm 2	75 \pm 2	1.00	1.00	1.00

Table 2: Total Consumption of propofol and sufentanil in all groups (Values mean \pm SD)

Details volume of	Group-P (20)	Group-S1 (20)	Group-S2 (20)	ANOVA test	P value
Propofol consumed (ml)	63.5 (\pm 14.66)	56.48 (\pm 18.49)	54.78 (\pm 16.38)	F=1.5539	P=0.2203
Amount of sufentanil at Induction (mcg)	73.24 (\pm 1.4)	70.20 (\pm 8.54)	64.54 (\pm 11.20)	F=5.8387	P=0.0049**
Amount of sufentanil given in Infusion and propofol	0	56.5 (\pm 18.40)	112.4 (\pm 27.24)	F=175.3768	P=0.0001**
Amount of sufentanil given as intra-operative boluses	12.62 (\pm 5.02)	10.81 (\pm 6.02)	12.24 (\pm 5.32)	F=0.6090	P=0.5474
No. of patients who received Intra operative boluses	10	10	6	Chi-square=2.1719	P=0.3375
Total amount of sufentanil consumed	80.72 (\pm 15.77)	135.2 (\pm 25.12)	182.13 (\pm 36.28)	F=70.3773	P=0.0001**

**indicates highly significant

Statistically highly significant difference observed in Amount of sufentanil at Induction, Amount of sufentanil given in Infusion and propofol and Total amount of sufentanil consumed in Group P, Group S1 and Group S2 ($P < 0.01$).

While no significant difference observed in propofol consumed, Amount of sufentanil given as intra-operative boluses and No. of patients who received Intra operative boluses in Group P, Group S1 and Group S2 ($P > 0.05$).

Table 3: Distribution of the number of patients who required additional intra-operative sufentanil boluses in three groups

	0	1	2	3
Group P-No of patient	8	7	3	0
Frequency percentage	40%	35%	15%	0
Group S1-No of patient	8	9	0	1
Frequency percentage	40%	45%	0	5%
Group S2-No of patient	12	4	3	0
Frequency percentage	60%	20%	15%	0
Total - No of patients	28	20	6	1
Frequency percentage	46.6%	33.3%	10%	1.6%

Table 4: Comparison of Anaesthesia Recovery time (mean value \pm SD) in post-operative period

Details	Group-P (20)	Group-S1 (20)	Group-S2 (20)	Test statistic P value
Anaesthesia recovery time (Minutes)	15 (\pm 4)	15 (\pm 5)	22 (\pm 8)	F=9.3333 P=0.0003**
No. of patient required rescue Analgesic	10	6	2	Chi square=7.6190 P=0.0221*

*Indicates significant and **indicates highly significant

Statistically highly significant difference observed in anaesthesia recovery time among Group P, Group S1 and Group S2 patients ($P < 0.01$). Also, there is significant difference observed in no. of patients required rescue Analgesic among Group P, Group S1 and Group S2 patients ($P < 0.05$).

Discussion

Present comparative of TIVA with using propofol with or without sufentanil in Laparoscopic cholecystectomies in Andhra Pradesh Population. In comparison of in pre-induction, post-induction, in pre-operative, post-intubation, post-operative have insignificant p value (Table-1).

Distribution of boluses in number of patients who required additional intra-operative sufentanil boluses in three groups was compared. Total consumption

additional in all (zero group) 28 (46.6%), 20 (33.3%) in 1st group, 6 (10%) in 2nd group, 1 (1.6%) in 3rd group (Table-3) Comparison of Anaesthesia recovery time in minutes 15 (\pm 4) in group P, 15 (\pm 5) in group S1, 22 (\pm 8) in group S2, F=9.33, $p < 0.003$ (p value is highly significant) No. of patient required rescue analgesic 10 in group P, 6 in group S1, 2 in group S2, chi-square test -7.61 and $p < 0.02$ (p value was highly significant) (Table-4). These finding are more or less in agreement in previous studies ⁽⁶⁾⁽⁷⁾⁽⁸⁾.

Propofol is a sedative hypnotic agent with excellent recovery characteristics at the end of infusion and additional anti-emetic property, has become drug of choice for TIVA. Hemodynamic parameters (heart rate, systolic and diastolic blood pressure) were not significant different in all three groups of patients in the pre-operative period. Fever group S2 had required additional sufentanil boluses

to maintain adequate depth of anaesthesia compared to other two groups, group S2 patients had better post-operative analgesia but had prolonged recovery time. Compared to other two groups sufentanil mixed with propofol provides better hemodynamic stability in present study with lesser requirement for additional sufentanil boluses and good post-operative analgesia.

It is reported that, increasing concentration of sufentanil reduce the volume of propofol consumed during surgery ⁽⁹⁾⁽¹⁰⁾.

It was also confirmed that, intra-operative usage sufentanil was very effective in providing excellent 24 hours post-operative analgesia ⁽¹¹⁾ sufentanil is suitable for post-operative pain control because it has no active metabolites and shows a higher therapeutic Index and lower frequency of respiratory suppression hence it is ideal combination in upper abdominal surgeries in upper abdomen there are chances of impairment of hemodynamic parameters, pneumothorax which may lead to morbidity and mortality.

Summary and Conclusion

In the present study it is noted that, both concentrations sufentanil achieve the goals of stable hemodynamic parameters without clinical recovery time. However 2µg mg concentration of sufentanil added to propofol provided greater peri-operative hemodynamic stability with lesser requirement of additional boluses and excellent post-operative analgesia but this study demands the clinical trials in larger group of patients to confirm the conclusion of present study of combinations of anaesthesia

Limitation of study - Owing to tertiary location of research centre, small number of patients and lack of latest techniques we have limited findings and research.

- The present research work was approved by Ethical committee of GSL Medical College Rajahmundry Andhra Pradesh-533296
- **No Conflict of Interest**
- **No Funding**

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Study of Co-existence of Fungal infection in Diabetic Foot ulcers in Delhi Population

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Abstract

Background: Diabetic foot ulcers are common diseases in long standing type-II DM patients. Moreover in most chronic diabetic foot ulcers (DFU) fungal infections were also observed which are difficult to diagnose in early stages and patients end up with amputations if not treated aggressively.

Method: 50 (fifty) known type-2 DM were studied - Tissue biopsy was collected from DFU and studied microbiologically gram stain, gram's Iodine test were done, LQCB test was done to rule out fungal infection.

Results: 50 (Fifty) adults patients aged between 30 to 75 years having DFU were studied. Duration of DFU were 15 (30%) were 3 months to 35 (70%) from 13 months to 36 months. Duration of DM 20 (40%) were 2 years to 5 years, 30 (60%) were 6 to 10 years. HBALC - 14 (28%) was 6-7% and 36 (72%) had 8-15% RBS, 23 (46%) had 200-300, 27 (54%) had 321 to 670, 17 (54%) had grade-II DFU, 22 (44%) had grade-III DFU, 11 (22%) had grade-IV DFU. Apart from Bacterial flora, 12 (24%) fungal infections were noted.

Conclusion: Present study signifies the need of mycological evaluation of non-healing DFU. Apart from antibacterial therapy, foot care, introduction of anti fungal treatment helps to heal the DFU in early stages and avoid the risk of amputation.

Keywords: DFU, LPCB, Gram stain, Grams Iodine, Candidiasis

Introduction

Diabetes Mellitus has reached a pandemic proportion affecting almost every country in the world ⁽¹⁾. Diabetic foot ulcer is one of the common complications of long standing diabetes mellitus,

resulting in increased economic burden ⁽²⁾. The plethora of bacterial infections, which may be present in a diabetic ulcer and the treatment protocol based on it, has now has been clearly defined⁽³⁾, but the chronic non-healing ulcers, many of which

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end up in amputations are found to be increasingly associated with fungal infections⁽⁴⁾. *Candida SPP*, is the most commonly isolated yeast from those ulcer 5-21 fungal infections were observed in diabetic foot ulcers, some studies have also reported that *Candida albicans* as the most prevalent species in Diabetic foot ulcers⁽⁵⁾. White blood cells have ability to destroy the pathogenic fungi but due to fluctuating blood sugar levels and hypoxia there is risk of acquiring fungal infections along with bacterial infections also. Hence attempt was made to evaluate the various degrees of ulcers and prevalence of fungal infections in diabetic foot ulcers.

Material and Method

Fifty (50) adult patients aged between 35 to 70 years who regularly visited Base Hospital and Army college of Medical Sciences Delhi Cantt, New Delhi were studied.

Inclusion Criteria: DM patients with blood glucose under control, Non-healing ulcers of more than 2 months duration undergoing treatment with antibiotics and wound care were selected for study.

Exclusion Criteria: Foot ulcers from other causes like patients having venous or arterial diseases pregnant and lactating mothers and other immunocompromised patients were excluded from study.

Method: In every patients ulcer was cleaned with povidone solution and sterile Normal saline, samples for study was taken from the depth of the ulcers measuring around 0.5X0.5cms. Transport media – Tissue samples were collected in plastic bottles (auto cleavable) containing approx 4.5ml of Normal saline in it. Tissue samples from the ulcers under aseptic precautions are sealed and labelled and were taken to microbiology laboratory within one hour.

Tissue blocks received were taken out from the sample collection bottle were triturated and then the tissue was ready for examination.

KOH 10% preparation – Tissue specimen is placed on clean side and 10% KOH is added, left in the incubator at 37 degree C for 2 hours cover slip is placed and examined under microscope. The alkali digests the keratin tissue and other tissue materials enabling the fungus elements to be seen clearly

.Examination is done under the low power with reduced light and looked for fungal elements.

Gram stain – With the triturated tissue material, a smear is made on a clean slide, which is then dried, heat fixed and stained 1.0gm crystal violet added in 5% sodium bicarbonate 1.0ml solution and mixed it and volume was made 100ml by adding Distilled water.

Gram's Iodine – 2gm Iodine crystals added in freshly prepared sodium hydroxide solution (10ml) and made the volume 100ml with distilled water. Gram stained smears are examined under 0.1 immersions for the presence of gram positive budding cells, and pseudohyphae. This was particularly important when *Candida* is suspected.

Cultural procedures were carried out, samples were inoculated into 4 tubes containing Sabouraud's Dextrose agar with antibiotics.

Lactophenol cotton Blue (LPCB) Mounting was done for identification of Fungal elements growth.

Duration of study was from January-2021 to March-2022

Statistical analysis: Various degree of DFU, duration of type – DM levels RBS, HBA1C comorbidity, Bacterial and fungal infections were studied and classified with percentage. The statistical analysis carried out in 2007 software. The ratio of male and female was 2:1.

Observation and Results

Table-1: Dermatographics of patients

- (a) Duration of foot ulcer – 15 (30%) patients had from 3 to 12 months, 35 (70%) had 13 to 36 months
- (b) Duration of type-II DM – 12 (40%) had 2 to 5 years, 30 (60%) had 6 to 12 years
- (c) Random Blood Sugar levels – 23 (46%) patients had 200-320, 27 (54%) had 321-620
- (d) HbA1c level – 14 (28%) had 6-7 %, 36 (72%) had 8-15%

Table-2: Grades of ulcers – 17 (34%) had grade-II, 22 (44%) had grade-III ulcer, 11 (22%) had grade-IV ulcer.

Table-3: Co-morbidities of ulcer patients - 19 (38%) had HTN, 14 (28%) had CRF, 8 (16%) IHD, 2 (4%) had TB, 1 (2%) Hypothyroid

Table-4: Study of Bacterial flora in Diabetic foot ulcer patients - 13 (26%) S. Aureus, 9 (18%) pseudomonas, 8 (16%) Enterococcus, 4 (8%) streptococcus, 2 (4%) proteus vulgaris, 2 (4%) Acinetobacter, 1 (2%) Klebsiella

Table-5: Out of 50 patients 12 (24%) patients had fungal positive

- (a) 5 (10%) had 5 to 6 years duration of type-II DM - 7 (14%) had 7 to 12 years.
- (b) Duration of foot ulcer - 7 (14%) patients had 4 to 5 months, 5 (10%) had 6 to 10 months
- (c) Duration of antibiotics - 9 (18%) started 15 to 20 days, 3 (6%) had 21 to 30 days
- (d) Amputation were 3 (6%) in patients

Table 1: Dermatographics of patients

Sl. No	Details	No. of patients (50)	Percentage (%)
1	Duration of foot ulcer		
	a) 3 months to 12 months	15	30
	b) 13 months to 36 months	35	70
2	Duration of Diabetes		
	a) 2 years to 5 years	20	40
	b) 6 years to 12 years	30	60
3	Random Blood Sugar		
	a) 200-320	23	46
	b) 321-670	27	54
4	Hb		
	a) 6 - 7	14	28
	b) 8 - 15	36	72

Table 2: Study of grades of foot ulcers

Sl. No	Grade of Ulcer	No. of patients (50)	Percentage (%)
1	Grade-II	17	34
2	Grade-III	22	44
3	Grade-IV	11	22

Table 3: Study of Co-morbidities in Diabetic foot ulcer patients

Co-Morbidities	No. of patients (50)	Percentage (%)
HTN	19	38
CRF (chronic renal failure)	14	28
IHD	8	16
TB	2	4
Hypothyroid	1	2

Table 4 (A): Spectrum of Bacterial flora in co-existence of fungal infections

Total No. of patients: 50

Sl. No	Bacterial Flora	No. of patients (50)	Percentage (%)
1	Staphylococcus Aureus	13	26
2	Pseudomonas	9	18
3	Escheria coli	8	16
4	Enterobacter	5	10
5	Streptococcus	4	8
6	Proteus vulgaris	2	4
7	Acinetobacter	2	4
8	Klebsiella	1	2
9	Enterococcus	6	12

Table 5 (B): Study of Fungal positive patients

Sl. No	Details	No. of patients (50)	Percentage (%)
1	Duration of type-II DM		
	a) 5 - 6 year	5	10
	b) 7 - 10 year	7	14
2	Duration of foot Ulcer (in months)		
	a) 4 - 5	7	14
	b) 6 - 10	5	10
3	Duration antibiotic		
	a) 15-20	9	18
	b) 21-30 (days)	3	6
4	Amputation	3	6

Discussion

Present study is of co-existence of fungal infection in DFU in Delhi population. The dermatological profile -duration of DFU 15 (30%) had 3 months to 12 months, 35 (70%) had 13 months to 36 months. Duration of type-II DM was 20 (40%) were from 2 to 5 years, 30 (60%) were 6 to 10 years. RBS level was 23 (46%) had 200-300, 27 (54%) had 321-670 HBA1C level was 14 (28%) had 6-7% and 36 (72%) had 8-15% (Table-1). The grade of DFU was 17 (34%) had grade-II, 22 (44%) had grade-III, 11 (22%) had grade-IV (Table-2). Co-morbidity of DFU patients were 19 (38%) had HTN, 14 (28%) had CRF, 8 (16%) had IHD, 2 (4%) had TB, 1 (2%) had hypothyroid (Table-3). In bacteriology flora study S Aureus and least was 1 (2%) Klebsiella, 9 (18%) Pseudomonas, 8 (16%) E coli, 5 (10%) Enterobacter, 4 (8%) Enterobacter, 6

(12%) enterococcus (Table-4 (A)) and 12 (24%) fungal infection was observed in DFU patients (table-4 (B)). These findings are more or less in agreement with previous studies ⁽⁶⁾⁽⁷⁾⁽⁸⁾.

The pathogenesis of Diabetic foot is highly complex, including poly neuropathy, peripheral vascular disease with compromised immunity, slower wound healing, trauma, and infection ⁽⁹⁾. Complications are associated with the development of infection and diabetic foot syndrome which are the main cause of morbidity, non-traumatic lower extremity amputations and patients mortality ⁽¹⁰⁾.

Bacterial infections of DFU are poly microbial and mixed aerobic anaerobic. Fungal infections include Candida SPP and / or Candida albicans

It is reported that, increased incidence of fungal

infections (dermatophytes) and candidiasis of inter digital spaces and nails in the toes of diabetic patients. These infections associated with development of severe and deep inflammatory processes in feet. It is also noted that candidiasis in DFU plays secondary role followed by bacterial flora in long standing diabetic patients⁽¹¹⁾.

It is described that systemic antifungal therapy (flucytosine, fluconazole, itraconazole or terbinafine administrated orally at variable dosage and duration have significant impact on healing in revascularized DFU patients⁽¹²⁾.

Summary and Conclusion

Present study is a proof of co-existence of fungal infection in DFU patients. It is polymicrobial in nature. DFU has predominately *Enterobacteriaceae* and *Pseudomonas* bacteria with 12% positive fungal infections in long standing diabetic patients. It is confirmed that, fungal infections were observed only in chronic DFU patients. Treating such patients in revascularised DFU with proper dosage of anti-fungal drugs has faster wound healing rates. It requires proper mycological evaluation to treat such patients. This study will help the clinician or dermatologist/surgeon to treat such DFU. But this study demands further patho-physiological, hormonal, nutritional, genetics based studies because exact cause of fungal infection in polymicrobial DFU is still unclear.

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Targeted Interventions to Improve the Health of Female Sex Workers in Amritsar: A Cross-Sectional Study

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Abstract

Introduction: Individuals working in the sex industry continue to experience many negative health outcomes such as sexually transmitted infections and HIV/ AIDS, owing to lack of knowledge, careless attitude, inaccessibility of contraceptives or practice of unprotected sex.

Aims/objectives: To assess the targeted interventions done to improve the health of female sex workers (FSWs) in Amritsar.

Material & Methods: This cross-sectional study, in 4 randomly selected hotspot areas under targeted intervention (TI) included 180 FSWs after obtaining written informed consent. We used one to one interview for collecting required information on structured questionnaire. The data was compiled using Microsoft excel and analyzed using EpiInfo07 by calculating proportions and inferential statistics.

Results: Age of study participants ranged from 19-45 years and most (66%) belonged to middle socio-economic class. Majority (73%) were in the profession for 3-5 years. Majority i.e. 98% underwent regular health checkups and HIV testing conducted by T.I. site. None was HIV positive. All FSWs (100%) were provided condom regularly by T.I. site. 85% reported to have knowledge about STIs. 95% reported regular conduction of health education programs by T.I. site.

Conclusion: Targeted interventions play a key role in conducting regular health check-ups of FSWs, imparting knowledge about STIs, its prevention and provision of condoms.

Key words: Female sex workers, targeted interventions, health check-ups, HIV testing, knowledge about STIs, condom provision.

Introduction

Individuals working in the sex industry continue to experience many negative health outcomes such

as sexually transmitted infections and HIV/ AIDS, owing to lack of knowledge, careless attitude, inaccessibility of contraceptives or practice of unprotected sex. As per the Integrated Biological

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Behavioral Surveillance (IBBS) conducted in 2014-15, HIV prevalence among female sex workers (FSWs) found to be 2.2%, which is eight times more than among pregnant women attending antenatal clinics (0.29%) as per HIV Sentinel Surveillance (HSS) 2014-15.¹ As of now, no specific health related program has been launched for sex workers although a major role is being played by National AIDS Control Organization (NACO) where National AIDS Control Programme (NACP) evolve and revolve around its twin objective of bringing about HIV prevention and providing treatment to people living with HIV including high risk groups (HRGs) such as female sex workers (FSWs).² NACP is a 100% centrally sponsored project³ which through the State AIDS Prevention and Control Societies (SACS) and various non-government organizations (NGOs) guides prevention programme at state, district and village level.² Under Punjab State AIDS Prevention and Control Society (PSACS), there are 59 targeted intervention project (TIs) in Punjab catering to the needs of various high risk groups out of which 32 are solely working for female commercial sex workers (FCSWs). Out of the 32 TIs working for FCSWs in Punjab, 3 are located in Amritsar.³ Apart from prevention of HIV infection, TIs facilitate prevention and treatment of sexually transmitted infections, counselling services to FCSWs, contraception provision, regular health check-ups, provision of legal support, Information Education and Communication (IEC) and Behavior Change Communication (BCC) activities and awareness on various health related issues are also linked to care, support and treatment services for HIV infected. All these services especially (counselling and health related) are provided through peer educators which are selected from within the high risk group (HRGs) for every hotspot.

Material and Methods

The present study was conducted in Amritsar under guidance of the Department of Community Medicine, Government Medical College, Amritsar. In Amritsar city, there are total 5 TI sites/ projects under PSACS. Out of the 5, 3 TI sites serve FCSWs and the remaining 2 cater to injecting drug users (IDUs). Out of these, one TI Site was randomly selected by lottery method, which came out to be All India

Women Conference (AIWC). The study population was selected from 4 out of the 10 hotspots under AIWC. 45 FCSWs from each of the selected hotspots were selected making a total sample size of 180. The study was planned to be conducted over a period of one year i.e. from 1st January 2020 to 31st December 2020 but due to COVID-19 pandemic and associated lockdown, the period of data collection was extended by 3 months.(till 31st March, 2021) Following inclusion and exclusion criteria were applied for the selection of study population:

4.4. a Inclusion criteria:

The FCSWs who:

- Gave a written informed consent,
- Were aged ≥ 18 years,
- Were registered with any of the three TI sites in District Amritsar, were included in the study.

4.4. b Exclusion criteria:

The FCSWs who were:

- Not available on third repeated visit,
- Deaf and/or dumb and/or suffered from any mental illness,
- Non-cooperative or not willing to participate in the study, were excluded from the study.

A written Informed consent was obtained prior to commencement of the interview. The interview of each respondent was held in a completely confidential environment with a one-to-one approach i.e. presence of only the interviewer and one study participant. No personal identifiers such as name and address were recorded, to maintain confidentiality. No invasive intervention was performed. For this study, a semi-structured questionnaire was developed keeping the aims and objectives of the study in mind.

The questionnaire consisted of following sections:

1. Section-I - socio-demographic profile of FCSWs.
2. Section-II - general health assessment including reproductive health.
3. Section-III - occupational profile and occupational health of FCSWs.

4. Section-IV - personal and social history of FCSWs.
5. Section-V - mental health and occupational stigma of FCSWs.

Data was compiled and analyzed using MS Excel and Epi info. For nominal, categorical and ordinal data, frequencies / proportions were calculated. For establishing association, chi-square test was used, where p-value of < 0.05 (on both sides) was considered to be statistically significant.

Observation and Results

Table 1: Distribution of female commercial sex workers according to their socio-demographic profile (N = 180)

Variable	Frequency	Percentage
Age-group (in years)		
18-25	31	17
26-35	117	65
36-45	32	18
Religion		
Hindu	84	47
Sikh	87	48
Others	09	05
Caste		
SC/ST	149	83
General	21	12
OBC	10	05
Family type		
Nuclear	132	73
Joint	48	27
Accommodation type		
Rented	37	21
Own	143	79
Education		
Illiterate	14	08
Primary	19	10
Middle	50	28
High	82	46
Intermediate & above	15	08

Table 1 shows that out of 180 FCSWs, majority i.e.117 (65%) were aged between 26-35 years whereas somewhat similar number were aged between 18-25 years (31; 17%) and 36-45 years (32; 18%), respectively.

Almost equal number of FCSWs followed Sikhism and Hinduism (87; 48% vs 84; 47%). As far as caste was concerned, most i.e.149 (83%) were from SC/ST caste. Majority i.e. 132 FCSWs (73%) lived in nuclear families and 143 (79%) in their own residences. Only 8% of the FCSWs were illiterate and 82% (147) had attained education up to middle class and above.

Table 2 shows the distribution of FCSWs according to their occupational profile where majority i.e. (147; 82%) entered the profession between the age of 18-25 years. The various reasons cited by FCSWs for entering the profession were need for money (99%), no other job option (42%), good and easy money (50%) and self-adventure (4%). Most of the study participants (91%), had been in the profession for more than 3 years. Majority (111; 62%) worked part-time in this profession whereas 38% (69) worked full-time. All 180 FSWs (100%) provided both oral and vaginal sex services. Majority i.e. 140 (78%) were married at the time of entry in the profession.

Table 2: Distribution of female commercial sex workers according to their occupational profile (N = 180)

Variable	Number	Percentage
Age of entry in the profession (in years)		
18-25	147	82
26-35	31	17
36-45	2	01
Primary reason to enter the profession (multiple responses)		
Need for money	179	99
Could not get another job	75	42
Good and easy money	89	50
Self-adventure / pleasure	7	04
Years in profession		
1 - < 3 years	16	09
3 - 5 years	131	73
> 5 years	33	18
Type of engagement		
Part time	111	62

Continue

Variable	Number	Percentage
Full time	69	38
Types of services (multiple responses)		
Vaginal sex	180	100
Oral sex	180	100
Marital status at entry		
Unmarried	40	22
Married	140	78

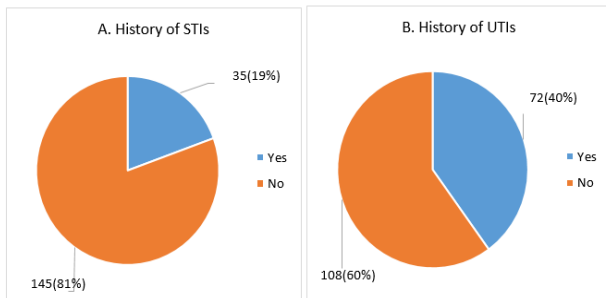


Figure 1: Distribution of female commercial sex workers according to history of sexually transmitted infections and urinary tract infections in their life time (N = 180)

Among all the study participants, 19% and 40% gave a history of STI and UTI, respectively (Fig. 1 A and B). All those who gave history of STI and UTI, took treatment for the infection.

Most i.e. 177 (98%) underwent regular health check-up at 3 monthly interval from Civil Hospital, Amritsar. The HIV test was conducted every 6 months at Integrated Counselling and Testing Center (ICTC), irrespective of the HIV status of female sex worker. (Fig. 2)

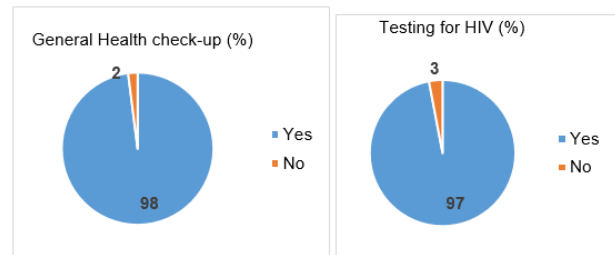


Figure 2: Distribution of FSWs according to regular health check-ups conducted by T.I. site (N=180)

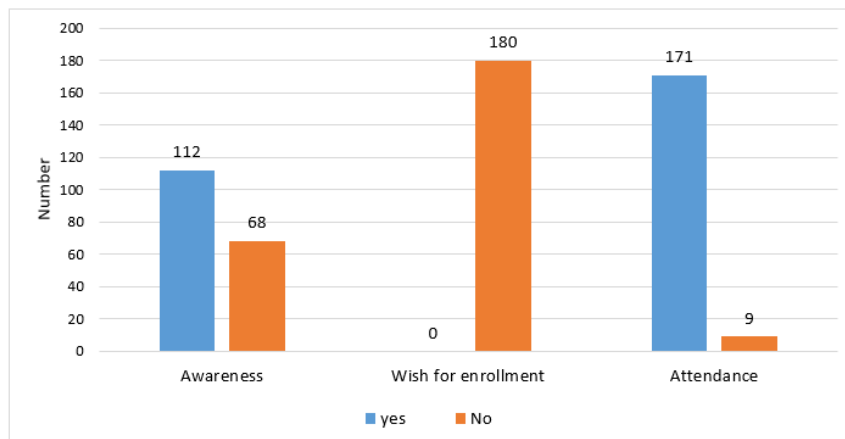


Figure 3: Distribution of female commercial sex workers according to knowledge, attitude and practices related to services provided and health education programs run by government and NGOs (N=180)

Among the study participants, majority i.e. (112; 62%) were aware of services provided by government for FCSWs. In spite of having knowledge about it, none reported wish for enrollment in rehabilitation programs run by various government and NGOs (fig. 3). However, 95% (171) reported attending health education programs run by government.

In the present study, 85% reported having knowledge about STIs and its prevention. Multiple

responses were recorded on asking about the methods of prevention such as condom use, abstaining from sex and avoiding multiple partners. All 100% FCSWs knew of condom use as one of the methods of prevention of STDs. Around 70% knew of sex abstinence as one of the methods of STD prevention.

Majority i.e. 85% of respondents had complete knowledge of benefits of condom such as STI/HIV prevention and prevention from skin diseases such as

syphilis and all 100% knew of prevention of unwanted pregnancy as one of the benefits of condom. All 180 female sex workers received condoms bi-weekly from the targeted intervention site, through the peer educator.

Discussion

In the present study, it was observed that the majority i.e. 65% of the FCSWs were in the age group ranging from 26-35 years whereas the remaining 17% and 18% were in the age group 18-25 years and 36-45 years, respectively (table no 1). Majority of the FCSWs falling in this age range i.e. 26 – 35 years, could be due to the fact that most women attain peak of their sexual activity in this age group. It is also a professionally profitable age as FCSWs of this age group are more in demand due to their young looks. Similar results have been reported by a multi centric study conducted in 22 districts from four high HIV prevalence states in India (Andhra Pradesh, Karnataka, Maharashtra and Tamil Nadu) which also revealed that majority of FCSWs were in the middle age group and 25% were in the age group of 18-25 years.⁴ It was observed that majority (82%) of the female commercial sex workers entered the profession in the age group 18-25 years (table no.2). A study by LA Kramer in Arizona showed the mean age of entry of FCSWs in the profession to be 23.⁵ This could be because of the fact that it is a vulnerable age in which girls can easily fall prey in the hands of commercial sex work due to various reasons such as want of easy and good money, bad company, self-adventure and pleasure etc. It was observed that majority (73%) were in the profession for 3-5 years and 78% were married at the time of entry in the profession.

98% of female commercial sex workers underwent regular health checkups, at 3 monthly interval from civil hospital in the city (figure 2). The checkup included general physical examination, routine blood tests and vaginal examination. The female commercial sex workers were subsequently provided treatment for any bodily complaints. This was majorly due to the awareness and active counselling imparted by the peer educators of the targeted intervention and partly due to the FCSW's attitude of self-care owing to the realization that any condition of ill-health might cause direct loss of clientage and daily wage in addition to health problems. The HIV test is mandatorily conducted at 6 monthly interval irrespective of the HIV status of the sex worker. The

routine health checkup and HIV test are conducted by the Targeted Intervention through Integrated Counselling and Testing Center (ICTC) under the guidelines of National AIDS Control Programme. With a considerably high proportion of female sex workers getting their necessary checkup, it can be assumed that female sex workers are imparted the necessary information and are repeatedly sensitized by the peer educators regarding their health and risks associated with their profession. The Targeted Intervention is definitely playing a crucial role in educating the sex workers regarding health. Another quasi-experimental intervention study conducted among Filipina commercial sex workers showed that HIV testing increased 86% from baseline to follow up and was significantly associated with higher HIV/AIDS knowledge.⁶ An association between regular health checkups and testing for HIV/AIDS was also seen in the current study.

Sexually transmitted infections (STIs) and Reproductive tract infections (RTIs) are important public health problems in India. The prevalence of these infections is considerably higher among high risk groups (HRGs) such as female commercial sex workers (FCSWs), ranging from 20-30%.⁷ In the present study, 19% of female commercial sex workers reported history of sexually transmitted infections which is in concordance with other studies on FCSWs of India in which the number of FCSWs having reported STI episodes was in the similar range. A qualitative study conducted to assess the psychological morbidity among female commercial sex workers at Victoria Hospital, Bangalore, showed 22% of their respondents were suffering from sexually transmitted diseases.⁸ A considerably higher proportion of FCSWs having knowledge about STIs and its prevention highlights the efforts being put by peer educators and TI in increasing knowledge of FCSWs and raising awareness on the same through repeated sensitization and sharing information. It shows that FCSWs realize that they are in a profession where they are facing repeated sexual exposures which could be a threat to these infections. However, no association between knowledge about STIs and socio demographic profile of FCSWs was found. Knowledge about STIs and its prevention also had no association with years spent by FCSWs in profession. In similitude with this observation, a community randomized trial regarding knowledge of STI symptoms among female sex workers in Peru showed the baseline knowledge of FSWs to be

90.6%.⁹ Another study conducted by R. Hemalatha et al among female sex workers in Andhra Pradesh showed that nearly 90% of FCSWs had heard of STIs and could correctly identify at least two of the most common STI symptoms.¹⁰ The knowledge about STDs and its prevention and benefits of condom was imparted mainly through peer educators of targeted intervention where sex workers were enrolled. The necessary efforts are being made by the peer educators in providing complete information to the sex workers regarding sexual health, STDs/HIV, its prevention and methods of contraception. Repeated trainings and IEC sessions are conducted by the Targeted Intervention in which detailed information regarding STIs, HIV and various other health depleting conditions are discussed. The training sessions also include giving FCSWs knowledge on condom types, its correct application and various benefits of condom. FCSWs are also routinely informed about various other contraceptive methods and their benefits but they are repeatedly sensitized on use of regular condom irrespective of any circumstance or condition. Majority reported attending health education programs and training sessions run by peer educators and targeted intervention site. FCSWs reported that these health education programs and training sessions were quite helpful in giving them appropriate knowledge on various health related issues associated with their profession. It was reported that peer educators make note of the FCSWs who do not attend health sessions regularly and repeatedly pursue and motivate them to do so by paying them personal home visits and informing them on the risks associated with this profession and informing them on the benefits of these health sessions.

Conclusion

Targeted intervention sites, through various interventions such as, conducting regular health check-ups, HIV testing and providing condoms play a key role in improving the health of female commercial sex workers. Information, Education and Communication (IEC) sessions conducted by targeted intervention sites, have significantly imparted knowledge to FSWs on various relevant health issues.

Conflict of interest: None

Source of funding: None

Ethical clearance: Ethical clearance was obtained from the institutional ethical committee of Government Medical College, Amritsar prior to the commencement of the study.

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A Comparative Study of Oxygen Saturation (Spo₂) At Rest and after 6-Minutes Walking Test in Young Adults with Variable BMI

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Abstract

Background: Exercise affects every system of the body and cause several changes in them and respiratory changes are most important. Changes in blood levels of oxygen are very vital during exercise. The respiratory system is most efficient in young adults and undergoes various anatomical, physiological and immunological changes with age and hence blood levels of oxygen during exercise is more affected in elderly as compared to young adults.. But increased body mass index affects respiratory system of even young adults so there blood levels of oxygen are more compromised as compared to normal BMI young adults during exercise.

Objective: Under normal circumstances in the blood there is a reserve of oxygen. However, when doing exercise, the body requires oxygen in large quantities to meet the need for energy. If the level of oxygen in the blood decreases beyond the normal limit, it will be very dangerous for the body. Health risks are associated with obesity, including its effects on respiratory function. Respiratory muscle weakness in obesity has been linked to muscle weakness as a result of decreased compliance of the chest wall or reduced lung volume or can occur both.

Aim: Is to study the effect exercise on SpO₂ in young adults with variable BMI.

Method: A comparative cross-sectional analytical study was conducted on 106 young adults in Medical College in North India. Data was collected by using self-administered questionnaire followed by anthropometric measurement. Body Mass Index (BMI) was calculated by Quetelet's index. Oxygen saturation at rest and after 6-minutes walking test was recorded by using pulse oximeter. Data analyzed on SPSS version 20.0 and various statistical tests were applied to find the correlation and significance.

Results: The students with high BMI show negative correlation with oxygen saturation (SpO₂) at rest and after 6-minutes walking test. This correlation is statistically significant.

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Conclusion: There is more decrease in oxygen saturation (SpO₂) in students with high BMI after 6-minutes walking test as compared to students with normal BMI. Weight management is recommended to young adults in order to prevent early impact of increased BMI on respiratory system.

Keywords: Body mass index (BMI), Quetelet's index, 6- minutes walking test, Obesity, oxygen saturation (SpO₂)

Introduction

During exercise, cells may need to use over six times the oxygen used during rest. Aerobic exercise is also limited by the ability of the cardiovascular system to deliver oxygenated blood to the muscles. (1) Exercise will cause several changes in the body, one of which is the oxygen level in the blood. Under normal circumstances in the blood there is a reserve of oxygen. However, when doing exercise, the body requires oxygen in large quantities to meet the need for energy. If the level of oxygen in the blood decreases beyond the normal limit, it will be very dangerous for the body. (2) Among the different systems affected by obesity, the respiratory system deserves special attention, as obesity can cause changes in respiratory function, exercise tolerance, pulmonary gas exchange, respiratory pattern and strength and endurance of the respiratory muscles. (3) Health risks associated with obesity, including its effects on respiratory function. Respiratory muscle strength can experience weakness in obesity, where there is a decrease in maximal inspiratory pressure in obese subjects compared to subjects for normal body weight. Respiratory muscle weakness in obesity has been linked to muscle weakness as a result of decreased compliance of the chest wall or reduced lung volume or can occur both. (4)

The amount of oxygen carried depending on haemoglobin in the blood is named as SpO₂ and this forms the main mechanism for the transportation of oxygen to the cells. Measurement of oxygen saturation gives information about hypoxia. (5) Peripheral capillary oxygen saturation (SpO₂) is commonly measured by pulse oximetry, which provides an indirect measurement of arterial oxygenation (SaO₂) based on the differential absorption of light by oxygenated and deoxygenated blood during pulsatile blood flow. (6) The oxygen saturation (SaO₂) is the statistical average of the entire oxygen bound to haemoglobin. In healthy individuals SaO₂ is 96%-98%. (7)

Blood gas analysis was the optimal technique for detecting hypoxemia in critically ill patients for many years, but it has potential complications and is unable to provide a continuous measurement. (8) Oxygen requirements can be determined using pulse oximetry, instead of arterial blood gas sampling. Pulse oximetry is a technique used to measure oxygen saturation (SpO₂) non-invasively. (9)

Material and Methods

A comparative cross-sectional analytic study was conducted in Medical College in North India. After explaining the procedure of the study to be conducted, an informed consent was obtained from the subjects. A total of 106 subjects were selected. Apparently healthy undergraduate medical students, aged between 18 -24 years, non-smokers, consenting for study were included in study. The history was also obtained from every individual prior to the study in which their personal details, medical record, family background, socio-economic status, diet and physical activity and history of smoking was asked. Students with any medical problem or on any medication, smokers, not consenting for study were excluded from the study.

Data was collected by using self-administered questionnaire based on review of similar studies. The questionnaire contains several anthropometric data included information of age, gender, height and weight. Pulse oximetry was done to know the oxygen saturation. Height was determined using a stadiometer and weight was measured using kg weight scale. The BMI was calculated by Quetelet's index i.e. BMI is weight (kg)/height (m)². BMI was classified in to three groups as per new classification for Asian Indians as {Undernourished: <18.0 kg/m² Normal weight: 18-22.9 kg/m² Overweight: 23-24.9 kg/m² Obese: >25 kg/m²} (10).

Oxygen saturation (SpO₂) was estimated by digital pulse oximeter at rest. Pulse oximetry is a relatively simple, feasible, non-invasive and

inexpensive method. The team was instructed to avoid measuring oxygen saturation at the fingers with any nail polish or dye, as they can interfere with accurate measurements. Readings for oxygen saturation after 30 s of the pulse oximeter being attached to the subjects' fingers were taken at rest. Another reading of SPO2 was taken after 6-minutes walking test.

6-Minute walking test; -The six minute walking test (6MWT) was developed by the American Thoracic Society and it was officially introduced in 2002. It is a sub-maximal exercise test used to assess aerobic capacity and endurance and has proved to be reliable, inexpensive, safe and easy to apply.

The subjects were asked to do 6 minutes walking test and pulse oximeter was placed on the index finger during the test and SpO2 was noted immediately after 6-minutes walking test.

Data entry and analysis was done using Statistical Package for Social Sciences (SPSS). Chi-square was used for categorical data analysis and a P value of

≤ 0.05 was regarded as statistically significant.

Results

Table 1: Gender Distribution

	Frequency	Percent	Cumulative Percentage
Female	66	62.3	62.3
Male	40	37.7	100.0
Total	106	100.0	

Table 2: BMI Distribution

BMI	Gender		Total
	Female	Male	
<18.5	2(1.9%)	2(1.9%)	4(3.8%)
18.5-24.9	48(45.3%)	30(28.3%)	78(73.6%)
25-29.9	13(12.3%)	7(6.6%)	20(18.9%)
>30	3(2.8%)	1(0.9%)	4(3.8%)
Total	66(62.3%)	40(37.7%)	106(100%)

Table 3: BMI and SPO2 (Crosstabulation)

BMI	Spo2 rest				Total	
	>98	97-98	95-96	<95		
<18.5	0 (0%)	1 (25%)	2 (50%)	1 (25%)	4 (100%)	Pearson's R=0.113 Spearman correlation=0.104 P Value =0.000 (p<0.005)
18.5-24.9	46 (58.9%)	20 (25.7%)	12 (15.4%)	0 (0%)	78 (100%)	
25-29.9	0 (0%)	4 (20%)	16 (80%)	0 (0%)	20 (100%)	Statistically Significant
>30	0 (0%)	0 (0%)	1 (25%)	3 (75%)	4 (100%)	
Total	20	51	31	4	106	

Table 4. BMI and SPO2 (after 6-minutes spot exercise)

BMI	spo2Exercise				Total	
	>98	97-98	95-96	<95		
<18.5	0 (0%)	0 (0%)	4 (100%)	0 (0%)	4 (100%)	Pearson's R=0.124 Spearman correlation=0.96
18.5-24.9	28 (35.9%)	34 (43.6%)	16 (20.5%)	0 (0%)	78 (100%)	
25-29.9	0 (0%)	3 (15%)	17 (85%)	0 (0%)	20 (100%)	(p<0.05)
>30	0 (0%)	0 (0%)	1 (25%)	3 (75%)	4 (100%)	Statistically
Total	28	37	38	3	106	Significant

Discussion

Many cardiovascular and respiratory mechanisms must operate in an integrated fashion if the O2 needs of the active tissue are to be met and the extra CO2 and heat removed from the body during exercise. Circulatory changes increase muscle blood flow while maintaining adequate circulation in the rest of the body. In addition, there is an increase in the extraction of O2 from the blood in exercising muscles and an increase in ventilation. (11)

The purpose of this study was to investigate the correlation of SpO2 (%) with pre- and post- induction of short term exercise (6-minutes walk test) in young, non-athletes undergraduate male and female medical students with an age ranging from 18-24 years with variable BMI. Our study included 106 students with 62.3% females and 37.7% males. Among these 3.8% were underweight with BMI <18.5, 78% were with normal BMI 18.5-24.9, 20% were overweight with BMI 25-29.9 and 3.8% were obese with BMI of >30. The percentage of obese and overweight female students were more than male students.

At rest oxygen saturations(SpO2) of >97 were in 84.6% students with normal BMI (18.5-24.9),80% overweight students (BMI 25-29.9) were having SpO2 levels of 95-96 while as obese students (BMI >30) with SpO2 levels <95 were 25% and 95-96 were 75%.

Table 3. shows that at rest students with higher BMI have lower SpO2 levels, high BMI is negatively

correlated with SpO2 levels. The correlation between BMI and SpO2 levels at rest was statistically significant with p=0.000 (p<0.05), Spearman correlation 0.104 and Pearson's R=0.113.

Similar studies were conducted by Vishesh K Kapur et al. (12) which showed that obesity Is Associated with a Lower Resting Oxygen Saturation in the Ambulatory Elderly. A study by Monica Linea Vold et al (13) showed that low FEV1, smoking history, and obesity are factors associated with oxygen saturation decrease in an adult population cohort.

After 6-minutes walking test, the SpO2 levels of >98, in students with normal BMI were 35.9%, 97-98 SpO2 in 43% while as overweight students with SpO2 of 95-96 were 85% and in obese students SpO2 levels were <95 in 75% and 95-96 in 25%. After exercise SpO2 levels decreased as compared to SpO2 levels at rest and this decrease was more in students with high BMI. The correlation between BMI and SPO2 levels after 6-minutes walking test was statistically significant with p=0.000 (p<0.05).

These results are in line with the results of research conducted by Eroglu et al. 2018, (14) which concluded that aerobic exercise performed acutely can reduce oxygen saturation. Barcroft et al (15) and Penaloza et al (16) also indicated that there was a decrease in oxygen saturation of arterial blood during exercise. Onder Daglioglu et al. 2013 (17) also studied that short-term exercise reduces the oxygen saturation but regular exercise doesn't affect the

change in oxygen saturation. In a study conducted on 117 patients, it was found that oxygen saturation decreased after aerobic exercise (Talvar et al., 2018).⁽¹⁸⁾ In another study conducted on patients (patients without cystic fibrosis), it was found that oxygen saturation decreased after the 6-min walk test (HSIEH, et al., 2017).⁽¹⁹⁾

Under normal circumstances there is a reserve of oxygen in the blood. However, when doing exercise, the body requires large amounts of oxygen to meet the energy needs for muscle contraction, thus causing oxygen stores in the body to decrease. The decrease in oxygen storage causes a decrease in oxygen saturation, so that the exercise group tends to have lower oxygen saturation compared to the control group.⁽²⁰⁾

Obesity is one of the independent contributors to a low SpO₂, with its effects comparable to or greater than other factors which are commonly associated with lower oxygen saturation. This suggests that the obesity or overweight affects lung function by diminishing oxygen exchange. The prognostic implications of this finding with regards to long-term outcomes are unclear and require further prospective evaluation.

Conclusion

In conclusion, we can say that SpO₂ becomes lower despite the same partial pressure of oxygen during exercise, as supported by the relevant literature and this SpO₂% become even more decreased in subjects with high BMI. Since obesity affects all systems of body including respiratory system. Keeping in view multisystem diseases and dysfunctions related to overweight and obesity especially in young adults, National Medical council (NMC) has introduced sports activities in revised curriculum to be implemented in every medical college.

Based on the results of the study it is recommended to do further research by comparing treadmill exercises with several kinds of exercise intensities like mild, moderate and severe to study the changes in oxygen saturation. Also weight management is recommended to young overweight and obese adults in order to prevent early impact on

respiratory system and to increase the endurance.

Limitations

We did not independently verify the accuracy of our SpO₂ measurements using arterial blood gases and relied on the long-term accuracy of the pulse oximeters due to invasive nature of arterial blood gas sampling.

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A Cross Sectional Study on Behavioural Pattern and Its Association with Various Factors among Children Living in Orphanages in Chitradurga, Karnataka, India

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Abstract

Background: Orphans are the most underprivileged groups in each society. Children who live in orphanage have significantly higher rates of growth and development problems, serious mental health problems, and difficulties accessing health services. Therefore, there is a need to address the needs of this vulnerable group. This study was conducted with the objective to assess the behavioral pattern of children and its association with various factors in the orphanage.

Methods: A Cross Sectional Study was conducted among orphanage children for a period of one year and a total of 297 children between the ages of 6-16 years were included in the study. Their behaviour pattern was assessed using the Strength and Difficulties Questionnaire (SDQ) scale devised by Goodman which includes emotional symptoms, conduct problems, hyperactivity, peer problems and pro social behavior. Data was analyzed using the SPSS version 20.

Conclusion: The study revealed that among the various behavioral problems, Peer problems (68.4%) were most frequently reported, followed by Conduct problems (33.7%). The results also shown that the association between child's age and emotional problems was statistically significant at F value (1.819), p value (0.05) as the age advances the child has more emotional problems.

Key Words: behavioral problem; conduct problem; orphans; orphanage.

Introduction

According to UNICEF the definition of an orphan is anyone between the ages of 0 and 17 years

who has lost at least one parent or both the parents.¹

Vulnerable children are those who belong to high-risk groups who lack access to basic social amenities

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or facilities. They include street children, orphans, child prisoners, child laborers, the children of sex workers and children who are orphaned by AIDS or have an HIV-positive parent². Orphan-hood is frequently accompanied with multidimensional problems including prejudice, reduced access to health and school services, inadequate food, sexual abuse and others.³ A large proportion of delinquent and neglected children come from broken homes. Desertion, divorce, illegitimacy, cruelty, drunkenness and drug abuse by the parents are some of the common denominators among the neglected children.⁴ The death of one or both parents has a profound and lifelong impact on the psychological wellbeing of children.⁵ Behavioral and emotional consequences are the two challenging aspects in children reared in orphanages. Some studies reported that children reared in the institutional environment have more maladaptive and atypical behaviors lower on the competence scale and social relatedness scale than community counterparts.⁶ In view of these aspects the present study was undertaken to assess the behavioral pattern of children and its association with various factors in the orphanage.

Materials and Methods

A cross-sectional institution-based study was conducted in all the orphanages registered with the Department of Women and Child Welfare, Chitradurga. After taking institutional ethical clearance, various orphanages were visited. Those who gave permission were included in the study. Children in the age group of 6-16 years who were available at the time of visit participated in the study. Complete enumeration was done and 297 children were the study participants. Children with mental retardation and neurological disorders that affect cognition and behavior were excluded from the study. Study duration was one year.

By using pre-designed, pre-structured questionnaire, socio demographic profile and their behaviour pattern were assessed. Assessment of behavior was done using the Strength and Difficulties Questionnaire (SDQ) devised by Goodman.^{7,8,9} The questionnaire contains 25 items designed to assess the strength namely pro social behaviour and the difficulties namely emotional symptoms, conduct

problems, hyperactivity and peer problems. The teacher or warden taking care of the child was asked to do scoring of the questionnaire based on the child's behavior over the last six months. The questionnaire was devised in the local language for better interpretation by the teachers. Based on the scores, the child's behavior was classified as normal, borderline and abnormal with respect to total difficulties and each of the five scales, which includes emotional symptoms, conduct problems, hyperactivity, peer problems and pro social behaviour. Pilot study was conducted before starting data collection to identify problems in the research design, validity of the study, and final modifications were made after the pilot study. Data entry and analysis was done by using SPSS Package version 20. Simple proportions mean, standard deviation, and multivariate analysis was applied to find the various factors associated with behavioral problems

Results and Discussion

A total of 297 children were taken during the study period. In our study majority of children were between the ages of 14-16 years (37.7%). The mean age of study subjects was 12.15 ± 2.5 years. Most of the children were males (80.5%) and Hindu by religion (83%). Almost 55% of the children were paternal orphans, entered orphanage after 5 years (92.3%). The main reason for children taking admission into orphanage was economical causes (62.6 %) and staying in orphanage since 3 years. More than 70% of the children were going to government schools and studying in high school (37.7 %).

By using SDQ questionnaire, behavioral patterns of children were assessed. Emotional problems scores of most the children's fell under the category of normal (91.9%) followed by borderline (1.3%) and abnormal (6.7%). Emotional symptoms includes child having many worries, fears, often unhappy and easily scared. With regard to conduct problems most of the children's scores fell under the category of normal (58.6%) followed by abnormal (33.7%) and border line (7.7 %). The Conduct problems includes the child often has temper tantrums, fights with other children, lies and steals from home, schools or elsewhere. The hyperactivity scores of most of the children fell under the category of normal (78.5%) which includes the

child is restless, overactive, constantly fidgeting, easily distracted. Most of the children had abnormal scores (68.4%) with peer problems followed by borderline (23.2%) and normal scores (8.4%). It include the child tends to play alone, has at least one good friend, gets on better with adults than with other children. Pro social behavior of most of the children's scores fell under the category of normal (95.3%). It includes the child readily shares with other children, considerate of other people's feelings, kind to younger children, often volunteers to help others. (Table 1)

In our study Peer problems were most frequently reported among children followed by Conduct problems. Scores on Total difficulties were evenly distributed across normal, borderline, and abnormal range where as Emotional, Hyper activity, Pro social scales generally fell in normal range . Similar to our study in a study conducted by Solomon WorkuAgaje in Ethiopia depicts that the child's behavioral scores were evenly distributed across normal, borderline, and abnormal symptoms in the total difficulties scale with 34.5%, 30.4%, and 35.1% respectively.¹⁰ In a study conducted by Tess Lang et al Peer problems were most frequently reported, followed by emotional and hyperactivity problems. Scores on the Conduct scale generally fell in the "normal" range and Pro-social behaviors were mostly in the normal to borderline range.¹¹

A multivariate analysis was done to find the various factors (age, duration of stay in orphanage, family contact with child and type of vulnerability) associated with Emotional Problems, Conduct problems, Hyper activity, Peer problems, Pro social behavior and Total difficulties.

In Table 2 the association between Emotional problems and various independent variables like age, duration of stay in orphanage, family contact with child and type of vulnerability (single orphan, double orphan or child with living parent) was assessed. The association between child's age and emotional problems was statistically significant at F value (1.819), p value (0.05). Younger and older

children were significantly different with emotional problems. As the age advances the child has more emotional problems. This may be because the younger children get adjust more easily to the care of non parents than older children. Similarly in a study conducted by Solomon WorkuAgaje revealed that there was significant age difference on the emotional symptoms, $F=6.83$, $P < 0.01$.¹⁰

From table 3, independent variables like child age (F value = 1.955; p value = 0.041) and family contact with the child (F value = 3.286; p value = 0.04) showed positive association with hyper activity. It is to be noted that family contacts play a vital role in shaping the psyche of children who reared in orphanages, more the contacts lesser will be the behavioral problems among them and vice versa. In the present study the same holds true as most of the children with hyper activity rarely had any contacts with their families. Similar observations were seen by Suma Narayana Reddy in her study. The proportion of disturbed children among those who had family contacts was much less than those who had regular contacts.¹²

From table 4, the independent variable i.e. Type of vulnerability showed positive correlation with Pro social Behavior. (F value = 4.022; p value = 0.02). It was observed that double orphans had more abnormal scores than single orphans, or child with living parent with respect to Pro social Behavior

It is shown from table 5 that the independent variables like child age (F value = 2.133; p value = 0.024) and duration of stay in the orphanage (F value = 4.551; p value = 0.012) showed positive association with Total difficulties. Most of the abnormal scores were seen among children who were staying in orphanage for more than 5 years. Similar findings were also observed by Solomon WorkuAgaje, Dyregrovin their studies.^{10,13}

In contrast to these findings our study did not find any significant association among various factors with conduct problems and peer problems

Table 1: Distribution of respondents according to their behavioral pattern

Sno	Behavior pattern	Normal No (%)	Border Line No (%)	Abnormal No (%)
1	Emotional Symptoms	273 (91.9%)	4(1.3%)	20(6.7%)
2	Conduct Problems	174 (58.6)	23(7.7)	100 (33.7)
3	Hyperactivity	233 (78.5)	48(16.2)	16(5.4)
4	Peer Problems	25(8.4)	69(23.2)	203(68.4)
5	Pro Social Behavior	283(95.3)	8(2.7)	6(2)
	Total behavioral difficulties	96(32.3)	116(39.1)	85(28.6)
Total		297 (100)	297 (100)	297 (100)

Table 2: Multivariate analysis of various factors associated with Emotional Problems

Characteristics	Multivariate Analysis			
	df	Mean Square	F value	P value
Age	10	0.367	1.819	0.05
Duration of stay	2	0.07	0.349	0.706
Contacts with family	2	0.266	1.319	0.27
Type of vulnerability	2	0.356	1.767	0.174

Note: Dependent variable: Emotional problems

Table 3: Multivariate analysis of various factors associated with Hyperactivity

Characteristics	Multivariate Analysis			
	df	Mean Square	F value	P value
Age	10	0.614	1.955	0.041
Duration of stay	2	0.267	0.851	0.429
Contacts with family	2	1.032	3.286	0.04
Type of vulnerability	2	0.248	0.788	0.456

Note: Dependent variable: Hyperactivity

Table 4: Multivariate analysis of various factors associated with Pro social behavior

Characteristics	Multivariate Analysis			
	df	Mean Square	F value	P value
Age	10	0.066	0.69	0.733
Duration of stay	2	0.02	0.212	0.809
Contacts with family	2	0.044	0.46	0.632
Type of vulnerability	2	0.384	4.022	0.02

Note: Dependent variable: Pro social Behavior

Table 5: Multivariate analysis of various factors associated with Total difficulties

Characteristics	Multivariate Analysis			
	df	Mean Square	F value	P value
Age	10	1.052	2.133	0.024
Duration of stay	2	2.245	4.551	0.012
Contacts with family	2	0.039	0.078	0.925
Type of vulnerability	2	0.408	0.827	0.439

Note: Dependent variable: Total difficulties

Conclusions

The study revealed that, among various behavioral problems Peer problems were most frequently reported in children followed by conduct problems, where as emotional, hyper activity and pro social scales generally fell in normal range.

The association of various factors with behavioural pattern of children were assessed. The association between child's age and emotional problems was statistically significant, as the age advances the child has more emotional problems. Type of vulnerability showed positive correlation with Pro social Behavior. It was observed that double orphans had more abnormal scores than single orphans, or child with living parent with respect to Pro social Behavior. The association between child age and duration of stay in the orphanage showed positive association with Total difficulties. Most of the abnormal scores were seen among children who were staying in orphanage for more than 5 years.

Our study did not find any significant association among various factors with conduct problems and peer problems.

Recommendations:

Majority of these children start their lives with the disadvantage of parental deprivation. Hence a comprehensive and integrated approach involving the caretakers, teachers, social workers, community volunteers and even parents wherever applicable should be developed to nurture these children. Child guidance clinics can be started in the orphanages. Specialists' visits with child psychologists could be helpful to address the behavioral problems in children at the earliest.

Limitations:

As the study was based on the perspective of caregiver; subjective bias is the limitation of our study.

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Role of Environmental Factors and Hygiene in Skin Diseases

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Abstract

According to a study, skin pattern in a population is generally determined by different ecological and other factors. The vicious cycle of ignorance, poverty, and disease is still the bane of many developing countries and plays a prominent role in the prevalence of many skin diseases. The skin disease may be accompanied by great morbidity, disfigurement, and distress, leading to a major source of social stigma. The body is liable to various skin infections and it may hamper the physical well-being of the individual. Due to ignorance or lack of proper education, personal hygiene may not be taken care properly. The present study was conducted to find out the role of environmental and hygienic factors in common skin diseases. The present study was conducted to find out the socio-demographic factors associated with common skin diseases. This study was conducted in the field practice areas of the Urban and Rural Health Centres, Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh. It was community based and cross-sectional study. The study period was one year i.e. from June 2016 to May 2017.

Inclusion criteria: All individuals of the household.

Exclusion Criteria: All who did not give consent.

This study found the association of skin disorder prevalence with presence of dampness in the living environment of the population. This study reported that prevalence of skin diseases was significantly more in both urban and rural areas with poor personal hygiene, compared to the individuals having average and good personal hygiene. And this association is statistically significant for both areas. This study reported that quality of life of rural population was affected more with the distribution of skin diseases among them.

Key words: skin diseases, hygiene, ventilation, dampness, urban, rural

Introduction

Human skin may reflect the presence of systemic

diseases in many different ways. An unusual skin eruption may be a clue to some internal disorder. ⁽¹⁾

According to a study⁽²⁾ skin pattern in a population is generally determined by different ecological and other factors. The vicious cycle of ignorance, poverty, and disease is still the bane of many developing countries and plays a prominent role in the prevalence of many skin diseases. The skin disease may be accompanied by great morbidity, disfigurement, and distress, leading to a major source of social stigma⁽³⁾. Although literature on specific skin disorders is very abundant, there are relatively few reports on the spectrum of skin diseases in various populations. In addition, most studies of the incidence and prevalence of skin diseases are based on hospital attendance and can provide a very crude indication of true prevalence and incidence in a community, as many social and economic factors affect the decision to seek medical advice⁽⁴⁾. The body is liable to various skin infections and it may hamper the physical well-being of the individual. Due to ignorance or lack of proper education, personal hygiene may not be taken care properly.⁽⁵⁾ Skin diseases are one of the commonest problems which include pediculosis, impetigo, pityriasis alba, scabies, tinea versicolor, seborrhea, allergy, viral warts and pyoderma⁽¹¹⁾.

The present study was conducted to find out the role of environmental and hygienic factors in common skin diseases .

Material and Methods

This study was conducted in the field practice areas of the Urban and Rural Health Centres, Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh. It was

community based and cross-sectional study. The study period was one year i.e. from June 2016 to May 2017.

Inclusion criteria: All individuals of the household.

Exclusion Criteria: All who did not give consent.

Sampling Method: Systematic random sampling with Population Proportionate to Size (PPS) was used to draw sample size.

Sample size calculation:

$$n = Z^2 p (100 - p) / l^2$$

$$n = (1.96)^2 p(100 - p) / l^2,$$

$$n \sim 4pq / l^2$$

$$q = 100 - p$$

p = prevalence of common skin disease(s) found in the pilot study

The sample size was calculated on the basis of pilot study conducted on 50 household each in RHTC and UHTC. As per pilot study, the prevalence of common skin diseases in registered areas of RHTC and UHTC came out to be 20% and 17% respectively.

Sample size calculation:

$$n = Z^2 p (100 - p) / l^2$$

l=(absolute allowable error)=2% at 95% confidence interval

Substituting the values for **RHTC**

$$(1.96)^2 p(100 - p) / l^2 = 4 * 20(100 - 20) / 2^2 = 1600$$

Substituting the values for **UHTC**

$$(1.96)^2 p(100 - p) / l^2 = 4 * 17(100 - 17) / 2^2 = 1411$$

$$\approx 1420$$

Applying PPS for both RHTC and UHTC

- Data was entered and managed in SPSS-20 (Statistical Package of Social Science). For descriptive purpose frequency and percentage were used.
- To test associations chi square test, independent t test and one way ANOVA was applied. P value <0.05 was considered significant

Ethical clearance was obtained from ethical committee, JNMC, AMU, Aligarh. Informed verbal consent was taken from each subject before interview (Copy of ethical committee is attached).

Prior permission was taken from Prof .A.Y Finlay through online and was given licence for **both DLQI and CDLQI**.

Licence ID CUQoL1454 for DLQI and CUQoL1455 for CDLQI

Impact of skin disease(s) on quality of life was assessed using respective **Children's Dermatological Life Quality Index(CDLQI)** and **Dermatological Life Quality Index(DLQI)** questionnaire for the age group 4-16yrs & > 16 years.

10 item questionnaire with response score range from 0(min) to 3(max) for each item.

Cumulative scoring for individual subject graded as

GRADE I 0-1 (NO EFFECT ON PATIENT LIFE)

GRADE II 2-5 (SMALL EFFECT ON PATIENT LIFE)

GRADE III 6-10 (MODERATE EFFECT ON PATIENT LIFE)

GRADE IV 11-20 (VERY LARGE EFFECT ON PATIENT LIFE)

GRADE V 21-30 (EXTREMELY LARGE EFFECT ON PATIENT LIFE)

Results

Table 1: Prevalence of skin diseases with dampness.

Dampness	Skin disease					
	Urban		Total N (%)	Rural		Total N (%)
	Present N (%)	Absent N (%)		Present N (%)	Absent N (%)	
Present	170(27.1)	458(72.9)	628(100)	233(39.6)	356(60.4)	589(100)
Absent	115(14.5)	677(85.5)	792(100)	195(19.3)	816(80.7)	1011(100)
Total	285(20.1)	1135(79.9)	1420(100)	428(26.8)	1172(73.2)	1600(100)
	$\chi^2=34.388$; df=1; p <0.001			$\chi^2=78.047$; df=1; p <0.001		

Table 2: Prevalence of skin diseases according to ventilation

Ventilation	Skin disease					
	Urban		Total N (%)	Rural		Total N (%)
	Present N (%)	Absent N (%)		Present N (%)	Absent N (%)	
Inadequate	202(25.1)	604(74.9)	806(100)	259(37.7)	428(62.3)	687(100)
Adequate	83(13.5)	531(86.5)	614(100)	169(18.5)	744(81.5)	913(100)
Total	285(20.1)	1135(79.9)	1420(100)	428(26.8)	1172(73.2)	1600(100)
	$\chi^2=28.952$; df=1; p<0.001			$\chi^2=73.674$; df=1; p<0.001		

Table 3: Distribution of patients according to personal hygiene

Personal hygiene	Skin disease					Total N (%)
	Urban		Total N (%)	Rural		
	Present N (%)	Absent N (%)		Present N (%)	Absent N (%)	
Poor	61(50.8)	59(49.2)	120(100)	169(92.9)	13(7.1)	182(100)
Good	86(11.7)	651(88.3)	737(100)	135(12.1)	980(87.9)	1115(100)
Average	138(24.5)	425(75.5)	563(100)	124(40.9)	179(59.1)	303(100)
Total	285(20.1)	1135(79.9)	1420(100)	428(26.8)	1172(73.2)	1600(100)
$\chi^2=110.140$; $df=2$; $p < 0.001$			$\chi^2=558.986$; $df=2$; $p < 0.001$			

Table 4: Distribution of diseased population with QoL Indices grade

QoL indices grade	Urban		Rural	
	N	%	N	%
Grade I	19	7.0	17	4.3
Grade II	131	48.5	127	32.3
Grade III	98	36.3	227	57.8
Grade IV	21	7.8	21	5.3
Grade V	1	0.4	01	0.3
Total	270	100	393	100

Table 5: Association of QoL indices score with age.

Age (Years)	Urban		Rural	
	Mean	S.D	Mean	S.D
6-10	4.39	2.14	4.52	2.59
11-18	5.59	3.13	5.84	3.21
19-30	6.24	3.59	6.51	3.13
31-40	5.88	4.44	6.43	2.47
41-50	5.00	1.86	6.73	3.66
51-60	6.50	4.56	7.48	3.16
>60	9.50	6.59	5.93	3.81
$f = 2.953$, $df = 6$, $p = 0.008$			$f = 3.419$, $df = 6$, $p=0.003$	

Discussion

Table 1 shows association of skin disorder prevalence with presence of dampness in the living environment of the population, and it was observed that in urban area, skin diseases were significantly higher i.e. 27.1 per cent individuals who lives in damp environment compared to 14.5 per cent in those who lives in damp proof conditions and was found significant with $p < 0.001$. In rural area diseases were present in 39.6 percent of individuals living in damp environment, compared to only 19.3 per cent in those having no dampness in their houses. The association also comes out to be highly significant in rural area ($p < 0.001$).

Another study⁽⁶⁾ revealed a prevalence rate of 8.0 and 7.0 per cent among those living in houses with dampness and no dampness respectively. Although the difference was statistically insignificant overall. Fungal infections were, however, significant more common among people living in damp houses (1.7 per cent) than in those living in houses without dampness (0.4 per cent). The difference was found to be statistically significant ($X^2 = 30.655$; D.f = 1).

Table 2 shows that, in the urban area, the prevalence of skin diseases i.e. 25.1 percent was more among the population living in inadequately ventilated houses in comparison to 13.5 per cent in population having adequate ventilation, showing a highly significant association ($p < 0.001$). In rural area also skin diseases were found to be more among population living in inadequately ventilated houses (37.7), which was highly significant ($p = < 0.001$).

This study⁽⁶⁾ reported prevalence of skin diseases according to ventilation revealed a higher prevalence (7.7 per cent) among people living in inadequately ventilated houses, than among those (6.7 per cent) living in wellventilated houses. The difference was, however, statistically insignificant. Among acne, eczema scabies, bacterial, and fungal infections, significant association of bacterial infections, eczema, and scabies was observed with inadequate ventilation.

As far as personal hygiene is concerned (**table 3**), prevalence of skin diseases (i.e. 92.9 per cent in rural and 50.8 per cent in urban) was significantly more in

both the areas with poor personal hygiene, compared to the individuals having average and good personal hygiene. And this association is statistically significant for both areas ($p < 0.001$)

Another study⁽⁷⁾ reported highly statistically significant association of skin diseases in children with poor hygiene 429 (78.4%), who did not bath daily 240(70%), who did not wear washed clothes daily 394 (69.1%), with previous skin infection 452 (75.7%) and skin diseases.

Infectious dermatoses were more (39.8%) among those who had not maintained personal hygiene than Non-Infectious group (28.7%) in another study⁽⁸⁾. Although these findings were not significant. They also observed that Infectious diseases were more common among those who had not got sufficient water (infectious-9.7%, non-infectious-8.2%) but this was also not significant.

This study⁽⁶⁾ reported that of all the common skin diseases, an apparently significant association with poor personal hygiene was observed only in cases of scabies. A significant majority - 161 (92.5 per cent) cases of scabies had poor personal hygiene. Another study⁽¹²⁾ also showed that, there was significant association between skin diseases and some of the personal hygiene practices ($p < 0.01$) such as hand washing, daily bathing, wearing clean clothes, trimmed & clean nails, walk without footwear, playing in mud & dirty water and others. Similarly, across sectional study conducted at a community school in the tribal area of Yercaud in Tamil Nadu⁽¹³⁾, including 923 children showed that 64.6% children had dermatologic manifestations and there was highly statistically significant association of skin diseases with poor hygiene (78.4%) such as those who did not bath daily (70.0%) and who did not wear washed clothes daily (69.1%). Another study done in Odisha⁽¹⁴⁾, on association of personal hygiene with common morbidities among upper primary school children showed that fungal infections were significantly associated with poor personal hygiene. Likewise a study conducted among 184 primary school children of South Kolkata⁽¹⁵⁾ also showed significant association between personal hygiene scores and morbidity profile among the children. Therefore, all the children should be educated

regarding proper hygiene practices to prevent most of the skin diseases.

Table 4 shows the diseased population distribution with different grades of QoL indices score and it can be seen that in the urban population most of the patients i.e. 48.5 per cent lie in grade II, having moderate effect of the skin disease on their quality of life. To follow were the patients in grade III (36.8 per cent), grade IV (7.8 per cent), grade I (7.0 per cent) and grade V (0.4 per cent).

In the rural population most of the patients i.e. 57.8 per cent lie in grade III, having large effect of the skin disease on their quality of life. Patients in grade II (32.3 per cent), grade IV (5.3 per cent), grade I (4.3 per cent), and grade V (0.4 per cent) were there to follow.

With this distribution of patients in the above table it shows that quality of life of rural population was affected more with the distribution of skin diseases among them. This study ⁽⁸⁾ found 35% patients had a moderate effect followed by very large effect 23.4%, small effect 20% and extremely large effect 8.3% on quality of life. This study ⁽⁹⁾ reported that 16% felt no effect of vitiligo on their quality of life while 84% patients reported small to very large effect on their quality of life. Out of 84%, 37% felt small effects, 21% felt moderate effect and rest 26% felt very large effect.

Table 5 shows that lowest mean QoL indices score in urban population i.e. 4.39 ± 2.14 (Mean \pm S.D) was observed for 6-10 years group and highest i.e. 9.50 ± 6.59 (Mean \pm S.D) was observed in more than 60 years age group. The difference of the mean between different age groups appeared to be significant. On further analysis by applying post hoc test, significance was observed between age groups i.e. 6-10 years compared to 11-18 years, 41-50 years and > 60 years. This shows that in urban area the patients of older age had poor quality of life as compared to younger ones. The mean of the rural area (table 25) was also found to be lowest i.e. 4.52 ± 2.59 (Mean \pm S.D) in the age group 6-10 years but the highest QoL indices mean score i.e. 7.48 ± 3.16 (Mean \pm S.D) was observed in the age group 51-60 years. The difference in the means of different age group came out to be significant in rural population also. On post hoc test analysis the mean QoL indices score was found to be

significantly less for 6-10 years group compared to 19-30 years, 31-40 years, 41-50 years, and 51-60 years age groups. This clearly depicts that there was significant moderate effect on quality of life of patients in the older age groups (most affected-51-60yr, followed by 41-50yr, 31-40yr, and 19-30yr) compared to the age group 6-10 years. This can be attributed to the fact that children are less bothered about their illness and looks compared to adults who are more sensitized for their looks and also concerned what others may think about skin problems they have. As far as variation of mean QoL indices with age is concerned in other studies, Mishra et al. ⁽⁹⁾ in their study on 100 patients of vitiligo did not find any significant correlation with age. Same was observed in another study ⁽¹⁰⁾ that age had no influence on the degree of impairment in patients affected with skin diseases in Saudi Arabia.

Conclusion

Health education regarding personal hygiene and oral hygiene should be given to the people. Regarding various morbidities among the school children, proper education and necessary support should be given by the class teachers. Socioeconomic factors are seen to play an essential role so proper approach in the community to improve the socioeconomic status as well as personal hygiene practice is necessary.

Conflict of interest: Nil

Funding: Self

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Quality Improvement in Critical Care Areas using the Lean Six Sigma approach

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Abstract

Background: An intensive care unit provides critical lifesaving care and as such, this study is done to understand the compliance of the nursing staffs working in the ICUs of a 350 bedded urban tertiary care hospital in India, towards the quality indicators functional in its critical area areas using the Lean Six Sigma approach and studying the deviation between the knowledge and practice.

Materials and Methods: An observational cross-sectional study was done among the nursing staffs of different ICUs, using google form questionnaire and checklists. Lean Six Sigma was used as a study tool. A sample size of 164 was considered using Convenience Sampling. And data analysis was done using the SPSS version 28.0.0.0.

Results: An increase in the bed occupancy, ALOS and HAIs among the ICU patients was markedly observed. The chi-square analysis revealed significant difference $\chi^2(3) = 18.0231, p < 0.05$ and $\chi^2(3) = 11.48, p < 0.05$ in practice, among the nursing staffs with respect to the quality indicators based on different variables.

Conclusion: Hospital quality indicators and the correct way to follow them, is necessary to deliver a quality healthcare service experience to the patients admitted in the critical care areas of the hospital.

Keywords: Critical care, infection control, quality indicators, Lean Six Sigma, Fish bone analysis, Pareto chart

Introduction

The differences in ICU outcomes between hospitals are likely related to differences in ICU design and treatment routes. Understanding these variables can aid in the reduction of variability and the improvement of patient care¹. As such, this study is done to understand the compliance of the nursing staffs working in the ICUs of a 350 bedded urban tertiary care hospital in India, towards the quality

indicators functional in its critical area areas, and Lean and Six Sigma (DMAIC) concepts are combined to increase a process' overall efficiency, providing a complete process performance improvement².

Material and Methods

Study design: Analytical Observational Cross-Sectional Study

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Study population: Patients and Nursing staffs in the critical care areas of a 350 bedded urban tertiary care hospital in India

Study period: April 2021 – June 2021

Period of data analysed: December 2020 – May 2021 (6 months)

Study tools: Structured Closed-ended Questionnaires and Checklists

Six Sigma tools: Lean Six Sigma tools – Chi square test

Data Collection Methods:

Primary data: Direct Questionnaires to nursing staffs in the ICUs using google forms and Collection

of data from quality indicators checklists

Secondary Data: ICU Records - Patient files and registers

Sampling Method: Convenience Sampling

Sample Size: 164 (out of total 225 nursing staffs in the critical care units)

Ethical Considerations:

- Data confidentiality has been maintained throughout the study.
- E-Consent was taken from every respondent.

Data Analysis: Descriptive statistical tools like chi square analysis, using the SPSS version 28.0.0.0

Findings

Define Phase

Project Charter for the Proposed Research

Problem Statement

A decrease compliance to quality indicators among the medical staffs of the critical care areas in a 350 bedded urban tertiary care hospital in India.

Project Title

Analysing the compliance to quality indicators among the medical staffs of the critical care areas in a tertiary care hospital in Durgapur - a DMAIC approach

Estimated Cost Saving

To increase the bed availability by 20%, and reducing their ALOS to increase hospital revenue by 35%

Scope of the project

Identifying the key improvement areas for increasing the compliance level of the medical staffs towards quality indicators in the ICUs of the hospital, in order to increase the quality of services being delivered to the patients.

Stakeholder Needs

Increase in the hospital revenue.

Availability of hospital resources and its optimum utilization.

Project Goals

Increased Revenue and availability of hospital resources.

Decreased incidences of HAIs

Decreased ALOS for the ICU patients

Increased compliance to quality guidelines.

Key Action Tools

Fish bone diagram

Data collection plan

Pareto analysis

Barriers

Non-compliance by the medical staffs.

Improper record keeping.

Inadequate knowledge

Project Timeline

Define	Identification of the problem area in the ICUs	1 week
Measure	Developing tools for data collection	8 weeks
	Collection of data through patient checklist, registers and patient files and from Infection Control Department	
	Conducting ICU staff questionnaire	
Analyse	Graphical representation of the collected data	2 weeks
	Analysis of data from survey and that collected through checklist from the ICUs for the past 6 months	
Improve	Data Interpretation and Representations	1 week
	Designing solutions and proposals	
Control	Approval of Proposed Solutions (Tentative)	1 week

Following this, study tools were developed. A questionnaire was prepared to understand the compliance level of the medical staffs to the quality indicators in the ICU and checklists were formed for doing the trend analysis for different quality parameters over the past 6 months from the study.

According to the Australian Critical Care Journal, the optimal bed occupancy in the ICUs is 82-85%. The below graph, shows a less than optimal bed occupancy in the months of Dec 2020 and March 2021. The same has been seen above optimal value in May 2021.

Measure Phase:

Bed Occupancy in the critical care areas for last 6 months

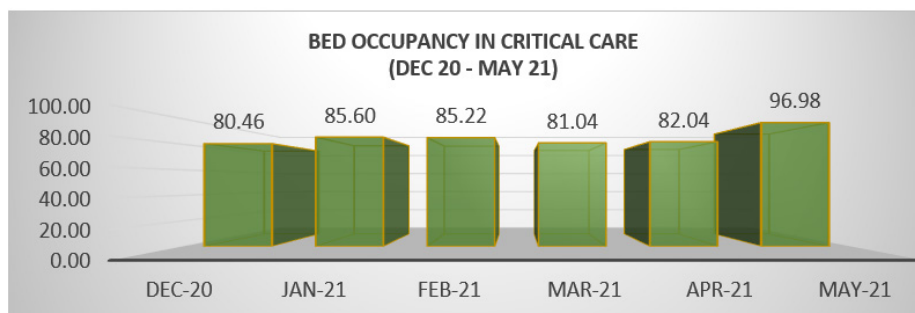


Figure 1 Bed Occupancy Rate in the Critical Care Areas from December 2020 to May 2021. Source. The 350 bedded urban tertiary care hospital, India. Credit. Self

Average Length of Stay for patients for the last 6 months.



Figure 2 Average Length of Stay (ALOS) in the critical care areas from December 2020 to May 2021. Source. The 350 bedded urban tertiary care hospital, India. Credit. Self

There has been a steady increase in the ALOS from March 2021 to May 2021. The reason attributing to the same could possibly be the delay in discharge

of Govt. Insurance patients and increased need for critical care for COVID patients admitted in the ICUs (April – May 2021).

Hospital Acquired Infection Rates for the last 6 months

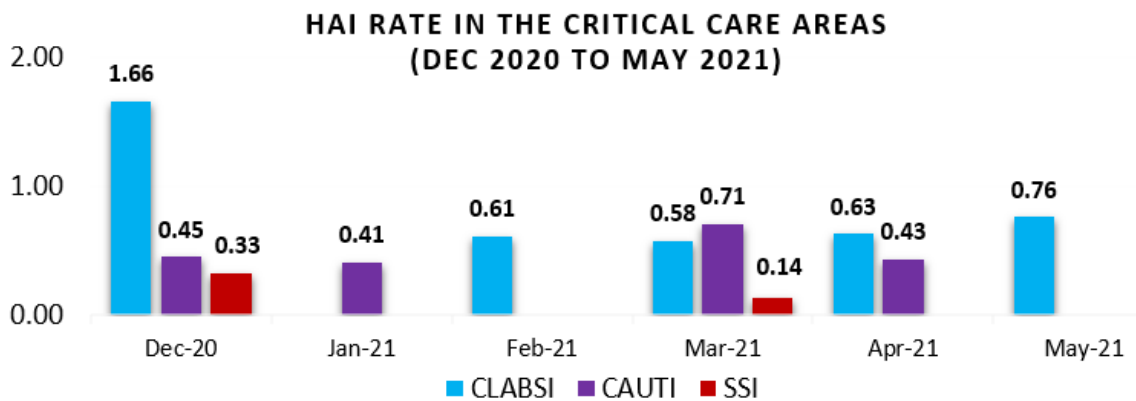


Figure 3 Hospital Acquired Infection Rates in the Critical Care areas from December 2020 to May 2021. Source. The 350 bedded urban tertiary care hospital, India. Credit. Self

The Hospital Acquired infections that were most commonly seen in the ICUs were, Central Line Associated Blood Stream Infections (CLABSI), Catheter Associated Urinary Tract Infections (CAUTI) and Surgical Site Infection (SSI).

Incidence of Adverse events for the last 6 months

From Dec 2020 to May 2021, there were 45 incidents of Accidental removal of lines. 40 pressure sore incidents, 3 incidents of patient fall, 20 incidents of re-intubation within 48 hours and 6 incidents of Return to ICU within 48 hours, that had occurred in the ICUs.

Analyse Phase:

A sum total of 164 responses (73% of total staffs) were collected from the different critical areas of the hospital.

Chi square analysis

The responses recorded were grouped into four types of variables, i.e., based on the type of ICU ward, experience in the healthcare sector, number of nursing trainings attended and according to the seniority of post held in the hospital. These numbers were then divided into two groups based on their scores in the survey in the knowledge and practice section,

and categorised further as, good or poor. Responses that scored more than 60% were considered as good and the rest were grouped as poor. Furthermore, the chi square analysis was done to understand the significant difference in the knowledge and practice among different groups of nursing staffs working in the critical care areas.

Chi square for wards and knowledge:

The value of chi-square statistic is 2.762. The p -value is .838.

The result was found non-significant at $p < .05$.

The result showed no significant difference between the knowledge level of the nursing staffs about the quality indicators in different types of ICU wards.

Chi square for wards and practice:

The value of chi-square statistic is 8.514. The p -value is 0.203.

The result was found non-significant at $p < .05$.

The result showed no significant difference between the practice level of the nursing staffs about the quality indicators in different types of ICU wards.

Chi square for experience and knowledge:

The value of chi-square statistic is 0.053. The p -value is 0.997.

The result was found non-significant at $p < .05$.

The result showed no significant difference between the experience and the knowledge level of the nursing staffs about the quality indicators in different types of ICU wards.

Chi square for experience and practice:

The value of chi-square statistic is 5.409. The p -value is 0.144.

The result was found non-significant at $p < .05$.

The result showed no significant difference between the experience and the practice level of the

nursing staffs about the quality indicators in different types of ICU wards.

Chi square for training attended and knowledge:

The value of chi-square statistic is 3.0818. The p -value is .214191.

The result was found non-significant at $p < .05$.

The relationship identified between the above variables was found to be non - significant, $(3, N = 164) = 5.409, p = 0.144$. Therefore, the result showed no significant difference between the experience and the practice level of the nursing staffs about the quality indicators in different types of ICU wards.

Chi square for training attended and practice:

The value of chi-square statistic is 18.0231. The p -value is .000122.

The result was found significant at $p < .05$.

The result showed a highly significant difference between the number of trainings attended and the practice level of the nursing staffs about the quality indicators in different types of ICU wards.

Chi square for position held and knowledge:

The value of chi-square statistic is 5.9372. The p -value is .051376.

The result was found non-significant at $p < .05$.

The result showed no significant difference between the position held and the knowledge level of the nursing staffs about the quality indicators in different types of ICU wards.

Chi square for position held and practice:

The value of chi-square statistic is 11.48. The p -value is .003215.

The result was found significant at $p < .05$.

The result showed a highly significant difference between the number of trainings attended and the practice level of the nursing staffs about the quality indicators in the critical care areas.

Root Cause Analysis

Problem 1.: Cause and Effect Analysis - High incidence of CLABSI

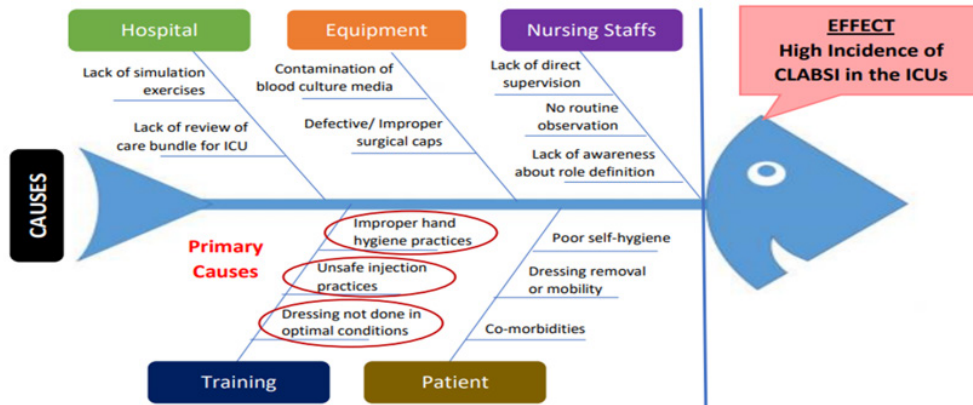


Figure 4 Fish bone diagram for the Root Cause Analysis of the increased incidence of Central Line Associated Blood Stream Infection (CLABSI) in different Critical Care areas of a 350 bedded urban tertiary care hospital, India.

Problem 2.: Cause and Effect Analysis - High incidence of CAUTI

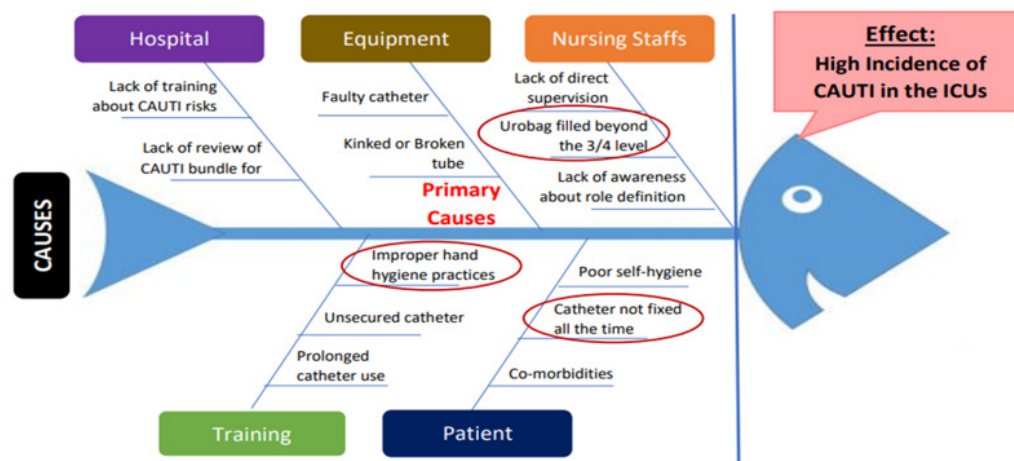


Figure 5 Fish bone diagram for the Root Cause Analysis of the increased incidence of Catheter Associated Urinary Tract Infection (CAUTI) in different Critical Care areas of A 350 bedded urban tertiary care hospital in India.

Problem 3: Primary Reasons for Increased Incidence of Pressure Sores:

As per the hospital incidents’ record, the main reasons documented for the increased occurrence of Pressure Sores in patients are -

- Prolonged bed ridden patients having a longer length of stay
- Under supervision of patient positioning.
- Prolonged wearing of diapers by patients

Problem 4: Primary Reasons for Increased Incidence of Accidental removal of lines:

As per the hospital incidents record, the main reasons documented for the increased occurrence of Accidental Removal of Lines in patients are -

- A restless or irritable patient or unaccompanied while moving.
- Lack of awareness during shifting of patients
- Self-removal by patients

Pareto Analysis

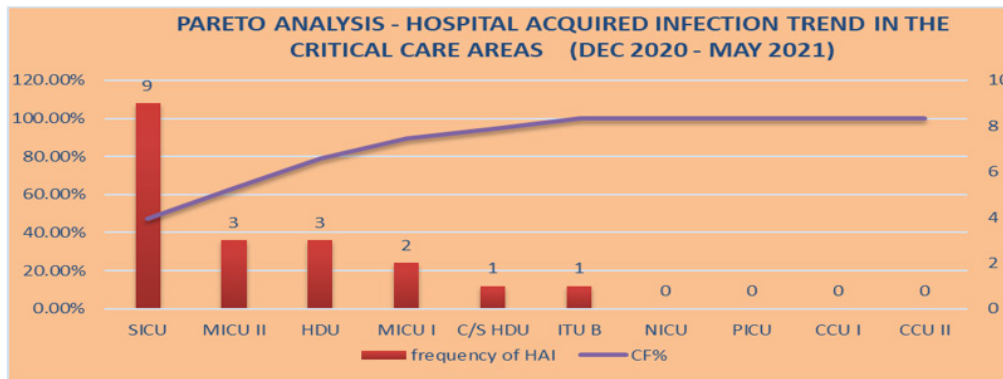


Figure 6 Pareto Chart for the Hospital Acquired Infections in the different ICU wards

Interpretation: The above Pareto analysis reveals that 70-80% of the Hospital Acquired Infections are reported from the SICU, MICU II and HDU. So,

focussing on reducing the HAI rates in these 3 ICUs can significantly reduce the majority of HAIs in the critical care areas of the hospital.

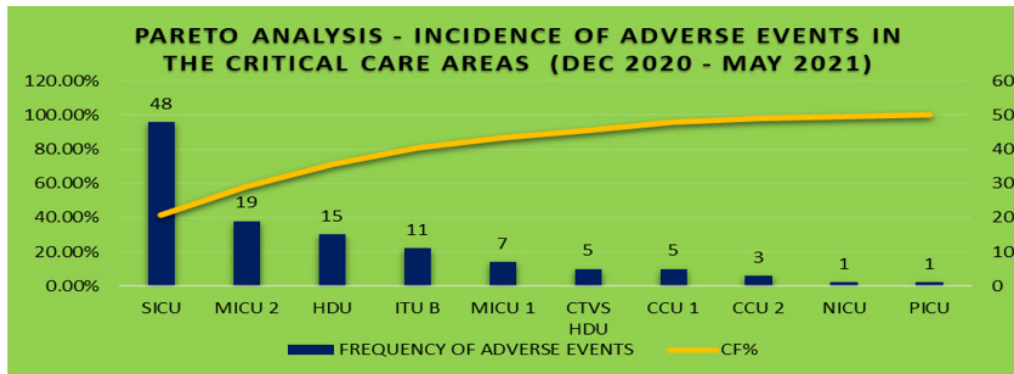


Figure 7 Pareto chart for the Incidence of Adverse events in different ICU wards of the hospital.

Interpretation: The above pareto analysis reveals that 70-80% of the incidents are reported from the SICU, MICU II and HDU. So, careful monitoring

strategies in these 3 ICUs can significantly reduce the rate of adverse events in the critical care areas of the hospital.

Discussion

Improve Phase:

Problems Identified	CA/PA suggested
1. Increase in the nosocomial infection rate	<ul style="list-style-type: none"> • Spot training of nursing staffs • Patients monitoring on a daily basis, and dressing change as needed. • Physical restraints used in case of restless/irritable patient.

Continue.....

2. Increase in incidence of few adverse events	<ul style="list-style-type: none"> • Bed alarms for patients who are required to be handled with extra care. • Hourly monitoring of high-risk patients on Morse Fall Scale. • Allocation of GDA staff to accompany patients while moving out of bed for any reason.
3. Decreased compliance with infection control guidelines	<ul style="list-style-type: none"> • Use of PPE as and when required by the care provider. • Medical waste handled and disposed of properly. • Hand washing following any contact with the patient.
4. Gaps in the knowledge and practice regarding quality and policy guidelines	<ul style="list-style-type: none"> • Training of the medical staffs regarding the quality guidelines. • Continuous surveillance of the nursing staff's activities for spot identification of gaps and training. • Multidisciplinary rounds to enhance patient care.

Conclusion

Most of the ICUs in India are facing the shortage of skilled workers like trained intensivists and critical care nurses, that is leading to a shortage of ICU beds across the country, especially during the pandemic and increased incidence of COVID pneumonia. In patients admitted to ICUs, a 24-hour trained intensivist presence has been found to improve outcomes³. Also, an increase in staffing in the ICU is associated with reduced mortality of patients in the critical care areas⁴. The prevention approach for reducing disease spread within ICUs has been identified by isolation of infected patients, that was followed by 54 percent of respondents in the survey. Furthermore, the survey witnesses an increased percentage of CLABSI and CAUTI rates and a net

increase in the ALOS by 7 - 8 days. As a result, better infection prevention techniques are needed in the ICU, so as to lower the morbidity and mortality for the admitted patients.

This study found gaps in specific aspects of knowledge and practice among the nursing staffs working in the ICUs regarding their compliance towards different quality and policy indicators. The attitude was seen to be better in senior level staffs and/or staffs with more training regarding the same. Hence, this gap should be focused on in future awareness and training programs conducted for the nursing staffs in the hospital.

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Conflicts of interest: There are no conflicts of interest

Abbreviations

ALOS	Average Length of Stay	IV	Intra Venous
CAPA	Corrective Action and Preventive Action	KPI	Key Performance Indicators
CAUTI	Catheter Associated Urinary Tract Infection	MICU	Medical ICU
CCU	Critical Care Unit	MO	Medical Officers
CDC	Centre For Communicable Diseases	NABH	National Accreditation Board for Hospitals
CLABSI	Central Line Associated Blood Stream Infections	NICU	Neonatal ICU
COVID-19	Coronavirus Disease Of 2019	OT	Operation Theatre

DMAIC	Define, Measure, Analyse, Improve, Control	PICU	Paediatric ICU
EOL	End of Life	PPE	Personal Protective Equipment
HAI	Hospital Acquired Infection	RTI	Respiratory Tract Infection
HDU	High Dependency Unit	SICU	Surgical ICU
HMIS	Hospital Management Information System	SIPOC	Suppliers, Inputs, Process, Outputs, Consumers
ICU	Intensive Care Unit	SSI	Surgical Site Infection
IEC	Information Education Communication	VAP	Ventilator Associated Pneumonia
ITU	Intensive Thoracic Unit	WHO	World Health Organization

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Pattern of COVID 19 Infection among Front line Health Workers and Contact Tracing Done among them. Our Experience in a Tertiary Care Hospital

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Abstract

Background: A considerable number of front-line workers are under risk due to repeated infection and exposure. The pattern of COVID 19 infection among the front-line workers was important, so that more focus would be laid on protecting them. Contact tracing is one key strategy for interrupting chains of transmission of SARS-CoV-2. This study aimed to find the pattern of COVID 19 infection among front line health workers and describe the process of contact tracing.

Methodology: The list of front-line workers with possible symptoms of COVID-19 or had come in direct contact with a "case" was shared with the department of community medicine for contract tracing activity as per the guidelines. The front-line workers who were categorized as High Risk were quarantined immediately and those who were categorized as Low-Risk were advised to be vigilant regarding the development of symptoms and were asked to continue with their routine duties with extra precautionary measures as they form a very vital part of the resource in this combat against COVID-19.

Result: About 138 front line health workers were affected by COVID-19 among which staff nurses (51) amounted to the maximum number who were affected.

Conclusion: COVID-19 was high among front-line workers and had a large number of high-risk contacts. Nurses were found to be most affected with COVID 19 infection.

Key Words: COVID-19, Pattern, Contact Tracing, Front-line workers

Introduction: CoV-2, was first detected on 31 December 2019 in Wuhan, People's Republic of China. The virus was COVID-19 caused by novel coronavirus, SARS-

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identified to be a respiratory pathogen and was found to be highly contagious with cases ranging from asymptomatic to severe respiratory infections. WHO declared COVID-19 a public health emergency of international concern on January 30, 2020 and India reported its first COVID-19 case in the state of Kerala on the same day. WHO declared COVID-19 as a pandemic on March 11 2020. In a period of less than 3 months it affected millions of people and causing governments and countries to shut down routine public life and business which led to implementation of various public health measures throughout the world. Pondicherry is a union territory in the southern part of India. On March 17, 2020, the first case of COVID-19 was identified in the district of Mahe. Since then, Pondicherry has seen a rapid rise in the number of COVID-19 cases just like the rest of the nation and the world.¹

During this pandemic even though every human being has been affected directly or indirectly to various degrees, the front-line workers have been placed under immense and unprecedented pressure all the while putting their physical, mental and social well-being at risk. The front-line workers are at constant risk of exposure to contract the COVID-19 virus. WHO have provided guidance on the quality, performance characteristics and related standards of personal protective equipment (PPE) to be used in COVID-19. The PPE include surgical masks, non-surgical masks, gloves, goggles, face shields, gowns and N95 masks. Despite use of PPE, the front-line workers get affected by COVID-19 and it is necessary to identify them as early as possible and quarantine these front-line workers so as to stop the spread among the front-line workers which can greatly affect the work force against this pandemic. It is estimated that over 15,000 front line workers have been affected by COVID in India so far.²

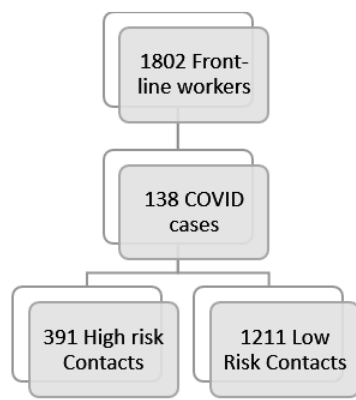
World nations and its governments introduced several non-pharmaceutical interventions, including social distancing and hygiene policies to control the rapid spread of COVID-19 virus. Contact tracing is one such intervention which plays an instrumental role in the identification and isolation of positive cases. Contact tracing has been one of the cornerstones

of infectious disease control and prevention for many years and it has proved to be one of the most important tools in curtailing COVID-19 transmission, morbidity and mortality. Contact tracing is the process of identifying, assessing, and managing people who have been exposed to someone who has been infected with the COVID-19 virus. Contact tracing is done by public health experts and quarantine of contacts identified through contact tracing interrupt transmission between people and are essential public health tools for controlling the virus. also help people who are at a higher risk of developing severe disease know earlier that they have been exposed so that they can get medical care quicker if they go on to develop symptoms. Contact tracing now-a-days can also be done digitally by using mobile technologies to digitally track and notify individuals about their interactions with potentially infected individuals. During the COVID-19 pandemic, this digital approach offers governments a more cost-effective and safer method than traditional contact tracing with regards to COVID-19 pandemic.³ Hence this study was done to find the pattern of COVID 19 infection among front line health workers in a tertiary care hospital and describe the process of contact tracing done among the frontline workers to control the spread of COVID-19

Methodology

The study was conducted between June 2020 and November 2020 among the front-line workers of a tertiary care hospital in Puducherry. Once a front-line worker is reported to be positive for COVID-19, the person is isolated and the details of the person who has been infected is immediately informed to the team in the HPC (Health Promotion Clinic) which is being used as the control room to coordinate all contact tracing works. Having undergone a basic course on COVID-19 contact tracing provided by John Hopkins University, the contact tracing of the patient was done and the details were documented.⁴ Front-line workers with possible symptoms of COVID-19 or had come in direct contact with a "case", were isolated and the complete details pertaining to "contact tracing" as per the guidelines laid by the John Hopkins University were obtained. The persons who are

categorized under high risk are made to quarantine with immediate effect and are advised to undergo RT-PCR to check for COVID-19 infection after 14 days. The persons who are categorized under low risk are advised to continue with their routine work, as they form a very vital part of the resource in this combat against COVID-19, with adequate personal protective measures but with extra precaution to look after symptoms/cardinal signs of COVID and in case he/she develops a sign/symptom of COVID, it is to be reported immediately to a health center nearby for further management.



Results

During the pandemic between June 2020 to November 2020, out of 1802 front-line workers, 138(7.65%) front line health workers were affected by COVID-19 in Pondicherry Institute of Medical Sciences. A total of 391 (21.7%) High risk contacts and 1211 (67.2%) Low Risk contacts were identified through the process of contact tracing.

The month-wise trend of COVID-19 infection among the front-line workers was studied for the duration between June 2020 and November 2020. The COVID-19 cases were a minimal at the beginning with caseload at the month of June 2020 being 2 cases constituting only 1.4% of the total cases between

the mentioned study duration. The cases began to rise steadily and rapidly and reached the peak with the maximum number of cases, 61 i.e., 44% of the COVID-19 cases, which was recorded in the month of August 2020. The number of COVID-19 cases among the front-line workers can be seen to start falling from September 2020 with 39 cases (28.2%) followed by 16 cases (11.6%) in October 2020 and finally 2 cases (1.4%) for the month of November 2020.

The pattern of COVID-19 among the various categories of front-line workers in the tertiary care hospital was also studied. Staff nurse (51) accounted to the maximum number of COVID-19 cases among the Front-line workers as they constitute the major workforce in the hospital who are constantly in close-contact with COVID-19 patients. They amounted to 36.9% of the total COVID-19 cases among the front-line workers. Doctors (38) amounted to 27.5% of COVID-19 cases among the front-line workers. 7.24% of the COVID-19 cases among front-line workers was found among the ward attenders and the rest 28.2% (39) of the COVID-19 cases was seen among janitors, electricians, technicians, receptionists, etc.

Table 1: Distribution of COVID-19 cases and contacts among health-care workers:

Category	Number
Total Number of COVID-19 cases	138 (7.65%)
Total number of cases subjected for contact tracing	138 (100%)
High Risk Contacts	391 (21.7%)
Low Risk Contacts	1211 (67.2%)
Total Number of Health-care workers	1802

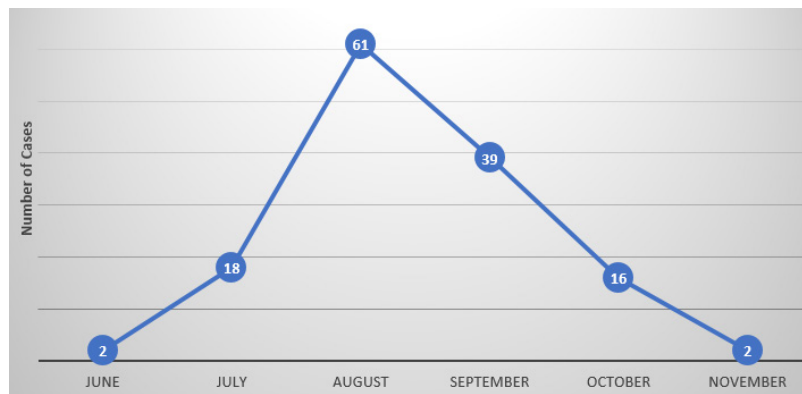


Figure 1: Month-wise trend of COVID-19 cases among health-care workers:

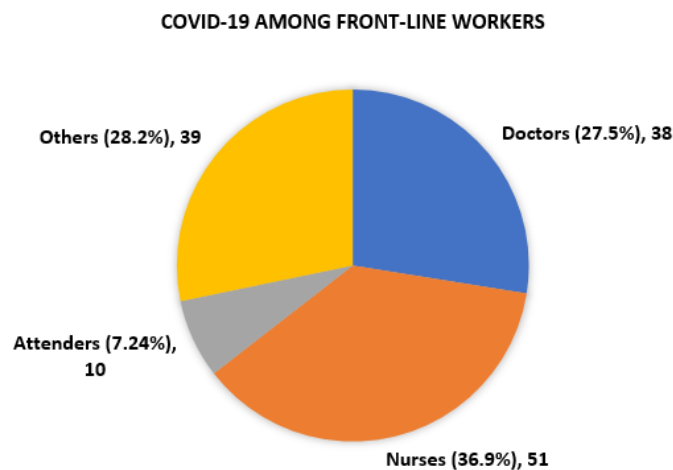


Figure 2: Reported Infections among various cadres of health-care workers:

Discussion

This article describes the role of contact tracing in early case detection and thereby breaking the chain of transmission by restricting the mobility of the infected individuals through various methods such as quarantine and isolation. This helps us in preventing the spread of COVID-19 virus not only in the hospitals but also in the community. Also, the pattern of infection among the frontline workers was identified.

The front-line workers are at increased risk of getting COVID-19 infection. This study shows that about 7.65% of the front-line workers were affected by COVID-19 infection. This is similar to a study done by Nguyen LH et al which shows 4.7% of the tests that had come out positive for COVID-19 were found to be among the front-line workers.⁵

Matt j. keeling et al shows contact tracing helps in identifying untraced cases and contacts with 1 in 6 cases turning out to be infected. The definition of contacts is based on the duration of contact with infected person and has been stated to be 4 hours which is similar to the contact duration presumed in our study. It has also been suggested that the burden of high number of contacts can be reduced by changing the definition of contacts but this will increase the risk of undetected cases.⁶

A study conducted by Shilei Zhao et al developed a different model for preventing the spread of COVID-19. The model used was based on Susceptible, Un-quarantined infected, quarantined infected, Confirmed infected (SUQC) model. The outbreak was analysed by applying the everyday data released of the confirmed infections in the SUQC model.⁷

Another study by Joel Hellewell et al which showed a stochastic transmission model which quantifies the potential effectiveness of contact tracing, active case finding, and isolation of cases at controlling a severe acute respiratory syndrome coronavirus 2. They identified that highly effective contact tracing and case isolation is instrumental to control a new outbreak of COVID-19 within 3 months.⁸

A study conducted by Lash et al where named contacts were identified using contact tracing of COVID-19 infected patients. The study revealed that the positive test prevalence was higher among named contacts than general population. This study reaffirms with our study which stresses on the importance of contact tracing in curtailing the outbreak of COVID-19.⁹

Kelly Jean et al conducted an evidence-based review to identify studies related to the effectiveness of contact tracing in viral outbreaks. The search dates were from database inception to July 24, 2020. Outcomes of interest included measures of incidence, transmission, hospitalization, and mortality. Contact tracing was mostly evaluated in combination with other nonpharmaceutical interventions and/or pharmaceutical interventions. Although some degree of effectiveness in decreasing viral disease incidence, transmission, and resulting hospitalizations and mortality was observed, these results were highly dependent on epidemic severity (R0 value), number of contacts traced (including presymptomatic and asymptomatic cases), timeliness, duration, and compliance with combined interventions (eg, isolation, quarantine, and treatment). Contact tracing effectiveness was particularly limited by logistical challenges associated with increased outbreak size and speed of infection spread. These findings align with findings of our study in shedding light on the importance of contact tracing in prevention and breaking chain of transmission of COVID-19 and also points at few challenges that was faced during contact tracing.¹⁰

Conclusion

The study shows among the frontline workers who were affected by COVID 19, a significant number

of high-risk contacts was identified. Staff nurse were the most commonly affected amongst the front-line workers in our tertiary care hospital, thus requiring our focus to be directed more towards increasing the personal protective measures towards protecting the nurses and other front-line workers.

Contact tracing process helps us to find the high risk and low risk contacts of COVID 19 affected individuals and thereby applying necessary preventive measures to curtail the spread the infection.

Ethical clearance- As the results obtained were from secondary data and explanation of the process involved has been mentioned, it is eligible for exemption from ethical clearance. Hence ethical clearance was not obtained.

Source of funding- Self

Conflict of Interest - Nil

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A Cross Sectional Study to Determine Periocular Parameters in Newborns At Different Gestational Age

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Abstract

Background: A nomogram of periocular measurements of newborn babies has its clinical implication in delineation of many syndromes.

Aim: To measure periocular parameters like inner canthal distance (ICD), outer canthal distance (OCD), inter pupillary distance (IPD) in newborns at different gestational age which will help in clinical evaluation of hypo and hypertelorism.

Materials & Methods: This is a hospital based observational, cross-sectional study in a secondary care hospital of West Bengal. The study was carried among 250 newborns with gestational period ranging from 32 weeks to 42 weeks who were born in obstetric department of the hospital during a period of 8 months. Ocular dimensions in newborns at different gestational age groups were measured on day 2, and the values are presented as mean +/- SD values for different gestational age groups. The data was collected by using structured schedule and was entered in the Microsoft excel sheets and statistically analysed by SPSS 24.0 and Graph Pad Prism version 5. **Results:** No significant difference noted between values of boy and girl babies. The values of different eye measurements have shown a positive correlation with gestational age and birth weight. To the best of our knowledge, till date there is only one such study from India.

Key Words: Newborn IPD, ICD, OCD, hypertelorism, telecanthus

Introduction

Anthropometry is an important diagnostic tool to evaluate dysmorphism in children and it is an important clinical tool for geneticists and dysmorphologists in diagnosing various diseases and syndromes. Geographical distribution,

ethnicity and other socio economic factors may affect anthropometric measurements, and for this reason every single society should determine their own standards. [1] Dysmorphologist employs canthal measurement in evaluating the degree of telorism while dentist employs canthal distance

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as a reliable predictor of maxillary canal incisor width.^[2] Standard values of ICD (distance between the two medial canthi of the eyes), OCD (distance between the lateral canthi), IPD (distance between the centres of two pupils) have been described to be very useful in diagnosis of neural crest migrational anomalies.^[3] In orbital hypertelorism (ORH), there is true lateralisation of the of the bony orbit that leads to decrease in distance between the lateral canthus and auditory meatus.^[4] The ORH is a craniofacial deformity, found in various craniofacial anomalies like craniofacial dysplasia, encephaloceles and craniosynostosis syndromes.^[5] In pseudo hypertelorism or primary telecanthus, abnormality is confined to soft tissue only. Patient with increased interorbital distance and proportionately increased intercanthal distances are referred to as having secondary telecanthus or true hypertelorism.^[6] The ICD, OCD and IPD are always increased in all cases of true hypertelorism. It may be emphasised that increased ICD alone without any increase in OCD cannot be termed as hypertelorism. ^[5] Values 2 SD greater above the mean compared with Tessier data are diagnostic of orbital hypertelorism. The use of Computerised Tomography (CT) to measure orbital hypertelorism has been investigated.^[4]

Hypotelorism is defined as a reduced distance between medial walls of the orbits with reduced inner and outer canthal distances; can be seen in 5p deletion, trisomy 21, holoprosencephaly, Meckel Gruber syndrome, Coffins Siris syndrome and Williams syndromes.^[7]

This study is an attempt for giving a mean value for various periocular measurements in newborns at different gestational age.

Material and Methods

The present study is a hospital based observational, descriptive, cross-sectional study conducted in department of Paediatrics, in a secondary care hospital of West Bengal. The hospital caters both rural and semi urban population equally.

Sample size was determined from the different studies done and expected proportion of the patients. The formula used for sample size calculation is as follows:-

$$n = 4 p q / L^2$$

Where, n is the required sample size, p is the approximate prevalence rate for which the study is to be conducted. The knowledge of this is to be obtained from previous study.

q = 1 -p and L is the permissible error in the estimate

$$n = 4pq / L$$

n= Required sample size

$$p= 0.20$$

$$q = 1 - p=0.8$$

L = Loss % (Loss of information)

$$n=4 \times 0.2 \times 0.8 / 0.0032(L^2)$$

$$n = 200$$

Inclusion criteria: Newborns (either out of normal delivery or caesarean section) born with gestational period ranging from 32 week - 42 week, term (≥ 37 weeks) and preterm (<36 weeks) healthy newborns which were sent to mother for rooming in and preterm newborns which require SNCU admission without major complications.

Exclusion criteria: Parents denied to participate in the study, babies with orbit or facial trauma or oedema, newborns with antenatal or postnatal diagnosis of IUGR, chromosomal or congenital anomalies babies with craniofacial anomalies, babies born to mother with preeclampsia, diabetes mellitus, autoimmune disorder, cardiac disease, mother on any drug, moribund condition at birth, babies in which gestational age was not confirmed and critically sick babies.

The study was conducted during 1/12/2017 to 31/7/2018(8 months). In this study, 250 live born with different gestational period ranging from 32 weeks to 42 weeks were subjected for measurement. Birth weight was recorded by nursing staff in the delivery room or OT using a digital balance. Periocular measurements (ICD, OCD) were taken by the principal investigator, in the maternity ward of the hospital on day 2 of birth, with the help of digital Vernier calliper. All effective measures and care was taken not to injure the newborns. Interpupillary

distance was calculated by using formula given by Feingold and Bossert ($IPD = 0.17 + 0.59 ICD + 0.41 OCD$).^[8]

The values of IPD, ICD, OCD are presented as mean +/-SD values for different gestational ages.

A total number of 250 neonates were included in the study. Out of 250, 50 babies were preterm (32- 36 weeks) and 200 were term babies (37 - 42 weeks).

The mean age (mean± s.d.) of boys was 44.0342 ±3.4440 hours. The mean age (mean± s.d.) of girl was 44.0150 ±3.3755 hours (**Table 1**).

Result and Analysis

Table 1: Distribution of mean age (in hours) in both sexes

	Gender	Number	Mean	SD	Minimum	Maximum	Median	p-value
Age (in hours)	Boy	117	44.0342	3.4440	38.0000	49.0000	45.0000	0.9647
	Girl	133	44.0150	3.3755	39.0000	49.0000	44.0000	

Difference of mean age vs. gender was not statistically significant (p=0.9647).

was 38.3504 ± 2.2101 weeks. The mean gestational age (mean± s.d.) of girl was 38.2857 ± 2.2882 weeks (**Table 2**).

The mean gestational age (mean± s.d.) of boys

Table 2: Distribution of mean gestational age in both sexes

	Gender	Number	Mean	SD	Minimum	Maximum	Median	p-value
Gestational age	Boy	117	38.3504	2.2101	32.0000	42.0000	39.0000	0.8208
	Girl	133	38.2857	2.2882	32.0000	42.0000	39.0000	

There was no significant difference between the sexes based on gestational age (p=0.8208).

Difference of mean OCD vs. gestational age (**Figure 2**) was statistically significant (p<0.0001). Difference of mean IPD vs. gestational age (**Figure 3**) was statistically significant (p<0.0001).

The mean ICD showed a positive correlation with gestational age (**Figure 1**). Correlation between these two was statistically significant (p<0.0001).

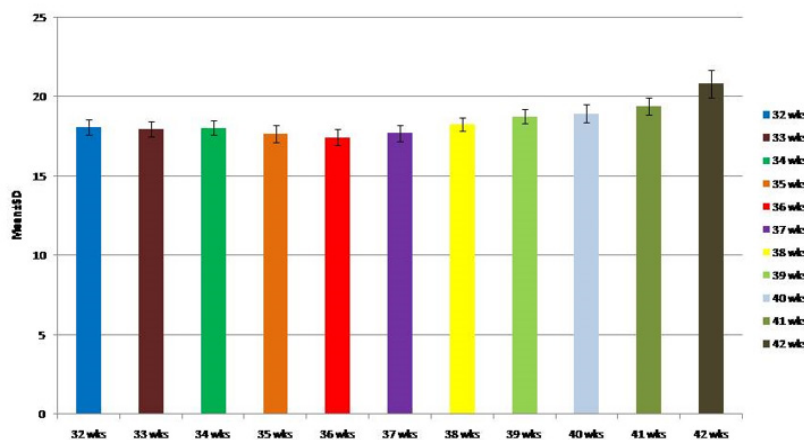


Figure 1: Inner canthal distance of both sexes at different gestational age.

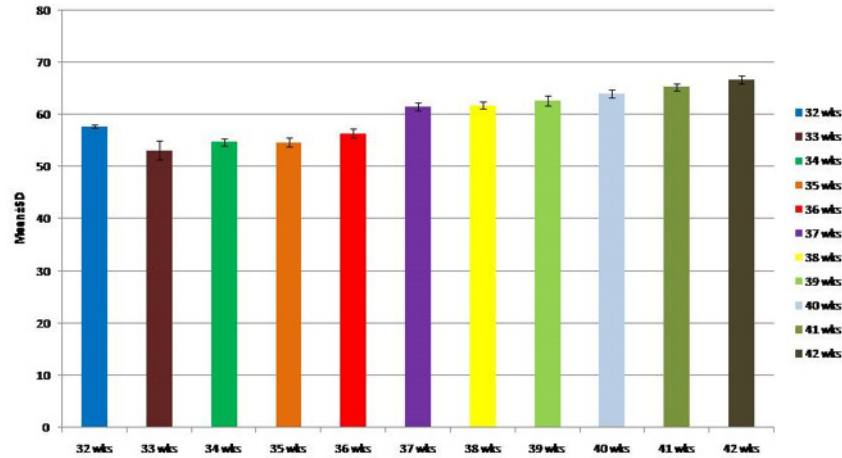


Figure 2: Outer canthal distance of both sexes at different gestational ages.

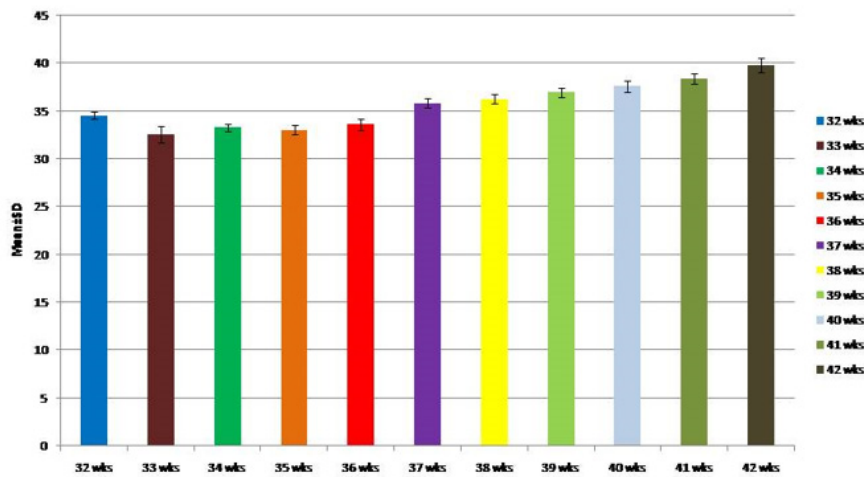


Figure 3: Interpupillary distance of both sexes at different gestational ages.

Discussion

Anthropometric measurements are non-invasive, highly sensitive and low-cost methods that can be performed in a short interval of time. Validity of anthropometric measurements are proved for public screening. Disease may be recognised and diagnosed in earlier stages, and anomalies can be identified earlier with follow up for normal growth and development. ¹Genetic differences play a role in differences in growth and body composition among various ethnic groups. Facial measurements and eye measurements help in identifying syndromes by showing anatomical anomalies. In the evaluation of eyes and periocular structure, measurements of ICD, OCD, outer orbital distance, IPD, palpebral fissure length, inner bulb index and canthal index

are helpful.^[9-10] The most accurate interorbital measurements would be bony interorbital distances from radiographs (Water’s view) or from postero-anterior cephalograms or (CT), usually used for presurgical purposes. ^[11] As we cannot evaluate each baby with radiological investigations for day to day practices, these can be evaluated manually and can be compared with their respective normal values.

A total number of 250 neonates were included in the present study, of which 50 babies were preterm (32- 36 weeks) and 200 were term babies (37 - 42 weeks). In this study, girl babies outnumbered boy babies i.e., 133 were girl babies and 117 were boy babies. Difference of mean age vs. gender was not statistically significant (p=0.9647).

The mean IPD in our study was 33.3 mm in term and 37.1mm in post term babies which showed a positive correlation with gestational age ($p < 0.0001$). IPD values in our study are not be comparable with most of the studies, as in many studies no newborns were included, and in some, only few newborns were included; but in those study methodology used were different.

Kulkarni ML et al. has done the study on newborn in state of Karnataka in which they have taken 817 newborns with GA ranging from 26 – 42 weeks. They found mean value of IPD 32.3 mm and 39.3 mm in at 32 and 41 week respectively.^[12]

Merlob et al. studied 87 term and 111 preterm babies ranging from 27 – 41 weeks. They found a mean IPD of 36.3 mm and 43.5 mm at 32 and 41 weeks respectively.^[13] They used the same formula like us, but as it was a different ethnic group, so the difference in values can be expected .

Pivnick et al. studied IPD in black people (birth to 24years) applying Pryor's formula, their mean value for newborns was 45.5 mm.^[14] This much difference in value in our study and their study can be due to different formula used for calculating IPD .

Sun C et al. determined the relationship of birth weight with ocular measurements in a Caucasian twin population(1498 twins) aged between 5 to 80 years participating in the Australian Twins Eye Study. Birth weight and gestational age were obtained from a self-administered questionnaire. They found IPD, IOP, and optic disc parameters are unrelated to birth weight.^[15]

In our study, mean ICD was higher in term baby .BilginS et al ^[16] has done a study on 1197 turkishnewborns born with a gestational age of 35 – 42 weeks . As per their study, values of ICD in preterm and term babies were 19 mm and 20 mm respectively. Values of OCD in preterm and term babies were 58 mm and 63 respectively. Shah k et al.^[17] reported mean value of ICD and OCD of newborns at birth as 19.82 ± 2.01 mm and 57.31 ± 6.29 mm respectively. This difference in the mean value may be a racial characteristic. The racial difference in the values of ICD and IPD have been reported earlier.

Conclusion

In our study, we have established a clinical index by giving mean value of IPD, ICD, and OCD in newborns at different gestational age to evaluate presence of hypo-hypertelorism. These nomogram will guide us for making a clinical assessment of telecanthus, ocular hypo- and hypertelorism and in early treatment of craniofacial variations in different syndromes.

Limitations of the Study

There are various limitations of this study. First is small sample size. Second is only newborns were included in the study, for following a trend of ocular measurements, measurements should be done in all age groups. Third, it is a single centered study, multicentric trials should be conducted to increase sample size and external validity of the study. In this case, result obtained from this study will only reflect a restricted geographical area of the country. Fourth, preterm < 32 weeks were not included. Also, Palpebral fissure length is not calculated in this study. For setting norms for ocular measurements palpebral fissure length is also important. A large multicentric observational study involving pre terms should be conducted to look for variability of these parameters.

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Effects of Combined Heat and Cold Therapy and Exercise on Delayed Onset Muscle Soreness in Healthy Persons

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Abstract

Purpose: This study was to compare the effects between heat and cold therapy and exercise on DOMS symptoms.

Methods: 50-healthy male participants were divided into two groups; Heat and Cold therapy (HCT) group (25 persons) and Exercise (E) group (25 persons). The Delayed Onset Muscle Soreness symptoms measurement consists of pain levels, swelling, muscle strength, Range of motion of the knee and ankle joints. All of the variables were measured before the experiment, after inducing Delayed Onset Muscle Soreness, after rehabilitation, after the experiment at 8, 24, 48, and 72 hours.

Results: This study found that pain was significantly decreased ($p < 0.05$) in both groups, swelling decreased significantly after rehabilitation-only in the HCT group ($p < 0.05$). Muscle strength, knee, and ankle Range of motion were found not changed in both groups. When comparing the two groups, Range of motion in both sides of the knee in the HCT group found significantly higher than the E group when compared after 8 hours of rehabilitation ($p < 0.05$). As for other variables, there found no difference between-group comparison.

Conclusion: Both heat and cold therapy and moderate exercise could reduce pain in a healthy male. However, only heat and cold therapy could reduce swelling after causing muscle aches. Although heat and cold therapy could not improve Range of motion after Delayed Onset Muscle Soreness stimulation, it could treat Range of motion more than moderate exercise.

Keywords: delayed onset muscle soreness symptoms, exercise therapy, heat therapy, cold therapy.

Background

Delayed Onset Muscle Soreness (DOMS) affects

at the beginning of exercise caused by strenuous exercise, wrong manners in sport, doing unfamiliar activities or eccentric exercise that cause limited

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mobility and the reduction of muscle performance. [20, 27]

DOMS symptoms include muscular soreness, decreased muscular strength, restricted range of motion (ROM), and swelling. According to the symptoms, muscular soreness lasts no longer than 1-3 days, and muscle strength is reduced for a maximum of 48 hours. In addition, Creatine Kinase (CK) secretion increases simultaneously. After exercise, reduced range of motion (ROM) and swelling occur within 3-4 days, and DOMS symptoms effectively increase between 24 - 48 hours [6], with symptoms recovering between 5 - 7 days. The length of recuperation is determined on the individual's potential. As a result, DOMS-symptoms have an impact on physical fitness and mental health. [6, 29, 18]

The previous study demonstrating that proper exercise is an effective method to recover DOMS [13] showed, in comparison, that DOMS could be recovered by a 20-minute aerobic exercise with moderate intensity after strenuous exercise. This works better than normal rest. [21] The study found that the warm-up and the cool-down with 20-minute cycling could respectively prevent and relieve muscle pain. [30] Also, the effect of prevention and rehabilitation with ice massage and exercise, and the exercise that affect the symptoms of DOMS are showed in the study. According to the study, the results showed that there were no differences among three remedy methods. Active blood circulation, increased degree of movement, and effective endorphin secretion, which results in more elimination of waste produced after exercise and reduces muscle soreness are the prospective effects of exercise. Therefore, proper exercise is effective in DOMS recovery [4, 6]

According to Olsen et al. [21], a 20-minute warm-up and a cooling cycle can both prevent and treat muscular soreness. Furthermore, Isabell et al. [30] discovered that ice massage and exercise had preventative and rejuvenating benefits on DOMS symptoms. According to the study, there were no variations in the results across the three treatment approaches. Exercise is intended to improve blood flow, movement, and effective endorphin release, resulting in the removal of post-workout waste and a reduction in muscular pain. As a result, proper exercise is beneficial in the restoring of DOMS. [4, 6]

The use of heat and cold is popular for muscle healing in terms of convenience and easiness. Previous studies have shown that 20 minutes of dry heat and 20 minutes of moist heat could alleviate discomfort after 24 hours of exercise. [23]

Hiruma et al. [10] shown that employing a 40 ° C hot pack for 20 minutes could raise the temperature of muscular tissue, enhance blood circulation, and alleviate pain. Heat has the advantage of expanding connective tissue, increasing blood flow, and increasing the level of movement. Other than that, heat also stimulates A-beta, which causes cells of the substantia gelatinosa to inhibit cell transmission, making it less painful and increasing tissue tear resistance. Therefore, heat could help to prevent and alleviate the symptoms of DOMS. [15, 31] Furthermore, cold therapy is commonly employed since it has the ability to alleviate pain after strenuous activity.

Kanda et al. [18] found that 10 minutes of cold water immersion at 10 ° C reduced muscular soreness and increased muscular strength. This research is consistent with Ascensao et al. [1], who discovered that cold water can reduce muscular pain and promote muscle recovery after football games. Cold enhances the transmission of pain perception nerves through pain-relieving adrenergic nerve fibers, which results in pain reduction. [15, 4, 26]

According to previous studies, the researcher aims to study the effects of heat in preventing DOMS and the effect of cold in reducing DOMS on muscle pain, muscle strength, ROM, and swelling by applying heat before exercise and applying cold after exercise, compared to an active one.

Materials and Methods

The sample size was determined using data from a research study entitled Effects of Water Immersion on Post training Recovery in Australian Footballers [11] And The value of pain value (VAS) was used as the main variable of this study. It is a variable used to calculate the sample size. It was taken to calculate the Effect Size equal to 0.8 and then used to estimate the sample size from the two-way hypothesis test sample size estimation table, the level of Confident 0.05 by selecting only the sample group.

Fifty two healthy male students aged between 18-25 years They were randomized into two groups by Simple random sampling, heat and cold therapy group (25 persons), exercise group (25 persons) and Two were excluded because they were unable to participate in all of the trials determined by the researcher. In this research, data were collected at the laboratory of Mahasarakham university. The Purposive sampling was applied using a weekly exercise frequency questionnaire. And Samples were randomly entered into the research by Purposive sampling with the following criteria for selection of research participants: The volunteers were required to exercise at least 3 times per week to be selected. The participants who exercised at least 3 days per week, no injury of the ligaments, muscles, and joints were included in this study. and those with symptoms will be excluded.

Procedure and protocol

The participants in the heat and cold therapy (HCT) group, received a hot compress with a silica gel pad for 20 minutes²⁰ at the front thigh, quadriceps muscle, which is the largest and most active muscle bundle. After that, they received an exercise to induced DOMS by using a 50 cm. height box. All of them step up and down on the box with speed at 140 beats per minute for 12 minutes. A cool compress with a silica gel pad for 20 minutes²⁸ at the same muscle was applied after exercise.

In the exercise (E) group, the participants received moderate exercise by using a mechanical treadmill at a level of 60-70% of the maximum heart rate for 20 minutes. Then, they received the same method to induced DOMS, after that, they received moderated exercise to reduced DOMS.

Table 1. Physical characteristic of healthy participants who performed heat and cold therapy (HCT) and Exercise therapy (E).

Sample	Age (yr)		Weight (kg)		Height (cm)		Leg strength (kg)	
		S.D.		S.D.		S.D.		S.D.
HCT group (n=25)	21.36	1.60	69.48	9.21	172.36	5.75	190.02	41.71
E group (n=25)	21.64	1.75	68.28	9.49	173.80	5.70	193.60	47.16

Note. Value are mean \pm SD; HCT: Heat and Cold therapy group; E: Exercise therapy group.

Table 2. Heat and Cold Therapy (HCT) and Exercise therapy (E) on all variables.

Dependent Variable	S.D.	SS	df	MS	F	P
VAS	0.23	0.23	1.00	0.23	0.07	0.79
Swelling (R)	394.74	394.75	1.00	394.75	2.46	0.12
Swelling (L)	294.03	294.04	1.00	294.04	2.01	0.16
Leg muscle strength	6726.68	6727.69	1.00	6727.69	0.81	0.37
ROM angle (R)	51.30	51.30	1.00	51.30	0.20	0.66
ROM angle (L)	518.50	518.50	1.00	518.50	3.86	0.06
ROM knee (R)	1173.95	1173.95	1.00	1173.95	7.86	0.01*
ROM knee (L)	1286.40	1286.40	1.00	1286.40	8.44	0.01*

Note: VAS = Pain, L=left, R=right, *Significant difference at p-value <0.05

Table 3. Heat and Cold therapy (HCT) and Exercise therapy (E) on Range of motion of the knee: ROM knee

ROM knee (R)							
Group	Pre	After DOMS	After Recovery	After 8 hr	After 24 hr	After 48hr	After 72 hr
HCT	131.56±4.70	129.56±6.27	129.56±6.09	125.24±7.77*	126.80±6.50	127.96±5.81	127.00±6.67
E	132.68±5.84	134.20±6.26	134.28±5.07	129.68±5.22*	131.08±5.54	130.84±5.12	130.56±6.64
ROM knee (L)							
Group	Pre	After DOMS	After Recovery	After 8 hr	After 24 hr	After 48hr	After 72 hr
HCT	131.76±4.77	129.24±6.06	129.68±6.07	124.84±8.00*	126.32±7.07	127.80±5.89	127.32±6.34
E	132.40±5.97	134.16±6.20	134.00±4.99	130.00±5.34*	131.04±5.62	131.36±5.71	130.84±6.93

Note: R=right: L=left *Significant difference at p-value <0.05

Discussion

The groups' results showed no differences since moderate exercise performed with the warm-up and the cool-down increases blood supply to muscles, and the muscles are fully activated to work, with less waste, which helps to reduce pain. The more waste the body holds, the more muscle aches [28, 20] as well as using heat and cold.

When the skin gets heat, the temperature rises to about 40-45 degrees Celsius, causing more blood to feed the muscles and inhibiting nerve impulses brought on by small nerve fibers. This results in nerve impulses passing through the brain to the area of less pain [10]. And the rehabilitation after exercise by cold compress, will result in the contraction of peripheral blood vessels, but it causes an increase in central blood flow, causing more blood supply to the muscles, affecting the disposal of waste, and reducing pain [32, 25].

Isabell et al. [30] studied the effect of prevention and rehabilitation with ice massage combined with exercise, and the exercising affecting the symptoms of DOMS. The results showed that there were no differences in the three treatment methods, the treatment for pain, degree of elbow movement, strength, and creatine kinase enzyme (CK) level, so whether using moderate exercise or the combination of heat and cold, both methods can help increase the blood supply to the muscles that are activated to function more to reduce the accumulation of waste, which is the main cause of the pain as well. This is according to Soetanto Hartono et al. [9] who said

cold water immersion decreases muscle damage and increases parasympathetic nerve function, And physiological changes during cold water immersion that increases recovery time include intracellular-intravascular fluid shift, reduction in muscle edema and fatigue, increased blood flow with possible nutrient and waste transportation.

In terms of swelling, there was no difference between groups. This is because the prevention and the rehabilitation using moderate exercise methods did not affect this experiment. When the swelling occurs, the body will secrete the substance such as Prostaglandin, especially Prostaglandin E2 that is involved in causing inflammation such as the expansion of blood vessels, and the increase of swelling. [6] This is according to [3] who said that when blood vessels expand, it will cause bleeding easier, increase swelling, and stimulate inflammation induction.

The effects of shallow heat help reduce pain, inflammation, swelling, increase circulation, and repair of tissues [16] but the rehabilitation after exercise with the method of cooling, commonly used after 24-48 hours of exercise [6, 26, 4, 28] and soaked in water instead of a specific compress.

Jonathan M. et al. [14] conducted a study about the effect of cold water immersion and therapy exercise affecting inflammation and cell stress. The results showed that there was no difference in both treatment methods, both in terms of inflammation and cell stress. Although the treatment is effective, it results in just a short period. For this reason, the

group that uses heat combined with cold therapy, the treatment may not show the full therapeutic effect of swelling. For the theory of swelling occurrence, the swelling may occur after 24 hours of exercise and will increase up to 3-4 days^[6] which may be why the protection and both rehabilitation methods did not reflect clear treatment results until 72 hours.

In terms of leg strength, there was no difference between groups. This is because Katch, McArdle, and Katch (2011) suggest that the optimal intensity of recovery is between 35-65% of the maximum oxygen consumption. If lower or higher than the appropriate weight level, it will slow down the movement of lactic acid. And this has corresponded to Kawin Phikunng (2007), who found that activity-based recovery at 50% of the heart rate range causes the body to recover as quickly as possible. Morteza Taheri et al.^[21], conducted a study about The Effect of Water Therapy and Jogging Exercises on the Health-Related Factors Physical Fitness of Elderly Women. The results showed that water therapy exercises and jogging had a significant effect on lower limb strength but there was no significant difference between the two experimental groups because the velocity and power of the two components are those that direct the dynamic equilibrium affect. As a result, physical exercises for water therapy and jogging, focusing on movement control, body position and respiration, can increase factors such as flexibility, strength and balance and improve elderly motor performance.

In terms of using heat combined with cooling, Hiruma et al.^[10] studied the effects of using hot compress pads at the temperature of 40 degrees Celsius for 20 minutes, causing the ability to work down the muscles. The decrease in the ability of the muscles to work is caused by the lack of strength of the muscles. However, strength recovery using a cold compress with a silica gel compression pad may not be sufficient for rehabilitation. Thus, cold use is considered important for preventing leg strength from overheating. According to Howatson and Van Someren (2003), ice massage affects the Creatine kinase enzyme (CK). after 72 hours from exercise but does not benefit the degree of movement and muscle strength in accordance with^[17] who studied the effect of recovery after hard exercise by hot stone massage method, sitting in the whirlpool, and cycling.

The results showed that there were no significant differences in the four methods affecting leg strength.

Although the results of the study do not find any differences between the groups. However, considering the average strength of the hind legs causing the symptoms of DOMs, it was found that the group that was protected and rehabilitated by exercise had lower leg strength levels than the group that was protected and rehabilitated. By using heat combined with cooling. Compared to before the experiment. Showed that the hot compress before exercise causing the leg strength to be reduced less than those receiving moderate exercise. Moderate exercise does not immediately increase strength, but after the 8th hour will gradually increase.

In terms of a range of motion, it was found that both the prevention methods and rehabilitation with exercise and the methods of prevention and rehabilitation with the use of heat together with the cold cannot increase the range of motion of the ankle, with no differences between the groups, However, this was found that there is a statistically significant difference between groups ($p < .05$) of the left-ankle range of motion in the post-experiment period at 8 hours. This is because after hard exercise until DOMS symptoms occur, the range of motion will continue to decrease within 3-4 days^[6], therefore, that may be the cause that makes prevention methods and both rehabilitation methods not to show clear treatment results. At the same time, that groups that use prevention methods and rehabilitation using heat together with the cold, the range of motion of the left knee increased more than those who use prevention methods and rehabilitation with exercise with statistical significance ($p < .05$), in which the past studies found that heat causes the connective tissues to expand, increase blood flow and the range of motion.^[31, 15] After 8 hours of the experiment, experimental group 2 had a greater degree of movement of the right knee. The first experimental group was statistically significant at the .05 level. It has been shown that prevention and recovery with heat combined with cold can improve the degree of motion of the right knee better than prevention and recovery with moderate exercise. After 8 hours of the experiment and After 8 hours of the experiment, experimental group 2 had a greater degree of

movement of the left knee. Experimental group 1 had a statistically significant .05 level, indicating that heat and cold prevention and recovery can improve left knee range of motion better than prevention and recovery with heat treatment. moderate exercise After the experiment, 8 hours.

Although the heat helps to increase the range of motion, the period of rehabilitation after exercise with the method of applying a cold compress can decrease the range of motion. Therefore, this causes the study results to be unclear and inaccurate. In consequence, according to the theory, the cold affects the skin blood vessels to contract, reduces synovial collagenase function (cartilage area), and this reduces muscle flexibility and increases stiffness. [3]

Krityakiarana et al. [19] conducted a study on protection effect and rehabilitation with an ice pack, dynamic stretching, and ice compress combined with dynamic stretching resulting in DOMS symptoms. The findings showed that there were no differences in the three treatment methods in terms of movement degrees, and it was found that only one method of treatment was not able to treat DOMS symptoms and increase range of motion. In accordance with [30] conducted the study about the effect of prevention and rehabilitation with ice massage, ice massage combined with exercise, and exercise affecting DOMS symptoms. The results showed that there were no differences in the three treatment methods, both in pain, degree of elbow movement, strength, and Creatine kinase enzyme (CK) levels.

Conclusion

Combined heat and cold therapy and exercise could reduce delayed onset muscle soreness, which combined heat and cold therapy could reduce muscle pain and swelling, and improve range of motion of knee. While exercise could reduce pain. improve muscle strength, and improve range of motion of ankle. It can be seen that the two treatments had some different results.

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Clinico-epidemiological profile of Mucormycosis patients admitted in VIMS hospital, Ballari: Case series

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Abstract

Background: Mucormycosis is caused by the fungi belonging to the order Mucorales. Humans acquire the infection predominantly by inhalation of sporangiospores, occasionally by ingestion of contaminated food or traumatic inoculation. In the backdrop of COVID-19 expression, there has been notable increase in the incidence of invasive fungal infection (IFI), namely Mucormycosis and aspergillosis. In the present study we aim to know the Clinico-epidemiological profile of Mucormycosis patients admitted in Vijayanagar institute of medical sciences (VIMS), Ballari, Karnataka.

Methodology: A descriptive study was carried out at VIMS Hospital, Ballari, Karnataka after obtaining ethical clearance. The data was collected using structured questionnaires through interview and case records on risk factors, clinical profile and management of patients who were suspected of Mucormycosis. Frequencies and Proportion were used to describe the variables. Study period was from April 2021-June 2021.

Results: Out of 52 patients, 45(86.5%) were male and 7(13.5%) were female. Age group between 41-50 years (40.4%) were most commonly affected followed by 31-40 years (28.8%) and 50% were positive for COVID 19, 26.9% were post COVID and 23.1% were NON COVID. Twenty two patients were on steroids, 21 (95.5%) of them due to COVID 19 and 1(4.5%) due to asthma. Comorbid conditions like diabetes mellitus 38(73.1%) and hypertension 12(23.1%) were most commonly present. 12(31.6%) out of 38 patients had uncontrolled diabetes mellitus. Mucormycosis was confirmed by KOH and histopathological results and were positive in 21(43.7%) and 27(77.1%) patients respectively. Management of Mucormycosis included both medical and surgical intervention.

Conclusion: Mucormycosis is a life threatening fungal infection. The present study emphasizes the need for further understanding of the disease and to take aggressive measures for early diagnosis and management.

Keywords: Mucormycosis, Invasive fungal infection, COVID 19

Introduction

Most cases of Mucormycosis result from

inhalation of fungal sporangiospores that have been released in the air or from direct inoculation

of organisms into disrupted skin or gastrointestinal tract mucosa. Seasonal variations affect the incidence of Mucormycosis, with most infections occurring from August to November.¹

Mucormycosis occurs in six different forms, i.e., rhino cerebral, pulmonary, cutaneous, gastrointestinal, and disseminated, and the most frequent sites of infection include pulmonary, rhino cerebral, cutaneous, and disseminated².

The incidence of Mucormycosis has been increasing in recent decades, mainly due to the growth of the number of severely immunocompromised patients³. It was thought that there might be higher chances of Mucormycosis in COVID-19 individuals who were diabetic and treated with corticosteroids. Interestingly, many COVID-19 patients who were non-diabetic and never used steroids also contracted the infection. Hence, it will be interesting to see whether COVID-19 itself possesses a risk factor by modifying the immunological markers. Prolonged hospital stay with mechanical intubation may also increase the chances of Mucormycosis. Indiscriminate and prolonged use of antibiotics may be responsible for increased susceptibility to fungal infections⁴.

Early diagnosis of Mucormycosis is of utmost importance, since it may improve outcome. Studies have shown that it increases survival⁵ and it may also reduce the need for or extent of surgical resection, disfigurement and suffering⁶.

Both antifungal and surgical management are recognized as the backbones of the treatment; however, both pose challenging issues, such as medication toxicities and anatomic location of lesions⁷.

All COVID-19 patients have to be monitored closely for sequelae of immunosuppression. The presence of risk factors adds burden in the treatment of COVID-19 patients.

In this context this study aims to know the Clinico-epidemiological profile of Mucormycosis patients admitted in VIMS hospital, Ballari.

Objective

1. To describe the clinico-epidemiological profile of Mucormycosis patients admitted at VIMS hospital, Ballari.

Materials and Methods

A prospective observational study was carried out at Vijayanagar institute of medical sciences (VIMS), Ballari, Karnataka. Ethical approval was obtained by institutional ethics committee before the start of the study.

Study participants

Individuals with features suggestive of Mucormycosis were enrolled in this study. Features suggestive of Mucormycosis are those individuals with clinically compatible disease and the demonstration of fungi in the tissue (or body fluids) either by direct microscopy (KOH), culture or molecular methods. All participants received treatment at the discretion of the treating physician. Patients admitted with suggestive features of Mucormycosis were interviewed after taking written consent in the local language (Kannada) explaining the purpose and objectives of the study.

Study tool

Pre-designed, semi-structured questionnaire was designed to gather the information like a) Basic demographic, epidemiological profile (age, sex, income, occupation, type of house etc.) b) Clinical aspects of the patients c) Predisposing factors (diabetes, corticosteroid therapy, stem cell transplantation and others) d) Comorbid conditions (Diabetes, hypertension, asthma and others) e) Investigations (Blood tests, histopathological findings, X-ray, CT and MRI scan, etc.) f) Treatment (medical, surgical) was obtained.

Study duration

3 months from April 2021-June 2021

Sample size (N) = Sample size is based on the number of patients suspected to be Mucormycosis who got admitted to VIMS Hospital, Ballari.

Inclusion Criteria

Patients presenting with features suggestive of Mucormycosis presented at the time of the study.

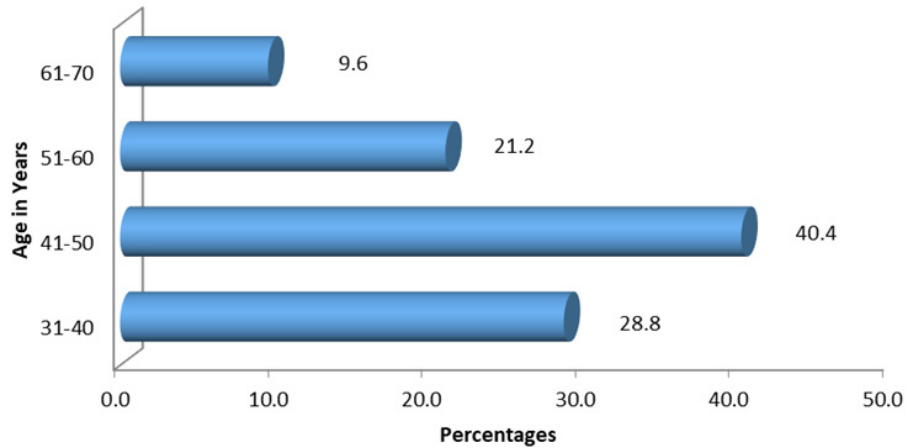
Exclusion Criteria

Severely ill patients who cannot be interviewed.

Statistical Analysis

Frequency and proportion was used for analysis.

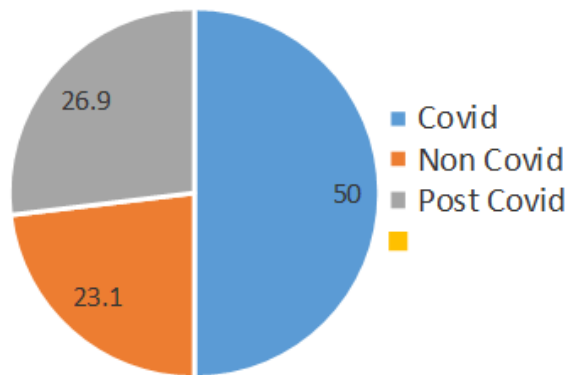
Results



Graph 1. Distribution Of Age Group

Most common age group was between 41-50 years (40.4%) followed by 31-40 years (28.8%).(GRAPH 1)

A total of 52 individuals were diagnosed with Mucormycosis during the study period, of whom 26 (50%) were positive for COVID - 19, 14 (26.9%) were postcovid and 12(23.1%) were noncovid.(GRAPH 2)



Graph 2 COVID status

Table 1. General Information (N=52)

	Frequency	Percentage
REFERRED FROM(N=5)	4	
PHC	1	80
Private hospital		20
GENDER		
Male	45	86.5
Female	7	13.5

Continue.....

	Frequency	Percentage
RELIGION		
Hindu	48	92.3
Muslim	4	7.7
SOCIOECONOMIC STATUS CLASSIFICATION		
Upper	01	1.9
Upper middle	06	11.5
Middle	10	19.2
Lower middle	17	32.7
Lower	18	34.6
HISTORY OF TRAVEL (IN THE LAST TWO WEEKS)	3	5.8
OCCUPATION		
Professional	1	1.9
Skilled	9	17.3
Semiskilled	6	11.5
Unskilled	33	63.5
Unemployed	3	5.8
METHOD OF STEAM INHALATION (N=19(36.5%))		
Vaporiser	05	26.0
Utensil	14	74.0
WATER USED FOR STEAM INHALATION		
Tap water	16	84.0
Distilled water	3	16.0

The general information is summarized in Table 1. Out of 52 patients, 45(86.5%) were male and 7(13.5%) were female. 4(80%) patients were referred from PHC and 1(20%) from private hospital. Most of the patients 18(34.6%) were belonging to lower socioeconomic status followed by lower middle

17(32.7%), 33(63.5%) and 9(17.3%) were unskilled and skilled workers respectively and 48(92.3%) belonged to Hindu religion. Only 3(5.7%) of them had a history of travel in the last two weeks. Steam inhalation was used by 19(36.5%) patients, 16(84%) of them used tap water.

Table 2. Assessment Of Predisposing Factors (N=52)

	Frequency	Percentage
Steroids intake	22	42.3
Reason		
Asthma	01	4.5
Covid-19	21	95.5
Immunomodulators intake	01	1.9
History of ICU stays (IN THE LAST MONTH)	01	1.9
Oxygen therapy(IN THE LAST MONTH)	25	48.0
History of transplant		
Stem cell	02	3.8
Voriconazole therapy(IN THE LAST MONTH)	01	1.9
Iron therapy(IN THE LAST MONTH)	07	13.5
Consumption of zinc tablets(IN THE LAST MONTH)	31	59.6
History of blood transfusion (IN THE LAST 1 MONTH)	02	3.8
Injections use IM/IV	22	42.3
On Ventilator support(IN THE LAST 1 MONTH)	03	5.7
History of intake of broad spectrum antibiotics (IN THE LAST 1 MONTH)	21	40.4

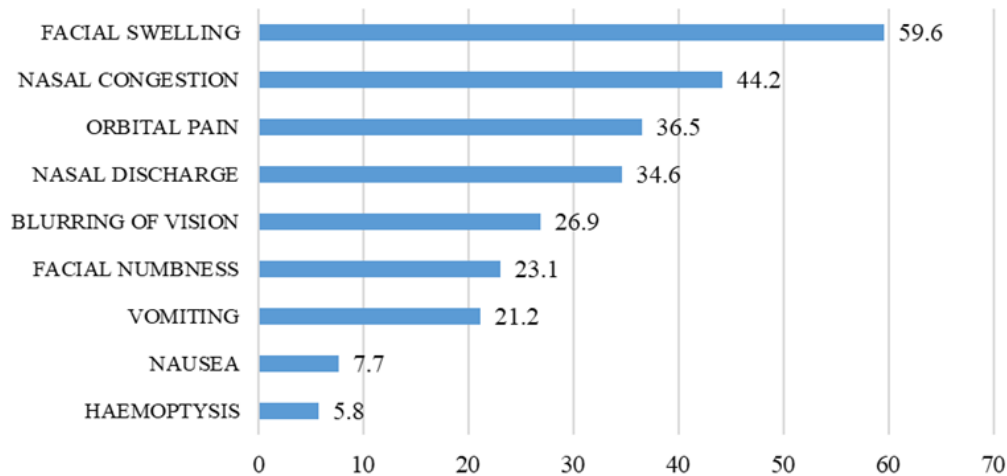
Twenty two patients were on steroids, 21 (95.5%) of them due to COVID 19 and 1(4.5%) due to asthma. Only one patient had history of Immunomodulators, ICU stay and Voriconazole therapy. Oxygen therapy and ventilator support was required in 25(48%) and 3(5.7%) patients respectively. Stem cell transplant was done in 2 (3.8%) patients. There was history of

consumption of iron and zinc tablets in 7(13.5%) and 31 (59.6%) patients respectively and 2(3.8%) patients received blood transfusion in the last month. Usage of injections(IM/IV) and broad spectrum antibiotics were seen in 22(42.3%) and 21(40.4%) of the patients respectively. (TABLE 2)

Table 3. Comorbidities

Type of Comorbid condition	Frequency	Percentage
Hypertension	12	23.1
Asthma	02	3.8
Thyroid disorders	02	3.8
Cardiac disease	01	1.9
Epilepsy	01	1.9
DIABETES (N=38)		
Controlled	26	68.4
Uncontrolled	12	31.6

Comorbid conditions like diabetes mellitus commonly present. 12(31.6%) out of 38 patients had 38(73.1%) and hypertension 12(23.1%) were most uncontrolled diabetes mellitus. (TABLE 3)



Graph 3- Symptoms Pertaining To Mucormycosis

Most of the patients had presentations like facial swelling 31(59.6%) followed by nasal congestion 23 (44.2%) (GRAPH 3)

Table 4. Signs Pertaining To Mucormycosis (N=52)

Nasal Examination	Frequency	Percentage
Ulceration, necrosis and discharge	19	36.5
Nasal cavity shows a blackish discoloration of the middle turbinate	07	13.6
Nasal mucosa		
Congestion	10	19.2
Healthy	01	1.9
Sinus mucosa		
Deviated nasal septum	05	9.6
Blood clots	01	1.9
Congestion	01	1.9
Minimal crusting, b/l mucoid discharge,	01	1.9
Oedematous	01	1.9
ORAL EXAMINATION		
Sinusitis	14	26.9
Tenderness of the cheek bone	13	25.0
Black eschar on the palate	03	5.7
OCULAR EXAMINATION		
Restricted eye movement	14	26.9

Continue.....

Proptosis	05	9.6
Swelling of right upper eyelid	05	9.6
Ophthalmoplegia	05	9.6
No vision PL=Negative	03	5.7
Oedema	01	1.9
Pterygium	01	1.9
Ptosis	01	1.9
FUNDUS EXAMINATION		
Cherry red spot	03	5.7
Periorbital oedema	03	5.7
Disc oedema	02	3.8

On nasal examination 19(36.5%) patients had ulceration, necrosis and discharge. 10 (19.2%) of them had nasal mucosa congestion and 5 (9.6%) of them had deviated nasal septum. On oral examination 14(26.9%) and 13(25%) of them had sinusitis and

tenderness of the cheek bone respectively. 14(26.9%) had restricted eye movement on ocular examination. On fundus examination 3(5.7%) had cherry red spot and periorbital oedema.(TABLE 4)

Table 5. Investigations And Management (N=52)

	Frequency	Percentage
KOH		
Positive	21	43.7
Negative	27	56.3
BIOPSY		
Mucormycosis with ischaemic changes	3	100.0
FUNGAL CULTURE		
Positive	2	50
No fungal growth	2	50
HISTOPATHOLOGY		
Positive	27	77.1
Negative	8	22.9
CT/MRI		
Positive	26	50
Negative	2	3.8
CT Positive	7	13.5
MRI Positive	12	23.1
MRI Negative	1	1.9
MANAGEMENT OF MUCORMYCOSIS (N=52)		
Medical Management	29	55.8
Medical and Surgical Management	23	44.2

Mucormycosis was confirmed by KOH and histopathological results and were positive in

21(43.7%) and 27(77.1%) patients respectively. Biopsy and fungal culture identified etiological agent in 3

and 2 patients respectively. CT and MRI was done to assess the extent of anatomic involvement and in 26(50%) of the patients had features suggestive of Mucormycosis. Management of Mucormycosis included both medical and surgical management. 29(55.8%) of them were treated purely by medical management and 23(44.2%) of them required both medical and surgical management.(Table 5)

Discussion

Although Mucormycosis is an extremely rare in healthy individuals but several immunocompromised conditions predispose it. This includes uncontrolled DM with or without DKA, hematological and other malignancies, organ transplantation, prolonged neutropenia, immunosuppressive and corticosteroid therapy, iron overload or hemochromatosis, deferoxamine or desferrioxamine therapy, voriconazole prophylaxis for transplant recipients, severe burns, acquired immunodeficiency syndrome (AIDS), intravenous drug abusers, malnutrition and open wound following trauma⁸.

Mucormycosis can involve nose, sinuses, orbit, central nervous system (CNS), lung (pulmonary), gastrointestinal tract (GIT), skin, jaw bones, joints, heart, kidney, and mediastinum (invasive type), but ROCM is the commonest variety seen in clinical practice worldwide⁸. It should be noted that term ROCM refers to the entire spectrum ranging from limited sino-nasal disease (sino-nasal tissue invasion), limited rhino-orbital disease (progression to orbits) to rhino-orbital-cerebral disease (CNS involvement)⁹.

The incidence of Mucormycosis is not age or gender dependant but in the present study there is significantly higher number of males (86.5%). Teny M. John, Ceena N et al found that Thirty-four (83%) of the patients in their study were males. Out of which 71% were reported from India¹⁰. In a study conducted by Roden et al. of 929 patients diagnosed with Mucormycosis, the mean age was 38.8 years, and disease was more common in males (65%) as compared to females (35%). In the study conducted by Bala K, Chander J et al the mean age was 40.43 years and the most common in males (72%) as compared to females¹¹ (28%). In the present study 45 (86.5%) of them were male and 7(13.5%) were female.

We found 26 (50%) patients who were positive for COVID 19, 14 (26.9%) were post-covid . Song et al. studied the association between Covid-19 and invasive fungal sinusitis in April 2020, and concluded that a large number of patients affected by or recovered from Covid-19 are at increased risk of developing invasive fungal diseases¹². Aditya Moorthy, Rohith Gaikwad, et al studied that all 18 cases in his study were positive for COVID 19¹³.

Hence it becomes utmost important that clinicians pay attention to the high probability of increased incidence of fungal infections in Covid-19 affected or recovered patients, similar to the finding observed in the present study.

Data from a global fungal infection registry reports haematological malignancy (63%) to be the most important underlying condition for mucormycosis¹⁴. In contrast diabetes (73.07%) was the main predisposing factor in the current study. IA. Patel, H. Kaur, I. Xess, et al in a multicentre observational study on the epidemiology, risk factors, management and outcomes of Mucormycosis in India concluded that Diabetes mellitus (73.5%) was the predominant risk factor for mucormycosis¹⁵. In a review of 179 cases of paranasal sinus Mucormycosis, 70% of patients had diabetic ketoacidosis¹⁶.

The situation might also be similar in other low- and middle-income countries, where diabetes is prevalent¹⁷.

Presence of DM significantly increases the odds of contracting ROCM by 7.5-fold (Odds ratio 7.55, P $\frac{1}{4}$ 0.001) as shown in a prospective Indian study, prior to COVID-19 pandemic¹¹. In a recent systematic review conducted until April 9, 2021 by John et al¹⁸. that reported the findings of 41 confirmed mucormycosis cases in people with COVID-19, DM was reported in 93% of cases, while 88% were receiving corticosteroids.

In the present study 22 patients were on steroids, 21 (95.5%) of them due to COVID 19 and 1(4.5%) due to asthma. In a review, 62(8%) per cent of coronavirus-positive or recovered patients had secondary bacterial or fungal infections during hospital admission, with widespread use of broad-spectrum antibiotics and steroids¹⁹.

Although according to reports published by doctors, it was remarked that patients with no history of the factors like reusing masks, not getting vaccinated; COVID-19 mutations were also infected with Mucormycosis. There were claims that one common factor involved in patients affected was "excessive steam inhalation²⁰." In this study 36.5% of the patients were using steam inhalation.

The consumption of zinc tablets was found in 31(59.6%) patients. It is scientifically proven that zinc starvation inhibits microbial growth in tissues and zinc acts as key nutrition for fungal growth. In vitro study, it has been seen that zinc chelator (zinc antidote) like clioquinol or phenanthroline or other zinc chelator inhibits the growth of this fungus. It means zinc deprivation inhibit the fungal growth. Not only this, it is difficult to grow this fungus in zinc deficient tissue²¹.

In the present study Mucormycosis was confirmed by KOH and histopathological results and were positive in 21(43.7%) and 27(77.1%) patients respectively. In a multicentre observational study conducted by IA. Patel, H. Kaur, I. Xess, et al confirmed Mucormycosis by direct microscopy in 406 (87.3%) participants, histopathology in 340(73.1%) participants¹⁵.

Present study aims to understand the clinico-epidemiological profile of the patients who were suspected to be of Mucormycosis. The limitation of the study is though it is an epidemiological study the exact incidence or prevalence of Mucormycosis was difficult to assess in different risk groups. Though the predisposing factors were assessed but the strength of association could not be described as there is no control group. The study results may not be generalizable where haematological malignancy and transplantation are the dominant risk factors.

Conclusion

In conclusion, Mucormycosis is a life threatening disease and a serious problem in India with a high mortality. Present study showed that diabetes mellitus was the major predisposing factor which has to be taken into account for further understanding of the disease and to reduce the severity. Use of steam inhalation, zinc therapy and oxygen

therapy were found to be predisposing factors which requires further evaluation. The breach in knowledge identified in the study need to be further addressed and there is a need of further awareness in understanding Mucormycosis so as to diagnose and provide prompt treatment.

Ethical Clearance: Ethical approval was obtained by institutional ethics committee.

Source of funding: NIL

Conflict of Interest: NO

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Evaluation of Oxidative stress using Superoxide Dismutase and Lipid Peroxidation in Lichen Planus: A Tissue Level Enzymatic Analysis Study

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Abstract

Introduction: Oral Lichen Planus (OLP) is a chronic inflammatory disease of oral mucosa with unknown etiology. Many studies have suggested that increased oxidative stress, an imbalance in the antioxidant defense system may be involved in pathogenesis of Lichen planus.

Aim: The aim of this study was to compare the tissue levels of antioxidant Super oxide dismutase (SOD) and lipid peroxidation marker Malondialdehyde (MDA) in established cases of OLP and healthy individuals.

Methodology: Ten patients with OLP and 10 control subjects matched for age and sex were enrolled in this case control study. The tissue levels of SOD and MDA were measured both in case and control groups.

Results: The tissue levels of SOD were increased that was statistically significant in OLP patients compared to healthy controls ($p < 0.01$). The lipid peroxidation product MDA were relatively higher in OLP patients compared to healthy controls. Conclusion: The current study suggests that oxidative damage is one of the major causes for the pathogenesis of OLP.

Key words: Oxidative stress, ROS, immunological disease, apoptosis

Introduction

Oral Lichen planus is a common disorder of the squamous epithelia. OLP is a T-cell-mediated mucocutaneous chronic inflammatory disease. The exact pathogenesis of the OLP remains unclear, many factors are proposed for the pathogenesis of OLP including Genetic; Bacterial and viral infections; Autoimmune diseases; Immunodeficiency; Dental materials; Diabetes; Hypertension; Drugs; food allergies; Stress and trauma^{1,2}. It is hypothesized that

both antigen-specific and non-specific mechanisms are involved in the pathogenesis of OLP^{3,4}.

In immune specific mechanisms there is activation of intra-epithelial CD4+ T helper cells and CD8+ cytotoxic T-cells by lichen planus antigen by MHC class I and II molecules or encountering the antigens in the basal keratinocytes. The lesional keratinocytes secrete cytokines and direct the T cells to migrate into the epithelium and trigger keratinocyte apoptosis^{3,5,6}.

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The non-specific mechanisms are associated with pre-existing inflammation causing the infiltration of lymphocytes. The in filtered T-cells release activators of zinc containing matrix metalloproteinase (MMPs) and causes the degranulation of mast cells. The principal function of MMPs is proteolytic degradation of connective tissue matrix proteins. This causes the destruction of keratinocytes of the epithelial basement membrane^{1,4,7,8}.

Both keratinocyte apoptosis and basement membrane disruption may be involved in the pathogenesis of OLP e.g., basement membrane disruption may trigger keratinocyte apoptosis, and apoptotic keratinocytes may be unable to repair the disrupted basement membrane. Such a cyclical mechanism may underlie disease chronicity^{2,4}.

Both the mechanism produce antibodies and T-cell mediation have been implicated. Activated T-cells release cytokines leading to the attraction of inflammatory cells and the destruction of keratinocyte by cell-mediated cytotoxicity. There are different factors that could play as triggers to induce OLP⁹.

Reactive oxygen species (ROS) are involved in the etiology and the pathogenesis of a variety of diseases in which ROS were involved in the initiation stage or are produced during its course^{2,6-9}. ROS are continuously produced in aerobic life; they are generated in vivo by multiple mechanisms, including the respiratory redox chain in mitochondria, the respiratory burst of phagocytes, and the activity of various oxidase¹⁰. The excess ROS are toxic to the cells it can damage cellular lipids, proteins, nucleic acids inhibiting their normal function¹¹. To defend such damage the body possesses several enzymatic and non-enzymatic antioxidant system that are important in the prevention of oxidative stress¹². Imbalance of the oxidant-antioxidant system resulting in excessive accumulation of ROS¹⁰. Several studies have evaluated salivary and blood level of oxidative stress markers in OLP patients and suggest that oxidative stress is implicated in the pathogenesis of OLP. The purpose of the present study was to evaluate the lipid peroxidation marker malondialdehyde (MDA) and anti oxidant enzyme superoxide dismutase (SOD) in the tissues of OLP to broaden the horizon related to its pathogenesis.

Materials and Method

The study was carried out in the Department of Oral & Maxillofacial Pathology, Faculty of Dental Sciences and Department of Biomedical Research, Sri Ramachandra University (SRU). The study group comprised of 10 subjects with OLP and 10 healthy subjects as the control group. The following inclusion and exclusion criteria were used to select the patients and controls for the study. The diagnosis of lichen planus was done after all patients were subjected to clinical and histopathological examination. Patients were selected based on histopathological evidence of lichen planus in biopsy specimens from the lesions. Subjects using tobacco, alcohol and any other medically compromised illness which may influence the antioxidant status were excluded from the study. The study was approved by the ethical committee of Sri Ramachandra University and informed consent was obtained from all of the participants prior to investigations.

Microscopic examination

Oral biopsies specimens were sectioned using a Semi-automatic Leica microtome and stained using the standard Hematoxylin-Eosin method (HE). Microscopic examination of tissue analysis was performed using Olympus Chi20 microscope equipped with image analyzer software.

Oxidant and Antioxidant Assays

The marker of antioxidant defense, antioxidant enzyme super oxide dismutase (SOD), was estimated based on the photometric determination of Kakkar P et al¹³ from the preserved oral tissue. The results were expressed in U/min/mg protein. The oxidative stress marker for lipid peroxidation, malondialdehyde (MDA) was assessed based on the photometric method of Ohkawa H et al¹⁴. The results were expressed in mg/gm of tissue.

Statistical analysis

The data were analyzed statistically using unpaired t-test. The correlations between the qualitative variables were analyzed by chi-square test. SPSS 15.0 statistical software was used to analyze all data.

Results

The average age group of the OLP patients was 45.6 ± 13.01

Histopathological sections showed parakeratotic stratified squamous epithelium with basal cell degeneration. The underlying connective tissue stroma showed juxta epithelial intense chronic inflammatory cell infiltration chiefly lymphocytes, plasma cells & dilated young blood capillaries suggestive of Lichen Planus.

The level of the antioxidant enzyme, SOD among the patients was found to be 5.35 U/mt/mg ptn while that of the controls was found to be 1.004 U/mt/mg

ptn (Table 1). The mean expression of MDA among the cases was found to be 44.657 $\mu\text{g/g}$ tissue while that of the controls was found to be 39.33 $\mu\text{g/g}$ tissue.

Median MDA levels were significantly increased in the tested group: 2.67 (0.26–3.40) vs. control group 0.44 (0.19–0.70). The simple comparison between groups has returned a value of 0.021. After age adjustment the difference was highly significant ($p < 0.0001$). GSH medium level was significantly decreased in patients tissue compared to controls: 2.3 (1.25–5.70) vs. 9.56 (6.5–12.5). Non-adjusted significance was $p = 0.005$. After the age adjustment, $p < 0.0001$ (highly significant).

Table 1: Comparison of mean expression value of SOD among the cases and controls

Parameter	Group	N	Mean	SD	p-value
SOD	Case	10	5.3500	6.97	0.000 (Significant)
	control	10	1.0040	0.399	

p-value is significant below the value of 0.05

Table 2: Comparison of mean expression value of MDA among the cases and controls

Parameter	Group	N	Mean	SD	p-value
MDA	Case	10	44.657	16.214	0.249 (Not significant)
	control	10	39.33	13.369	

p-value is significant below the value of 0.05

Discussion

Oxidative stress may damage cell membranes through production of lipid peroxides, as well as molecules such as nucleic acids, proteins and carbohydrate. To counter the deleterious actions of ROS, antioxidant enzymes are synthesized in response to higher production of ROS. Therefore, a study was undertaken to evaluate the levels of SOD and MDA in the tissue samples of oral lichen planus.

In this study a significant increase in SOD activity was observed in the tissue of Oral lichen planus patients with the mean value of 5.35U/mt/mg of protein as compared to the controls with the mean value of 1.004 U/mt/mg of protein (as shown in Table 1).

Similar studies were conducted by Sezer et al⁶, who concluded increase in serum SOD levels in patients with lichen planus as compared to the healthy controls.

SOD constitutes the first line of defense against oxygen derived free radicals by converting O_2^- to H_2O_2 . Due to accumulation of H_2O_2 , there is vacuolization of the basal layer in lichen planus. CAT is the main enzyme involved in the removal of H_2O_2 , which is generated by superoxide anion radicals by SOD.

There is an imbalance in the antioxidant status which may lead to accumulation of H_2O_2 , thus leading to basal cell degeneration seen in lichen planus. This is the reason for increased tissue SOD levels in lichen planus as compared to the healthy controls in our present study.

The protein value of the cases and controls were determined to assess the value of Malondialdehyde (MDA), which is a by-product of lipid peroxidation.

Malondialdehyde (MDA), a product of lipid peroxidation induced by reactive oxygen species (ROS) is well correlated with the degree of lipid peroxidation. MDA is an indicator of oxidative stress.

Lipoperoxidation, the primary reaction sites

of which involve membrane associated PUFAs of phospholipids can be a major manifestation of oxidative stress. In this study, although higher levels of MDA in the tissues of patients with Lichen planus (44.65µg/g tissue) were seen as compared with matched controls (39.33µg/g tissue) the statistical analysis of the same was found to be not significant (as shown in Table 2) which could be attributed to the smaller sample size.

In a study by Sezer et al⁶ in the serum involving 40 cases and 40 controls, a higher value of MDA in patients with Lichen planus with a mean value of 18.24µg/g tissue +/- 5.2µmol/L was obtained in comparison to that of the control group which is similar to the results obtained in the present study.

Studies done by Ines Dammak et al¹⁵, and Rai Balwant et al¹⁶ have also reported that higher levels of MDA were observed in the tissue of patients with lichen planus.

Rai Balwant et al.¹⁶ demonstrated elevated levels of MDA in cases with periodontitis (p-value of < 0.05) and concluded that free radicals had a role in the pathogenesis of periodontitis.

Lipid peroxidation can alter cell signaling or act as toxic second messengers that amplify damage. Such by-products include 4-hydroxynonenal, Malondialdehyde etc which induce apoptosis. This could explain the reason for apoptosis in lichen planus.

In our study, we found significantly higher levels of SOD, and relatively higher levels of protein and MDA in the tissue samples of oral lichen planus contributing to the pathogenesis of lichen planus. Further research with larger sample size are required to conclusively prove the role of oxidative stress and lipid peroxidation in the pathogenesis of lichen planus.

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Conflict of Interest: Nil

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A Case Series of Syphilis in Gender Incongruent Individuals Residing in an Urban Slum of a Metropolitan city: Are we letting down the Guard of Contact Tracing?

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Abstract

Introduction: In India, Sexually transmitted infections (STI) have variability in prevalence across different subregions and subpopulations practicing high-risk behavior (the gender incongruent individuals, commercial sex workers, truck drivers etc.). Prevalence of syphilis in gender incongruent individuals is a gray area due to stigma and discrimination associated with the diagnosis. Contact tracing is a boon in better handling the public health burden of STIs. The current case series is to highlight the resurgence of syphilis in gender incongruent individuals and to underscore the importance of screening and contact tracing for the same for public good.

Methods: Twenty one gender incongruent individuals testing positive for Syphilis with the Rapid Reagin Test (RPR) in a period of a year at the Malvani Urban Health Training Center (UHTC), Malvani Slum, Malad, Mumbai; were included in the study.

Results: The RPR titres ranged from 1:2 to 1:64. Out of these twenty one, 4 of them were found to be HIV co-infected. They were counseled and treated according to the standard guidelines. Contacts of partners whom they had intercourse with, in past 3 months could not be traced, as a result of which partner management couldn't be done.

Conclusions: Better patient awareness through counseling and incorporation of information technology can aid in tackling the problem of non compliance with contact tracing. Active screening for HIV should be done in patients with STI.

Keywords: Sexually Transmitted Infection (STI), Syphilis, Gender incongruent individuals, Human Immunodeficiency Virus (HIV), Contact tracing, Urban slum.

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Introduction

Sexually transmitted infections (STIs) are an important public health concern. They are associated with higher reproductive morbidity and also increase the risk of HIV transmission. Prevention and control of STIs is an important prevention strategy for controlling HIV epidemic. A remarkable decline in the STIs was observed after the national AIDS control program was launched. However, the situation still remains shady.

Globally, almost one million new cases of curable STIs are acquired each day¹. The estimates of low prevalence of STIs in Southeast Asia are countered by limited data availability¹. Annually, India reports population prevalence² of STIs such as syphilis, gonorrhoea and chlamydia in the range of 0–3.9%. Higher variability in prevalence is reported across different subregions and subpopulations practicing high-risk behavior^{3&4}. A steadily declining prevalence of syphilis among patients with STIs, pregnant women and high-risk groups is reported in India⁴. While the transmission efficiency of HIV is low, varying between one in 100 to one in 1000, syphilis occurs in one in 30 people who come in contact with a carrier.⁵⁻⁷

Prevalence of syphilis in gender incongruent individuals still remains a gray area due to stigma associated with diagnosis and inability to make daily wages since most of them are engaged in commercial sex work. The current case series is to highlight the resurgence of syphilis in gender incongruent individuals and to underscore the importance of screening and contact tracing for the same for public good.

The mainstay of public health efforts to stop spread of a particular disease is to identify the case of the contagious disease and follow chains of transmission from the diseased. Contact tracing aids in achieving this objective⁸. Prima facie, finding and tracing people who may possibly cause spread of the disease represents a dilemma between the public health security and rights of the diseased individual. If the disease individual refuses to reveal contacts or if the contacts become untraceable, contact tracing eventually fails. Contact tracing, a public health strategy, was developed for strategically managing

STIs such as syphilis and gonorrhoea. It gained a lot of importance during the COVID-19 pandemic. Though confidentiality and privacy are maintained in contact tracing, stigma, discrimination, finger-pointing or worse may result of the disease diagnosis in some societies.⁸ Gender incongruent individuals being the marginalized sections of our society are vulnerable for such experience, resulting in intentionally hiding the information of the contacts. This case series also highlights the importance counseling the gender incongruent individuals to be better responsible for their health and the health of the community at large.

Material and Methods

All the gender incongruent individuals testing Rapid Plasma Reagin (RPR) positive at the Malvani Urban Health Training Centre (UHTC), Malvani Slum, Malad(W), Mumbai; from May, 2020 to May, 2021 were included in this case series, after taking their informed consent. Their history was taken by the authors maintaining privacy and confidentiality.

Case description:

Twenty one gender incongruent individuals with mean age 31±9.5 years tested RPR reactive in the span of a year. Table no. 1 shows the symptomatology⁹ of the individuals being screened by RPR test.

Table 1: Symptomatology of individuals being screened by RPR test.

	Symptom	Frequency (N=21)
1.	Discharge from genitalia	00
2.	Lower abdominal pain	00
3.	Genital ulcer disease - Herpetic	00
4.	Genital ulcer disease - Non Herpetic	02
5.	Genital Warts	00
6.	Anorectal warts	00
7.	Urethral discharge	00
8.	Scrotal swelling	00
9.	Inguinal bubo	00

The RPR titres ranged from 1:2 to 1:64. Out of these, 4 were found to be HIV reactive. All of them were involved in commercial sexual activities;

meeting their sexual partners via mobile (including apps)/internet/railway platforms. Six of them gave history of anal intercourse and 15 of them gave history of oral intercourse with their partners. None of them indulged in group sexual activities. Genital and oral examinations of these patients were done, but no significant lesions were observed except for two. Non herpetic ulcer was found in two of them. None of them used condoms during sexual intercourse. Contacts of partners whom they had intercourse with, in past 3 months were not known, as a result of which partner management couldn't be done. All of them were treated with White Kit (STI Syndromic management, NACO) (Contents: Inj. Benzathine penicillin 2,4 MU + Tab. Azithromycin 1g single dose)

Discussion

As a routine protocol at our UHTC, contact-tracing of sexual partners of patients with STI is done. All patients with STI are interviewed by a medical officer after taking informed consent and maintaining confidentiality and privacy of the patient. We also emphasize on screening for HIV in patients with STI, after taking consent of the patient¹⁰. This is the reason why we could diagnose four of them with Syphilis-HIV Co-infection and treat them accordingly. It is thus important that Syphilis-HIV co-infection is given importance similar to TB-HIV co-infection and active screening for HIV is in patients with STI.

This case series highlights two striking facts, first: barrier method of contraception was not used during sexual activity and second: contact tracing failed miserably.

The patients were counseled to either inform their partners themselves, or provide us with the details of the partner. Unfortunately, neither was possible, because the patients apparently did not remember their sexual contacts/partners of the last three months. Non compliance with contact tracing may be attributed either to the stigma and discrimination associated with the disease⁸, or to negligence from patients' side. Better patient awareness through counseling can aid in tackling the problem. Also, information technology interventions may be incorporated for better contact tracing (for eg, 'Arogya Setu app' used for COVID-19 contact tracing.)

Conclusions

- This case series is a reminder to clinicians, and public health workers, that contact tracing is of utmost importance to curb the increasing feet of syphilis in gender incongruent individuals. Prompt medical intervention in the sexual contacts of those RPR reactive individuals, will help in successfully fighting the dark realities of Syphilis elimination.
- Active screening for HIV should be done in patients with STI. Potentiating research and improving syphilis-HIV co-testing could help in early detection of HIV patients, thereby ensuring timely management.

Acknowledgments: The authors express their sincere gratitude to all the study participants.

Abbreviations: UHTC: Urban Health Training Center; STI: Sexually Transmitted Infection; HIV: Human Immunodeficiency Virus; RPR: Rapid Plasma Reagin.

Ethical Clearance: Taken from Institutional Ethics Committee, Seth GSMC and KEM Hospital, Mumbai.

Conflict of Interest: Nil.

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Knowledge, Attitude and Practices Regarding Hepatitis B among Expectant Mothers Seeking Antenatal Care in a Tertiary Care Hospital in a Metropolitan City

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Abstract

Background: Mother-to-child-transmission (MTCT) is one of the common modes of Hepatitis B transmission. Though there is improved childhood Hepatitis B vaccination in India, MTCT accounts for about 50% of new Hepatitis B infection. Preventing MTCT is of utmost importance for decreasing the feet of Hepatitis B. Prevention requires expectant mothers to be aware of the disease and to understand the consequences of Hepatitis B transmission to their child. The study aimed to determine the knowledge, attitude and practice (KAP) towards Hepatitis B among the expectant mothers seeking antenatal care in a tertiary hospital in a metropolitan city.

Methods: After obtaining Ethics clearance from the Institutional Ethics Committee, this cross sectional study was conducted among 163 expectant women attending the outpatient and inpatient department of Obstetrics and Gynecology of a tertiary care centre. Data collection was done using a study questionnaire and analysis was done using IBM SPSS version 26.0

Results: Forty nine percent of the 163 participants were aware about hepatitis B infection. Only 7% were aware of mother to child transmission. Socio-demographic factors like age, education, socioeconomic status were statistically significantly associated with awareness regarding Hepatitis B, but the gravid status was not. None of the women were aware of the National Viral Hepatitis Control Program (NVHCP) launched by the Government of India and its provisions.

Conclusions: The need for creating awareness regarding Hepatitis B among expectant mothers exists, since a substantial number of females lack knowledge and positive attitude which reflects as poor practices towards Hepatitis B.

Keywords: Hepatitis B, Knowledge, Attitude, Practice, Expectant mother, National Viral Hepatitis Control Program.

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Introduction

Hepatitis B virus (HBV) infection is a significant health problem in India. Since India has one-fifth of the world's population, it possibly accounts for a large proportion of the worldwide HBV burden¹. It is estimated that 15 - 25% of these chronic hepatitis B cases are likely to suffer from cirrhosis and liver cancer and may die prematurely. The Government of India therefore, launched the National Viral Hepatitis Control Program (NVHCP) on the World Hepatitis Day (28th July 2018) with provision of free diagnosis and treatment for viral hepatitis through the National Health Mission¹. Mother-to-child-transmission (MTCT) is the major mode of HBV transmission worldwide, which is problematic since, around 90% of infected infants progress to chronic hepatitis B. This risk is much higher than from horizontal transmission where the rate of chronicity is 30± 50% when infected before 6 years of age and <5% when infected in adulthood¹⁻³. Despite improved childhood HBV vaccination worldwide, MTCT still accounts for about 50% of new HBV infections in high endemic countries and one-third in low endemic countries⁴⁻⁷. Therefore, preventing MTCT is crucial for decreasing HBV prevalence. Prevention requires HBV-infected mothers to be aware of their disease status and to understand the consequences of HBV transmission to their child. HBV infection in pregnancy is not only a problem for infants, but also for women's health⁸.

Hepatitis B vaccination is part of universal immunization program in India since 2002. Only 4% of women in childbearing age had heard about hepatitis B infection in Mumbai city.⁹ In this study authors aimed to assess the knowledge, attitude and practice of expectant mothers availing antenatal services at the selected tertiary care hospital in metropolitan city.

Methods

Study Design: Observational descriptive study.

Study Site: Obstetrics outpatient department and ANC ward of a tertiary care hospital in Metropolitan city.

Duration of Study: August, 2020 to August, 2021

Sampling method and sample size: Random sampling method (lottery method) was employed to choose the unit in Obstetrics and Gynecology department for the sake of feasibility. Complete enumeration of the ANC patients registered under that unit was done and included in the study. We included 163 expectant mothers fulfilling inclusion criteria using complete enumeration method.

- Inclusion criteria: Pregnant women seeking antenatal care on OPD basis or those admitted in the ANC ward of the tertiary care hospital during the study duration.
- Exclusion criteria: Critical ANC's admitted in MICU; those in labor.

Operational definitions:

Knowledge: information that the participants have about HBV and Hepatitis B.

Knowledgeable: study participants who correctly answered ≥ 50% of knowledge-related questions.

Not knowledgeable: study participants who answered <50% of knowledge-related questions.

Attitude: complex interaction of beliefs, feelings, and values to respond in a manner towards Hepatitis B.

Positive attitude: study participants who answered correctly ≥ 50% of the attitude-related questions about Hepatitis B.

Negative attitude: study participant who answered <50% of the attitude-related questions about Hepatitis B.

Practice: what the study participants actually practice for prevention and control of Hepatitis B.

Tool of assessment:

Study questionnaire: The purpose of the questionnaire was to assess the knowledge, attitude, and practice (KAP) of the participants towards Hepatitis B and its prevention.

Pre-formed pre-tested semi-structured questionnaire was used which was validated by the experts in the department.

The Questionnaire consisted of two parts:

Part 1: Demographic and socio-economic data: The demographic information related to age, education, employment, and family income was collected in this section.

Part 2: This section had questions seeking information about knowledge, attitude and practice related to Hepatitis B and its prevention.

Data collection: Data Collection was done after Ethics Clearance from the Institutional Ethical Committee. Privacy of the study participants was maintained by conducting the interview in a separate room.

Procedure:

- Step 1: After explaining the format of study to the women, informed consent was taken from them.
- Step 2: Collection of demographic details and detailed information about the knowledge, attitude and practices regarding Hepatitis B and its prevention was done using the study questionnaire.
- Step 3: Awareness about Hepatitis B and its prevention was created in the women.
- The entire data collection took 15-20 minutes of time of the study participants. .
- Statistical analysis: Questionnaire data was coded and entered into computer using Microsoft Excel and analysis will be done using IBM SPSS 26.0

Results

A total of 163 expectant mothers gave informed consent to participate in the study. The mean age of the participants was 23.35±3.63 years.

Table 1. Distribution of study participants according to educational status.

Education	Frequency(n)	Percentage (%)
Illiterate	10	6.1%
Primary	33	20.3%
SSC	73	45%
HSC	35	21.5%

Graduate and above	12	7.1%
Total	163	100

Out of the 163 study participants, 96 (59.8%) were Hindus, 47 (28.83%) were Muslims and 20 (12.5%) were Christians.

Table no. 2. Distribution of women based on Socio-Economic Status

Socio-Economic Status (Modified B.G. Prasad class)	Frequency (n)	Percentage (%)
Class II	12	7.4
Class III	98	60.1
Class IV	53	32.5
Total	163	100

Knowledge regarding Hepatitis B infection and its prevention: The maximum score obtainable in this section was 36 and the minimum was 0. For the study participant to qualify as a knowledgeable participant she had to score a minimum score of 18 or above. Out of the 163 study participants, 43% (n=70) had knowledge regarding Hepatitis B. Healthcare workers were the most common source of information for them. (68.9%) of the participants did not know the availability of vaccine against HBV, while 151(n= 93%), 142 (87.1%), 134 (82%) of them did not know the transmission way of HBV from mother to child, through contaminated blood, and through unsafe sex, respectively. Most of the participants (n= 153) wrongly responded that HBV is a bacteria. Very few knew (n=71) that it infects the liver. None of the women were aware of the National Viral Hepatitis Control Program (NVHCP) launched by the Government of India and its provisions.

Attitude and practices towards Hepatitis B infection and its prevention: In the attitude section of the question, there were a total of 10 questions. A score of 5 or more was considered as a positive attitude. Of the total participants, 52 (32%) were having positive attitude. Thirty three study participants believed that they could get infected with hepatitis B. Only 21 study participants would insist on safe equipment and blood/blood products. Co-habiting, working or sharing food/utensils with Hepatitis B infected persons was a matter of concern

for 68 study participants (42%). Thirty-four percent were aware that they had been screened for hepatitis B infection during their antenatal care visit. Most of them, 73% were ready to give the Hepatitis B vaccine to their child to protect against hepatitis B infection, if the vaccine is available and is safe to be given as per recommendation of the doctor. Forty nine percent (n=80) of the study participants felt that breastfeeding

should not be avoided by Hepatitis B affected mother.

A consolidated score of 24 or more was considered as an overall satisfactory KAP score. There were 81 (49.6%) women who had satisfactory KAP score. Of these 81 expectant women, 56 were primigravidae, 17 were second gravidae and 08 were multigravidae.

Table 3: Correlation between age, Socio-economic status and education with overall KAP score.

Variables	KAP score	P value	Statistically significant
	Correlation coefficient		
Age	Pearson Correlation coefficient = 0.314	0.007	Yes
Socio-economic status	Pearson Correlation coefficient = 0.457	0.003	Yes
Education	Spearman's rho Correlation coefficient =0.574	0.002	Yes

Spearman rank correlation showed significant positive correlation between knowledge-attitude/practice ($r=0.403$, $p=0.0002$) which highlights the fact that better the knowledge, good will be the attitude and practice.

Discussion

This study highlights that only 49% of the expectant mothers availing antenatal care facility at the tertiary care center in a metropolitan city are aware of Hepatitis B. About 43% had knowledge of effects of hepatitis B on health, transmission, signs and symptoms, treatment and preventive modalities. The findings of our study are in contrast from other.⁹⁻¹¹ This may be attributed to the fact that the study participants seeking care in tertiary care center have better access to healthcare and therefore are better aware. Primigravid women were contrastingly more aware than multigravida. This may be attributed to the fact of missed opportunity to create awareness in them at earlier points of contact.

It was alarming to note that awareness regarding the two most common modes of hepatitis B transmission - mother to child and sexual was only 7% and 18% respectively.

Universal screening of all pregnant women for Hepatitis B infection to reduce MTCT is recommended by WHO.¹¹ All expectant mothers are screened for Hepatitis B during their very first visit, as routine protocol. Still, only 34% of the expectant

mothers knew that were screened for Hepatitis B and that their status was negative for the same.

More than 85% were hesitant to work or share food/utensils with other hepatitis B patients. Most of them (94%) were worried about their child if they were to be with another child with hepatitis B infection at school. This may be due to wrong belief that HBV is transmitted through casual contact like touch, cough (47%) and fear of isolation in the society (88%). Thus, this study highlight the stigma attached to the disease prevalent in the minds of the expectant mothers. Similar beliefs about hepatitis B being transmitted by sharing food/utensils (52%) and that other chronically infected hepatitis B patients are risk to other persons (61%) are reported from Vietnamese studies.¹⁰

Awareness that Hepatitis B is a vaccine preventable disease and that immunizing their children can help them save their lives is evident from the fact that more than 70% of participants were willing to give Hepatitis B vaccine to their child. None of them were aware of the National Viral Hepatitis Control Program (NVHCP) launched by the Government of India and its provisions. The reach of the program to the grassroots needs to be potentiated in order to have the desired outcomes of the program.

Correlation studies showed that greater knowledge and understanding of hepatitis B was strongly associated with good attitude/practice^{12&13}.

Awareness regarding hepatitis B was better in those with higher education^{3,12&13}. Those with higher education are known to have better access to resources and also self-understand things better. These findings underline the necessity to have tailor-made awareness programs for Hepatitis B prevention and control which may be rolled out to the expectant mothers during their routine antenatal care visits.

Conclusion

A dire need to create awareness regarding Hepatitis B in expectant women is highlighted by the study. None of the study participants were aware of the National Viral Hepatitis Control Program (NVHCP) launched by the Government of India and its provisions for the beneficiaries.

Recommendations:

Awareness sessions should be conducted; structured information-education-communication (IEC material) regarding Hepatitis B needs to be displayed for the expectant women attending the tertiary care centers. Also, awareness regarding NVHCP and its provisions needs to be done. Further studies are needed to assess the effectiveness of the above stated recommendations.

Ethical approval: The study was approved by the Institutional Ethics Committee

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Conflict of interest: None

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Clinicopathologic Significance of Atypical Glandular Cells in Cervical Cytology Smears: A five years Retrospective Study in a Tertiary Care Hospital

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Abstract

Introduction: Cervical cancer is the fourth most common cancer among women. Recently the incidence of cervical adenocarcinoma has been increased significantly on the contrary to the decreasing incidence of cervical squamous cell carcinoma. Routine screening of cervical cancer by cervical smear cytology study to detect the pre-invasive lesions carries a significant role in reducing the incidence and mortality rate of cervical cancer.

Objective: The aim of our study was to analyze the prevalence of Atypical Glandular Cells (AGCs) detected in cervical smear screening, the follow up histopathological outcome and their clinical significance.

Materials and Methods: This was a retrospective study done in College of Medicine and Sagore Dutta Hospital, Kolkata over a period of 5 years from June 2017 to June 2022. Patients detected with Atypical Glandular cells (AGCs) in cervical smears and having records of follow up histopathology reports were included in this study. The cases of AGCs in which the follow up histopathological reports were not available were excluded from the study.

Result: The prevalence of atypical glandular cells were 0.57%. Out of the total 10,950 cervical smears examined AGCs were found in 63 cases (0.57%). Out of 63 cases of AGCs subcategorization was done (according to TBS 2015) which showed AGC not otherwise specified (AGC-NOS) in 46 cases (0.43%) and AGC Favoring Neoplasia (AGC-FN) were seen in 15 cases (0.13%). Both AGC -NOS and AGC-FN showed various pathology ranging from reactive, metaplastic, benign to, in situ/Invasive carcinomas.

Discussion: One of the major concern of AGC is that the cytological findings which characterize it have poor reproducibility between observers leading to interobserver variability. Due to the reported risk of premalignant and malignant lesions in AGCs it bear a great clinical significance and need for further histopathological correlation.

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Conclusion: Due to very low incidence of AGCs and the risk of malignancy associated with it multiple histological evaluation methods required for earlier diagnosis and management of the malignancies detected on histologic follow up.

Key Words: Cervical smear, Atypical Glandular Cells, histologic follow up, Bethesda System.

Introduction

Cervical cancer is the fourth most common cancer among women globally, with an estimated 6,04,000 new cases and 3,42,000 deaths in 2020. ¹ The incidence of cervical cancer has been reduced in many countries due to the widespread cervical cytology screening. The mean annual % decrease in the average age adjusted range from 1.81% to 3.48%. ² The risk of cervical cancer due to squamous cell abnormalities as detected on cervical cytology is widely accepted. ³ The risk of cervical cancer associated with the abnormalities of cervical glandular cells are still uncertain. ⁴

On the contrary to this the incidence of cervical adenocarcinomas have significantly increased where as cervical squamous carcinomas show a decreasing incidence. ⁵ The decreasing incidence of SCC is probably related to its early recognition at its precursor stage (Squamous intraepithelial lesions) by effective screening programs .

In the new 2001 Bethesda system the term Atypical Glandular Cells of undetermined significance has been replaced by the term Atypical Glandular Cells (AGC) ⁶ with the subclassification of AGC not otherwise specified (AGC NOS), AGC – favor neoplasia(AGC- FN), Adenocarcinoma In situ (AIS) and adenocarcinoma. AGCs are uncommon diagnosis with a screening incidence between 0.08 to 2.1%. ⁷ Now a days one of the major challenge in gynecologic cytopathology is accurate interpretation of AGC in cervical PAP smears for early detection of glandular neoplasia of the female genital tract.⁸ AGC in cervical cytology include conditions ranging from reactive, inflammatory to dysplasia and malignancy. Due to this, the presence of AGCs in cervical cytology smear are very important and carries a great clinical significance.

AIMs & Objectives

The aim of our study was to analyze the clinicopathologic significance of AGCs detected in cervical smears and their various histopathologic follow up outcomes.

Materials and Methods

Study design and place of study

This was a retrospective study done in a tertiary care hospital college of Medicine and Sagore Dutta Hospital, Kolkata.

Duration

The study was conducted over a period of 5 years (June 2017 to June 2022).

Case Definition

(AGCs in cervical cytology smears were subcategorized according to the Bethesda System 2014.

(a) Definition of AGC NOS

Cells resembling endocervical cells with nuclear atypia, that exceeds a reactive or reparative process but lack unequivocal features of endocervical adenocarcinoma in situ or invasive adenocarcinoma.

(b) Definition of AGC, FN

Glandular cells with morphology either quantitatively or qualitatively falls short of interpreting as endocervical adenocarcinoma in situ or invasive adenocarcinoma.

Inclusion Criteria

The women whose cervical cytology smears show AGC(NOS, FN) (Categorized according to the Bethesda 2014) along with available histopathology follow up reports were included in this study.

Exclusion Criteria

The women whose cervical cytology smears show AGCs but follow up histopathology reports not available were excluded from this study.

→ Cases interpreted as AGC on PAP test in cervical smear from June 2017 to June 2022 were retrieved from cervical cytology records of our department of pathology.

→ All the documented histologic follow up such as endocervical curettages, cervical biopsies cervical excisional biopsy, endometrial curettage and biopsies were collected from the histopathology record of our department.

→ The parameters retrieved from medical records in the obstetric and Gynecologic department of our institution included the patients age at the AGC interpretation, follow up procedures, the time interval from the PAP smear study to the colposcopic examination and cervical biopsy, HPV testing.

Ethical Consideration

The study was approved by the Institutional Ethics Committee (IEC) of our institute.

Statistical Analysis

All the data were analyzed and represented as number and percentage by using software SPSS version 20.0. P-value < 0.05 was considered statistically significant.

Result

The total numbers of cervical smears examined over the period of 5 years in our hospital were 10,950. Out of this AGCs were detected only in 63 cases (0.57%). Out of the 63 cases of AGC, 48 cases were diagnosed as AGC NOS (0.43%) and 15 cases were diagnosed as AGC, FN (0.13%). Subcategories of AGC along with their clinical presentations were described in Table-1.

Histologic follow up of patients with AGC NOS and AGC FN were described in Table-2 and Table-3 respectively. Various interventions such as colposcopy, USG, HPV testing which the women detected with AGCs had undergone was described in Table-4.

Table-1: prevalence of AGCs subcategories in different age groups and their clinical presentation.

n-63

	AGC NOS (n=48, 76.19%)	AGC FN (n=15, 23.8%)
A) Age group		
i) 30-39 years	28 (58.33%)	3 (4.76%)
ii) 40-49 years	11 (17.46%)	4 (6.34%)
iii) ≥ 50 years	9 (14.28%)	8 (12.69%)
B) Clinical presentation		
i) Abdominal pain	11 (17.46%)	6 (9.52%)
ii) Vaginal discharge	34 (53.96%)	9 (14.28%)
iii) Spotting/vaginal bleeding	3 (4.76%)	12 (19.04%)

Table 2: Histologic Follow up Results of 48 patients with AGC-NOS.

n=48

Sl. No	Histology	Number	Percentage
1	CIN-1	6	12.5%
2	CIN-2 & CIN-3	4	2.4%
3	AIS	2	0.8 %
4	AC	1	0.6 %
5	Endometrial hyperplasia	1	0.6%
6	Ovarian Malignancy & Metastatic Carcinoma	0	0 %
7	Endometrial carcinoma	0	0%
8	Benign	31	64.58%
9	Difficulty in diagnosis	3	6.25%

Table 3: Histologic follow up of 15 cases of AGC, FN.

Sl. No	Histology	Number	Percentage
1	CIN-1	1	6.6%
2	CIN-2/CIN-3	2	13.3%
3	AIS	5	33.3 %
4	AC	3	20 %
5	Endometrial Carcinoma	1	6.6 %
6	Metastatic Carcinoma	1	6.6 %
7	Benign	2	13.3 %

Table 4: Various other interventions the patients detected with AGC had undergone.

n=63

Interventions	Number	Percentage
1.Colposcopy	Abnormal findings seen in 26 cases	41.26%
2.Abdominal USG	Endometrial pathology - 2 cases	3.17%
	Adnexal SOL -1 case	1.58%
3.HPV testing	3 (Available)	4.76 %
4.Repeat cervical smear study	3	4.76%

Discussion

The Bethesda system of reporting of cervico-vaginal cytology was initiated at the National Institute of Health in Bethesda Maryland.^{9,10} In December 1988. Recently an update has come up that is TBS-2014 update.¹⁰ In our study all the cases of AGC were studied and categorized according to the TBS-2014 guidelines.

Atypical Glandular Cells (AGC) in cervical cytology smears (PAPs) are diagnosed when the glandular cells show nuclear atypia that exceeds reactive or reparative changes but do not exhibit the characteristic features of Adenocarcinoma In situ(AIS) or Invasive Adenocarcinoma (AC).¹¹

AGC are classified into the following Sub categories.¹⁰

- Atypical Endocervical cells (NOS or Specify in comments).
- Endometrial cells (NOS or specify in comments).
- Glandular cells (NOS or specify in comments).
- Atypical Endo cervical cells favor neoplastic
- Glandular cells favor neoplastic.

One of the major concern of AGC is that the cytological findings which characterize if have poor reproducibility between observers leading to interobserver variability .¹²

According to SF Derchian et al there is a poor correlation between initial Pap smear results of AGC with that of final histopathology report, which might be because of various factors affects the histopathological outcomes of AGC on pap test.¹³

The incidence of AGC has been reported to be 0.48%.³ The malignancy rate of AGC have been reported to be 2.8-9.7%.³ Due to the reported risk of precancerous and malignant lesions of AGC in cervical cytology, if bears a great clinical significance and need for further histopathological correlation.¹⁴

Following the Bethesda System guideline 2014 in our study all the cases were categorized as follows.

In our study out of 10950 cases AGC detected in 63 cases (0.57%). The sub-categorization of AGC in our study were AGC-NOS (n=48, 0.43%) and AGC-FN (n=15, 0.13%).

In our cases majority of the patients subcategorized under AGC-FN were > 50years age, with the complain of vaginal discharge. 34 cases from AGC-NOS patients and 12 cases from AGC-FN patients complained of vaginal discharge with a percentage of 53.96% and 19.04% respectively.

According to the guidelines of the American Society for colposcopy and cervical pathology (ASCCP) 2019¹⁵ Women diagnosed with atypical glandular cells (AGC) on cytological smears have to undergo a series of interventions for proper clinical management, such as -

Colposcopy for abnormal clinical findings.

Colposcopy guided cervical biopsy.

Endocervical curettage

Since the precise discrimination of the cells of AGC (endocervical or endometrial) endometrial sampling along with colposcopy guided cervical biopsy and endocervical curettage is recommended in women aged ≥ 35 years. (According to the guidelines of the ASCCP).¹⁵

In our study all women aged ≥ 35 years detected with AGC has undergone cervical biopsy & endocervical curettage along with pelvic examination, USG and endometrial biopsy.

In women < 35 years if AGC detected a repeat cervical smear testing done before any further investigation.

On cervical biopsy and endocervical curettage if the histopathology report show any one of the following features such as reactive, metaplastic, inflammatory lesions if needs no further evaluation. If the histopathology report shows presence of SIL (LSIL or HSIL) or AIS they have to undergo a standard established protocol for follow up (after conization) such a colposcopy, repeat PAP smear testing, HPV testing with an interval of 6 months. In our study on histopathology follow up the 48 cases of AGC-NOS shows the following diagnosis as - CIN 1 (6,12.5%), CIN 2 &3(n=4, 2.4%), AIS (n=2, 0.8%), AC(n=1, 0.6%), endometrial hyperplasia (n=1, 0.6%), benign (Reactive, metaplasia) (n=31, 64.58%) and in 3 cases (6.25%) there were difficulty in diag. Out of 15 cases of AGC -FN show the following diagnosis. [IN 1 (n=1, 6.6 %)], CIN 2/3 (n=2, 13.3%), AIS (n=5, 33.3%), AC (n=3, 20%). Endometrial Ca (n=1, 6.6%), metastatic carcinoma (n=1, 6.6 %) and benign lesions (n=2, 13.3%).

Since the glandular abnormalities have a tendency to extend high into the cervical canal and to develop skip lesions, identification and accessibility of these lesions on colposcopy is a critical challenge.¹⁶

In our study the abnormal finding on colposcopy was seen in 26 cases (n=26, 41.26%). This is due to the co-existence of HSIL with AGC which is similar to the study by KE Sharpless et al which stated that it is the abnormalities of the squamous component which is identified on coloscopy.¹⁷

HPV testing

Result of HPV testing is available only in 3 cases (4.76%).

Limitation of the study

One of the important limitation of the study was small sample size due to low incidence of AGCs on pap test.

There were very low number of results of HPV testing available.

The ancillary studies like high risk HPV testing and cell block preparation of cervical cytology specimens were not available, which might help to improve diagnostic accuracy of AGC specially in the cases of associated squamous abnormalities & could be helpful in better clinical management of these women.^{18,19}

Conclusion

Since AGCs include a wide variety of conditions which range from reactive conditions to dysplasia to carcinoma and due to very low incidence of AGC multiple histological evaluation methods required (following PAP test) for earlier diagnosis and management of the malignancies detected on histologic follow up.

Conflict of Interest- None.

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Contribution of the authors- All authors having equal contribution.

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Rapid Slide Culture Technique for *Mycobacterium Tuberculosis* and Predictors of Poor Outcomes among Pulmonary Tuberculosis Patients

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Abstract

Tuberculosis (TB), a dreadful disease known to mankind continues to be a problem in a developing country like India. The incidence of people getting infected with TB is on the rise due to compounding factors like coinfection with the human immunodeficiency virus and multidrug-resistant strains. There is a definitive need for early diagnosis and treatment of TB to curb transmission of the infection. Direct smear microscopy, though cheap and rapid, lacks sensitivity. Isolation of *Mycobacterium tuberculosis* in culture requires a long time, because of which there is a need for a rapid method which has good sensitivity and specificity for the detection of *M. tuberculosis*. Hence the present study was undertaken to determine Performance of rapid slide culture method for confirming pulmonary tuberculosis in clinically suspected and smear positive cases and also to assess the factors responsible for poor outcomes in the study population

Key Words: Tuberculosis, Early diagnosis, Rapid slide culture method, Poor outcomes.

Introduction

In 2020 and 2021, the coronavirus pandemic had huge medical, social, and economic implications. This includes the number of people diagnosed with tuberculosis (TB) and reported as TB cases, as well as the availability of and access to necessary TB services.¹ Years of progress in eradicating tuberculosis have been stalled by the COVID-19 epidemic, and TB fatalities have risen for the first time in over a decade. More individuals died from tuberculosis in 2020 than

in 2019, with fewer people being identified, treated, or given TB preventative therapy, and total spending on key TB treatments declining. Despite the fact that tuberculosis (TB) is a preventable disease, it is one of the top 10 causes of mortality worldwide.^{2,3}

Bacteriological examination of the clinical specimens plays an important role in the diagnosis of any mycobacterial infection, more so for TB. The widely used acid-fast smear (Ziehl Neelsen stain) for the demonstration of the acid-fast bacilli, though rapid

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and simple to perform, has a low sensitivity, especially for single and paucibacillary specimens. Also, it cannot differentiate live bacilli from inactive or dead bacilli. A definitive diagnosis of active Mycobacterial infection therefore depends on the isolation and identification of mycobacteria from the clinical specimen, by culture. Traditional or conventional methods for mycobacterial culture utilize media containing egg or potato base (Middlebrook 7H10 or 7H11) or albumin (Lowenstein - Jensen medium, LJ). Although these media support the growth of mycobacteria, several weeks (2-8 weeks) of incubation maybe necessary before the growth can be detected. This duration may further be prolonged in the case of paucibacillary specimens. Robert Koch was the first to employ coagulated human serum in a rapid slide culture (RSCJ technique). The 'gold standard' for TB laboratory diagnosis is mycobacterial culture. Lowenstein-Jensen medium (LJ) is an egg-based solid media that is cheap yet takes weeks to culture.⁵ Liquid media culture, such as Middlebrook 7H12 in MGIT tubes, is quicker but costlier. The rapid slide culture (RSC) technique is an ancient technology that is gaining popularity again due to its low cost and speed.^{4,6} Dickinson and Mitchison described a new slide culture technique that was rapid, simple, and safe but required the use of a fluorescent microscope. We have modified the above technique to obtain similar results with the use of a bright field microscope¹⁶. Rapid slide culture is a sensitive, economical, and rapid method for diagnosis. This method uses human blood medium and an incubation period of seven days. The method was successfully followed by *Jena et al.* Considering this background, we modified the growth detection approach and utilised Middlebrook 7H9 broth instead of human blood medium as the RSC culture medium in this work. We wanted to see if this novel RSC approach might be used to identify pulmonary tuberculosis quickly when compared to conventional LJ medium culture.^{6,7}

Materials and Methodology

The study was carried out on a total of 40 AFB positive sputum samples collected from patients diagnosed with pulmonary tuberculosis. The samples received in Laboratory of Microbiology, JSS Hospital, Mysore. Among the 40 positive samples, the majority

of them (77.5%) were male and 22.5% were female. Also, the collected samples were divided into three groups according to their age. Group I were people of the age 21- 40, group II included people between 41- 60 years and above 60 years was considered as group III. Among the 40 samples, 20 belongs to group I, 14 of them belonged to group II and 6 of them belonged to group III. The majority of the cases were from the first group which accounted for about 50% of the total cases evaluated. There were no samples from less than 20 years age group for the study.

For the screening of samples did the ZN staining (Gabblet's method) and gave the grading according to RNTCP guidelines for grading ZN-stained sputum smears. After Screening The samples were decontaminated by using NALC method. 100 ml of RSC media (90 ml of Middlebrook and 10ml OADC growth supplement and 1 ml of 0.04% malachite green) was taken in a beaker and kept for autoclave sterilisation at 121°C for 30 minutes. The media was incubated overnight for determining the contamination. If the media turns out to be contaminated after incubation, they were discarded immediately. If there was no evidence of contamination, the media was then poured into different coplin jars. Coplin jars were sterilised in hot air oven at 160°C for 2 hours. 30 ml of the media was poured into one coplin jar and sealed with parafilm. RSC media was prepared before one day of sample processing and stored at 8 °C. For one sample, four RSC were prepared. The slides were first sterilised placing in a petri dish plate by using hot air oven at 160°C for 2 hours. The sediment collected after centrifugation was taken for smear preparation. One smear (1cmx2cm) was made on lower 1/3rd of the slide. Smears were prepared for each sample without heat fixing. Then the smears were put into coplin jars containing RSC media. Only one slide was kept in one jar in a slanting position. The coplin jars were sealed with parafilm and put for incubation at 37°C. Coplin jars were observed after 3,6,9,12days respectively. On the particular day, the turbidity of RSC media was noted. The slides were taken out with the help of forceps and heat fixed. The media left out in the coplin jar was then decontaminated using autoclave. After heat fixation, ZN staining was performed. It was then observed under light microscope by oil immersion lens for detecting the growth of MTB. To obtain pertinent data, a pre-designed data sheet was

employed. The data collected was used to investigate probable predictors of poor outcomes in pulmonary TB patients.

Results

Rapid slide culture technique for mycobacterium tuberculosis

72.5% samples showed no increase in growth at the end of 3rd day, At the end of 6th day, 1+ grading was observed in a smaller number of samples compared to 3rd day. 22.5% samples reported 1+, maximum grading was given to 2+ and 3+ which was about 30% and 35% of cases respectively. At the end of 9th day, 1+ was observed in comparatively less samples which was 17.5% of the total cases. 42.5% samples showed 2+ grading and 17.5 % samples showed 4+ grading. The least observed grading was 1+ followed by 3+ which accounted for about 22.5% of the total samples evaluated. At the end of 12th day, 1+ grading was observed the least. It was seen in only 10% cases. The maximum samples reported for a 4+ grading compared to other days. 7.5% samples reported 4+, 30% reported 3+ and 32.5% reported 2+.

The number of samples that reported 4+ grading kept on increasing when evaluated after incubation on consecutive days. Maximum number of samples reported 4+ grading after the 12th day. To conclude, 62.5% samples showed growth of different grading at the end of 12th day. Whereas, 37.5% samples no growth even at the end of 12th day. (Table 1)

Table 1: Showing RSC growth at the end of 12th day

RSC growth	n	%
Positive	25	62.5
Negative	15	37.5

The number of bacilli in 20 OIF was observed at the end of 3rd, 6th, 9th and 12th days. The number showed an increase in each of the respective days. The maximum number of bacilli was thus noted at the end of 12th day (Table II).

Table 2 showing Increase in number of bacilli

	Mean number of bacilli	SD
3 rd day	54.5	12.02
6 th day	127.5	10.6
9 th day	276	90.5
12 th day	430	98.99

Predictors of poor outcomes among pulmonary tuberculosis patients

Among 40 patients, majority reported cough as the primary symptom for them to visit a health centre. Other reported symptoms included weight loss (57.5%) and weakness (90%). Fever and night sweating was also reported by some. 95% people who were tested positive depended on government hospitals and health centres for treatment and medicine. Only a very few consulted private doctors or clinics. Many people had to travel long distances to reach government hospitals.

The major difference noted between patients who visited government hospitals and private hospitals was the lack of knowledge and awareness they had about TB and its consequences. The people who consulted government centres were unaware about the type of TB, their HIV status and also about the kind of diet supplements like fruits and vitamins that they should be taking. Whereas the people visiting private hospitals for their treatment responded well about their condition and the diet that they were following.

But the main reason for people to depend on government hospitals is the free treatment including consultation and medicines. Because most of the people were from financially backward category which gave them no option other than to rely on government services for such treatments. Government centres should also include more awareness to people in their treatment method which can make people conscious about the condition and also educate other people around them.

The disease has made people either to quit their jobs or to depend on other family members for their

living. Most of the people belonged to BPL category and only earned 300 – 500rs per day initially. After the pandemic, since many people lost their jobs and many couldn't work, made the condition more miserable for the patient and their family to live.

Majority of the patients were male (Table I), and were the primary income earners in their household. Also 50% of the cases belonged to 21-40 age group where young men were forced to leave their jobs and married men had to survive and look after their children without any income.

Lack of awareness has very major role in the poor outcomes reported. People living in a 5 minutes walking distance from the hospital has also not consulted any doctor with history of one year of cough and weight loss. Such situations can only be avoided in the future with frequent awareness and increased screening for TB which should be arranged by all the hospitals together.

Discussion

Despite advances in care and diagnosis, tuberculosis remains a major public health concern, particularly in developing countries. Even though tuberculosis is an avoidable disease, the alarming news is that the number of new tuberculosis cases has not dropped. In India, tuberculosis has been a serious public health issue with negative social and economic effects.⁸ The rise of antibiotic resistant strains, particularly MDR TB, has exacerbated the problem. Increased HIV infection, inadequate tuberculosis management, and laboratory inefficiencies in diagnosing M. Tuberculosis are all contributing causes to the recent MDR TB outbreak and its continued growth.⁹ The fast and accurate identification of infected persons is critical to its control. Microscopy detection of acid-fast bacilli is the simplest rapid diagnostic approach. The gold standard for diagnosing pulmonary tuberculosis is a conventional culture, although it takes several weeks to turn positive. As a result, a faster, less expensive, and more effective approach has been devised.¹⁰ The current study focused on active pulmonary tuberculosis with a positive direct smear, whereas prior investigations included both negative and positive direct smear cases. The results were based on four sets of RSC. One on the 3rd day, one on the 6th day, one on the 9th day, and one on the 12th day,

respectively. These extra processes can also improve the RSC's sensitivity as compared to other media such as LJ. The translucent Middle Brook 7H9 medium employed in this work is fairly inexpensive, as is the malachite green utilised to prevent contamination. RSC is more sensitive and specific for Mycobacterium TB growth than many other studies, which makes it more sensitive and specific for *Mycobacterium tuberculosis* growth. In the current trial, RSC took 6-12 days to complete. Rapid slide culture has the advantage of allowing colonies to be viewed without the need of an inverted microscope, and results can be obtained in as little as seven days. Rapid slide culture has proven to be a quick, low-cost, and effective way to identify tuberculosis.¹² When it comes to examining the poor outcomes of people with pulmonary tuberculosis, those who had a poor understanding of the disease had a higher probability of having a poor treatment outcome than those who had a strong understanding.¹³ Fatiregun AA et al¹¹ also reported this observation. The bulk of the patients in the current study were men. It could be due to the fact that women from lesser socioeconomic and educational backgrounds do not prioritise their health, or it could be due to the fact that women's health is undervalued. Men who are financially self-sufficient are given preferential treatment, whereas women who rely on other family members for financial support are often neglected. As a result, while the study included more men, it is impossible to establish that men are more afflicted.¹⁴ Knowing the elements that influence treatment success will lead to the implementation of specific PTB management techniques that may help to reduce treatment failure.¹² Unsuccessful treatment outcomes could also be due to other circumstances, such as the patient's age, unemployment, and the financial hardship of continuing therapy, or a patient from a bigger family who is responsible for the entire home. In this study, several such situations were encountered, and comparable findings were also reported by Tekkel M et al¹³. Low income is linked to unemployment and bigger family sizes. Malnutrition is common among low-income patients, which can lead to increased treatment side effects and decreased stamina, as well as poor adherence, mortality, or abandonment of anti-TB chemotherapy. Poverty was identified as one of the key risk factors for tuberculosis in a study conducted by Belo MTC et al¹⁴ in Brazil. The majority of TB patients in our study came from low-income families. Another study, which agreed with this one, found that unemployment was strongly linked to a poor treatment outcome.¹⁵

Conclusion

When compared to other culture methods, the current study produced good RSC findings. RSC was only slightly more expensive than culture in L-J medium, and it had a significant advantage over both L-J and MGIT in terms of turnaround time. As a result, RSC should be further investigated to see if it can meet the great desire for a quick, sensitive, and low-cost culture approach in resource-constrained environments. The strength of this study is its capacity to gather verifiable data from TB patients in order to establish treatment outcomes. We were able to generalise our findings after studying 40 patients at random. Older age, larger family sizes, unemployment, and a lower educational background were identified as predictors of failed treatment outcomes. Following this finding, we recommend that patients who are at high risk of a poor treatment result be identified early and provided more follow-up, as well as a combination of medical care and social support.

Ethical Clearence: This current study is approved by the Institutional ethics committee of JSS Medical college and Hospital, JSSAHER, Mysore.

Source Of Funding: Self

Conflict Of Interest: Authors declare no conflict of interest.

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A Cross-Sectional Study on Quality of life and Stress among Nursing Students in Central Karnataka

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Abstract

Introduction: Various studies have shown higher levels of stress and lower quality of life (QoL) among healthcare students compared to others. This study was done to assess the quality of life and perceived stress levels among nursing students and correlation between them. The symptoms in case of stress and coping strategy for stress were also studied.

Methodology: All students studying in a nursing college in Central Karnataka were interviewed. WHO Quality of Life-Bref (WHOQOL-BREF) scale and Perceived Stress scale (PSS-10) were used to assess the Quality of life and perceived stress levels respectively.

Results: 175 students participated. Psychological domain and environment domain scores (55.6 and 53.8 respectively) were lower. Significant negative correlation was observed between all the domains of Quality of life and Stress scores. Majority (81.7%) of nursing students were under moderate stress.

Conclusion: Efforts should be made to improve the Quality of life of nursing students. Effect of various better coping methods for stress should be researched and taught to them.

Key Words: Quality of Life, Stress, Coping strategy, nursing students.

Introduction

WHO defines Quality of Life as “an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”. Many physical, psychological, social, demographic, environmental factors affect quality of life.¹

Psychological stress, as defined by Lazarus and Folkman (1984) is “a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being”.² Various studies have found higher stress levels among students, and still more among students in healthcare field. Various socio-demographic, college related

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factors are associated with stress.³⁻¹⁰ There are lesser number of studies in this area in India. Hence, the present study was done to assess the quality of life and perceived stress levels among nursing students and correlation between them, to find out various symptoms experienced in case of stress and coping strategies used by students in case of stress. This can help administrators, college managements to address the factors to improve quality of life and decrease stress levels among nursing students.

Methodology

After obtaining institutional ethics committee clearance, this study was conducted among nursing students studying in SJM Institute of Nursing Sciences, Chitradurga, Karnataka from August to September 2022. Permission from the head of the institution was taken. Universal sampling was done. The purpose of the study was explained and a pre-designed self-administered questionnaire was sent to all the students via google forms. The responses from all those students who consented to participate in the study and returned fully filled questionnaire forms were considered for analysis.

WHO Quality of Life Bref (WHOQOL-BREF) scale was used to assess the Quality of life and Perceived Stress Scale -10 (PSS-10) scale was used to assess perceived stress levels. WHOQOL-BREF is a 26-item survey with respect to experiences in past 2 weeks. It evaluates quality of life (QOL) in 4 domains: Physical health, psychological health, social relationships, and environment. It has single item questions for Overall QOL and satisfaction with health as well. It is a likert-scale ranging from 1 (very poor) to 5 (very good). This survey has been used in diverse populations wherein good reliability with Cronbach's α of 0.68-0.82 is shown. Final scores can be transformed into 0-100 measured in a positive direction. Higher scores indicate better quality of life.

PSS-10 is a survey with 10 questions. It is self-reported measure of amount of stress with respect to experiences in the past 1 month. Questions have responses in a likert-scale ranging from 1 (never) to 5 (always). Responses to questions 4,5,7,8 are reversed

and overall total is calculated which ranges between 0 to 40. Low stress is 0-13. And 14-26, 20-40 are moderate stress and high stress respectively.

Data was entered in Microsoft excel and analysed using SPSS V 20. Qualitative variables are presented as frequencies and percentages. Quantitative variables are presented as mean, SD, median and mode. Statistical tests like t-test, ANOVA, Mann-Whitney test, Kruskal Wallis test were used for statistical analysis. P value less than 0.05 was considered as statistically significant.

Results

A total of 175 nursing students participated in the present study. It was found that, among the respondents, a majority (96.6%) belonged to age-group of 18-22 years, 77.1% were females, 68% were from rural area, 87.4% were pursuing B.Sc. Nursing course whereas 12.6% were studying General Nursing and Midwifery (GNM). A higher percentage of 76.6% were currently residing in hostel accommodations, 16% resided at their homes and 7.4% students opted for other accommodations such as paying guest facilities or sharing flats with friends. (Table 1).

149 respondents (85.1%) reported that they were currently ill. 49% reported their overall quality of life as 'good'. Followed by 'neither poor nor good', 'poor', 'very good', 'very poor' (29%, 11%, 6% and 5% respectively). 61% reported 'satisfied' for self-reported satisfaction with one's health. Followed by 'neither satisfied nor dissatisfied', 'dissatisfied', 'very satisfied' (19%, 10%, 7% respectively). Least was for 'very dissatisfied' (3%).

Mean of social relationship domain of WHOQOL-BREF was maximum (71.9 \pm 20, median = 75). This was followed by that of physical domain (65.5 \pm 14.7, median = 63), psychological domain (55.6 \pm 16.8, median = 56), environment domain scores (53.8 \pm 15.4, median = 56). PSS scores ranged from 7 to 29, with a mean of 18.6 (SD = 4.3, median = 19). (Figure 1). Most of the students (81.7%) were under moderate stress. 12% and 6.3% were under low and high stress respectively.

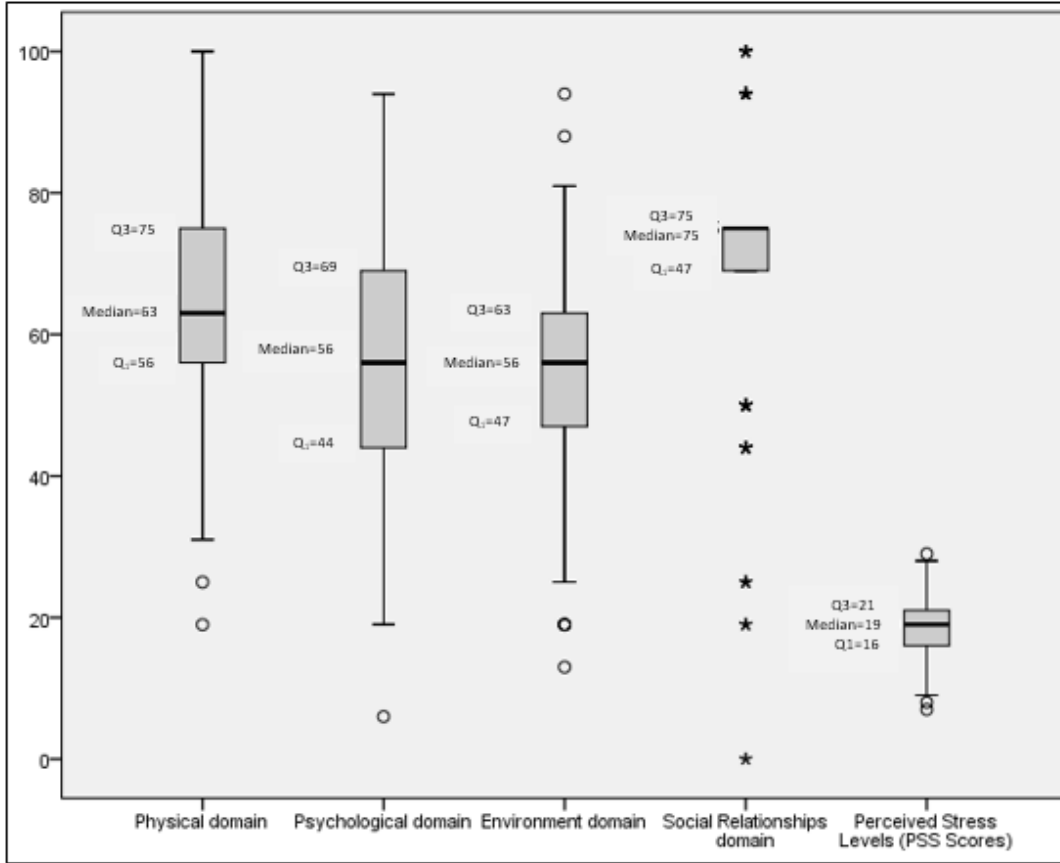


Figure 1: The description of Domain Scores of WHOQOL-BREF Scale and Perceived Stress Levels as per PSS-10 Scale.

Table 1: Quality of Life domains and PSS scores with respect to various socio-demographic variables

Socio-demographic variables	Frequency n (%)	WHOQOL-BREF domains				PSS Score
		Physical Domain Mean ± SD (Median)	Psychological domain Mean ± SD (Median)	Social Relationships domain Mean ± SD (Median)	Environment domain Mean ± SD (Median)	
Sex						
Male	40 (22.9%)	69.8±14.7 (69)	60.3±17.7 (56)	78.7±17.9 (75)	57.9±13.8 (56)	18.1±4.0 (19)
Female	135 (77.1%)	64.2 ±14.5 (63)	54.3 ± 16.3 (56)	69.9±20.2 (75)	52.6±15.7 (56)	18.7±4.4 (19)
Mann-Whitney U, p-value		2209.5, p>0.05	2235.5, p>0.05	2032, p<0.05	2253, p>0.05	2526 p>0.05
Academic Year of studies						

Continue

1 st year	69 (39.4%)	65.7±12.4 (63)	56.5±13.8 (56)	74.5±17.8 (75)	54.6±12.2 (56)	18.2±3.6 (19)
2 nd year	49 (28.0%)	64.0±16.9 (69)	55.1±19.7 (56)	65.9±26.4 (75)	51.7±17.1 (56)	19.9±4.8 (20)
3 rd year	31 (17.7%)	66.7±17.1 (69)	55.9±18.2 (56)	72.9±12.9 (75)	54.6±17.3 (56)	18.2±5.1 (19)
4 th year	26 (14.9%)	66.2±12.9 (63)	54.0±17.0 (56)	75.1±17.2 (75)	54.6±17.8 (56)	17.6±3.6 (17)
Kruskal Wallis H, df, p-value		0.346, df:3 p<0.05	0.262, df:3 p>0.05	3.495, df:3 p>0.05	0.594, df:3 p>0.05	F (3,174) = 2.209, p > 0.05
Present accommodation						
Home	28 (16.0%)	68.8±15.0 (63)	54.6±16.2 (56)	72.9±16.9 (75)	55.9±15.7 (56)	16.5±4.5 (16)
Hostel	134 (76.6%)	63.7±14.2 (63)	54.9±17 (56)	70.5±20.9 (75)	52.7±15.6 (56)	19.2±4.3 (19)
Others	13 (7.4%)	76.5 ± 13.1 (75)	64.4± 13.9 (56)	84.7 ± 12.2 (75)	60.2 ± 11.4 (56)	17.0±2.6 (16)
Kruskal Wallis H, df, p-value		8.876, df:2 p<0.05	2.845, df:2, p>0.05	6.580, df:2, p<0.05	2.751, df:3 p>0.05	9.892, df:2, p<0.05

Significant negative correlation was seen between all the domains of quality of life and the PSS scores (r = -0.38, -0.34, -0.35, -0.3 between PSS scores

and physical domain, psychological domain, social relationship domain, environment domain scores respectively).

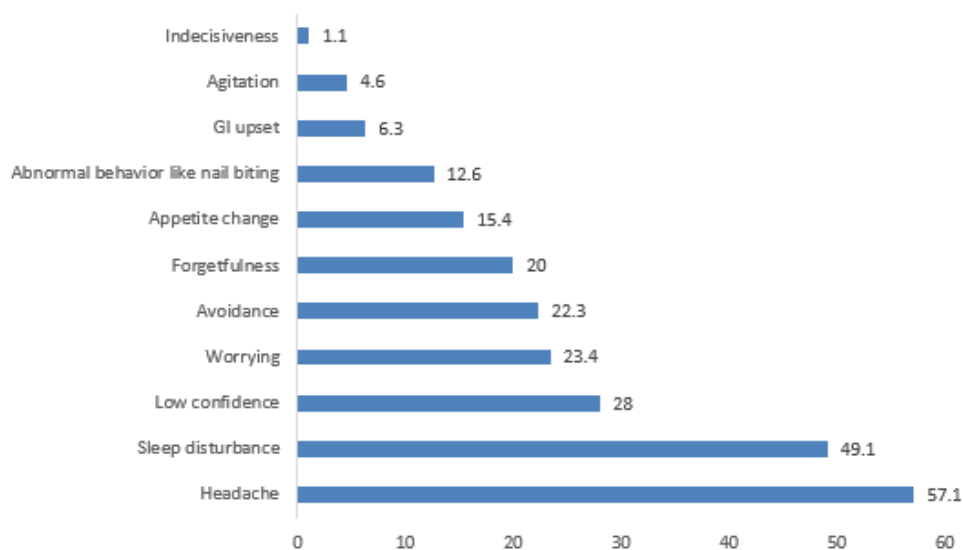


Fig 2: Symptoms experienced during stress

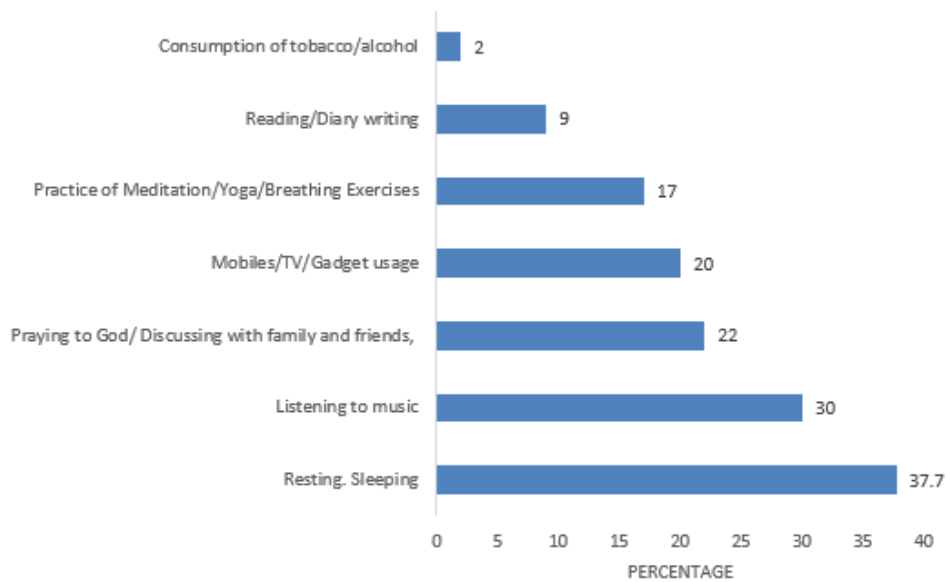


Fig 3: Coping strategy practiced for managing stress

Discussion

The present study was done to assess the quality of life, stress levels among students studying in a nursing college in Central Karnataka. The symptoms in case of stress and coping strategy for stress were also studied.

In our study, only 6% respondents reported overall QoL as 'very good'. Whereas in the study on medical students in Saudi Arabia by Malibary H et al, it was 33.6%.⁶ Only 7% respondents reported satisfaction with health as 'very satisfied'. Malibary H et al, reported it as 23.7%.⁶

Average for WHOQOL-BREF scores for physical health domain, psychological health domain, social relationships domain, environment domain were 65.45 ± 14.67 , 55.63 ± 16.77 , 71.91 ± 20.03 , 53.78 ± 15.43 respectively. Alkatheri AM et al reported lower scores for physical (57.1) and social relationship domains (58.3) and higher scores for psychological (58.3) and environment domains (62.5) in their study on students studying in a Health Sciences University in Saudi Arabia.⁷ Malibary H et al reported lower scores for social relationship domain (55.67 ± 23.95) and physical domain (46.94 ± 14.24). Whereas environmental domain scores (67.81 ± 17.39) and

psychological health domain scores (64.37 ± 14.27) were found to be higher than those from our study.⁶

Social relationship domain scores were significantly different with respect to sex. Malibary H et al reported no significant difference between sex and various domains of Quality of Life.⁶ In the study on medical students in China by Zhang Y et al, males had significant higher scores than females in the physical and psychological health domains.⁸ They reported significantly higher scores for females for social relationships domain. Blebil A et al found significant association between sex and QoL in their study on pharmacy students in Malaysia.⁹

We found no significant difference between domains of QoL and urban or rural place of origin. Zhang Y et al found significantly higher scores for psychological health and social relationships domains in urban students compared to rural ones.⁸

We found no significant difference with QoL with respect to year of studies. Malibary H et al, Moritz AR et al reported similarly.^{6,10} Blebil A et al reported otherwise.⁹ Zhang Y et al found significant difference for psychological health and social relationships domains scores with respect to year of studies.⁸

We found significant difference with physical health, social relationships domains of QoL and place of staying/accommodation. Blebil A et al found otherwise.⁹

In our study, PSS-10 total scores range was 7 – 29. Whereas, 0-35 was found in the study on University students in Saudi Arabia by Anwer S et al.¹¹ Mean PSS-10 total score was 18.58±4.32. Manzar MD et al (University students in Ethiopia) and Opoku-Acheampong A et al (pharmacy students, Ghana) reported similarly (18.07±4.72 and 18.06±6.21).¹²⁻¹³ Slightly lower average (16.28±5.93) was seen in study by Anwer S et al.¹¹ Slightly higher means were seen in studies by Lippke S et al (international students studying at a German University), Henning MA et al (pre-medical and health science students in New Zealand) and Gupta K et al (college students in India) (19.89±6.90, 20.24±7.33, 20.43±6.30 respectively).¹⁴⁻¹⁶

Majority of students (81.7%) had moderate stress, followed by low (12%) and high stress (6.3%). Gajula M et al, in their study on adolescent school students in India, reported higher proportion of students in high stress (24.44%).¹⁷

We found no significant difference with respect to stress and sex of students. Gupta K et al reported similarly.¹⁶ Whereas, Karaca A et al, in their study on nursing students in Turkey, reported otherwise.¹⁸ We found no significant difference with respect to stress and year of studies. Karaca et al and Opoku-Acheampong A et al reported similarly.^{18, 13}

Significant negative correlation was seen between physical health domain, psychological health domain, social relationships domain, environment domain scores with PSS scores (-0.382, -0.337, -0.354, -0.3 respectively). Alkatheri AM et al also reported similarly.⁷

Conclusion

Physical health, Psychological health and environment domains scores (65.4, 55.6 and 53.8 respectively) were lower. Efforts should be made to improve them.

Majority (81.7%) of nursing students were under moderate stress. Effect of various better coping

methods should be researched and taught to them to handle stress.

Limitations of the study:

Being a single-centre study, the present study results cannot be generalised to the students of all the health care courses. Regional or national level multi-centric studies have to be done to know quality of life, stress, coping methods in case of stress among students of various health care courses' students.

Ethical Clearance: Ethical Clearance was obtained from the institutional ethics committee of Basaveshwara Medical College and Hospital, Chitradurga, prior to the commencement of the study.

Source of funding: Self

Conflict of interest: Nil

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A Comparative Study of Anemia in Adult Women of Telangana Population

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Abstract

Background: Anemia is still a major health problem in females of both rural and urban areas of the developing countries like India. The objective of the present study was to find out the hematological parameters and blood indices among adult females in rural and urban areas of Patancheru (Mandal), Telangana and correlate to type of anemia, degree of anemia, and percentage of anemia in both rural as well as urban areas in adult females.

Methods: A cross-sectional study was conducted among adult female subjects of age group 18-35 years comprised of n=100 subjects selected from rural area and n=100 subjects from urban areas of Patancheru (Mandal), Telangana. The hematological parameters, Hb gm%, MCV (fl), RBC count/mm³, MCH(pg), PCV(%), MCHC(gm/dl) were investigated by Hematology Analyzer-automated blood counter.

Results: among the total sample of n=200 adult female subjects of age group 18-45 years, the overall prevalence of anemia was observed 58%, recording 60% in rural area females and 56% in adult female subjects of urban area. The overall microcytic anemia was observed maximum (40%), recording 70% in rural area subjects and 67% in urban area subjects. The overall macrocytic and normocytic anemias were recorded 9% each. The macrocytic anemia was recorded 13.5% in rural area and 17.8% in urban area. The normocytic anemia's was recorded 16.6% in rural area and 14.2% in urban area adult females. Both parameters of urban and Rural females were compared and there was highly Significant P Value (P<0.001).

Conclusion: The present study indicated that prevalence of anaemia is slightly higher among rural adult female subjects of age group 18-35 years compared to urban area female subjects. The current study results suggests, need of due emphasis on iron and folic acid supplementation and education on consumption of iron rich foods, so as to bring down the prevalence of anemia among the adult females

Keywords: Anemia, Hematological parameters, Adult female, Telangana.

Introduction

Anemia appeared as a serious public health

problem throughout the world. Particularly in developing countries ^{1,2}. WHO estimate the number

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of anemic people worldwide to be a staggering two billion i.e. 27% of the world's population had anemia in 2019³. It is also estimated that one third of all women of reproductive age are anemic⁴. The world health organization (WHO) reported that 58% of the pregnant women with anemia were also anemic before being pregnant⁵. Prevention of anemic in adult women could the health status of the pregnant women, eventually contributing to the reduction of both maternal and perinatal mortality.

Anemia's are major health problem in females of reproductive age women, in developing and developed countries of the world. In India, more than 50 % of all the females are suffering from anemia both in rural as well as urban areas. The most common type by which females of reproductive age women are suffering are "iron deficiency anemia vitamin B12 and folic acid deficiency anemia's, anemia's due to blood loss and hemolytic anemia's. These anemias are categorized as microcytic anemias, macrocytic anemia's, and normocytic anemia's. Microcytic anemias is iron deficiency anemia, commonly occurring in females of reproductive age women in India. Macrocytic anemia are vitamin b12 or folic acid deficiency anemia's, also occurring in females of reproductive age group map normocytic anemia's occurring in females of are due to blood loss of hemolytic anemias. In India more than 50% females are reproductive age women are suffering from iron deficiency which is a type of microcytic anemia. Iron deficiency anemia's are majorly due to dietary deficiency, hookworm infestations, nutrition, blood loss depletion of iron store due to increased physiological demands in reproductive age. ⁶

The type of anemia occurring in rural and urban females is categorized by these blood indices (MCV), (MCH), (MCHC). MCV measures the average volume of red blood cell and is the indicator of RBC size and discriminate between microcytic and macrocytic anemias. microcytic anemias have small RBCs and decreased MCV. Microcytic anemia's reflected low MCV due to defective Hb% production either from ineffective haem or globin synthesis.⁷

Hence attempt is made to find out the hematological parameters such as Hb(gm%), total RBC count (mm³), and packed cell volume (PCV%)

among adult females of age group 18-35 years in rural and urban areas of Telangana.

Material and Methods

The study sample and population and sample size included adult females of age group 18-35 years considering n=100 subjects(cases) in rural area and n== 100 subjects in urban area.

The subjects in the area of UHC(urban health centre) and RHC(rural health centre) under TRRIMS medical college, Patancheru, Telangana were studied

Inclusion criteria : Normal adult non-pregnant females of age group between 18-35 years. Were selected for study

Exclusion Criteria: Pregnant women, elderly women, children, females suffering from hematological disorders, leukemia, myeloproliferative disorders.

Method: The study design was cross-sectional study using simple random sampling. Appropriate sample size was taken the study was conducted for a period of one year. The study variables included age, gender, marital status, education, family background, nutrition, income.

Procedure: A sterile 5ml syringe was taken for collection of blood sample following strict aseptic measurements of venous blood samples were collected into anticoagulant (EDTA) added in sample tubes. The hematological parameters such as hemoglobin (gm%) total RBC count/mm³, pcv% were investigated. blood indices like MCV(fl), MCH(pg), MCHC(gm/dl) were calculated. All the above hematological parameters were analyzed by hematology analyzer-automated blood cell counter (SYSMEX XP-100) in the central laboratory of TRRIMS.

Statistical Analysis: The statistical analysis of data is correlated to distribution and percentage of anemia, degree of anemia, types of anemia in both rural and urban areas compared, which helps to preventive, differentiating and diagnostic aspects of anemias. Mean values of various hematological parameters were compared with Z test and Anova test the statistical analysis was done by using SPSS software version-20 and Ms excel-2007.

Observation and results

Table-1 Comparison of hematological parameters and blood indices in adult female subjects of age group (18-35yrs) between anemic and non-anemic in rural population

mean value of Hb(gm%) 9.97, (SD± 0.997) in anemic and 12.56 (+- 0.39) in non-anemic women and $p < 0.01$. the mean value of RBC(millions/mm³) 4.390(SD+ .03745 in anemic and mean value 4.41 (SD ± 0.2412) in non-anemic and $P < 0.001$ (P value is highly significant). Mean value of pcv(%) 34.507, SD ± 3.4494 in anemic and 40.710 in anemic and (SD ± 2.0201) in non-anemic women and $P < 0.001$ (P-value is highly significant).

Mean value MCV(fl)78.500,SD ± 11,5021 in anemic and 91.084(SD ± 11.5021 in anemic and 91.084(SD ± 3.8429) in non-anemic women and $p < 0.001$ (p value is highly significant)

Mean value of MCH(pg) 22,667, SD ± 3.5706 in anemic and 28.130 (SD ± 1,4357) in non-anemic women, $p < 0.001$ (p-value is highly significant)

Mean value of MCHC(gm/dl) 28.840(sd+-2.4319) in anemic and 31.340(SD ± 2.0187) in non-non anemic women and p value is $p < 0.001$ (p-value is highly significant)

Table-2 Comparison of hematological parameters in both rural and urban females

Mean value of Hb(gm%) 10.15 (SD ± 0.532) in anemic and 12.56 (SD ± .645) in non-anemic-women and $P < 0.001$, (Pvalue is highly significant)

Mean value of RBC(millions/mm³) 7.378(SD ± 10.6352) in anemic and 4.318(SD ± 0.3002) in non-anemic women and p value 0.185(p value not significant)

Mean value of PCV(%), 35.696, SD ± 3.0789 in anemic and 38.932(SD ± 2.4396) in non anemic women and $p < 0.001$, p-value is highly significant.

Mean value mcv(fl) 79.568(SD ± 12.2190) in anemic and 89.609 (SD ± 3.7369) in non-anemic women, $p < 0.001$, (p value is highly significant)

Mean value of MCH(pg)22.529,(SD ± 3.3554) in anemic and 28.882(SD ± 1.61120 in non-anemic women, $p < 0.001$ (p-value is highly significant)

Mean value MCHC(gm/dl) 28.971,(SD ± 2.3442) in anemic and 32.505(SD ± 1.8123) in non-anemic, P value is < 0.001 is highly significant.

Table-3 Comparison of hematological parameters by Anova test

The parameters including Hb gm%, RBC mm³, PCV%, MCV(fl), MCh(pg), by Anova-analysis and observed highly significant P-value ($P < 0.001$)

Table-4 The percentage of anemia in rural and urban adult female population compared. In rural 66% were anemic and among them microcytic anemia were 70%, macrocytic anemia were 13.5% and normocytic anemia 66.6% and non-anemic females were 14%. In urban area 56% were anemic among them 67.8% had microcytic anaemia 17.8% macrocytic anemia 14.2%, normocytic anemia and 44% were non-anemic.

Table-1: Comparison of haematological parameters in females of age group (18-35y) between anemic and non anemic in rural area.

Parameters	Group	Number	Mean value	Std. Deviation	P value	Inference
Hb gm %	Anemic	60	9.97	0.997	0.001	HS
	Non anemic	40	12.56	0.396		
RBC millions/mm ³	Anemic	30	4.390	.3745	0.793	NS
	Non Anemic	20	4.415	.2412		
PCV %	Anemic	30	34.507	3.4495	0.001	HS
	Non Anemic	20	40.710	2.0201		

Continue

Parameters	Group	Number	Mean value	Std. Deviation	P value	Inference
MCV fl	Anemic	30	78.500	11.5021	0.001	HS
	Non Anemic	20	91.085	3.8429		
MCH pg	Anemic	30	22.667	3.5706	0.001	HS
	Non Anemic	20	28.130	1.4357		
MCHC g/dl	Anemic	30	28.840	2.4319	0.001	HS
	Non Anemic	20	31.340	2.0184		

Table 2: Comparison of Hematological Parameters in Adult females of age group (18 - 35 years) between anemic & non - anemic in urban area.

Parameters	Group	Number	Mean	Std. Deviation	P Value	Inference
Hb gm %	Anemic	56	10.15	.532	0.001	HS
	Non Anemic	44	12.56	.645		
RBC millions/ mm ³	Anemic	28	7.379	10.6352	0.185	NS
	Non Anemic	22	4.318	.3002		
PCV %	Anemic	28	35.696	3.0789	0.001	HS
	Non Anemic	22	38.932	2.4396		
MCV fl	Anemic	28	79.568	12.2190	0.001	HS
	Non Anemic	22	89.609	3.7369		
MCH pg	Anemic	28	22.529	3.3554	0.001	HS
	Non Anemic	22	28.882	1.6112		
MCHC g/dl	Anemic	28	28.971	2.3442	0.001	HS
	Non Anemic	22	32.505	1.8123		

Table-3 Comparison of haematological parameters in rural and Urban females (Anova Test)

Rural	P- Value	Inference	Urban	P- Value	Inference
Hb gm %	0.001	P<0.005 (HS)	Hb gm %	0.001	P<0.005 (HS)
RBC millions/ mm ³	0.004	P<0.005 (HS)	RBC millions/ mm ³	0.027	P<0.005 (NS)
PCV %	0.001	P<0.005 (HS)	PCV %	0.001	P<0.005 (HS)
MCV fl	0.001	P<0.005 (HS)	MCV fl	0.001	P<0.005 (HS)
MCH pg	0.001	P<0.005 (HS)	MCH pg	0.001	P<0.005 (HS)
MCHC g/dl	0.001	P<0.005 (HS)	MCHC g/dl	0.001	P<0.005 (HS)

HS: Highly Significant, NS : Insignificant

Table-4: Percentage distribution of Anemia among adult female subjects in rural and urban areas

Rural (n=100)	Urban (n=100)	Total samples (n=200)
Anemia 60%	Anemia 56%	Anemia 58%
Anemia types (%)	-	-
Microcytic anemia (70%)	Microcytic anemia (67.8%)	Microcytic anemia (40%)
Macrocytic anemia (13.5%)	Macrocytic anemia (17.8%)	Macrocytic anemia (9%)
Normocytic anemia (16.6%)	Normocytic anemia (14.2%)	Normocytic anemia (9%)
Non- anemic (40%)	Non- anemic (44%)	Non- anemic (42%)

Discussion

The study aimed at detection of anemia and types in this group. The areas selected are rural and urban areas of Patancheru (Mandal) Telangana. In the present study Hb, RBC,PCV,parameters taken into determine anemia blood indices MCV, MCH,MCHC were used to classify anaemia. The type of anemia occurring in rural and urban females categorized by these blood indices. The blood indices include mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), and mean corpuscular haemoglobin concentration (MCHC).

It is reported rural women has a higher prevalence of anemia compare to urban women.⁸ it was suggested that, effects on iron deficiency anemia are, PEM (19%), bleeding from alimentary track(56 %), high bleeding during menstruation (29%), pregnancy(6%).⁹ it is suggested that B 12 deficiency observed in vegetarian families and infants of breast feeding, as Vegetarian mothers cobalamin content of milk is low¹⁰. Macrocytic anemias seen in elderly women; ageing process may be the intrinsic factor in development of this type of anemias. our results suggested over all prevalence of anemia (Hb < 12 g / dl) is 58%. In rural females 60 %. In urban females 56 %. In urban females anemia is mild type (11.9 – 10 g/dl), In rural females mild to moderate type anemia observed. overallly the commonest type is microcytic anemia where MCv (<78 fl) is 40% and macrocytic anemia (MCV > 96 fl) are 9% and normocytic anemia (MCV 78 -96 fl) 9%. The mean age group is 25.7years. our study results observed that mean Hb value falls than normal in both rural and urban females. Mean Hb of rural females is 11 g/dl, mean Hb of urban female is 11.2 g/dl, results suggested that anemia prevails both in rural and urban females. Mild type

of anaemia observed in urban females, mild to moderate anaemia observed in rural females. The RBC indices MCV, MCH, MCHC, p -values (P<0.005) significantly correlates with microcytic, macrocytic and normocytic anemias. In present study anemia occurrence is slightly higher in rural females compared to urban females in rural females most common type are microcytic, followed by normocytic and macrocytic anemias. In urban^{11 12} females microcytic anemias followed by macrocytic and normocytic anemias. Rural females usually suffer with chronic infections and inflammatory diseases, so these tests may not correlate significantly with anemias and also expensive and unavailable to rural females.¹³ Thus a brief dietary history, family history, local examination with blood indices study helps the clinician greatly in differentiating and diagnostic aspects of anemias. As per the national guidelines antenatal programs included, however there is a still a need to reinforce this key element and give sufficient importance to it as an intervention for reducing maternal morbidity and mortality.¹⁴ The present study warrant a need for attention to anemia among this age group.

Conclusion

The present study results indicate the prevalence of anemia is slightly higher among rural adult females compared to urban females considering it to be major health problem in the adult females of both rural as well as urban areas of developing countries like India. The results shows that iron urban females mild type of anemia is common, while in rural mild to moderate type. The current study results suggests need of due emphasises on iron and folic acid supplementation and health and education on the consumption of iron rich foods, so as to bring down the prevalence of anemia among the adult women. prevention of

anemia in adult females could improve the health status of the future mothers to avoid morbidity and mortality in both mother and foetus.

Limitation of study: Owing to remote location of study centre, small number of patients and lack of latest techniques, we have limited findings and results.

This research paper was approved by Ethical committee of TRR institute of medical sciences, Inole, Patancheru (Mandal), sangareddy (District), Telangana 502319.

No conflict of interest

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Placenta Previa: Maternal and Fetal Outcome a Two Year Study

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Abstract

Introduction: Placenta previa is one of the major causes of antepartum hemorrhage and a life-threatening condition for both the mother and the fetus. The incidence of placenta previa is 0.3 to 1% in 300 to 400 deliveries.^[1] The present study was done retrospectively to observe the maternal and fetal outcome in pregnancies with placenta previa.

Method: The retrospective study was done from June 2019 to June 2021 to study the maternal and neonatal outcome in pregnancies with placenta previa who got admitted in Obstetrics and Gynecology department of Rajindra Hospital, Government Medical College Patiala. Detailed history, clinical examination and investigations were evaluated and analysis was done at the end of the study.

Result: Total number of deliveries during this period were 8193 out of which placenta previa was present in 210 with an incidence of 2.5%. The major risk factor for placenta previa in the present study was previous LSCS in 34.3% followed by previous dilatation and curettage (D&C) in 16.6%. The majority of the women 57.2% had major degree placenta previa, out of which placenta accreta was present in 5.8%. The majority of the women 94.7% were delivered by LSCS and 4.2% had obstetric hysterectomy, 16% had PPH intraoperatively and 1.4% needed ICU care. 60% of the babies were born prematurely and 25.7% required NICU care.

Conclusion: Placenta previa is a major contributor in increasing maternal and fetal morbidity and mortality. The present study showed that increasing maternal age, multiparity, previous cesarean section, previous dilatation and curettage are the risk factors for placenta previa. Placenta previa is associated with increased intraoperative interventions, surgical complications and maternal morbidity.

Key Words: Placenta Previa, Maternal outcome, Fetal outcome

Introduction

Antepartum hemorrhage (APH) is a serious condition in obstetrics ^[2]. One of the causes of APH

is placenta previa where painless vaginal bleeding occurs mostly in second and third trimester. Placenta previa is implantation of placenta near or covering the internal cervical os. The incidence of placenta

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previa is 0.4%-0.5% of all labor. [3] Risk factors for placenta previa includes previous uterine surgery, increased maternal age, multiparity, multifetal pregnancy, risk increasing with increasing number of cesarean section, for ≥ 3 cesarean deliveries chances of placenta previa being 37%, smoking, and history of abortions. [4] Availability of USG for early diagnosis of placenta previa, 24hr blood bank facilities, NICU care have improved the maternal and fetal outcome in placenta previa and has decreased the morbidity. [2] The present study was done retrospectively to observe the maternal and fetal outcome in the pregnancies with placenta previa.

Material and Methods

This retrospective, observational study was done from June 2019 to June 2021, to study the maternal and neonatal outcome in pregnancies with placenta previa who got admitted in obstetrics and gynecology department of Rajindra Hospital, Government Medical College Patiala. Detailed history, clinical examination and investigations were studied.

Inclusion Criteria

- (a) All the women with antepartum hemorrhage confirmed by USG as placenta previa after 28 weeks of gestation.
- (b) Undiagnosed placenta previa confirmed intra-operatively during caesarean section under taken for obstetrical indication.

Exclusion Criteria

- (a) Second trimester abortion, with diagnosis of low lying placenta before 28 weeks of gestation.
- (b) Other causes of antepartum hemorrhage.
- (c) Normally situated placenta

GESTATIONAL AGE was calculated by

- (a) Date of LMP
- (b) USG - Dating scan done in first trimester

Maternal outcomes were assessed by operative intervention, requirement of blood transfusion, ICU care, postpartum hemorrhage (PPH), hysterectomy, and maternal death. Fetal outcome parameters were

assessed by period of gestation at time of birth, birth weight, APGAR score, requirement of NICU care, perinatal deaths, and early neonatal death

Sample size calculation, was done by using

$$n = z^2 \times p(1-p) / e^2$$

Where Z is critical value of normal distribution, e is the margin of error, p is sample proportion and N is the population size. n came out to be 208 and to reduce the margin of error 210 is taken as sample size for present study.

Descriptive statistics was done for all data and were reported in terms of mean, S.D for the quantitative variables and number & percentages for qualitative variables. The data was analyzed using SPSS trial version 22 and Microsoft Excel.

Findings: In the present study, analysis of maternal and fetal outcome was done in cases of placenta previa over a period of two years at Rajindra Hospital, Government medical college Patiala. Total number of deliveries during the study period was 8193, out of which 210 were having placenta previa, so the incidence was 2.5%. As per patients profile, majority of the women, that is 79% were multigravida with mean age of 26.45 \pm 3.82 and majority (78.6%) were in the age group of 20-29 year. 34.3 % women had previous LSCS, 16.6% had previous D&C, 0.4% women had previous myomectomy and 0.4% had twin pregnancy increasing the risk of placenta previa. Majority (37.2%) had type IV placenta previa, followed by type I (31.4%), type IIA (11.4%), type IIB (10.5%), type III (9.5%). majority (57.1%) had posterior placenta previa. 77.7% had cephalic presentation, 22.3% women had malpresentation out of which 16.6% were breech, 1.4% were oblique lie and 4.3% had transverse lie. Majority of the women had LSCS as mode of delivery, out of which 155 women had emergency LSCS, 44 had elective LSCS, 5 had classical CS (out of which 3 had major degree placenta previa and accreta) and 6 had vaginal delivery. Intraoperatively 34 women had PPH, 3 women were given massive blood transfusion, 27 women had placental bed oozing and 7 women had placenta accreta. To control PPH, CG balloon (Chhattisgarh condom balloon) was put in 23 women, 13 had uterine artery ligation, 8 had caesarean hysterectomy

(4 due to placenta accrete, 4 due to massive PPH) and one had interval hysterectomy. 7 women had placenta accreta out of which two had focal accrete. All the women with placenta accreta had previous LSCS, 5 had type IV, 1 had type IIA and 1 had type III placenta previa. Postoperatively 3 women needed ICU care, 4 had sepsis, 8 had urinary tract infection, 13 had fever. Among neonates, majority (60%) were

delivered as preterm and were live, 35.7% were term and live, 4% were stillbirth, 25.7% needed NICU care, out of which 4.8% died within 48hrs. 5 babies had congenital malformations which included polydactyl, anencephaly, hydrocephalus, club foot. Mean APGAR score at 0 min was 8.09+/-2.26, at 1min 8.38+/-2.07.

Table 1: Type and location of placenta and presentation of fetus

Variable	Number	Percentage
Type of Placenta Previa		
I	66	31.4
II A	24	11.4
II B	22	10.5
III	20	9.5
IV	78	37.2
Location of Placenta		
Anterior	90	42.9
Posterior	120	57.1
Presentation		
Breech	35	16.6
Cephalic	164	77.7
Oblique lie	3	1.4
Transverse lie	9	4.3
POG		
<34 Weeks	44	21
34-37 weeks	115	54.8
>37 Weeks	51	24.3

Table 2: Mode of delivery, Intra Operative complications and Intra Operative Interventions

Mode of delivery	I (n=66)	IIA (n=24)	IIB (n=22)	III (n=20)	IV (n=78)	P value	Significance
Vaginal Delivery	6	0	0	0	0	0.117	NS
Emergency LSCS	47	16	15	16	61		
Elective LSCS	13	7	7	3	14		
Emergency Classical	0	0	0	1	2		
Elective Classic	0	1	0	0	1		
Intra Operative complications							
PPH	3	4	2	2	23	<0.001	HS
Massive blood Transfusion	0	0	0	0	3	0.536	NS

Continue

Mode of delivery	I (n=66)	IIA (n=24)	IIB (n=22)	III (n=20)	IV (n=78)	P value	Significance
Placenta Cut through	3	2	0	1	11	0.152	NS
Placenta Bed oozing	6	1	1	2	17	0.074	NS
Dense Adhesions	0	0	0	0	0	-	-
Placenta Accreta	0	1	0	1	5	0.161	NS
Intra Operative Interventions							
Haemostatic sutures	5	2	1	2	17	0.082	NS
Uterine artery Ligation	2	2	1	0	8	0.318	NS
CG Balloon	2	3	1	1	16	0.009	HS
Caesarean Hystrectomy	0	1	1	1	5	0.174	NS
Interval Hystrectomy	0	0	0	0	1	0.999	NS
Maternal Mortality	0	0	0	0	0	-	-

Table 3: Neonatal Outcomes

Obstetric Morbidity	Number	Percentage
Term Live Births	75	35.7
Live Preterm	126	60.0
Neonatal Deaths	9	4.3
Still Births	10	4.8
NICU Admission		
Yes	54	25.7
No	156	74.3
Birth Weight		
<2000 gm	48	22.8
2000 - 2500 gm	94	44.8
>2500 gm	68	32.4
APGAR Score		
Mean \pm S.D	8.09 \pm 2.26	
	8.38 \pm 2.07	

Discussion

The present study was conducted retrospectively for duration of two years from July 2019 to June 2021.

Total numbers of women delivered during the mentioned period were 8193, out of which 210 pregnancies were complicated by placenta previa with an incidence of 2.5%. The results were comparable

with Maiti et al [3] with 2.2% incidence. In present study, majority of the women with placenta previa belonged to age group of 20-29 years with mean age of 26.45±3.82yr. Similar results were observed in studies conducted by Raja Rajeshwari et al [5], Das et

al [6] with mean age of 28.6yr and Singhal et al [7] as 26.2yr. Present study concluded a strong relationship of increasing maternal age with placenta previa as also observed by FarkhundaKhursheed et al [8].

Table no.4 Comparison of risk factors and maternal outcomes with other studies

Variables	Maiti et al ^[3]	Maunica et al ^[4]	Shruthi et al ^[9]	Santosh et al ^[10]	Haripriya et al ^[11]	Meenakshi et al ^[2]	Present Study
1. Multiparity	-	-	73.55%	60%	72%	56%	79%
2. Risk Factor	-						
A. Previous LSCS	-	29.80%	39.08%	17.14%	22%	12%	34.30%
B. D&C	-	18.30%	37.93%	17.14%	32%	18%	16.60%
C. Myomectomy	-	-	1.72%	-	-	-	0.40%
2. Type of Placenta previa	-						
A. Major Degree	-	67.90%	82.10%	82.84%	33%	52%	57.20%
3. Mal presentation	-	9.90%	-	17.14%	24%	20%	22.30%
Gestation (34-37week)	-	-	-	40%	-	-	54.80%
Mode of delivery							
A. Cesearan section	93.30%	66.40%	93.60%	88.50%	-	-	97%
B. Elective LSCS	36.70%	-	-	-	-	-	20.90%
C. Emergency LSCS	46.70%	-	-	-	-	-	73.80%
D. Classical LSCS	10%	-	-	-	-	-	2.80%
Intra Op complication							
A. PPH	30%	10.70%	45.40%	11.40%	-	-	16%
B. Placental bed oozing	-	-	17.80%	-	-	-	12.80%
C. Massive BT	10%	18.30%	-	2.85%	-	-	1.40%
D. Placenta Accreta	-	0.76%	-	2.80%	-	-	3.30%
E. Haemostatic suture	3.3	-	12%	2.85%	-	-	12.80%
F. Uterine artery ligation	13.3	-	5.18%	5.71%	-	-	6.10%
Variables	Maiti et al^[3]	Maunica et al^[4]	Shruthi et al^[9]	Santosh et al^[10]	Haripriya et al^[11]	Meenakshi et al^[2]	Present Study
G. CG Balloon Insertion	-	-	22.40%	-	-	-	10.90%
H. Caesarean Hystrectomy	6.70%	3.05%	1.10%	2.80%	-	-	3.80%
I. Interval Hystrectomy	-	-	1.70%	-	-	-	0.47%

Majority of the women were multigravida (79%) concluding that there is increased risk of placenta previa with increasing parity. Major risk factor was previous LSCS in 34.3% women also concluded that previous scar act as nest for the implantation of the placenta in the lower uterine segment.

This concluded that placenta previa increases the incidence of caesarean section and related morbidity. 7 women had placenta accreta out of which two had focal accrete. All the women with placenta accreta had previous LSCS, 5 had type IV, 1 had type IIA and 1 had type 3 placenta previa. Post operatively

3 women needed ICU care, 8 had PPH, 4 had sepsis and 8 had urinary infections .The results concluded that the placenta previa is associated with increase in

intra operative interventions, surgical complications and maternal morbidity.

Table no.5 Comparison of fetal outcome with other studies

Neonatal Outcome	Maiti et al ^[3]	Maunica et al ^[4]	Shruthi et al ^[9]	Meenakshi et al ^[2]	Present Study
Perterm live	36.6%	29.7%	37.3%	72%	60%
Term live	63.3	70.3%	60.9%	6%	40%
Still birth	-	3.05%	1.1%	22%	4.8%
Neonatal deaths	-	-	0.57%	6%	4.3%
NICU admission	36.66%	25.2%	37.35%	24%	25.7%
Fetal wt					
<2001 gm	26.7%	-	-	-	22.8%
2001-2500gm	60%	-	-	-	44.8%
>2500 gm	36.66%	-	-	-	32.4%

In the study done by Mcshane et al^[12] with NICU admission 24%, neonatal deaths were lower in present study as recorded in study done by Meenakshi et al^[2] ,Lavanya et al^[13] was 6%. This may be due to timely and good antepartum and intrapartum care and good NICU care along with experienced neonatologist. 5 babies had congenital malformations which includes polydactyl, anencephaly, hydrocephalus, club foot. The results from the study concluded that the placenta previa increases incidence of prematurity and increase in NICU admission, increasing neonatal morbidity and mortality.

Conclusion

The present study proves that the placenta previa is a major contributor in maternal and fetal morbidity and mortality. It is associated with greater risk of surgical interventions like obstetric hysterectomy, PPH requiring blood transfusion, ICU care. This can be prevented by creating awareness among women, early ANC registrations, regular ANC visits, correction of anemia, careful monitoring, early detection of high risk pregnancies, timely referral to tertiary healthcare center having 24hr operative facility, blood bank, NICU facility and avoidance of unnecessary primary cesarean section especially for non-recurrent causes to decrease the increasing incidences of placenta previa in previous LSCS.

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A Study to Assess the Awareness and Usage of Contraception Among Married Women

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Abstract

Background: India is the second most populous country in the world. Karnataka is the eighth largest state in India in terms of Population. High fertility rate and hence high population growth rate are among the leading economic and social problems faced by the developing world. This study is done to assess the awareness and usage of various methods of contraception.

Methodology: A cross sectional study was conducted in urban field practice area of Sri Siddhartha Medical College in Tumkur. 260 study participants were included in the study and systematic random sampling method was used to select the study subjects. Pre-tested questionnaire was used to interview participants about their reproductive intentions and contraceptive behaviour.

Results: In the present study 193 (74.23%) study participants were aware about one or the other methods of contraception. Majority 191(73.46%) of the participants were aware about tubectomy. The prevalence of contraceptive usage was 55.4%.

Conclusion: The total demand of the community for Contraceptives is 77.3%, which has to be taken in to consideration by policy makers. Only 74.23% of study participants were aware about one or the other methods of contraception, hence there is a scope to increase the awareness.

Keywords: Reproductive age-group women, Contraception, Awareness, Married Women

Introduction

India is the second most populous country in the world. Karnataka is the eighth largest state in India in terms of Population. Ever since the family planning (FP) programme was introduced, India's demographic and health profile has changed

radically.¹ In the 1965-2009 period, Contraceptive usage has more than quadrupled (from 13% of married women in 1970 to 56% in 2006), and the fertility rate has more than halved from 5.7 in 1966 to 2.7 in 2006) but the national fertility rate is still high enough to cause long-term population growth. The United Nations estimated that world population grew

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at an annual rate of 1.23% during 2001-2010 whereas India's population grew at 1.64% per annum during 2001-2011.² Several studies about contraceptive prevalence have been done in different parts of India. These studies not only help us to understand the distribution of contraceptive prevalence but also in planning appropriate preventive measures.

Increasing contraceptive use in the developing countries has cut the number of maternal deaths by 40% over the past 20 years, merely by reducing the number of unintended pregnancies.³ Contraceptive use averts almost 230 million births every year and prevents 272,040 maternal deaths worldwide. Research indicates that addressing unmet need will both result in contraceptive prevalence rates that exceed many countries' targets and help women achieve their own goals – and thus relieve population pressures.⁴ It has been estimated that meeting women's need for modern contraceptives would prevent about one quarter to one-third of all maternal deaths, saving 140,000 to 150,000 lives in a year.⁵

There is paucity of such data in the state and the literature review does not reveal many such studies from our area. In view of addressing the demand for this need, the present study was undertaken, with the objectives of determining the prevalence of awareness and usage of contraception and to study the factors associated with it in Tumkur district.

Materials & Methods

This Community based Cross sectional study was conducted between November 2017 to January 2018 in Maralur and Maralur Dinne, urban localities under urban health Training Centre of Sri Siddhartha Medical College, have the total population of 18,000. Among them 1856 women were in reproductive age-group. Study subjects were Married women living in the urban field practice area of age 15-49 years.

Sample size has been estimated using the following formula, $n = Z(1-\alpha/2)^2 pq/d^2$, Where in, Z (1- $\alpha/2$)² value for 95% level of significance = 1.96, p = Prevalence of unmet need for contraception in urban Karnataka (18.6%), q=100-p which is 81.4, d=precision of 5%. Substituting the above values in the above

formula $n=232.65$. To this 10% non-response rate is added; $233+23= 256$. Thus the sample size for this study derived was 256, which was approximated to 260. Inclusion criteria were married women in the age group 15-49 years. Exclusion criteria were women with psychiatric morbidity; women with difficulty in hearing and speech.

Institutional ethical clearance was obtained. Systematic random sampling was used to select the sample of 260 out of 1856 women from the list of reproductive age-group women obtained from urban health centre. The sampling interval obtained was 7. The first sampling unit between 1 and 7 was chosen at random and this was 4. The subsequent participants were selected by adding the sampling interval 7, till the required sample size was reached. A written informed consent in the local language was taken from all participants before participating in the study.

The participants selected were interviewed with the help of pre-tested questionnaire by house to house survey after obtaining their address from the list. The questionnaire was used to collect data to assess their reproductive intentions and contraceptive behaviour. After collecting the data women were given health education regarding various contraceptive methods available and their advantages and disadvantages.

Statistical Analysis

Data was entered onto a Microsoft Excel 2007 spread sheet; subsequently it was analyzed by using Epi info version 3.5.3. Descriptive statistics including frequency, percentage, mean, standard deviation and chi square test was used to see association between contraception awareness and usage and other variables. A P-value less than 0.05 were considered statistically significant.

Results

In our study, 260 married women were studied ranging from age 15-49 years in Maralur, urban field practice area of Sri Siddhartha Medical College, Tumkur. The mean age of the study population was 30.39 years and standard deviation of 7.425.

Table 1 - Distribution of study participants according to Socio-demographic factors.

Socio-demographic Variable		Frequency	Percentage
Religion	Hindus	73	28.10
	Muslims	180	69.20
	Christians	7	2.70
Age	15-24	65	25.00
	25 -34	122	46.92
	35-49	73	28.07
Type of family	Nuclear family	168	64.60
	Joint family	92	35.40
Socio-economic class (as per Modified Kuppuswamy's classification.)	Class-2	22	8.46
	Class-3	69	26.64
	Class-4	86	33.08
	Class-5	83	31.92
Education	Illiterate	29	11.2
	Primary school [1-4]	33	12.7
	Upper primary [5-7]	43	16.5
	Lower secondary [8-10]	54	20.8
	Upper secondary [11-12]	44	16.9
	Diploma	26	10.0
	Graduation	31	11.9
Employment status	Home-maker	205	78.85
	Working	55	21.15
Total		260	100.00

180(69.2%) participants were Muslims followed by 73(28.1%) Hindus and 7 (2.7%) Christians. 168 (64.6%) participants belonged to nuclear family whereas only 92(35.4%) of them belonged to joint family. 86 (33.08%) participants belonged to class-4 and 83(31.92%) participants belonged to class-5 socio-economic class. Only 22 (8.46%) of them

belonged to class-2. 205 (78.85%) of participants were home-makers and 55 (21.15%) of the participants were working women. 54 (20.8%) participants had studied up to lower secondary level, 29 (11.2%) were illiterates, 26 (10%) had completed their diploma and 31 (11.9%) had completed their graduation.

Table 2 - Distribution of study participants according to awareness about different contraceptives.

Awareness about method of contraception	Frequency	Percentage
Tubectomy	191	73.46
Copper-T	135	51.92
Oral contraceptive pills	103	39.62
Male condom	75	28.85
Other methods	27	10.38
No method	67	25.77

Note - Study participants were allowed to give multiple answers.

193 (74.23%) participants were aware about one or the other methods of contraception and 67 (25.77%) of the participants were not aware of any of the methods of contraception. Majority 191(73.46%) of the participants were aware about Tubectomy, 135 (51.92%) of the participants were aware about Copper-T, 103 (39.62 %) of the participants were aware about Oral contraceptive pills, 75 (28.85%) of the participants were aware about Male condom, 27

(10.38 %) of the participants were aware about other methods like vasectomy, injectable, rhythm method, coitus interruptus.

Out of all the participants 144 (55.4%) were using a method of contraception whereas 116 (44.6%) were not using any method. The contraceptive prevalence rate was 55.4%.

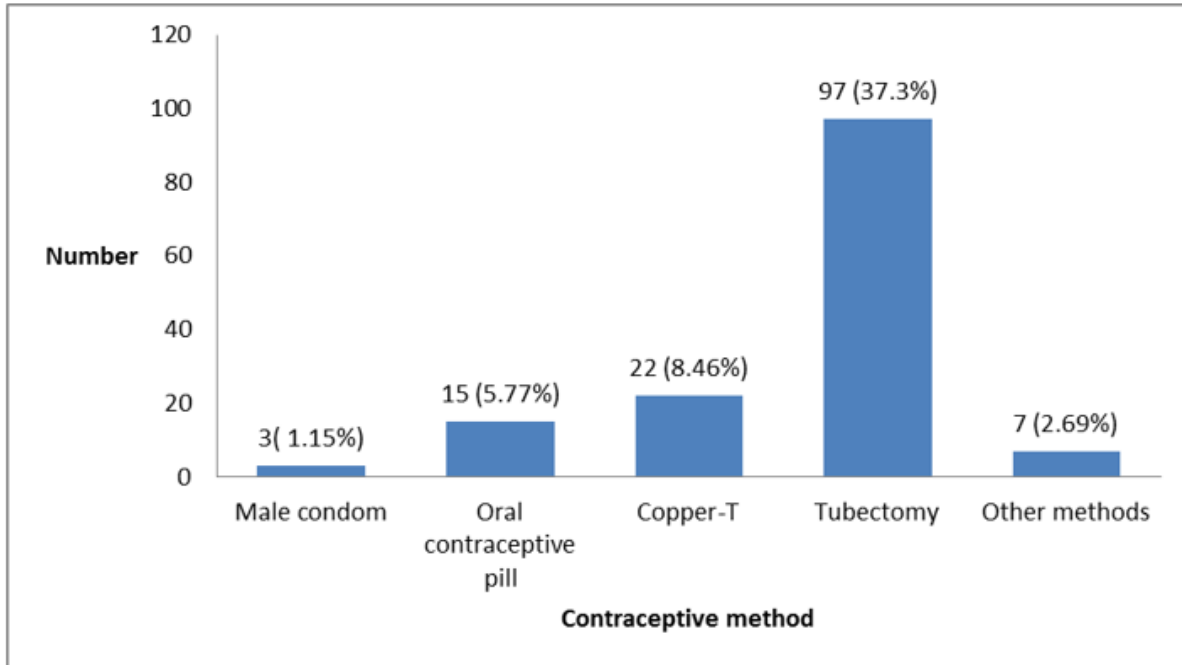


Figure 1 - Distribution of study participants according to usage of different methods of contraception.

* Note - 116 non-users are not shown in the figure.

97 (37.3%) participants were using tubectomy as a method of contraceptive, 22 (8.46%) of them were using copper-T, 15 (5.77%) of them were using Oral contraceptive pill, only 3 (1.15%) of them were

using male condom, 7 (2.69%) of them were using other methods which included rhythm method, coitus interruptus. None of the women told that their husbands had undergone vasectomy.

Table 3 - Association between Awareness about contraceptive method and Various socio-demographic factors.

Variable		Awareness about contraceptive method		p-value
		Aware	Not aware	
Age- group (years)	15-24	32 (49.23%)	33 (50.77%)	χ^2 value = 31.498 p < 0.001
	25 -34	106 (86.89%)	16 (13.11%)	
	35-49	55 (75.34%)	18 (24.66%)	

Continue

Education status	Illiterate	15(51.72%)	14(48.28%)	χ^2 value = 27.272 p< 0.001
	School(1-7)	47(61.84%)	29(38.16%)	
	High school (8-12)	77(78.57%)	21(21.43%)	
	College	54(94.74%)	3(5.26%)	
Religion	Hindus	60(82.19%)	13(17.81%)	χ^2 value = 10.246 P=0.006
	Muslims	131(72.78%)	49(27.22%)	
	Christians	2(28.57%)	5(71.43%)	
Type of family	Nuclear	140(83.33%)	28(16.67%)	χ^2 value =20.565 p< 0.001
	Joint	53(57.61%)	39(42.39%)	
Socio-economic class	Class-2 & class-3	83(91.21%)	8(8.79%)	χ^2 value =21.096 p< 0.001
	Class-4 & class-5	110(65.09%)	59(34.91%)	
Employment status	Home-maker	146(71.22%)	59(28.78%)	χ^2 value = 4.593 P=0.032
	Working women	47(85.45%)	8(14.55%)	
Total		193	67	

When the association between various socio-demographic factors and awareness about contraceptive method was studied, it was found that 106 (86.89%) participants in the age group 25-34 years were aware about one or the other methods of contraception and the association with awareness was significant ($p < 0.001$). Similarly significant association was found between education status, type of family, socio-economic status and awareness ($p < 0.001$). Association between religion and awareness was also significant ($p = 0.006$) and association was also found between employment status and awareness ($p = 0.032$).

Discussion

The Contraceptive prevalence in our study was 55.4% which is low as compared to contraceptive prevalence in overall Tumkur district (69.3%) and overall prevalence in urban Karnataka (60%) as per DLHS-4. The contraceptive prevalence according to NFHS-4 for overall India is 53.5%, which is consistent with the results from our study. In a study by Bendhari Manisha Laxman et al carried out in the slum covered by urban health centre RCSI Govt. Medical College, Kolhapur the prevalence was 70.25%,⁶ which is more as compared to the findings from our study.

In another study from Punjab on women attending an urban health centre the contraceptive prevalence was 53.84%,⁷ which is similar to our finding and lower usage among Muslim couples observed was consistent with other studies. In the study from Belgaum by Kruthika et al. in UHTC area of JN Medical College the contraceptive prevalence was 58.8%,⁸ which is in accordance with the results from our study.

Usage of contraceptive methods

In present study, 144 (55.4%) participants were using contraceptives and 97 (37.3%) participants were using tubectomy as a method of contraceptive, 22 (8.5%) of them were using copper-T, 15 (5.8%) of them were using Oral contraceptive pill, only 3 (1.15%) of them were using male condom, 7 (2.69%) of them were using other methods which included rhythm method and coitus interruptus. 116 (44.6%) of the participants were not using any method. It should be noted that none of the them were protected by vasectomy, pointing to the limited male involvement in Family planning.

In the study by Bendhari Manisha Laxman in western Maharashtra, the acceptors of terminal

method of contraception were more (80.07%) than spacing methods (19.93%) amongst contraceptive users. The contraceptive prevalence was 70.25% which is more compared to our study.⁶ Nair R.V et al. conducted a study in rural areas of Tamilnadu, where out of 84 participants, 48 (57.14%) were using some method of contraception and Sterilization was used by 22 (26.2%) participants, which constituted the major method of contraception similar to our study, IUCDs was used by 4 (4.8%), Oral pills by 2 (2.4%), Barrier methods were used by 12 (14.3%) participants.⁹ In their study Natural methods were used by 15 (17.9%) participants, which is considerably more in number compared to our study and Emergency contraception by 6 (7.1%) women whereas none of the women were using Emergency contraception in our study. 36 (42.86%) of women were not using any method which is comparable in number to our study, even though the study was done in rural areas, the use of modern contraceptives was more due to well-educated participants in the study. Alka Verma et.al.¹⁰ found 96% women had knowledge about but only 28 of 122 women were using contraception. Takkar N et.al.¹¹ reported that 81.1% practiced contraception. Kelly K et al.¹² reported 46.8% usage of contraception. Berihun Megabiaw et al.¹² found 90.7% awareness about contraceptive methods and 34.3% were currently using contraception. In a study done by Manjeera Lakshmi et al, out of 705 women, 590 (83.69%) were using a method of contraception, 224 (31.8%) followed tubectomy which constituted the major method similar to our study and 3 (0.4 %) followed vasectomy pointing to some amount of male involvement in family planning compared to our study, 130 (18.4%) used Intra Uterine Contraceptive Device (IUCD), 110 (15.6%) used condom, 94 (13.3%) used rhythm method, 35 (5%) used Oral Contraceptive Pills (OCPs), only one (0.1%) used injectable methods, and one (0.1%) followed emergency contraception.¹⁴ The prevalence and usage of modern contraceptives is more as compared to our study since it is a hospital based study.

Awareness about contraceptive methods

193 (74.23%) participants in the present study were aware about one or the other methods of contraception, 191(73.5%) of the participants were aware about tubectomy, 135 (51.9%) of the

participants about Copper-T, 103 (39.6%) of the participants about Oral contraceptive pills, 75 (28.9%) of the participants about Male condom, only 27 (10.4%) of the participants were aware about other methods like, rhythm method, coitus interruptus vasectomy, injectables and 67 (25.77%) of the participants were not aware of any of the methods of contraception. Koringa et al in their study in urban slums of Gujarat found that, out of 450 women, 309 (68.67%) were aware about Tubectomy, 337 (74.89 %) about IUD, 315 (70%) Pills, 310 (68.89%) Condom, 118 (26.22%) Vasectomy, 92 (20.44%) Hormonal injections, 212 (47.11%) were aware about Natural methods and only 22 (4.89%) were not aware about any of the methods of contraception.¹⁵ Higher percentage of awareness about modern methods and natural methods in contrast to our study may be attributed to higher socio-economic status, education level and varied religion distribution. In a study done by Manjeera Lakshmi et. al¹⁴ among out-patients, 671 (95.2%) women were aware of one or multiple methods of contraception and 34 (4.8%) women were not aware of any methods of contraception,¹⁴ the awareness is more due to the fact that it was done among out-patients, belonging to better educational status and socio-economic status.

Association between socio-demographic factors and awareness

The education of women leads to a greater awareness and a significant effect on family planning behavior and use of contraception. Our study revealed significantly higher usage of contraception among literates when compared with the illiterates. The literates will be able to understand the pros of contraceptive usage which could have brought the behavioral change. This result was consistent with studies done by Singh AK, *et al.*¹⁶, Gupta *et al*¹⁷., Kumar N, *et al*¹⁸. and Oppong FB, *et al*¹⁹. Improving education status can pave way to delay a women's marriage age, she will be able to seek a job and can help to change the attitude toward birth spacing and family size and empowers women to make a better decision.

In our study 33(50.77%) participants in the age-group 15-24 years, 14(48.28%) illiterate women, 49(27.22%) Muslims, 39(42.39%) women belonging to

joint family, 59(34.91%) women belonging to class-4 and class-5 socio-economic class, 59(28.78%) women who were home-makers and 11 (52.38%) women who had ≥ 5 children had lack of awareness about any of the methods of contraception. Significant association was found between Age-group, Education status, Type of family and socioeconomic status, Employment status, Age at marriage, and number of living children a woman had and awareness in our study. However, no association was found between religion and awareness, even though awareness was more among non-Muslims. Our findings are in accordance with the study from Gujrat by Koringa H et al except for the age factor. However, association between religion and awareness was significant ($p < 0.01$) in their study in contrast to our study.¹⁴

In the urban field practice area, 136 (52.3%) of the participants were in the age group 20-29 years and the mean age was 30.39 ± 7.425 years, 180(69.2%) participants belonged to Muslim religion, 168 (64.6%) of participants belonged to nuclear family, 169 (65%) of them belonged to class-4 and 5 socio-economic class, 29 (11.2%) were illiterates, and 31 (11.9%) had completed their graduation, 205 (78.85%) of participants were home-makers, 67 (25.8%) got married before 18 years, 141 (54.23%) of participants had one to two children. 67 (25.77%) of the participants were not aware of any of the methods of contraception and majority 191(73.5%) of the participants were aware about tubectomy, 193 (74.23%) knew where to get contraceptive supplies, 170 (65.38%) knew that they could get from any government health centre. For majority 91 (35%) participants, the source of information about the contraceptives was health worker. 144 (55.4%) were using a method of contraception and 97 (37.31%) participants were using tubectomy. Association between different age groups and awareness was highly significant ($p < 0.001$), similar association was found between education status, type of family, socio-economic status, age at marriage, number of living children a woman had and awareness ($p < 0.001$). Association between religion and awareness was not significant but the awareness was more among non-Muslims compared to Muslims. Association was also found between employment status and awareness ($p = 0.032$).

Limitations of the study were unmarried women

and adolescents were not included in the study. Inclusion of this group would have given a higher prevalence of unmet need. In spite of the best efforts to get the correct age by cross checking, women older than 49 years might have been included in the 45-49 age group, thereby increasing the proportion of women with unmet need particularly for limiting births. Since the study involved revealing intimate information of participants about reproductive behaviour, inhibition to provide information by a few participants was observed.

Conclusion

Only 74.23% of study participants were aware about one or the other methods of contraception, hence there is a scope to increase the awareness, which plays a significant role in reducing the unmet need. The reasons for non-usage of contraceptives like partner disapproval, preference for male child, religious beliefs should be addressed to while giving health education. Only 3 (1.15%) study participants were protected by male condom and none of the women were protected by vasectomy of their husbands which points to the limited male involvement in the study.

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Ethical clearance: Ethical clearance obtained from institutional ethics committee.

Conflict of interest: None.

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SARS-CoV-2 Positive Patients and the Associated Risk Factors During the Third Wave: A Study in a Tertiary Care Hospital of Punjab

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Abstract

Background: SARS-CoV-2 has a high mutation rate, resulting in the emergence of multiple variants in a shorter time frame, starting with Wuhan strain during first wave, then Delta during second wave and Omicron during third wave. World faced distressing spread of novel corona virus. The reason for this study was to look at the third flood of SARS-CoV-2, clinical highlights and risk factors in northern India.

Methods: This study involved 1,43,983 individuals for testing the presence of SARS-CoV-2 infection during January 2022 by RT-PCR. The epidemiological record was collected as per the guidelines of ICMR from the patient forms.

Results: A total of 12.24% individuals were found positive with mean age of 29±10 years. Large portion of positive population (63.87%) was asymptomatic. Among the positive population, higher positivity rate was observed in males (57.51%) with age band of 21-40 years (51.17%). Significant association (p value = <0.00001) was found between positivity rate with age, gender and status (symptomatic/ asymptomatic). SARS-CoV-2 was shown to be more prevalent in Patiala, (49.66%) district followed by Ludhiana (24.24%), Sangrur (10.06%), Mansa (7.06%), Shaheed Bhagat Singh Nagar (6.90%) and Malerkotla (2.08%) during second and third week of January 2022. Hypertension and bronchial asthma were the most well-known comorbidities found in the current study.

Conclusion: In totality, current study showed positivity rate of 12.24% from large population size for SARS CoV-2 from period of 1st January 2022 to 31 January 2022. Current findings include younger age group (21-40 years), high percent of asymptomatic individuals, less disease severity and a little need of hospitalization.

Keywords: Covid -19; SARS-CoV-2; third wave; Comorbidities; Case fatality rate; RTPCR.

Introduction

SARS-CoV-2 (acute respiratory syndrome coronavirus 2), formerly known as the new COV /

nCoV, is a coronavirus that causes high morbidity and mortality. It has emerged as one of humanity's most serious dangers, with a coronavirus pandemic declared by WHO in 2020. SARS-CoV-2 is evolving

continually due to point mutation or single nucleotide polymorphism (SNP) variants leading to numerous lines hastily all around the world ⁽¹⁾. Many new mutations of SARS-CoV-2 isolates were identified all around the world from 2020 to 2022. Earlier in India especially Punjab, during second wave in 2021 Delta variant was the major variant, now there is a transition from delta to the Omicron (B.1.1.529), New Variant of Concern (VOC) that was discovered in 2021. The S protein in this form contains a lot of mutations, and it's mostly linked to upper respiratory infections ⁽²⁾. This illness may strike people of any age group, and it is more common in those who have co-morbid disorders like diabetes, hypertension, cardiovascular and cerebrovascular disease, also a higher morbidity and mortality is reported. During the third wave in 2022, positive patients with infection mostly had mild symptoms ranging from fever, cough, stomach and body aches but some also presented acute to severe respiratory symptoms. Hence, it is very important to investigate the clinical manifestations of SARS-CoV-2 in the regional population. To see how SARS-CoV-2 positive patients presented during the third wave in 2022, this study zeroed in on inhabitants in Punjab.

Methodology: This is a study of SARS-CoV-2 positive subjects at a tertiary care hospital in northern India. During the third wave, a total of 1,43,983 samples were analyzed between January 1st and January 31st, 2022. The individuals involved in the study were both symptomatic and asymptomatic. Epidemiological data on population characteristics, clinical features, comorbidities and mortality rate (CFR) (ICMR) were collected in accordance with the criteria of the Indian Council of Medical Research.

Study Area:

Punjab is located in northwestern part of India. The state is divided into three primary regions: Majha, Malwa and Doaba ⁽³⁾. The Malwa locale, south of the Sutlej River, was the focal point of our study. During the third influx of the Covid19 wave in January 2022, 1,43,983 samples were overviewed. SARS-CoV-2 suspected samples were received from Sangrur, Mansa, Patiala, Malerkotla, and some

portion of Ludhiana and Shaheed Bhagat Singh Nagar (SBS Nagar) at tertiary care hospital, Patiala. Individuals infected with Covid 19 had their personal demographic information such as name, age, gender, geographic area, and contact information gathered in compliance with ICMR criteria.

Sample Handling:

There were five distinct districts in the Malwa area that sent in respiratory samples to the Virus Research and Diagnostic Laboratory (VRDL) at Punjab Tertiary Care Hospital. The samples were subjected to RT-PCR and RNA extraction. The rest of the samples were put away at -80°C until required.

RNA Extraction: A 200 micro liter sample was used to extract RNA from the nasopharyngeal swab. To extract nucleic acids from 96-well plates, the MagMAX™ viral pathogen DNA extraction kit (according to the manufacturer's instructions) was used. RNA was extracted using a 50 µl elution buffer. A molecular analysis was performed on the recovered genetic material.

RT-PCR: SARS-CoV-2 DNA detected qualitatively using the COVID19 RT-PCR assay in pooled and single samples obtained in January 2022. The real-time PCR test converts viral RNA into DNA in order to identify the infection. We used the COVIPATH (COVID-19 RT-PCR Kit) multiplex real time PCR kit to detect the presence of SARS-CoV-2 RNA in 10 liters (sample volume). After 10 min counter-record, initiation at 95 ° C for 2 min, and improvement of 40 samples at 95 ° C for 3 s and 60 ° C for 30 s, the PCR response was complete. The reporter dye VIC was used for the N gene, Rox was used for the RNase P gene, and FAM was used for the ORF1abgene. After analyzing the results, positive samples were considered which a cycle threshold of less than 25 while the others were taken as negative.

Statistical analysis: Mean and standard deviation were utilized to address ceaseless information, while recurrence and rate were utilized for clear cut information. The Chi square test was utilized to decide if the gatherings were tantamount. A p-esteem

under 0.05 was viewed as genuinely critical. For factual investigation, Microsoft Excel Office 2010 was used.

Results

The research was carried out in the Malwa Tertiary Care Hospital. During the third wave, from January 1st to January 31st, 2022, 1,43,983 suspected people were tested for SARS-CoV-2. A total of 17,633 people tested positive for RT-PCR, whereas 1,26,350 tested negative. 1,20,752 people were asymptomatic negative, 11,263 people were asymptomatic positive, 5,598 people were symptomatic negative, and 6370 people were symptomatic positive.

Table 1 lists the characteristics of all of the

people who were examined. The average age of patients positively tested for Covid-19 was between 29±10 years. It was observed that individuals with age between 21-40 years showed highest rate of positivity for SARS-CoV-2 during third wave. Significant association (p value = <0.00001) was found between positivity rate with age, gender and status (symptomatic/ asymptomatic). A total of 36.13% were symptomatic, while 63.87% individuals were found to be asymptomatic. In other categories, pregnant females were 2.62%, symptomatic individuals with travel history were 0.53% and 11.99% were hospitalized among total symptomatic population, while category of 24.02% collected not mentioned in the month of January 2022.

Table 1: Distribution of individuals tested for SARS-CoV-2.

Characteristics	Number Of Individuals		P value (Chi square)
	Positive	Negative	
SARS-Cov-2 RT-PCR			
Negative	126350 (87.75%)		
Positive	17633 (12.25%)		
Gender	Positive	Negative	
Male	10141 (57.51%)	84234 (66.67%)	<0.00001
Female	7492 (42.49%)	42116 (33.33%)	
Age (Years)			
0-20	1795 (10.18%)	17986 (14.24%)	<0.00001
21-40	9021 (51.16%)	43056 (34.08%)	
41-60	5463 (30.98%)	39846 (31.53%)	
>60	1354 (7.68%)	25462 (20.15%)	
Status			
Symptomatic	6370 (36.13%)	35801 (28.33%)	<0.00001
Asymptomatic	11263 (63.87%)	90549 (71.67%)	

Age And Gender Wise Distribution: Females were outnumbered by males by a factor of 1.35. This study showed that the positivity rate was higher among males with age band of 21-40 years as shown

in figure 1. During the research period, there were no significant changes in the proportion of individuals of different ages being tested.

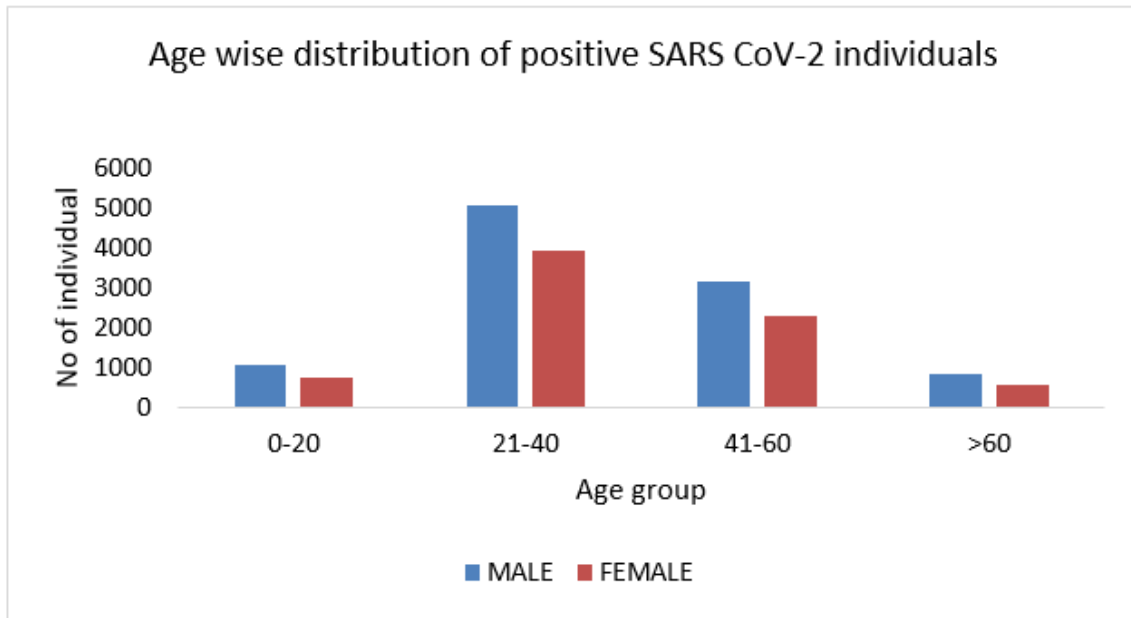


Figure 1: The pattern of age group and gender in SARS-Cov-2 positive individuals.

District Wise Distribution: The distribution trend of Covid-19 testing during third wave from 1st January 2022 to 31st January 2022 in 6 districts of Punjab has been represented in the figure 2. Analysis of distribution trend of positivity rate, out of samples

received at tertiary care hospital from studied districts revealed that district Patiala showed highest number of positivity rate with 8755 (49.65%) individuals while lowest number was found in district Malerkotla during third wave with 366 (2.08%) individuals.

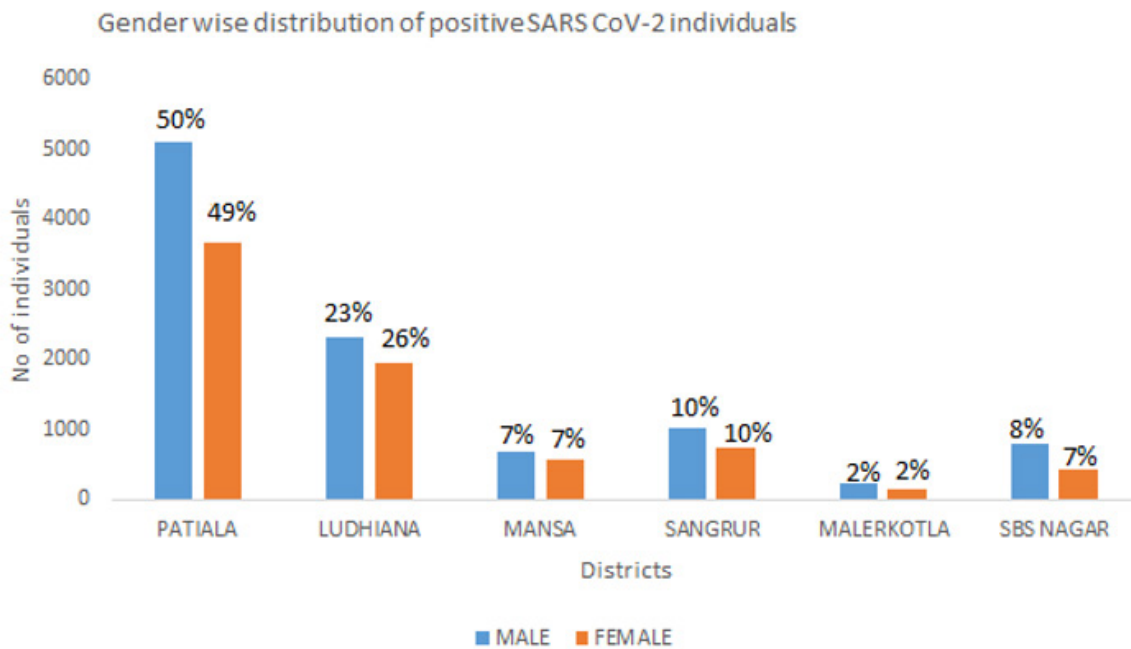


Figure 2: District wise distribution of SARS-CoV-2 positive samples.

Week Wise Distribution: Since the first week of January, new cases have been quickly increasing

in six districts in Punjab, peaking at 3341 positive individuals in Patiala district during the second week

of January, followed by other districts in the Malwa area, where there is an uptick of positive cases every week.

The number of positive RT-PCR tests in patients was highest in second week of January in Patiala

district, while in Ludhiana district of Malwa region, the positivity rate was found to be high in third week of January, followed by Mansa, Sangrur, Malerkotla, and SBS Nagar as shown in figure 3.

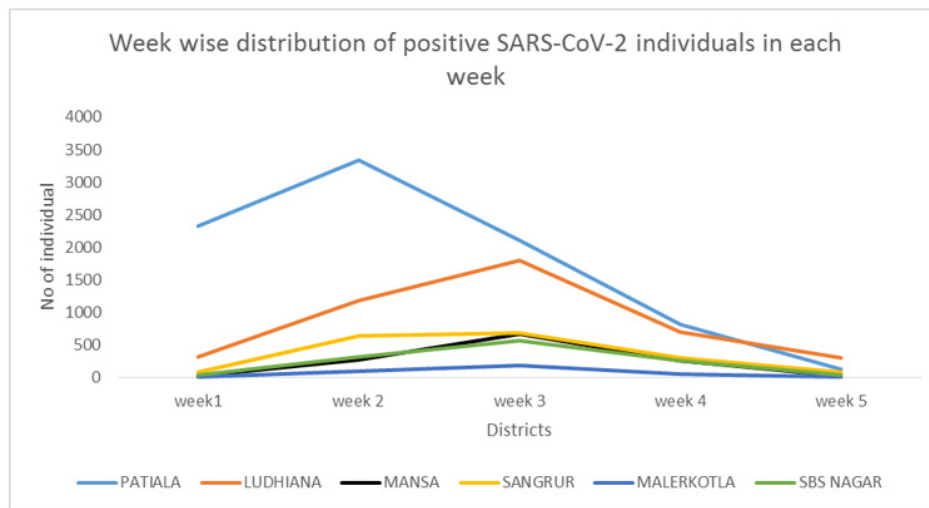


Figure 3: Week wise distribution trend of Covid-19 positivity in each district of Malwa region during third wave (1st January 2022 to 31st January 2022).

Discussion

Understanding the transmission dynamics and pathophysiology of SARS-CoV-2 is crucial for halting the infection's progress and preventing the pandemic from spreading further. During the third wave in January 2022, the current investigation was done at a tertiary care facility in the Malwa area. People who had SARS-CoV-2 tested during the third wave were the focus of this study, which examined their demographics, from January 1 to January 31, 2022, of whom 17,633 were found to be positive for RT-PCR and 1,26,350 were found to be negative. Positive samples were chosen for further investigation. Positive covid-19 patients were on average 29 years old. The study includes all age groups with 0-20 years 10.18% individuals, 21-40 years 51.16% individuals, 41-60 years 30.98% individuals, and more than 60 years 7.68% individuals. Our test positivity for SARS-CoV-2 was maximum in individuals with age between 21-40 years and minimum in individuals with age >60 years during third wave. A total of 36.13% were symptomatic, while 63.87% individuals were found to be asymptomatic. In other categories, pregnant females were 2.62%, symptomatic individuals

with travel history were 0.53% and 11.99% were hospitalized among total symptomatic population, while category of 24.02% collected samples were not mentioned in the month of January 2022. Second and third week of month was considered epitome for covid-19 positive cases with hyper tension and bronchial asthma as comorbidities in Malwa region. It was concluded from the current study that Punjab has seen comparatively less number of fatalities and hospitalization during third wave.

Our age group results are similar to those published by Sahu⁽⁴⁾ in Odisha, India, and Maechler⁽⁵⁾ in Germany. The findings of present study reflects that intensity of infection was observed in the age group of 21-40 years (51.16%), due to state-wise lockdown, schools, colleges and workplaces were shut down. Age was found to have positive association with the infection as observed by various previous published studies⁽⁶⁻⁹⁾. As compared to younger age group the infection was found to be higher in middle and elderly age group which has been documented in many studies⁽¹⁰⁻¹²⁾. Concomitant comorbidities and likely exposure to other sick people owing to their unrestricted travel might explain the risk. Men

are more likely to be infected with SARS-CoV-2 than women. In prior investigations, men were regularly shown to have a greater infection rate than females (13-16). A nationwide surveillance conducted in India also found more positivity among males and had also observed higher fatality rates. This might be owing to the fact that different genders have distinct immunogenic responses to SARS-CoV-2.

Among the studied districts from Punjab Malwa region, Patiala reported highest number of positive cases during January 2022. Delhi is the neighboring state of Punjab which reported that maximum positivity rate was (approx. 6.3% to 20%) during 2021 (17).

Mild symptoms such as cough, fever, cold were observed during third wave in Malwa region as compared to other waves which witnessed the severe symptoms. These symptoms were similar to common flu, hence hospitalization was very minimal during this period as compared to other waves in Punjab. In addition, our research included a large number of asymptomatic positive people. Similar results were reported in Karnataka and other areas of the globe the previous year (18-21). Co-morbidities, on the other hand, have been linked to the onset of symptoms (22,23). SARS-CoV-2 infection has been associated to co-morbidities such as asthma.

The covid-19 outbreak's case mortality rate has become a serious source of worry. Previously, it was reported that the first and second waves of Covid-19 had a higher mortality rate than the first wave, especially in the second wave. The current study also highlighted the case fatality rate during the 3rd wave in January 2022. It was found that the rate was comparatively lower in the 3rd wave, however higher age group male population got affected in this wave. A second possible explanation for the low case-fatality rate may be due to less severity of the variant and majority of the population was fully vaccinated. Calculating the number of persons infected with the virus proved to be a huge difficulty. Asymptomatic cases and patients with mild symptoms could be left out resulting in overestimation of the CFR.

Conclusion

To our knowledge, this is the first research to

offer an epidemiological and clinical picture of the SARS-Cov-2 positive population during the third wave, which began in January 2022. In totality, the current study showed positivity rate of 12.24% from large population size for SARS CoV-2 from period of 1st January 2022 to 31 January 2022. Most of the positive individuals were asymptomatic with mild symptoms, majorly in male persons with age group of 21-40 years. This data provides the blueprint of preparing imperative strategy for the management of disease spread.

Ethical Approval- Approval taken from Institutional Ethics Committee.

Conflict of Interest – Nil.

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Impact of Education and Socio-Economic Status on Post-Natal Body Weight using Machine Learning Approach

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Abstract

Background: The maternal education and socio-economic status of the mother greatly affect the growth of the baby. Nutritional deficiency is the major cause of motor and physiological disorders in children. Hence, predicting body weight could be used to monitor the growth of the babies. Although the prediction of weights is standardized by World Health Organization (WHO), for babies based on their gender and age; generalizing it for all locations and socio-economic variations is not possible

Method: Hence, in this paper, an ANN-based predictive approach to establish the relationship between the factors like socioeconomic status, age, and prior weights to predict the baby's weight using a locally acquired dataset. This could be helpful for the health workersto properly diagnose the disease a time ahead.

Conclusion: The proposed work suggests predicting the baby's growth rate using Machine Learning (ML) techniques is both an efficient and feasible approach.

Keywords: Neonatal weight, Socioeconomic status, Machine learning, ANN, Regression.

Introduction

During the prenatal phase, fetal growth is influenced by the mother's nutritional status. Economic, social, and cultural considerations could make it difficult for many women in developing countries to receive the quality food and health care. After the childbirth, baby's physical and intellectual growth solely depends on its nutritional intake and indicated by their body weight. Lack of which malnutrition can occur. Malnutrition could be poor diet or insufficient calorie intake, an

uneven calorie intake, and problems induced by sickness, leading to impaired nutrient absorption and excessive nutrient loss, are only a few of them¹. Quality food is the primary source of nourishment as it provides vital chemicals for development lack of which risk of malnutrition increases². 80% of brain development and organ growth occurs within the two primary years of life, hence early detection of a child's sensitivity to malnutrition is critical³. Excessive muscle loss, greater infection, higher complication, increased morbidity and mortality, and poor wound

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healing are all consequences of malnutrition⁴. India has a high population of malnourished children and adults, according to a World Health Organization (WHO) research⁵. The Sustainable Development Goals (SDGs) of eradicating all types of malnutrition by 2030, according to a 2018 WHO and UNICEF assessment, are ambitious, but may not be realized⁶. A curative intervention might be early diagnosis of vulnerability and provision of needed therapy. Several studies imply that the mother's socioeconomic status has an impact on the child's development. The growth of the child could be quantified using his/her observed body weights over a timespan. So, those factors could be considered for applying Machine Learning (ML) techniques to predict the child's weight in advance. The mean body weight of boy and girl according to WHO standards are presented in the figure 1.

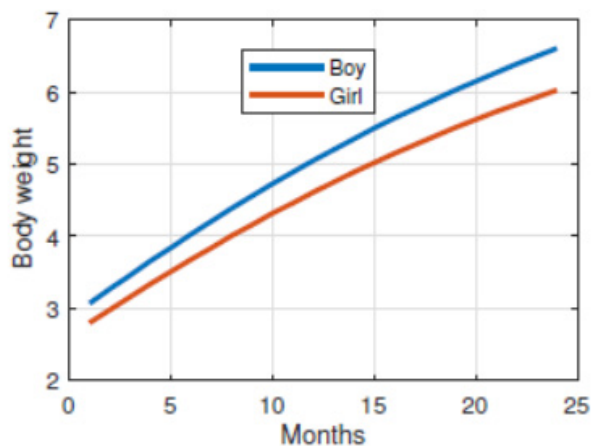


Fig. 1 Mean body weight of boy and girl according to WHO standards

ML techniques might provide a cost-effective solution in terms of money and time for early detection of retarded growth of a child. ML approaches may predict a child's nutritional status with a high degree of accuracy if the model is trained with reliable data.

In this work, ML techniques were used to achieve high-accuracy predictions based on a few critical characteristics. Because this research focuses on predicting baby weight, the mother's socioeconomic position might be a key starting point.

ML based Body Weight Prediction

From several studies suggested that the child's body weight is in linear relation to the mother's socioeconomic status and qualitative nutritional intakes. So, the present study is to predict child's body weight in-relation-to past record of body weight and socioeconomic status of family. In order to identify a correlation between them, ML algorithm is adopted and implemented. Although ML algorithms are extensively applied for regression and classification purposes such as fiscal analysis⁷, remote sensing^{8,9}, health related like diabetes prediction^{10,11}. While, their applications for body weight prediction of child are sparse in literature. Linear and non-linear regression analysis for prediction of neonatal weight at birth is presented in¹². Several such research has been carried out to predict infant weight using probabilistic models¹³, nutritional prediction using artificial intelligence¹⁴, birth weight prediction using neural network^{15,16}, dog body weight prediction using morphological parameters¹⁷. Other than data mining, image processing-based body weight prediction also proved efficient¹⁸. Detection and classification of malnutrition has been successfully implemented using decision tree and artificial neural network approaches¹⁹. In this study, the child's body weight is predicted using Decision Tree and Artificial Neural Network, and compared to find the best alternative.

Decision Tree

For classification and regression, Decision Trees (DT) could be used as a non-parametric supervised learning method. There are three types of nodes in a decision tree which are decision nodes, chance nodes, and end nodes. The contents of the leaf node are the outcome, and the conditions along the route create a conjunction in the if clause in the decision tree. If-then rules are used to apply to DT in general. Classification or regression rules are represented by the pathways from root to leaf.

Artificial Neural Network

Artificial Neural Networks (ANN) are a type of human brain replication that uses mathematical models to produce a computer method for information

processing²⁰. ANN is made up of numerous layers with linked neurons, with each neuron represented as shown in Fig.2. Independent variables characterise the input layer, whereas dependent variables characterise the output layer. The ANN could build the association between input and output hyper-dimensional spaces based on the training data. The back propagation algorithm is commonly used in the ANN training process, which reduce the error function.

The ANN is a function of the input (observation) space X and the output (decision) space Y (Eq. 1).

$$f : X \rightarrow Y \quad (1)$$

The linear connection between the neuron's output and its input feature space with features as might be characterised as in Eq. 2.

$$Y' = \sum_{i=1}^n x_i w_i + b \quad (2)$$

where b is a bias term that is multiplied by the input feature space and added to the sum of weights.

In most real-time applications, highly non-linear systems may be modelled using ANN by including the transfer function. Such a transfer function is characterised by the activation function, as shown in Eq. 3.

$$Y = \varphi(Y') = \varphi\left(\sum_{i=1}^n x_i w_i + b\right) \quad (3)$$

where the activation function is used $\varphi(\cdot)$ often refers to nonlinear functions²¹ like $\text{logsig}()$, $\text{tansig}()$, $\text{purelin}()$, and so on.

Proposed ANN Architecture

The proposed ANN architecture consists of five input features, multiple hidden layers, and a single output neuron for predicting the post-natal body weight. Past three months body weight along with gender, and socioeconomic status of the mother are inclusive of the five input features. The socioeconomic status consists of information such as education, occupation and yearly income of the family. A framework of proposed ANN model is presented in the Figure 2. In the figure, represents the post-natal body weight at present month, similarly and represents the measured body weights in the past months. represents the future prediction of body weight. The scores representing education, occupation and income as specified in the Table 1 are calculated and fed to the ANN with reference to the collected survey data. So, all the input features are of numeric data except gender which is a binary feature. The ANN model further is trained using back propagation technique based on the training data.

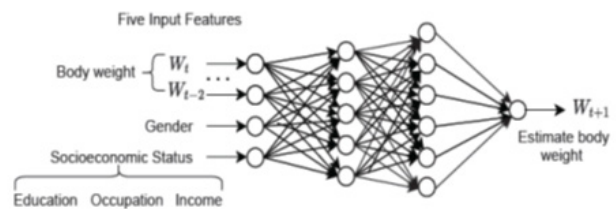


Fig. 2 Proposed framework of Artificial Neural Network

Table 1 Modified-Kuppuswamy scale of reference (February 2019)

Education of Head of the Family	Score	Occupation of Head of the Family	Score	Total Family Income per Month	Score
Professional Degree	7	Professional	10	52,734 and above	12
Graduate or postgraduate	6	Semi professional	6	26,355-52,733	10
Intermediate/diploma	5	Clerical/shop/farm	5	19,759-26,354	6
High school	4	Skilled worker	4	13,161-19,758	4
Middle school	3	Semi-skilled worker	3	7,887-13,160	3
Primary school	2	Un-skilled worker	2	2,641-7,886	2
Illiterate	1	Unemployed	1	Less than 2,640	1

Materials and Methods

Study Area

The study was carried out in various areas of the Ganjam region of Odisha, with the mothers of the volunteers being chosen at random. Ganjam district is one of Odisha's most populous and advanced districts, with inhabitants from various socioeconomic groups. Families from various socioeconomic groups were selected and urban sectors. Data on study parameters was gathered from the sampled families, health workers, community health centres, Anganwadi workers, and the Chief District Medical Officer's office (CDMO). Volunteer families communicated by visitation or over the phone at fixed intervals to acquire data on various aspects of the baby's postnatal development.

Collection of Data

Data was collected throughout and after pregnancy by planned house visits, Anganwadi visits, and phone calls. 312 pregnant women were enrolled in this study, and they were followed up on.

Out of 312 individuals, 300 mothers and their infants (158 boys and 142 girls) were chosen for this study. The research was unable to enrol the 12 individuals since they were unavailable throughout the long-term data gathering phase. According to their socioeconomic position, the women were divided into five categories.

Procedures

Participants were given an information consent document outlining the study's needs and their rights before being asked to submit their information. Pregnant women are asked to provide information such as their age, pregnancy stage, projected delivery date, education, employment, and family monthly income during the initial examination. Following that, post-birth data such as 1) gender, 2) date of birth, 3) birth weight, and 4) health condition were gathered.

Assessment of Mother's Socioeconomic Status (SES)

The SES of women is calculated using the collected data, which includes 1) education, 2)

occupation, and 3) family income. According to the Kuppuswamy scale²² of reference, the SES is further split into five groups. As demonstrated in Table 1 and Table 2, this scale categorizes the sample populations into five SES categories.

Table 2 Socio-Economic-Status (SES), class definitions as per scoring using Modified-Kuppuswamy scale

SES	Class	Total Score
1	Upper	26--29
2	Upper-Middle	16- 25
3	Lower-Middle_3	11--15
4	Upper-Lower	5--10
5	Lower	3--9

Performance Measure

The prediction of post-natal body weight using decision tree approach is validated using three performance measures such as Mean Square Error (MSE), Root Mean Square Error (RMSE), Mean Absolute Error (MAE).

The equation for MSE could be represented

$$MSE = \frac{1}{n} \sum_{i=1}^n (Y_i - Y'_i)^2 \quad (4)$$

The equation for RMSE could be represented as,

$$RMSE = \sqrt{\frac{1}{n} \sum_{i=1}^n (Y_i - Y'_i)^2} \quad (5)$$

The equation for MAE could be represented as,

$$MAE = \frac{1}{n} \sum_{i=1}^n |Y_i - Y'_i| \quad (6)$$

Results and Discussion

Experiments on the collected data is carried out using both Decision Tree Regressor and Artificial Neural Network Regressor. The collected dataset is divided into 10% training and 90% testing data. All the performances reported for the experiments on the testing data. Performance measures such as MSE and RMSE are evaluated for each category of experiments. The results are represented in the form of images and

tables. The Table 3 shows the performance measures of Decision Tree and Artificial Neural Network for prediction of body weight for boys, girls and both. From the Table 3 it is clear that, Decision Tree regressor has low accuracy in comparison to Artificial Neural Network regressor. Similar results could be interpreted for the measures such as , and .

Table 3 Performance comparison of Decision Tree and Artificial Neural Network for prediction of body weight

	ML	MAE	MSE	RMSE
Boy	DT	0.15	0.076	0.275
Girl		0.392	0.161	0.401
Total		0.268	0.115	0.339
Boy	ANN	0.102	0.036	0.186
Girl		0.116	0.078	0.273
Total		0.185	0.052	0.229

Figure 3(A) shows the regression performance of ANN on test data. The Figure 3(A) (a) represents the regression plot, and the Figure 3(A) (b) represents the

residual plot. Since every sample point in the Figure 3(A) (a) is in line with the diagonal reference line, it is obvious that the ANN regressor can accurately estimate body weight. Additionally, it can be seen from the residual plot in Figure 3(A) (b) that the prediction’s divergence from the target body weights is modest and falls within the range of -0.5 to 0.5. This demonstrates how important it is that most projections are about similar to actual body weights.

The effectiveness of Decision Tree’s regression on test data is shown in Figure 3(B). The regression plot is shown in Figure 3(B)(a), and the residual plot is shown in Figure 3(B) (b). It is evident from Figure 3(B) (a) that the ANN regressor can accurately estimate body weight because all of the sample points are lined up with the diagonal reference line. The divergence of the forecast from the target body weights is modest within the range of -1 to 1, as seen from the Figure 3(B) (b) residual plot. This demonstrates how important it is that while the majority of predictions are roughly comparable to the real body weights, they are less so when compared to the ANN regressor.

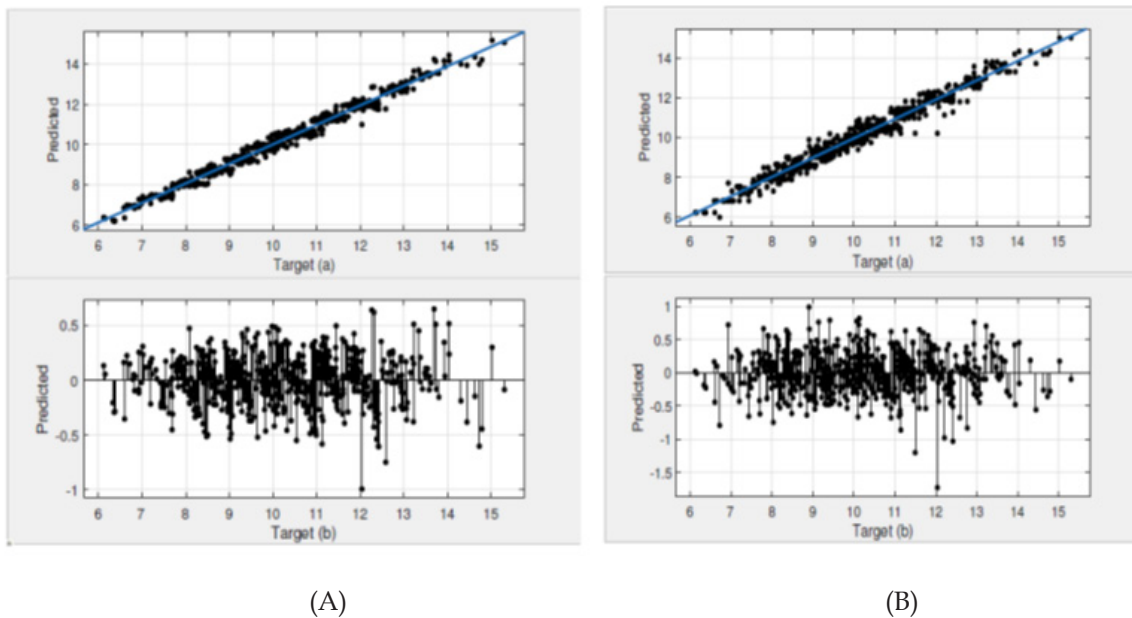


Fig. 3 (A)Regression performance of ANN on test data. The subfigures represent: (a) Regression plot (b) Residual plot.

(B) Regression performance of DT on test data. The subfigures represent: (a) Regression plot (b) Residual plot

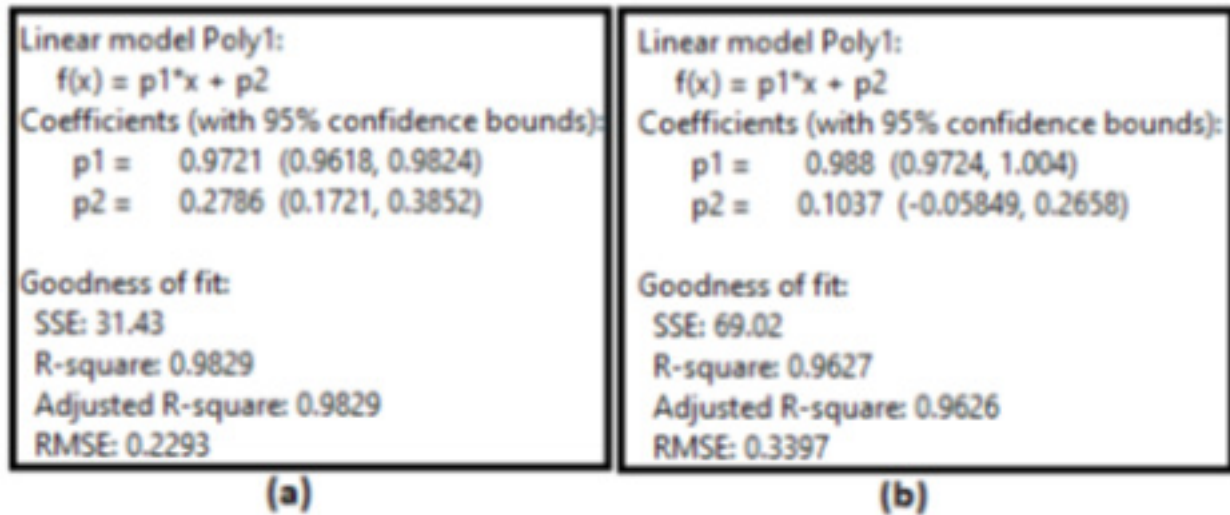


Fig. 4 Regression performance of ANN and DT on test data

The Figure 4 shows the regression analysis of both the ANN and DT regressor. The goodness of fit performances is presented in terms of Sum of Square Error (SSE), R-square, Adjusted R-square and RMSE. The SSE for ANN is 31.43 while for DT it is 69. This represents that, the ANN is predicting the body weight better as compared to the DT regressor. Also, similar interpretation could be observed for R-square, adjusted R-square and RMSE showing the significance of ANN. The obtained results suggest that socioeconomic factor and gender could be considered as one of the factors along with the past body weight information for prediction of body weight.

Conclusion

Effect of maternal education and socio-economic status on growth of neonates is well known in the literature. However, predicting child's body weight using past weight information and socioeconomic factors is limited in research. Also, presently, ML techniques are applied to build such relationship is novel. And from the preliminary findings, to predict the child's body weight in relation with socioeconomic status, the ANN regressor is suggested as compared to the DT regressor.

However, dietary information could be considered as a feature to predict body weight, which could be a future research direction. As the present research is based on data collected from Ganjam

district, Odisha, India, several other data can also be gathered and the proposed approach's global significance could be claimed.

Ethical clearance: Written informed consent from legally authorized representatives/parents/guardians are obtained from the participants of the study.

Source of funding: Self

Conflict of Interest: Nil

Reference

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Diagnostic Role of Serum Protein Electrophoresis

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Abstract

Introduction: Electrophoresis is a technique for separation of different charged particles. It is based on movement of charged particles through a solution when subjected to an electrical field. Since proteins are negatively charged at pH 8.6, subjecting them to electrical field will push protein particles towards anode.

Materials and Methods: Place of Study: This study was carried out in the Department of Pathology, Rampurhat Government Medical College & Hospital, Birbhum, West Bengal, India.

Period of Study: Study was conducted from January 2020 to March 2022.

Study Design: Prospective

Age Group: 1st decade to 8th decade

Control Group: 10 male and 10 female healthy persons of every decade were chosen as control groups.

Result: Cellulose acetate electrophoresis of 150 symptomatic patients performed. Major diseases diagnosed were Multiple Myeloma (24 cases), Chronic inflammatory disease (15 cases), HIV (13 cases), Hematological malignancy (10 cases), solid malignancy (10 cases), tuberculosis (7 cases) with some Miscellaneous conditions.

Among the 28 Monoclonal Gammopathy cases studied (100%), the most common case was Multiple Myeloma (24 cases, 85.71%) followed by 2 cases of Solitary Plasmacytoma (7.15%) and 1 case of Monoclonal Gammopathy of undetermined significance (MGUS) (3.57%) and 1 case of Smoldering Myeloma (3.57%).

Keywords: Serum Protein, Electrophoresis, Multiple Myeloma, Solid Malignancy

Introduction

Electrophoresis is a technique for separation of different charged particles. It is based on movement of

charged particles through a solution when subjected to an electrical field⁵. Since proteins are negatively charged at pH 8.6, subjecting them to electrical field

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will push protein particles towards anode. Weight and charge on different protein fractions separates them out into albumin (molecular wt 69000), α_1 and α_2 -globulin (molecular wt 140,000), β and γ globulin¹². Electrophoresis initially started as moving boundary electrophoresis in which boundaries of medium used to move to separate protein fractions. Later on it was improved in the form of zone electrophoresis in which electrophoretic support medium was static and after application of serum sample, different protein particles used to migrate on it⁹. Various support media are used in electrophoresis depending upon the type of electrophoresis e.g. serum proteins, enzymes, lipoproteins etc³. It includes paper, cellulose acetate, starch gel, agarose gel and polyacrylamide gel. Factors affecting mobility include size and shape of particles, ionic strength of solution, viscosity and temperature of the medium².

Separation of serum protein fractions is very important for the diagnosis of different diseases like paraproteinaemias, haemoglobinopathies, immune deficiency and genetic abnormalities. It is also helpful along with other investigations in chronic liver disease, malignancies and collagen disease. In multiple myeloma it is also helpful in monitoring the treatment¹⁷.

Materials & Methods

Place of Study: This study was carried out in the Department of Pathology, Rampurhat Government Medical College & Hospital, Birbhum, West Bengal, India

Period of Study: Study was conducted from January 2020 to March 2022.

Study Design: Prospective

Age Group: 1st decade to 8th decade

Control Group: 10 male and 10 female healthy persons of every decade were chosen as control groups.

Inclusion criteria for study:

All the suspected and diagnosed cases of dysproteinemia were included. Male and female were chosen randomly.

Exclusion Criteria:

1. Undiagnosed cases of pyrexia of unknown origin (PUO)
2. Patients receiving steroid therapy / Immunosuppressive or chemotherapy or has undergone transplantation.
3. Patients below 6 months of age or more than 80 yrs.
4. Patients with malnutrition.

Study of cases:

All, cases registered in the study were interviewed for detailed history, clinically examined thoroughly and underwent Cellulose Acetate Electrophoresis.

Selective Monoclonal Gammopathy cases were undergone immunofixation by capillary zone electrophoretic (CZE) method.

Results

A total number of 150 cases were included in this study. Different monoclonal and polyclonal gammopathy cases were studied electrophoretically. In this study maximum number of patients was in polyclonal gammopathy group(75.33%). Irrespective of clinical manifestation,6% cases were electrophoretically normal and 18.67% cases were in monolonal gammopathy group. Out of 150 cases (**Table-1**)most common case was Multiple Myeloma (20.16%) followed by Chronic inflammatory diseases (12.60%) and HIV (10.92%). single case of MGUS, Smoldering Myeloma,were studied.

In this study age range was from 1st to 8th decade(**Table-2**). Maximum cases were in 4th and 6th decade. Minimum number of cases was in 1st decade. Study shows that male female ratio is almost equal (1.22:1). Different polyclonal and monoclonal gammopathy conditions studied in our study.

Among the 28 Monoclonal Gammopathy cases(100%) in our study, the most common case was Multiple Myeloma (24 cases,85.71%) followed by 2 cases of Solitary Plasmacytoma(7.15%) and 1 case of MGUS (3.57%) and 1 case of Smoldering Myeloma (3.57%). Out of 28 cases of Monoclonal gammopathy(100%), in 24 cases (85.71%) monoclonal spike is in the gamma region. Rest 4 (14.29%) of cases monoclonal spike is in the beta region. No monoclonal spike is in alfa 2 region. We also found

that most common type of monoclonal protein was IgG Kappa.

10 Solid malignant cases studied electrophoretically. Albumin concentration decreased in 60% of cases (Table-3). But Alfa -1 and Alfa -2 protein concentration were normal in 100% and 90%

of cases. β -globulin concentration were normal in all cases. Gamma globulin concentration was raised in 60% of cases. Most of the HIV cases showed normal electrophoretic pattern except one case which showed hypogammaglobulinemia and 3 cases of polyclonal hypergammaglobulinemia (Table-3).

Table 1: Major Disease Studied (n = 119), Miscellaneous Conditions Studied (n = 31), Monoclonal Gammopathy Cases Studied (n = 28)

	Disease	Cases	
		No	Percentage
Major Disease(n=119)	Multiple Myeloma	24	20.16
	Chronic Inflammatory Disease	15	12.60
	HIV	13	10.92
	Hematological Malignancy	10	8.40
	Solid Malignancy	10	8.40
	Protein Losing Enteropathy	8	6.89
	Tuberculosis	7	5.88
	Iron Deficiency Anaemia	7	5.88
	Cirrhosis of Liver	5	4.20
	Congenital Hemolytic Anaemia	5	4.20
	Schizophrenia	5	4.20
	Total Cases	119	100
Miscellaneous Conditions(n=31)	Pregnancy	4	12.90
	Inflammatory Bowel Disease (IBD)	3	9.67
	Nephrotic Syndrome	3	9.67
	Diabetes Mellitus	3	9.67
	Chronic Osteomyelitis	2	6.45
	Autoimmune Thyroiditis	2	6.45
	Hepatitis -C	2	6.45
	Chronic Bronchitis	2	6.45
	Alfa - Anti-Trypsin Deficiency	2	6.45
	Solitary Plasmacytoma	2	6.45
	MGUS	1	3.22
	Smoldering Myeloma	1	3.22
	Epilepsy	1	3.22
	Bisalbuminemia	1	3.22
	Total	31	100
Monoclonal Gammopathy Diagnosis(n=28)	Multiple Myeloma	24	85.71
	Solitary Plasmacytoma	2	7.15
	MGUS	1	3.57
	Smoldering Myeloma	1	3.57
	Total	28	100

Table 2: Distribution of cases(n=150) according to age and gender

Age group in years	Cases			
	Male	Female	No of cases	Percentage
0-10	2	2	4	2.66
11-20	4	3	7	4.67
21-30	8	11	19	12.67
31-40	17	13	30	20
41-50	10	9	19	12.67
51-60	18	12	30	20
61-70	15	11	26	17.33
71-80	8	7	15	10
Total	82	68	150	100%

Table 3: Electrophoretic Pattern of HIV Cases Studied (n = 13) & solid malignancy Cases(n=10)

Electrophoretic Pattern of HIV Cases (n = 13)								
Parameter	Normal		Increased		Decreased		Total	
	No	%	No	%	No	%	No	%
Albumin conc.	9	69.23	0	0	4	30.67	13	100
α 1 Protein conc.	11	84.61	2	15.39	0	0	13	100
α 2 Protein conc.	11	84.61	1	7.69	1	7.69	13	100
β-globulin conc.	12	92.30	1	7.70	0	0	10	100
γ-globulin conc.	9	69.23	3	23.07	1	7.69	13	100
Electrophoretic Pattern of solid malignancy cases (n = 10)								
Albumin conc	4	40.00	0	0	6	60.00	10	100
α 1 Protein conc.	10	100.00	0	0	0	0	10	100
α 2 Protein conc.	9	90.00	1	10.00	0	0	10	100
β-globulin conc.	10	100.00	0	0	0	0	10	100
γ-globulin conc.	4	40.00	6	60.00	0	0	10	100

Discussion

This study was conducted to assess the diagnostic significance of serum protein electrophoresis, to study different monoclonal gammopathy cases, to diagnose, screen and differentiation of different polyclonal gammopathy cases on the basis of serum protein electrophoresis in proper clinical setting.

In our study, 150 Cases of suspected and diagnosed dysproteinemic cases were studied electrophoretically. All the cases studied were in the age range of 1st to 8th decade. Maximum number of cases was in the 4th and 6th decade. Minimum number of cases was in the 1st decade. The result of the study

as regard to the age incidence of patient is compatible to the study done by Gowenlocketal (1987).⁵

Out of 150 cases most common group was of polyclonal gammopathy cases (75.33%), monoclonal gammopathy cases were of 18.67% and 6.00% of patients irrespective of different clinical manifestations revealed normal electrophoretic pattern.

Nearly similar observation shown by Waqar Azimetal¹⁶who had taken 1556 patients. Out of that 340 had normal electrophoretic pattern, 125 cases were of monoclonal gammopathy and 1091 cases were of polyclonal gammopathy. Similar observation

also made by Theodorexetal¹⁴.

In the present study Male / Female distribution was nearly 1:1.

Nearly similar sex ratio observed in a study by Dispenzieriet al (May 2001)⁴. In that study out of 148 patients 59% were female and 41% were male.

Different polyclonal and monoclonal gammopathy conditions studied in our study. Out of 150 cases most common case was Multiple Myeloma (20.16%) followed by Chronic inflammatory diseases (12.60%) and HIV (10.92%). single case of MGUS, Smoldering Myeloma, were studied.

According to Mayo clinic data (2001)¹³, 122 out of 148 patients with polyclonal gammopathy, Liver disease was the most common cause, followed by Connective tissue disease (22%), Chronic infections (6%), Hematological Disorders (5%) and Non hematological diseases (3%).

Among the 28 Monoclonal Gammopathy cases(100%)in our study, the most common case was Multiple Myeloma (24 cases, 85.71%) followed by 2 cases of Solitary Plasmacytoma(7.15%) and 1 case of MGUS (3.57%) and 1 case of Smoldering Myeloma (3.57%).

This result is not matching with Mayo clinic data of 2006⁷. They examined 1684 cases of Monoclonal Gammopathy. Out of which most common condition was Monoclonal Gammopathy of Undetermined Significance(MGUS)(55%) followed by Multiple Myeloma (16.5%) followed by Amyloidosis (11.5%), Lymphoproliferative disorders(4%), Smoldering Myeloma(3%), Solitary Plasmacytoma (2%), Waldenstorm's Macroglobulinemia(2%) and others (6%).

The cause of may be

- Our study group is small (28 patients) in respect to Mayo clinic study group (1684).
- In our study only symptomatic patients were studied, good number of MGUS patients are asymptomatic.

Out of 28 cases of Monoclonal gammopathy(100%), in 24 cases (85.71%) monoclonal spike is in the gamma region. Rest 4 (14.29%) of cases monoclonal spike is

in the beta region. No monoclonal spike is in alfa 2 region.

According to Wintrob's Clinical (2009)⁸ Hematology "A monoclonal spike is seen as a discrete band that usually migrates to the gamma or beta region of the electrophoretic strip and rarely to the alfa - 2 region.

Out of 10 Multiple Myeloma cases studied by Immunofixation method showed that the most common case was IgG (70%) Kappa (80%).

According to Alexanian R. et al (1999)¹ in Multiple Myeloma, monoclonal proteins in order of frequency are

IgG	:	61%
IgA	:	27%
Light chain only	:	25%
IgM	:	8%
Biclonal	:	5%

10 Solid malignant cases studied electrophoretically. Albumin concentration decreased in 60% of cases. But Alfa -1 and Alfa -2 protein concentration were normal in 100% and 90% of cases. β -globulin concentration were normal in all cases. Gamma globulin concentration was raised in 60% of cases.

Stephen R. Vavricka (2009)¹⁵ made nearly similar observation. They observed increase of Alfa -1 globulins and especially Alfa -2 globulins due to an increase of acute phase proteins. An increase of the gamma fraction can occasionally be observed in end-stage patients.

Graham et al (1963)⁶ also made similar observation. They did electrophoresis of 97 solid malignant cases. Albumin proportion was decreased in most of the cases. Total Alfa-2 globulin proportions were significantly elevated in all but skin cancer. In the Gamma globulin areas the effects were scattered.

Samuel Lifshitz et al (1980)¹¹ observed decreased albumin and increased Alfa-1, Alfa -2 and Beta globulins, in solid malignant cases.

Electrophoretic pattern of 13 diagnosed

HIV patients, showed that 9 cases (69.23%) of patients have normal electrophoretic patterns. 3 cases (23.07%) of patients showing polyclonal hypergammaglobulinemia and 1 patient (7.70%) showed hypogammaglobulinemia.

Gary L. Horowitz et al (2007)¹⁰ made nearly similar observation. They studied 320 HIV infected patients. Protein electrophoretic pattern (PEP) was normal in 83.8% of samples, 8.1% had subtle oligoclonal monoclonal band concentration banding, 4.4% had low concentration monoclonal band. Hypogammaglobulinemia and polyclonal hypergammaglobulinemia occurred in 1.9% each.

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Community Health Nurses' Role in Genetic Sequencing: A Prospect for Health Team Preparedness Against Covid-19

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Abstract

Genetic sequencing is a scientific process of reading genetic material using advanced technology. Through genetic sequencing, we can better comprehend super-spreader events and outbreaks, and strengthen national public health responses. A better understanding of the transmission of viruses, the severity of patient illness, and mortality rates can be gained by combining this information with that from the IDSP and patient reports. Connecting the dots between the data and the host's genetics, immunology, clinical outcomes, and risk factors is also possible. Many roadblocks must be overcome before raw sequence data can be put to direct clinical application. Since DNA sequencing has so many potential applications in the field of nursing, it ought to be a required topic for students in the profession. Group wellness Preparing patients for procedures, identifying those most at risk, doing sentinel surveillance, and conducting in-depth studies are all areas in which nurses can be of assistance. The goals of this paper are twofold: (1) to present the notion of genetic sequencing and (2) to highlight the role of Community health nurses. To reduce the impact of pandemics and endemics and improve nursing care, Western countries are seeing an uptick in the participation of nurse scientists in genetic sequencing; the case of newborn screening provides a particularly apt example.

Key words: Genetic sequencing; epidemics; community health Nurses

Introduction of Genetic Sequencing

Genomics is "the study of all of a person's genes, including the interaction of genes with each other and the environment," according to the NIH, genetics is the "research of genes and their involvement in inheritance of illness." Genome project has advanced the knowledge related to gene and chronic diseases [1]. All living things, including bacteria, plants, and mammals, have their own genetic code, or genome,

which is made up of nucleotide bases (A, T, C, and G). If you know the order of the bases in an organism, you have found its unique DNA fingerprint, or pattern. Sequencing means to figure out the order of the bases. Whole genome sequencing is a lab process that tells in one step how the bases in an organism's genome are put together. Genetic sequencing understanding will help the in preparation of the nursing workforce for the future of personalized healthcare [1].

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Genetic sequencing for public health: This helps us understand super spreader events, outbreaks, and boost public health responses across the country. When this data is combined with IDSP data and patient symptoms, we can learn how viral infections spread, how sick patients get, and how many die. The data can also be linked to the host's genetics, immunology, clinical outcomes, and risk factors. [2]

Background: Recently the Indian SARS-CoV-2 Genomics Consortium (INSACOG)^[2] was formed by the Union Health Ministry of Health, the Department of Biotechnology (DBT), the Council for Scientific and Industrial Research (CSIR), and the Indian Council of Medical Research (ICMR). CoV-2's INSACOG is a multi-laboratory, multi-agency, Pan-India network to track SARS-CoV-2 genomic alterations. This is done by the NCDC in Delhi and the CSU under the Integrated Disease Surveillance Program (IDSP). The data from genome sequencing labs are examined based on field data patterns to see if genomic variations are linked to epidemiological trends. The group is attempting to link genomic sequencing with clinical outcomes. The partnership has put up a network of hospitals to study the host's immunological response and COVID's long-term impact on immunity. This section of the consortium will examine clinical correlations between moderate and severe COVID cases, as well as long-term consequences and immune alterations. Many variants have been uncovered using INSACOG's Whole Genome Sequencing operations.^[2]

Steps in Genetic sequencing ^[1]

1. **DNA shearing:** First, scientists use molecular scissors to cut the DNA, which is made up of millions of bases (A's, C's, T's, and G's), into pieces that are small enough for the sequencing machine to read.
2. **DNA bar coding:** Scientists use small pieces of DNA tags, or bar codes, to figure out which bacteria each piece of cut DNA belongs to. This is like how a bar code at a grocery store tells you what a product is.
3. **DNA sequencing:** DNA sequencing is done by putting the bar-coded DNA from several different bacteria into a DNA sequencer. The sequencer figures out which A's, C's, T's, and G's, also called bases, and are in each bacterial sequence. The bar code is used

by the sequencer to keep track of which bacteria's bases go with which bases.

4. **Data analysis:** Scientists use computer tools for data analysis to compare the sequences of different bacteria and find differences. Scientists can tell how closely related the bacteria are and how likely it is that they are all part of the same outbreak by the number of differences between them.



Figure 1: steps in genetic sequencing

Genetic sequencing in Nursing care: High-throughput DNA sequencing is now both economically and technically feasible, which means it can be used to develop treatments for people at high risk of inherited disorders. Western nation studies in review Suggest Nurse Scientists are uniquely qualified to assess reports based on DNA sequencing and to explain genetic information to patients and their families, both of which can have a considerable impact on health outcomes; neonatal genomic screening is a prime example of their work⁵. There are a lot of obstacles on the way from raw sequence data to direct clinical use. Benefits of genetic sequencing suggest it should be incorporated in Nursing curriculum ^[6]. Because Nurses are frontline health workers, nurses can make a huge impact in the lives of persons with genetic disorders ^[8]. In order to better assist those patients in most need, nurses in clinical practice and those in research will share their experiences and insights with one another. Gene discoveries impact community health nurses. Nurses identify genetic disease risk groups and participate in newborn screening, carrier discovery, and pre symptomatic genetic testing programs ^[13]. Newborn screening is a way for the public health system to find rare but treatable health problems in young babies. In the US, nurses, nurse educators,

and nurse researchers can make a difference in the field of newborn screening by making sure programs are carried out safely and effectively, by helping to educate the nursing workforce, and by creating and contributing to research programs in newborn screening^[3]. Community health nurses give direct nursing care to people with genetic diseases. The community health nurse's duty includes protecting clients from hazardous genetic information, developing and implementing genetic screening programs, and locating genetic resources^[8]

Proposed Role of community health Nurses in genetic sequencing^{[6][7][8]}:

1. **Building knowledge:** Community health Nurses can build knowledge among members regarding genetic sequencing procedure, its benefits which will develop readiness among community members for testing.
1. **Motivation:** Community health Nurse can work for motivation of family members or community members for choosing genetic sequencing as safest method of diagnosis.
2. **Epidemiology :**Community health Nurses identify Burden of hereditary diseases through survey can be identified and refer for genetic sequencing for accurate diagnosis.
 - **Sample Collection :** Collection of sample can be assisted by community Health Nurses.
 - **Sentinel surveillance:** During pandemic genetic sequencing will serve in early identification of variants. CHOs, Community health Nurses can help in updating the information through sentinel sites.
 - **Research practices:** Evidence based researches can be generated to promote its clinical utility for choosing better treatment options.

Conclusion

Community health nurses can broaden their scope of practice by learning the basics of DNA

sequencing to better assist with routine community care and emergency situations such as those caused by pandemics, epidemics, and endemics.

Conflict of interest: none

Source of funding: nil

Ethical clearance: This study is a perspective article regarding role of community health nurses no subjects are direct involved in this study so ethical clearance is not applicable.

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Assessment of Determinants of Sleep Deprivation amongst Post Graduate Students of Government Medical College, Amritsar

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Abstract

Background: Sleep is an active, repetitive and reversible state of perceptual disengagement from the environment. A chronic lack or poor quality sleep increases the risk of various disorders. Post graduate students is at the top of the list of sleep deprived individuals.

Material and methods: A cross sectional study was conducted amongst the post graduate students of Government Medical College, Amritsar. All the post graduate students admitted to various pre, para and clinical departments during the years 2018, 2019 and 2020 formulated the sample size for this study. Semi structured proforma were developed for data collection. Chi-square test was applied, where p-value of <0.05 (on both sides) was considered to be statistically significant

Results: According to PSQI poor sleep quality was among 178(58%) post graduate students, excessive daytime sleepiness according to ESS was among 120(40%) post graduate students and sleep hours <7 hrs were among 182 (66%) post graduate students. After compiling results of all three, 223(72%) post graduate students were found to be sleep deprived. Association of sleep deprivation with sleep hygiene and night duties was found to be statistically significant.

Conclusion: Increased amount of workload on the residents and more number of night duties affect the sleep of the post graduate students and majority of them feel exhausted and fatigued after their night duties.

Keywords: sleep deprivation, daytime sleepiness, post graduate students, night duties, sleep hygiene, workload,

Introduction

Sleep is an active, repetitive and reversible state of perceptual disengagement from the environment. It is a physiological process essential to life. It is an

important part of the daily routine. Human beings spend about one third of their daily time in sleeping.¹

It serves different functions such as growth and repair, learning and memory consolidation etc. Both

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the quantity and quality of sleep play an important role in an individual's psychological and physical well-being. Sound sleep gives boost to all types of tissue, organ and system in the body, thereby improving the output from brain, heart, lungs etc. besides better immune function, metabolism and mood elevation as well. A chronic lack or poor quality sleep increases the risk of disorders such as high blood pressure, cardiovascular disease, diabetes, depression, and obesity.²

The requirement of sleep tends to change over the course of human life, Newborns sleep for about 12-18hrs, the demand for sleep reduces to 10hrs in children of 5-10 yr, followed by teenagers (Adolescent 8-9 hrs) and adult (7-8 hrs).³ Sleep deprivation is a general term is a state caused by inadequate sleep (sleep <7hrs) or poor quality of sleep or daytime sleepiness.^{4,5}

Post graduate students is at the top of the list of sleep deprived individuals. The factors responsible for it includes: pressure of academic deadlines, erratic schedules, overnight on call duties, pre sleep cognition activities like active thinking, worrying, planning and analysing at bed time. Long working hours comprising of outpatient department (OPD) duties, indoor patient care and emergency services and night duties, results in shortage of time for other equally important activities in personal and social life.

Materials and Methods

Study setting: The present study was conducted under the department of Community Medicine, Government Medical College, Amritsar, where study population was selected from various departments (clinical, para-clinical and pre-clinical) of the institute.

Study population: Post graduate students of all the departments (clinical, para-clinical and pre-clinical) studying in Government Medical College, Amritsar formulated the study population for the study.

Study period: The present study was proposed to be conducted over a period of one year that is 1st April 2020 to 31st March 2021.

Sample size: All the post graduate students

admitted to various pre, para and clinical departments of Government Medical College Amritsar during the years 2018, 2019 and 2020 formulated the sample size for this study.

Sampling technique: Universal sampling technique was used for the current study according to which all the post graduate students admitted with effect from year 2018-2020 were selected after applying pre-specified inclusion and exclusion criteria.

Data collection tool: Semi structured proformae were developed for data collection which consisted of sections shown below:

PROFORMA I:

Section A- this includes the socio demographic profile of post graduate students.

Section B- this includes the Pittsburgh Sleep Quality Index (PSQI) scale (A standardized questionnaire). This was used to measure the quality and sleeping pattern among post graduate students. It consists of 19 self rated questions. These items are combined to form 7 components scores, each of which has a range of 0-3 points in all cases, 0 indicates no difficulty and 3 indicates severe difficulty. The 7 components scores are then added to yield 1 global score which ranges from 0-21, where 0-indicates no difficulty and 21 indicates severe difficulties in all areas.

Section C- This includes the Epworth Sleepiness Scale (ESS) (a standardized scale) which is a subjective measure of patient sleepiness. It consists of list of 8 situations which are rated on the tendency of the respondent to become sleepy on a scale of 0 (no chance of dozing) to 3 (high chance of dozing). The values of each response are added to give us the total score which ranges from 0-24.

PROFORMA II

Section 1: This includes semi structured questionnaire which included all the possible factors affecting sleep among post graduate students. It also included questions related to assessment of quality of life.

Section 2: Satisfaction with Life Scale (SWLS) (a standardized scale) which consists of 5 statements that are marked on a scale of 1-7.

Operational definitions:

Sleep deprivation is a general term is a state caused by inadequate sleep (sleep <7hrs) or poor quality of sleep or daytime sleepiness.^{4,5}

In our study, the prevalence of sleep deprivation among post graduate students was determined by using following criteria:

Sleep quality - PSQI score ≤ 5

Daytime sleepiness - ESS score > 10

Average sleep time <7hrs

Quality of life: Quality of life is a highly subjective measure of happiness that is an essential component of many financial decisions. Factors that play a role in the quality of life vary according to personal preferences, but they often include financial security, job satisfaction, family life, health, and safety.⁶

Methodology

This cross sectional study was conducted after obtaining ethical approval from the institutional ethical committee among all the post graduate students enrolled during the years 2018, 2019 and 2020 at Government Medical College, Amritsar.

Prior to the commencement of the study, department wise lists of post graduate students admitted in above mentioned years was obtained from the Office of Director Principal, Government Medical college, Amritsar. Further, the duty rosters and mobile numbers were collected from the respective departments so that each one could be contacted during their free time.

After contacting each post graduate student telephonically, time and place suitable to them in the hospital/ college premises was decided and one to one interviews with them were held at the pre-decided slot/ time. Prior to the start of the interview, the aims and objectives of the study were explained clearly to each participant and written informed consent was taken. Each participant was contacted twice that is during phase 1 and phase 2 of the study. During the phase 1, information on socio-demographic profile was collected on a pre-tested and structured proforma, during the same phase sleep quality and

daytime sleepiness were also assessed using PSQI and ESS respectively. Because of the complexity involved in calculation of PSQI and the time required for each interview (approximately 30 minutes), participants were contacted again in phase 2 of the study, during which the results of PSQI and ESS were conveyed. After conveying the above result to each participant, they were again interviewed in which proforma II was filled and information pertaining to determinants of sleep deprivation, quality of life and satisfaction with life was collected. This phase of interview took approximately 45 minutes. Because filling of the proformae took about 1hr and 15 minutes and sparing such a long time for the same by post graduate students in one sitting was difficult, hence this study was conducted in 2 phases to avoid any inconvenience and to improve the participation.

Any post graduate student who failed to give an informed consent for participation in the study, who could not be contacted on 3 consecutive visits as well as was with diagnosed sleep disorders were excluded from the study.

Statistical analysis:

The data was compiled and analyzed using Microsoft Excel and Epi info CDC USA. The individual scores of each participants for PSQI, ESS and satisfaction with life scale were calculated after summing up the responses to each item. Mean scores \pm standard deviation for each scale were calculated. The individual scores were interpreted against standardized protocol where for the calculation of prevalence of sleep deprivation among post graduate students fulfilling any of these three criteria i.e. PSQI ≥ 5 , Average sleep time 10 were taken as numerator where as all the post graduate students were taken as denominator. For further analysis the whole sample size was categorized into sleep deprived which consisted of those who fulfilled any of the all three above criteria and non sleep deprived, those who did not fulfill any of the above three criteria. For determining the association of various factors with sleep deprivation, chi-square test was applied where p-value of < 0.05 (on both sides) was considered to be significant. If any of the expected cell value was < 5 then Fischer's- exact test was used.

The distribution of data for various nominal and categorical variables was represented as frequencies and proportions where as mean \pm standard deviation was calculated for all the continuous variables.

Results

This cross sectional study was conducted among post graduate students of Govt. Medical College,

Amritsar. This study was conducted in a phased manner where in Phase 1 total of 306 post graduate students were interviewed to assess sleep deprivation. During phase 2 the information on various factors associated with sleep deprivation was sought from 274 students. The data was analyzed using Microsoft Excel and Epi info to obtain following results.

Table 1: Distribution of post graduate students according to socio-demographic profile (N=306).

Variable	Number	Percentage
Sex		
Male	114	38
Female	192	62
Religion		
Hindu	173	57
Sikh	128	41
Others	05	02
Caste		
General	208	67
SC/ST	79	27
OBC	19	6
Residential Area		
Rural	28	09
Urban	278	91
Type of Family		
Nuclear	249	81
Joint	57	19
Department		
Clinical	235	77
Para-Clinical	68	22
Pre -Clinical	3	1

Table 1 shows the distribution of post graduate students according to their socio demographic profile, where females were higher in number (192;62%) in comparison to males(114;38%). Majority of the post graduate were Hindu (57%) by religion followed by Sikh (41%) religion. 67% belongs to the General Caste and majority i.e. 91% resided in the Urban areas. As far as department of posting was concerned, 77% were from clinical branches and only 1% (3) were from preclinical branches. Mean age of the post

graduate students was 28.28 ± 2.9 which ranged from 24 to 42 years

According to PSQI poor sleep quality was among 178 post graduate students , excessive daytime sleepiness according to ESS was among 120 post graduate students and sleep hours <7 hrs were among 182 post graduate students. After compiling results of all three, 223 post graduate students were found to be sleep deprived.

Table 2: Distribution of postgraduate students according to pattern of night duties (n=156)

Variable	Number	Percentage
Night duties/month		
4-5	49	31
6-7	40	26
≥8	67	43
Time to sleep during night duty		
Yes	63	40
No	35	23
Sometimes	58	37
Duration of sleep after night duty		
4-5hrs	63	40
6-7hrs	83	54
>7hrs	10	06

Among the post graduate students who did night duties, 43% had ≥8 night duties in a month and 23% did not get any time to sleep during the night duties (table 2). Sleep pattern after night duty where,

average duration of sleep after night duty for almost half of postgraduates (54%) was 6-7hrs whereas only 6% got to sleep for >7 hrs.

Table 3: Association of sleep deprivation among post graduate students with the pattern of night duties (N=156)

Variable	Sleep deprived (n=139)	Non sleep deprived (n=17)	χ ² (p-value)
Night duties/month			
4-5	39 (28)	10 (58)	11.17 (0.003)* df=2
6-7	34 (24)	06 (35)	
≥8	66 (48)	01 (07)	
Time to sleep during night duty			
Yes	105 (75)	16 (94)	10.44 (0.005)* df=1
No	34 (25)	01 (6)	
Sleep Quality after Night Duty			
Uninterruptedat least for 4 hrs	48 (34)	05 (30)	0.17 (0.673) df=1
Disturbed	91 (66)	12 (70)	

- All figures in parenthesis are percentages
- * p < 0.05 is considered to be significant

Table 3 shows the association of sleep deprivation among post graduate students with pattern of night duties, where among the sleep deprived about half of the post graduate students (48%) were doing ≥8 night

duties/month whereas 58% of non sleep deprived were doing lesser number of night duties per month i.e. 4-5 and this difference was found to be statistically significant. Two third (75%) of the sleep deprived got to sleep during the night duty which was significantly lower than non sleep deprived (94%).

Table 4: Association of sleep deprivation among post graduate students with their satisfaction with life scale (N=274)

Satisfied with life	Sleep deprived (n=223)	Non sleep deprived (n=51)	χ^2 (p-value)
Satisfied	103 (46)	38 (74)	27.77 (0.000)* df=2
Neutral	23 (10)	11 (22)	
dissatisfied	94 (44)	02 (04)	

- All figures in parenthesis are percentages
- *p < 0.05 is considered to be significant

Table 7 shows the association of sleep deprivation among post graduate students with satisfaction with life scale, where a significantly higher proportion of non sleep deprived were satisfied (74%) and neutral (22%) on satisfaction with life scale in comparison to 46% and 10% of sleep deprived respectively. 44% of sleep deprived were dissatisfied with life in comparison to 4% of non sleep deprived.

Discussion

In the present study, the prevalence of sleep deprivation among post graduate students was determined as per any of the three criteria, viz. Global Pittsburg Sleep Quality Index (PSQI) which determines sleep quality, Epworth Sleepiness Scale (ESS) which determines daytime sleepiness and average sleep time,

Poor sleep Quality: As per PSQI, the present study has shown that, 178(58%) of post graduate students had poor sleep quality with mean score of 5.65 ± 3.4 which was higher than the cut off of 5. This study was comparable with the study conducted by Garg S, in which 65% of the post graduate students had poor sleep quality.⁷

Daytime sleepiness: As per the ESS, the present study has shown 40% post graduate students had daytime sleepiness of which, 30% had mild daytime sleepiness while 8% had moderate daytime and 2% had severe daytime sleepiness. The mean value of ESS was 9.07 ± 3.85 . Our study was comparable with studies conducted by Siddalingaiah HS et al and by Sharma A et al, where the prevalence of daytime sleepiness among post graduate students was 47.4% and 33.3% respectively.^{8,9}

Average sleep time: According to the Mayo clinic, the average sleep time of adults should be between 7-9 hrs and total time less than 7 hours is considered as insufficient sleep or sleep deprivation.¹⁰ The present study has indicated that 182 (66%) post graduate students had <7hrs of sleep which is comparable with the study conducted by Garg S¹⁰

In the present study majority (62%) of sleep deprived post graduate students were doing night duties whereas opposite trend was observed among non-sleep deprived, where 67% were not doing night duties. This difference was found to be statistically significant. Comparable results were found in a study conducted by Qanash S et al where 71% of night shift workers had poor sleep quality.¹¹

In the present study, 44% of sleep deprived post graduate were dissatisfied with their life as compared to 2% of non sleep deprived. Comparable results were found in the study conducted by Singh A et al where satisfaction with life had positive correlation with sleep deprivation.¹²

Conclusion

Present study highlights the prevalence of sleep deprivation among post graduate students of Government Medical College, Amritsar and also identifies the determinants of sleep deprivation. The results of this study reflects that workload on the residents and number of night duties affects the sleep of the post graduate students and majority of them feel exhausted and fatigued after their duties. This study also indicates that sleep deprivation is more among post graduates who were not satisfied with their life.

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Conflict of interest- Nil

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Post Vaccination Adherence to Covid Appropriate Behavior: A Cross Sectional Study

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Abstract

Introduction: COVID-appropriate behavior refers to the development of those habits that may serve to limit the disease's spread and, thus, reduce the number of individuals affected. Vaccinated individuals may be less willing to comply with COVID-appropriate conduct due to their perception of a diminished health risk. Consequently, the present study was conducted to assess public's attitude regarding COVID preventive measures following vaccination.

Methodology: This cross sectional study was conducted among adults aged 18 and above. 200 individuals who had received either both doses of COVID-19 or at least one dosage of either COVID-19 participated in this survey, which was performed online and involved the distribution of a self-administered questionnaire via social media.

Results: Covishield was the most commonly administered vaccination (70%), followed by Covaxin (23%). The majority of respondents adhered to mask use after vaccination (82.5%), but 15% of respondents adhered to mask use less after vaccination than before. 2.5% of respondents reported an increase in mask use. Physical distancing was shown to be less after vaccination among (65.5%) than before vaccination. 19% of study participants reported that their frequency of hand washing with soap and water decreased following vaccination. 31% of respondents said that their usage of hand sanitizer dropped following vaccination.

Conclusion: It should be stressed to the public that getting vaccination does not make them invincible foe the various new strains in circulation of the virus. Strict policy making should be emphasized to make people follow COVID appropriate behavior at all times.

Keywords: Adherence, covid appropriate behavior, COVID 19, vaccination

Introduction

Pandemic status for the COVID 19 virus was

announced on March 11, 2020^[1]. Since then, scientists in a number of nations have been toiling away in labs to discover a vaccine that can protect citizens

from contracting the disease or finding a solution for the wide variety of symptoms and syndromes it has caused. There are a select number of countries that have achieved this goal. The World Health Organization has only given its stamp of approval to a small number of vaccines which range from RNA vaccines to inactivated ones, and some of which are still in experimental phases in different countries [2]. In addition to testing, treatment, and protection, suitable COVID preventative behaviour was important to restrict the contagion because COVID 19 is a member of the coronavirus family and is quite similar to the SARS and MERS viruses, which may spread quickly among humans.[3].

Developing COVID-appropriate behaviours refers to doing things that could reduce the spread of the disease and the number of persons who contract it. The Indian government's Ministry of Health and Family Welfare (MoHFW) proposed and implemented guidelines for how to behave appropriately around people who may be infected with the deadly coronavirus avian influenza (COVID). These include things like keeping a safe distance from others, always wearing a mask, keeping one's nose and mouth covered, regularly washing one's hands, keeping common areas clean, avoiding unnecessary travels, discouraging crowds, and other similar measures.[4] In addition, efforts are being made to vaccinate persons against COVID who are at risk. Even after vaccination, persons are advised to maintain COVID-appropriate behaviour. [5] India's goal was to vaccinate all of the population that was eligible to be vaccinated by the end of 2021; however, this goal is still in jeopardy due to a number of factors, including the availability of the vaccine, vaccine hesitancy, gender disparity, a higher rate of vaccination in urban areas, the successful transportation of vaccine to remote areas of the country, etc. According to government statistics, nearly 70% [6] of the country's eligible population has received at least one dose of the COVID vaccine [7]. India had witnessed a devastating impact of the second wave across the nation in recent times, the root causes of which have been attributed to ineffective coordination between centre, state, and national institutes, the premature easing of lockdown restrictions, difficulties in immunizing the population

due to a lack of health literacy, health inequality, reservations for receiving vaccinations, etc. Following that, country is currently experiencing a declining trend in the figures of confirmed COVID cases. [8,9,10,11] Vaccinated individuals may still be exposed to the potential for the capture and transmission of virus, including variants not inoculated against [12]. Still, however, vaccinated people may be less inclined to comply with COVID appropriate behavior, given perceived lesser danger for their health. Similar instances have been already reported in cases of influenza vaccine and Lyme's disease vaccine roll outs, where decreased compliance with protective behavior was observed after introduction of their respective vaccines [13, 14]. As vaccines are not 100 percent effective, it must always be recognized that even a fully vaccinated person can become reinfected and transfer the disease to susceptible persons [12]. Understanding why people are less compliant after vaccination is also an important component of pandemic management; thus, the present study was conducted to analyse the attitude of individuals towards COVID preventive measures after vaccination.

Methods

It was a cross-sectional study of adults who had received either both doses or at least one dose of any COVID-19 vaccination administered in India or overseas. A self-administered questionnaire was sent via social media to the authors' professional and non-professional connections during the months of August and September 2021. For data collection, snowball sampling was utilised, and participants were requested to distribute the questionnaire with their connections. Only respondents who consented to informed consent at the beginning of the questionnaire were permitted to complete the survey. Participants older than 18 years of age and who had received at least one dose of COVID vaccination were included in the study, but those less than 18 years of age and unvaccinated individuals were excluded.

The participants filled out the questionnaire; seeking information regarding their adherence to COVID-appropriate behavior following vaccination, as opposed to their behavior prior to vaccination. The questionnaire also collected information regarding

demographic characteristics, such as age, gender, socioeconomic status, etc., type of vaccine and the organization through which they received vaccination, and whether they were informed of the adverse event following immunization prior to receiving vaccination. Institutional ethics committee approval was obtained from Al-falah School of medical sciences and research centre (Ref. No. AFSMS&RC/F-01/22/101). Throughout the duration of the study, complete confidentiality was maintained and no information was shared with any third party.

The data were examined using the SPSS 21 software. For categorical variables, descriptive analysis was conducted. The Chi-square test

was performed to determine the significance of proportional differences between categorical variables. A p value of less than 0.05 was deemed statistically significant.

Results

During the study period, a total of 250 individuals were contacted, of which 200 agreed to participate in the research. The bulk of respondent participants were women. Most were between the ages of 18 and 36. By religion, the majority were Muslims, were professionals, and belonged to the top class (79%) (Table 1).

Table 1: Socio demographic characteristics of study population

Variable	Number (N)	Frequency (%)
Gender		
Male	82	41.0
Females	118	59.0
Age range (in years)		
18-36	157	78.5
37-53	31	15.5
54-72	12	6.0
Religion		
Hindu	71	35.53
Muslim	120	60.0
Others	9	4.5
Occupation		
Professional	137	68.5
Semi-professional	22	11.0
Skilled	5	2.5
Student	24	12.0
Unemployed	12	6.0
Socio- economic status		
I (Upper class)	158	79.0
II (Upper middle class)	27	13.5
III (Middle class)	6	3.0
IV (Lower middle class)	5	2.5
V (Lower class)	4	2.0

Concerning vaccination history, the questionnaire inquired about the vaccines chosen by

the participants, the place of vaccination, the number of doses, dissemination of information about adverse

effects following immunization and monitoring for at least 30 minutes after vaccination. The majority of trial participants (70%) chose for the Covishield vaccination, followed by Covaxin (23%) and other vaccines (7%). A significant proportion (69%) of study participants had received both vaccination doses.

The majority of respondents (78%) had received vaccinations at a public healthcare facility. 66% were warned about adverse events following vaccination at their specific healthcare facility, and 80.5% were instructed to remain at the vaccination site for at least 30 minutes after vaccination. (Table 2).

Table 2: Table showing variables related to COVID-19 vaccination

Variables Related To Vaccination History		Number (N)	Frequency (%)
Type of Vaccine taken	Covisheild	140	70
	Covaxin	46	23
	Sputnik V	2	1
	Others	12	6
Number of doses taken	Single dose	62	31
	Both doses	138	69
Site of vaccination	Private healthcare setup	44	22
	Public healthcare setup	156	78
Whether informed about adverse event following immunization	Yes	132	66
	No	68	34
Whether advised to stay for at least 30 minutes after vaccination	Yes	161	80.5
	No	39	19.5

42 %(84/200) respondents were found to be following all the COVID appropriate behavior practices strictly: adhering to mask usage, cleaning regularly used surfaces, frequent hand washing and use of sanitizer, and physical distancing while 58% were found to follow COVID appropriate

behavior as much as they could. The majority of responders (82.5%) adhered to the same mask usage after vaccination as before, whereas 15% reported a reduction in mask usage after vaccination. However, 2.5% of respondents used masks more frequently than in the past. (Table 3).

Table 3: Table showing variables related to adherence to COVID appropriate behavior after vaccination

Variables Related To Adherence To Covid Aproprate Behaviour		Number (N)	Frequency (%)
Adherence to mask usage	Higher than before	5	2.5
	Same as before	165	82.5
	Lower than before	30	15
Frequency of cleaning regularly used surfaces	Higher than before	14	7
	Same as before	120	60
	Lower than before	66	33
Adherence to Physical distancing	Higher than before	8	4
	Same as before	61	30.5
	Lower than before	131	65.5

Continue

Frequency of hand washing with soap & water	Higher than before	7	3.5
	Same as before	155	77.5
	Lower than before	38	19
Frequency of usage of sanitizer	Higher than before	4	2
	Same as before	134	67
	Lower than before	62	31

Sixty percent of respondents said that their frequency of cleaning frequently used surfaces after vaccination was the same as before, however one-third of respondents reported that their frequency of cleaning frequently used surfaces after vaccination decreased. After immunization, 7% of respondents reported that they were cleaning commonly used surfaces more thoroughly than previously.

The majority of respondents (65.5%) reported poorer adherence to physical separation after vaccination, while 30.5% reported keeping physical distancing at the same level as before and just 4% reported maintaining physical distancing at a higher level.

When questioned about frequency of hand washing with soap and water after vaccination, the majority of study participants (77.5%) said they are adhering to it the same as before, whereas 19% of study participants said their frequency of hand washing with soap and water after vaccination

decreased. Only 3.5% of respondents indicated that their frequency of hand washing with soap and water increased following vaccination.

The majority of study participants (67%) reported that their frequency of hand sanitizer use after vaccination remained unchanged, whereas 31% of respondents reported that their frequency of hand sanitizer use after vaccination declined. Only 2% of responders increased their usage of hand sanitizer after receiving a vaccination.

When participants were asked whether they were adhering to respiratory etiquette while coughing or sneezing after vaccination, the majority (91.5% of respondents) stated that they were adhering to respiratory etiquette while coughing or sneezing even after vaccination, while 7% of respondents were not adhering to respiratory etiquette after vaccination (Figure 1). Only 1.5% of the overall study participants were unaware of what respiratory etiquette actually entails.

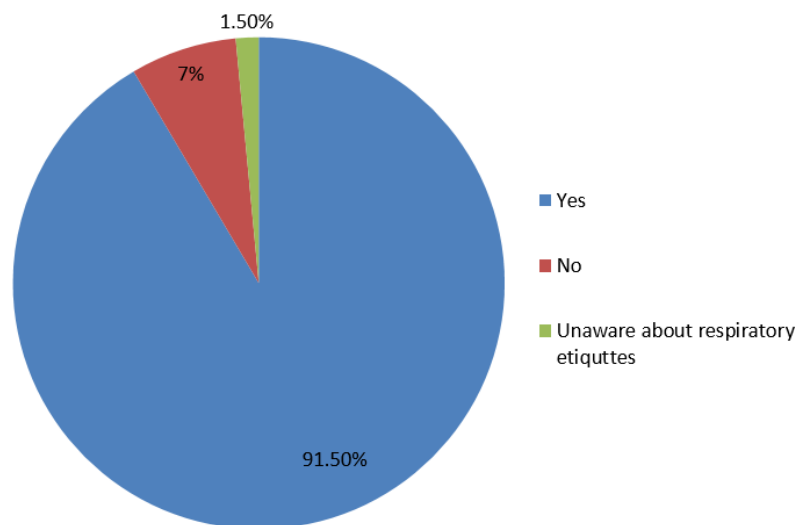


Fig 1: Showing respiratory etiquettes while coughing or sneezing post vaccination.

Figure 2: When asked about the type of mask they were using, the majority of respondents (43%) indicated that they were wearing N-95 masks,

followed by surgical masks (31.5%) and fabric masks (25%). Only 0.5% of the participants in the study were not wearing any form of mask.

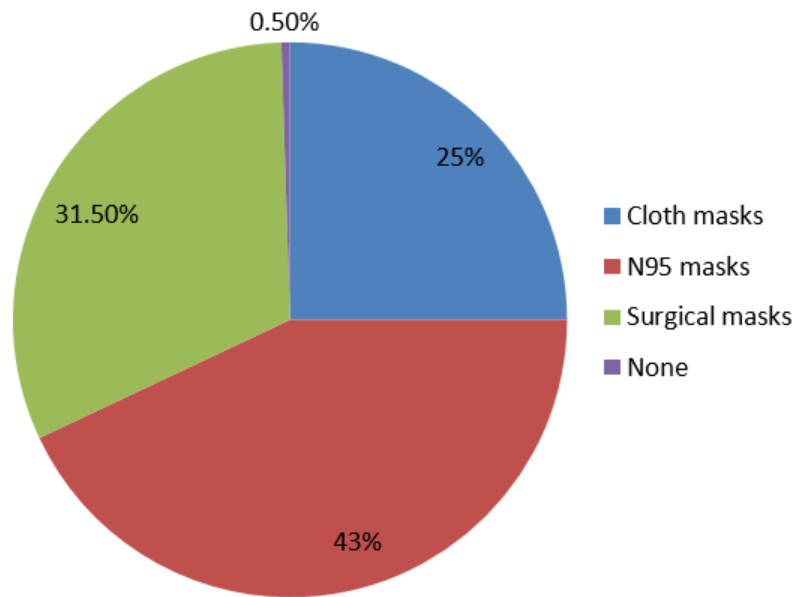


Fig 2: Type of masks study participants were using post vaccination.

Discussion

Similar to previous findings [13,14], the survey revealed a decline in adherence to physical distancing following COVID 19 vaccination, which was observed in nearly two-thirds of the surveyed population, whereas adherence to mask wearing remained the same as before in the majority of the study population. The majority of those surveyed stated that their frequency of hand-washing with soap and water remained unchanged following vaccination. In addition, the majority of those surveyed reported the same frequency of hand sanitizer use after vaccination as before. These results demonstrated that hand washing and the usage of hand sanitizer have become fundamental parts of people’s lives, since the majority still adhere to these routines. After immunisation, one-third of respondents reported that they cleaned frequently used surfaces less frequently than previously. Even after vaccination, the majority of the studied population adheres to respiratory etiquette when coughing or sneezing, while just 1.5% of the overall questioned population is unaware of what respiratory etiquette actually entails. The majority of study participants reported using N-95 masks when asked about the type of masks they wore,

followed by surgical masks and then cloth masks. Only 0.5% of the total trial participants did not wear a mask. Although these findings are not surprising, they should be considered when formulating health policy regarding COVID-19 preventative behavior or COVID-appropriate behavior in populations that have been extensively immunized.

Conclusion

This survey is a preliminary attempt to evaluate vaccination recipients’ adherence to COVID-appropriate behavior. In India, there has been no modification to the health policy addressing covid-appropriate behavior after vaccination with COVID-19. Thus, the majority adheres to the same health-related behaviors as previously; yet, the majority does not adhere to physical separation, which is concerning. This information is not shocking, but it should be considered when formulating and implementing health policy regarding COVID-19 preventative behavior in heavily vaccinated populations.

Ethical clearance: Institutional Ethics Committee from Al-falah School of medical sciences and research centre (Ref. No. AFSMS&RC/F-01/22/101)

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Relationship Between Novel Parameters of Six-Minute Walk test and Respiratory Parameters in Patients with Interstitial Lung Disease

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Abstract

Background and Aim: The 6-minute walk test (6MWT) is used to measure exercise capacity and assess prognosis in interstitial lung disease (ILD). In this study we aim to evaluate the correlation of outcomes of 6MWT with spirometry variables and DLCO in patients with interstitial lung diseases thereby corroborating 6MWT as reliable marker of functional assessment of ILD.

Material and Methods: It is a hospital based descriptive observational study conducted over a period of one year. The study population comprises of 100 patients of interstitial lung disease who attended pulmonary clinic at Tertiary care Hospital of India. The information on sociodemographic status including age, sex, religion, occupation and residential place were noted. Further clinical assessment, lab investigations, radiographs, pulmonary function tests and 6 minute walk test were done the data was then subjected to statistical analysis.

Results: The percentage predicted mean values for FEV1 and FVC are 1.90 (0.75) and 1.50 (0.60). Out of all 100 patients, 6MWD had a statistically significant negative correlation with age and statistically significant positive correlation with the height of the patient. Also 6MWD had positive correlation with weight ($r=0.02$) but thus cant correlation was not statistically significant. Borg scale dyspnoea had non-significant correlation with age, height and weight but had a statistically negative correlation with FVC and DLCO while it had a statistically significant positive correlation with FEV1.

Conclusion: The conclusion drawn from our study is to emphasize the importance of six minute walk test in patients of ILD by virtue of its strong correlation with many of the objective parameters for detecting the functional status like spirometry variables and DLCO.

Key Words: 6-minute walk test, Diffusion Capacity for Carbon Monoxide, Interstitial lung disease, Spirometry

Introduction

Exercise limitation is a cardinal feature of interstitial lung disease (ILD), resulting in reduced

ability to undertake daily activities and poor quality of life.¹ Reduced peak oxygen uptake (VO_{2peak}) and exercise-induced hypoxemia during the cardiopulmonary exercise test (CPET) are sensitive

markers of mortality.²⁻⁵ The six minute walk test is simple and practical tool that holds the potential of providing the holistic assessment of exercising capacity in patients with cardiac, respiratory and neuro muscular pathologies. Therefore test provides reflection of functional status of the patient and also employed to monitor the response to therapy given and further predict the morbidity and mortality of patients suffering majorly from cardio respiratory diseases.⁶ The validity, reproducibility and reliability of this test were studied among different subsets of population with different physiological variables and in different pathological states like diffuse parenchymal lung diseases and heart failure.⁷

A reduced 6-minute walk distance (6MWD) is a predictor of mortality for people with idiopathic pulmonary fibrosis (IPF) in some but not all studies.⁸⁻¹⁰ Although the 6MWD has a significant relationship with other measures of outcome such as forced vital capacity (FVC) and diffusing capacity for carbon monoxide (TLCO) across a range of ILDs, these relationships are poor to modest in strength.^{11,12} Whilst it is often considered a submaximal test, perhaps partially reflecting functional exercise tolerance, one previous study has suggested that the VO₂peak achieved during a 6MWT may be equivalent to that during CPET in people with ILD, although this study may not have been sufficiently powered to detect differences between the tests.^{13,14}

There are several parameters that have been evaluated as predictors of outcome of ILD thereby accelerating the need of diagnosis and treatment like the spirometry variables and diffusion capacity for carbon monoxide (DLCO).¹⁵ but they failed to forecast the prognostic outcomes. Recently dynamic assessment of functional capacity by cardiopulmonary exercise testing employed in many pulmonary conditions like Idiopathic Pulmonary Fibrosis (IPF) predicts the survival outcomes. In this study we aim to evaluate the correlation of outcomes of 6MWT with spirometry variables and DLCO in patients with interstitial lung diseases thereby corroborating 6MWT as reliable marker of functional assessment of ILD.

Material and Methods

It is a hospital based descriptive observational study conducted over a period of one year. The study population comprises of 100 patients of interstitial lung disease who attended pulmonary clinic at Tertiary care Hospital of India.

Adult patients with confirmed diagnosis of interstitial lung disease were included who were in stable clinical condition and not on oxygen therapy were included in the study.

Exclusion criteria were clinical instability, history of syncope on exertion and presence of comorbidities that precluded exercise testing. Patients were also excluded if they had resting oxygen saturation (SpO₂)

The information on sociodemographic status including age, sex, religion, occupation and residential place were noted. A complete history was noted. All of the above patients were then subjected to the following parameters:

Clinical assessment

This includes general physical examination and recording of parameters like pulse blood pressure, height, weight, head to toe examination including pallor, clubbing, cyanosis and signs suggestive of connective tissue disorder were also noted. A complete cardio respiratory systemic examination was then undertaken.

Laboratory investigations

This includes estimation of complete blood count, liver and renal function test. The sputum if productive was also tested for gram stain, acid fast bacilli and fungal stain to rule out any active infectious diseases.

Radiological examination

This included chest x ray, HRCT thorax were done for all patients with ILD

Pulmonary function test (PFT)

All study population was subjected to measurement of spirometry and lung diffusion test (Dlco). All the spirometric indices including FEV₁ and FVC were done using computerized spirometer. Each patient underwent minimum of two DLco procedures that satisfied ATS criteria

Six minute walk test (6MWT)

6MWT was performed in a 30 meter long and ventilated indoor corridor. At the time of test, patient's heart rate, blood pressure, and oxygen saturation were measured. The patient were asked to record their level of effort to breathe using 10 points Borg scale, where 0 indicate no effort at all and 10 indicate very, very severe effort. At the end of the test, the blood pressure, heart rate and oxygen saturation were again measured along with the Borg scale measurement and distance walked for six minutes were recorded. The patients were observed for 10 to 15 minutes after the test to asses any untoward effect. Distance saturation product (DSP) is calculated as the product of 6MWD and saturation (SPO 2) at the end of 6MWT.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Total of 100 patients diagnosed with ILD were taken into study and the observations recorded were as follows:

The total of 100 patients included in the study, out of which 48 were males and 52 were females. The mean age of cohort was 55 years. The age range in our study was 20-80 years. The percentage predicted mean values for FEV1 and FVC are 1.90 (0.75) and 1.50 (0.60). The mean 6MWD for the entire cohort was 390.41 meters. The mean distance saturation product (DSP) was 330.40 meters. The value of mean DSP was higher in males than in females.

Twenty patients (20%) were in the age group of 21-40 year, 10 of them were male and 10 of them were female. Forty eight patients (48%) were in the age group of 41-60 years, with 14 (14%) were male and 34 (34%) were female. 32 patients (32%) were in the age group of 61-80 years, with 24 (24%) were male and 8 (8%) were female. The mean age of 100 cases was 55.1±12.30 years. The mean age of male patient

was 56.90±17.40 years and that of female patient was 52.90±11.50 years. (Table 1)

FVC is the measure of lung volume and is usually decreased in restrictive airway diseases. Since all of our study population belongs to ILD category hence majority of the patients had reduced FVC values. About 36 (36%) patients had FVC < 1.5 litres, of which 28 were females and 8 were males.

6MWT was performed in a 30 meter long well ventilated corridor according to ATS guidelines. The range of 6MWD was 120-672 meters. Out of 100 patients, 6 patients covered more than 600 meters. Majority of the study population covered the distance between 300-400 meters. The mean 6MWD was 380.10 ±101.5 meters. (Table 2)

At the start and the end of the test, oxygen saturation was measured using pulse oximeter. About 86 (86%) patients desaturated during 6 MWT. The distance saturation product (DSP) was calculated using post test oxygen saturation. The mean DSP was 330.90 and the value of mean DSP was higher in males than for females.

Out of all 100 patients, 6MWD had a statistically significant negative correlation with age and statistically significant positive correlation with the height of the patient. Also 6MWD had positive correlation with weight (r=0.02) but thus cant correlation was not statistically significant.

DSP had statistically significant negative correlation with the age of the patient and significant positive correlation with height of the patient. Borg dyspnea scale had a positive correlation with age and negative correlation with height and weight, however these correlation were not statistically significant.

6MWD had a statistically significant positive correlation with FEV1 and FVC. DSP had a statistically significant positive correlation with FEV1 and FVC. Borg dyspnea scale had statistically significant negative correlation with FVC and statistically significant positive correlation with FEV1.

6MWD had statistically significant positive correlation with DLco and insignificant correlation with carbon monoxide transfer coefficient.

Table 1: Baseline characteristics of the study population

Variable	Male	Female	Total (n=100)
Age Mean (SD)	56.90 (17.40)	52.90 (11.50)	55.1 (12.30)
Mean FVC(SD)	2.35 (0.70)	1.45 (0.30)	1.50 (0.60)
Mean Fev1 (SD)	1.84 (0.10)	1.15 (0.25)	1.90 (0.75)
Mean Dlco(SD)	13.20(5.95)	9.90 (9.89)	11.45(5.50)
Mean 6MWD (SD)	408.20 (135.25)	375.24 (59.10)	390.4 (100.5)
Mean DSP (SD)	353.14(120.10)	314.50 (57.65)	330.40 (99.20)

Table 2: Distribution of the study population according to 6MWD

6MWD	Male	Female	Total (n=100)
<200	2	0	2
200-300	8	4	12
300-400	16	34	50
400-500	12	12	24
500-600	4	2	6
>600	6	0	6

Discussion

Our study establishes significant Correlation of 6MWT with spirometry as well as DLCO. The 6MWT imposes a greater cardiorespiratory load on those with greater disease severity, where the peak VO₂ can equal or exceed the VO₂peak seen during a CPET.

In this study, the three outcomes of six minute walk test namely six minute walk distance (6MWD), distance saturation product (DSP) and Borg dyspnea scale were initially studied in relation to the demographic profile of the patient that includes age, height and weight of the patient. The major highlights of the study showed correlation existed between 6MWD and subject's age and height, as there was highly significant negative correlation between 6MWD and age of the patient and significant positive correlation between 6MWD and height of the patient but correlation with weight of the patient was not found significant. This correlation was also established in the study done by Enright et al¹⁶ where statistical significant exist between 6MWD and height of the patient and also in the study done by Hallstrand et al.¹⁷

Another parameter of 6MWT is distance saturation product (DSP) showed statistically positive correlation with the height and statistically negative correlation with the age but non-significant correlation with weight of the subject. The same corroboration was also established in a study conducted by Chetta A et al¹¹ and Hallstrand et al¹⁷ where DSP correlated with the height of the patient.

Several studies have shown that 6MWD and/or decline in 6MWD are strong independent predictors of mortality in patients with IPF.¹⁸⁻²¹ In an adjusted multivariate analysis in 454 patients with IPF listed for lung transplantation, a 6MWD < 207 m versus ≥207 m was associated with a 5-fold increase in mortality at 6 months.²²

In smaller studies, 6MWD has been shown to correlate with lung function parameters in patients with IPF, including forced expiratory volume in 1 s (FEV₁), forced expiratory flow between 25 and 75% FVC and vital capacity (VC), and to correlate negatively with Medical Research Council (MRC) dyspnoea grade.¹⁸⁻²³

Finally in our study 6MWD and DSP also had statistically significant positive correlation with

lung diffusion index parameter (Dlco). Oxygen supplementation should be delivered in the same way and at the same flow rate in serial 6MWTs. Any change in the provision of supplemental oxygen to a patient should be considered in the interpretation of changes in 6MWD, and 6MWD from different studies should not be compared if oxygen was supplemented differently.

Conclusion

The conclusion drawn from our study is to emphasize the importance of six minute walk test in patients of ILD by virtue of its strong correlation with many of the objective parameters for detecting the functional status like spirometry variables and DLCO. In addition to the correlation established, the simplicity, reliability, validity and reproducibility of 6MWT mandates its use as a supportive test in patients of ILD for diagnosis, prognosis and monitoring therapeutic response and thereby taking appropriate actions.

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Conflict of interest: None declared

Ethical approval was taken from the institutional ethical committee

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Study of Prevalence of Anaemia and Haematological Parameters in Children of Maharashtra below 12 years

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Abstract

Background: Anaemia is a widespread public health problem associated with increase risk of morbidity and mortality especially in children and women of reproductive age.

Method: 120 children below 12 years of age suffering with anaemia were studied. The blood examination was done to rule out PCV, MCV, MCH, MCHC, RPW, Hb% PS study, reticulocyte count and serum Iron (Fe), serum B₁₂ and folic acids.

Results: 65 (54.1%) had Iron deficiency, 17 (14.1%) had Thalassemia, 13 (10.8%) had Megaloblast anaemia, 12 (10%) anaemia of acute haemorrhage, 7 (5.83%) had sickle cell anaemia, 4 (3.33%) had Aplastic anaemia, 2 (1.66%) had leukaemia. Clinical manifestation included mainly pallor 120 (100%), 103 (85.8%) weakness and fatigability 42 (35%) fever, 29 (24%) had IC term, 24 (20%) shortness of breathing, 21 (27.5%) hepatomegaly, 15 (12.5%) history of pica, 23 (19.1%) had mild, 59 (49.1%) had moderate, 38 (31.6%) had severe anaemia on the basis of haemoglobin level profile.

Conclusion: Iron deficiency is the major cause of anaemia followed by thalassemia, megaloblastic, acute haemorrhagic sickle cell, aplastic anaemia. This pragmatic study in children certainly helps the nutrition expert and paediatrician to treat such children efficiently to avoid morbidity and mortality.

Keywords: Hb%, Iron deficiency, Sohil's method, Serum Fe, B12 Folic acid

Introduction

Anaemia is the most common nutritional deficiency disorder globally, affecting the under developed countries including India especially children and women of reproductive age group ⁽¹⁾. 1.62 billion People globally and 447 million people in

India suffering with anaemia ⁽²⁾. Highest prevalence of anaemia is observed in pre-school children below 5 year to 12 years is 20% in Industrialised and 39% in non-industrialised countries ⁽³⁾.

Anaemia is defined as the condition in which there is less than normal level of haemoglobin

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(Hb%) in the body, which decreases oxygen carrying capacity Anaemic is diagnosed on the basis of Hb level according to age and gender. Majority of anaemic causes are due to Iron deficient. Iron deficiency generally develops slowly and is not clinically apparent until anaemia is severe even though functional consequences already exist. Iron deficiency impairs the cognitive development of children from infancy through adolescence. Sickle cell anaemia is the most common single gene disorder resulting in haemolytic anaemia ⁽⁴⁾. Folic acid deficiency, Vit 12 deficiency or may be combination of these factors, which can present with dimorphic picture. Aplastic anaemia is due to blood loss and anaemia of chronic disease ⁽⁵⁾. Hence attempt is made to evaluate the causes types and clinical manifestations in children below years of both sexes.

Material and Method

120 (one hundred twenty) children below 12 years regularly visiting to Pravara Institute of Medical Sciences hospital Loni, Maharashtra-413736 were studied.

Inclusive Criteria: Children aged between 6 months to 12 years with pallor clinically diagnosed as anaemia were selected for study.

Exclusion Criteria: Children more than 12 years less than 6 months, children with congenital heart disease, immune compromised, tuberculosis, were excluded from study.

Method

Routine blood examination for anaemia was morphologically based on peripheral findings all volume (PCV). Mean corpuscular volume (MCV), Mean corpuscular haemoglobin (MCH), Mean corpuscular haemoglobin Concentration (MCHC), and red cell distribution by (RDW), were determined by automated cell counter haemoglobin was estimated by sahil's method and expressed in gm% Ps (peripheral smear) was stained by Leishman's

stain. Reticulocyte count was done by Brilliant crystal stain method. Serum Iron determination was done by Romany's dipyriddy method. Total iron method binding capacity was determined by Ramsay'e method, serum vitamin 12 and folic acid was determined by architect method.

The duration of study was from August-2021 to August-2022

Statistical analysis: Various parameters concerned with anaemia, clinical manifestation were classified with percentage. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1.

Observation and Results

Table-1: Age wise distribution of patients of anaemia - 18 (15%) were 6 months to 1 years, 55 (45.8%) were aged between 1 to 5 years, 32 (26.6%) were between 6 to 9 years of age and 15 (12.5%) were 10 to 12 years.

Table-2: Prevalence of different Types of anaemia - 65 (54.1%) had Iron deficiency, 17 (14 %) had thalassemia, 13 (10.8%) had megaloblastic anaemia, 12 (10%) had anaemia of acute haemorrhage, 7 (5.83%) had sickle cell anaemia, 4 (3.33%) had Aplastic anaemia, 2 (1.66%) had leukaemia.

Table-3: Clinical manifestation of Anaemic patients - 120 (100%) had pallor, 103 (85.8%) had weakness and fatigability, 42 (35%) had fever, 29 (24.1%) had Icterus, 24 (20%) had shortness of breathing, 21 (17.5%) had hepatomegaly, 16 (13.3%) had cough, 15 (12.5%) had history of pica, 14 (11.6%) splenomegaly, 12 (10%) had petechiae, 9 (7.5%) had vomiting, 10 (8.33%) had kiloychia, 6 (5%) had hyper pigmentation, 8 (6.6%) had tremors.

Table-4: Graders of Anaemia on the basis haemoglobin level 23 (19.1%) had mild anaemia, 59 (49.1%) had moderate, 38 (31.6%) had severe anaemia.

Table 1: Age wise distribution of patients of anaemic

Age in years	No. of Patients (120)	Percentage (%)
6 months to 1 year	18	15
1 to 5 years	55	45.8
6 to 9 years	32	26.6
10 to 12 years	15	12.5

Table 2: Prevalence of different types of Anaemia

Types of Anaemia	No. of Patients	Percentage (%)
Iron deficiency	65	54.1
Thalassemia	17	14.1
Megaloblastic Anaemia	13	10.8
Anaemia of acute haemorrhage	12	10
Sickle cell anaemia	7	5.83
Aplastic Anaemia	4	3.33
Leukaemia	2	1.66

Table 3: Clinical Manifestations of Anaemia Patients

Clinical Manifestation	No. of Patients	Percentage (%)
Pallor	120	100
Weakness and fatigability	103	85.8
Fever	42	35
Icterus	29	24.1
Shortness of Breathing	24	20
Hepatomegaly	21	17.5
Cough	16	13.3
History of Pica	15	12.5
Splenomegaly	14	11.6
Petechiae	12	10
Vomiting	9	7.5
Koilonychia	10	8.33
Hyper pigmentation	6	5
Tremors	8	6.6

Table 4: Grades of Anaemia on the basis of haemoglobin level

Grades of Anaemia	Male	Female	Total	Percentage %
Mild	16	7	23	19.1
Moderate	36	23	59	49.1
Severe	27	11	38	31.6
Total	79	41	120	99.8

Discussion

The present study of prevalence of anaemia and haematological parameters in children of Maharashtra below 12 years 18 (13%) were between 6 months to 1 year, 55 (45.8%) were aged between 1 to 5 years, 32 (26.6%) were aged between 6 to 9 years, 15 (12.5%) were aged between 10 to 12 years (Table-1). 65 (54.1%) had Iron deficiency anaemia, 17 (14.11%) had Thalassemia, 13 (10.8%) had megalblastic anaemia, 12 (10%) had anaemia of acute haemorrhage, 7

(5.83%) had sickle cell anaemia, 4 (3.33%) had aplastic anaemia, 2 (1.66%) had leukaemia (Table-2). Clinical manifestation included 120 (100%) pallor, 103 (85.8%) weakness and fatigability, 42 (35%) fever, 29 (24.1%) had Icterus, 24 (20%) shortness of breathing, 21 (17.5%) hepatomegaly, 16 (13.3%) cough, 15 (12.5%) history of pica, 14 (11.6%) splenomegaly, 12 (10%) had petechiae, 9 (7.5%) had vomiting, 10 (8.33%) had Kiloychia, 6 (5%) had hyper pigmentation, 8 (6.6%) had Tremors (Table-3). 23 (19.1%) had mild anaemic,

59 (49.1%) had moderate, 38 (31.6%) had severe anaemia on the basis of haemoglobin levels (Table-4). These findings are more or less in agreement with previous studies ⁽⁶⁾⁽⁷⁾⁽⁸⁾.

Characterising the symptoms helps to elucidate the severity and chronicity of anaemia and may identify the patients with blood loss or haemolytic aetiologies. Common symptoms of anaemia include lethargy tachycardia and pallor ⁽⁹⁾. Infants with anaemia may present irritability and poor oral intake, changes in urine colour, sclera, icterus or jaundice may indicate the presence of haemolytic disorders such as G6PD (glucose 6-phosphatase dehydrogenase) deficiency. Bleeding from GIT (gastro-intestinal tract) includes changes in stool colour, identification of blood in stool, history if blood symptoms must be reviewed. Severe or chronic epistaxis also may result in anaemia from blood loss and Iron deficiency.

Previous medical history also plays vital role to find out the cause of anaemia in children gestational age, duration of birth, hospitalisation and history of Jaundice and / or anaemia in the new born period Travel to / from endemic infection (E.g. Malaria, hepatitis, tuberculosis) should also be ruled out to evaluate the cause of anaemia. Moreover herbal or oxidant drugs may cause haemolysis particularly in patients with G6PD, possible environmental toxins exposure should be explored including lead exposure and nitrates in well water, family history of inherited haemolytic anaemia ⁽¹⁰⁾.

Anaemia with high absolute reticulocyte count (ARC) reflects an increased erythropoietic response haemolysis or blood. Anaemia with low or normal ARC reflects deficient production of RBC (i.e., reduced bone marrow response to anaemia). However haemolysis or blood loss can be associated with low or concurrent disorder that impairs RBC production. In some cases reticulocyte counts depends in the phase of illness ⁽¹¹⁾.

Review of peripheral smear (PS) is an essential part of anaemia evaluation. Even patients RBC indices are normal review. The blood smear may reveal abnormal cells that can help to identify the cause of anaemia.

The diagnosis approach of anaemia includes pancytopenia in leukaemia, thrombocytopenia

indicateshaemolytic uremic syndrome and thrombocytosis in Iron deficiency, and Leukocytosis in elevated WBC count include leukaemia and infection.

Summary and Conclusion

The present study of anaemia in children below 12 years mainly related to malnutrition in pregnancy and in infancies period of child. Prevalence of high lymphocyte count in anaemia indicates viral infection. The prevalence of anaemia was higher in lower age group; it is due to the frequent infections. Girls of pre-school age had a probable Iron, Vitamin B12 or foliate deficiency as indicated by high ROW (Red Cells distribution Width) values. Girls of adolescent age (11-12 years) were more anaemic indicating more nutritional requirement with onset of puberty overall children below 12 years boyswere found to be suffering from higher level of hypochromasia and microcytic anaemia. The present study recommends about pure water, sanitation and nutritional counselling to the parents having low social economic status moreover nutritional status of pregnancy will have significant impact on infancy and later stage of childhood too.

Limitation of study – Owing to tertiary location of research institution, small number of patients lack of latest techniques we have limited findings and results.

- **This research paper was approved by EthicalCommittee of Pravara Institute of Medical Sciences Loni Maharashtra-413736.**
- **No Conflict of Interest**
- **No Funding**

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Pairwise and Network Meta-Analysis of Antiviral and other Treatment Efficacy in Covid-19 Patients

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Abstract

A total of 77 literatures till November 2020 were screened regarding various interventions to treat COVID-19 patients, among which 16 and 15 studies fulfilling predefined exclusion and inclusion criteria were subjected to Pairwise and Network meta-analysis respectively. In Pairwise meta-analysis, the recovery rate of *treatment with Lopinavir/Ritonavir* versus other antiviral (OR= 0.0381, CI= 0.0021-0.6870), placebo (OR= 0.6592, CI= 0.4207-1.0329), Remdesivir (OR= 0.5286, CI= 0.3915-0.7137) and standard care (OR= 0.9787, CI= 0.8523-1.1238) in fixed and random effect model with 95% confidence limit found statistically significant protection than those of all other treatment. In Network meta-analysis, recovery estimates sizes of treatment, in reference with other antivirals 1.0000 (0.9917, 1.0000) shows less risk with treatment Standard care 0.7811 (0.6696, 0.8417), Remdesivir 0.7717 (0.6491, 0.8144), Lopinavir/ Ritonavir 0.7801 (0.6701, 0.8473), Placebo 0.7219 (0.6178, 0.7836).

Keywords: COVID-19, treatment efficacy, Network meta-analysis, Pairwise meta-analysis, worldwide.

Introduction

To date seven coronavirus have been identified that can infect humans. The newly-identified SARS-CoV-2 are highly pathogenic, causing severe lower respiratory tract infection in relatively more patients with a higher chance to develop acute respiratory distress syndrome (ARDS) and extrapulmonary manifestations¹.

In December, 2019, Wuhan City of Hubei Province of China reported cluster of cases of pneumonia of unknown etiology associated with the Huanan seafood market in Wuhan and causative agent was

identified as severe acute respiratory syndrome coronavirus 2(SARS CoV-2 previously 2019-nCoV) with use of next-generation sequencing^{2,3}.

A few medicines are as of now being tried around the world. Viral contaminations are the most incessant irresistible sicknesses and are normal triggers for comprising major organic, clinical, and financial issues around the world^{4,5}. Therefore therapeutic management of COVID-19 cases will play a vital role in prevention and halt the spread of disease⁶.

There are dearth of FDA approved antiviral drugs and other interventions capable of combating

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COVID-19 infections, which has led to great difficulty in limiting morbidity and case fatality rate caused by this pandemic⁷. The World Health Organization's International Clinical Trials Registry Platform stated that presently more than 590 clinical trials are identifying effective therapeutics interventions to treat COVID-19 patients^{8,9}. There are several candidate medications such as Arbidol, Azithromycin, Favipiravir, Hydroxychloroquine, Lopinavir/Ritonavir, Remdesivir and Tocilizumab have been evaluated to treat COVID-19 but none of the drugs has been approved so far¹⁰. Despite sincere efforts worldwide to identify potential treatments for COVID-19 patients, there is no promising evidence for drugs that specifically targeting SARS-CoV-2¹¹.

Methods

The recommended approach to developing the research question is the **PICO** (i.e., participants, intervention, comparator, and outcome) framework. Pairwise meta-analysis and network meta-analysis can be used to answer comparative effectiveness research questions in which multiple interventions are available, or can be used for a given condition. The studies had patients with lab confirmed COVID-19 of any age which were enrolled either in *remdesivir and lopinavir/ritonavir* compared to standard care, placebo and other antiviral *treatment*. Remdesivir and lopinavir/ritonavir were taken in the treatment arm and placebo, standard care and other antiviral in the control arm. We performed a comprehensive published article search regarding treatment of COVID-19 patients and its recovery worldwide from all peer-reviewed articles. All the individual studies were reviewed and screened manually by two investigators independently based on the pre-define inclusion and exclusion criteria (Supplementary Table 1) and the third investigator resolved the discrepancy between the two review investigators. All peer-reviewed articles documenting the treatment efficacy of COVID-19 worldwide till November 2020 were selected for review from electronic databases like PubMed, Science Direct, Scopus, Indianjournals.com, J-Gate@ Consortium of e-Resources in Agriculture (CeRA), Google Scholar, and Springer publications. The keywords used for the search were COVID-19, SARS-CoV-2 treatment, worldwide, efficacy, clinical

trial, remdesivir and lopinavir/ritonavir. Screening at title and abstract level followed by full-text screening, data extraction, and quality assessment, were also carried out before starting the review of full papers. A total of 77 literatures till November 2020 were screened regarding various interventions to treat COVID-19 patients among which 16 and 15 publications (Supplementary Table 2 and 3) were extracted into the author's name, year of publication, article title, sample size, recovery and death were incorporated for pairwise and network meta-analysis respectively. The PRISMA flowchart summarizing screening and selection process is depicted.

Data analysis

Analysis of pairwise meta-analysis within frequentist framework using "netmeta" and random-effects network meta-analysis within a Bayesian framework using "pcnetmeta", Arm-based model for binary outcomes were performed in R studio software (version 3.6.3)¹².

```
model = "het_cor",
link = "probit",
prior.type = "chol",
a = 0.001, b = 0.001, c=5,
n.adapt = 5000, n.iter = 10000,
n.thin=1, n.chains = 3.
```

Results

A meta-analysis of these studies showed significant variability/heterogeneity between the studies, and the between-study variance, $I^2 = 0.0\%$ and $\text{Tau}^2 = 51.4\%$. In meta-analysis, network plot setup visualized the network among treatment. Each node represents a treatment, and the edges indicate the direct comparisons between the two treatments and the thickness of the line corresponds to the number of trials in the comparison and size of the node corresponds to the number of studies that involve the intervention. Direct comparison between lopinavir/ritonavir-standard care, remdesivir-standard care, lopinavir/ritonavir-placebo, remdesivir-placebo whereas indirect comparison between lopinavir/ritonavir-other antivirals was created in 'netmeta'.

Meta-analysis outcome measured in treatment effect size which reflects the magnitude and direction of the treatment effect of each study. The treatment effect size of every treatment was lower than that of treatment between lopinavir/ritonavir and other antivirals (3.2669) (Supplementary Table 4). The recovery rate of *treatment with lopinavir/ritonavir* versus other antiviral (Odds Ratio (OR)= 0.0381, CI= 0.0021-0.6870), placebo (OR= 0.6592, CI= 0.4207-1.0329), remdesivir (OR= 0.5286, CI= 0.3915-0.7137) and standard care (OR= 0.9787, CI= 0.8523-1.1238) in fixed and random effect model with 95% confidence limit found statistically significant protection than those of all other treatment including other antivirals, remdesivir, placebo and standard care (Table 1 and 2) which revealed that lopinavir/ritonavir had better efficacy among the interventions for COVID-19 patients' treatment.

One of the most useful tools used in meta-analysis is forest plot which provides a visual summary of analysis and findings. The reference treatment remdesivir passes through a line of no effect and OR of lopinavir/ritonavir was significantly lower compared to all other treatments viz. standard care, placebo and other antiviral. The reference treatment other antivirals passed through the line of no effect and OR of lopinavir/ritonavir and standard care were significantly lower compared to placebo and remdesivir and the reference treatment standard care passes through line of no effect and OR of lopinavir/ritonavir was border line significantly lower compared to those of all other treatment placebo, other antiviral and remdesivir revealed that lopinavir/ritonavir had significantly protective effect among COVID-19 patients treatment. One of the most important functions of meta-analysis is that the comparative advantage of treatment can be determined through rank probability. Rank probability (Table 3) showed that lopinavir/ritonavir (0.8930) was the best treatment followed by standard care (0.8319), placebo (0.4794), remdesivir (0.2723) and other antiviral (0.0234).

The net heat plot is a matrix visualization that highlights hot spots of inconsistency between specific direct evidence in the whole network and renders transparent possible drivers¹³. In this plot the area of a grey square displays the contribution of the direct

estimate of one design in the column to a network estimate in a row. In combination, the colors show the detailed change in inconsistency when relaxing the assumption of consistency for the effects of single designs. The colors on the diagonal represent the inconsistency contribution of the corresponding design. The colors on the off-diagonal are associated with the change in inconsistency between direct and indirect evidence in a network estimate in the row after relaxing the consistency assumption for the effect of one design in the column. Cool colors indicate an increase and warm colors a decrease: the stronger the intensity of the color, the greater the difference between the inconsistency before and after the detachment. So, a blue colored element indicates that the evidence of the design in the column supports the evidence in the row. A clustering procedure is applied to the heat matrix in order to find warm colored hot spots of inconsistency. In the case that the colors of a column corresponding to design d are identical to the colors on the diagonal, the detaching of the effect of design d dissolves the total inconsistency in the network.

Network meta-analysis of COVID-19 treatment efficacy by Remdesivir and Lopinavir/ Ritonavir.

The network meta-analysis was carried out to evaluate the comparative efficacy and safety of treatment used in treating COVID-19 by R package "pcnetmeta". The treatment reference number has been designated as A (Standard care), B(Remdesivir), C (Lopinavir/ Ritonavir), D (Other antivirals), and E (Placebo). The direct comparison between A to B, A to C, B to E and indirect between A to E, E to C and no comparison between E and D was created in "pcnetmeta".

Recovery effect estimates in network meta-analysis are presented in absolute plot, showed that the treatment-specific effect sizes in reference with treatment D (Other antiviral) shows less risk with treatment A (Standard care), B(Remdesivir), C (Lopinavir/ Ritonavir), E (Placebo). Contrast plot indicated the comparison among reference D (Other antiviral) with other treatments showing significant failure and density plot displaying posterior density of estimates of absolute risk, here D (Other antiviral)

showed high density of risk among other treatments of COVID-19.

In rank plot each vertical bar represents probabilities of ranks for a specific treatment, a dark area indicates the probability of a higher rank and the black area indicates the probability of the best

treatment. Rank probabilities of treatments outcomes from first to last were placebo (0.8031), remdesivir (0.4072), standard care (0.4834), lopinavir/ ritonavir (0.4073), other antiviral (1.0000) (Table 4). This indicated that placebo have better role in recovery of COVID-19 than other treatments.

Table 1: Treatment estimate (sm = 'OR'): Fixed effect model with 95%-confidence limit

Treatment	Antivirals	Lopinavir-ritonavir	Placebo	Remdesivir	Standard care
Antivirals	-	26.2308 (1.4557-472.6701)	17.2905 (0.9268-322.5623)	13.8653(0.7576-253.7646)	25.6722 (1.4200-464.1354)
Lopinavir-Ritonavir	0.0381 (0.0021-0.6870)	-	0.6592 (0.4207-1.0329)	0.5286(0.3915-0.7137)	0.9787 (0.8523-1.1238)
Placebo	0.0578 (0.0031-1.0789)	1.5171 (0.9682-2.3771)	-	0.8019 (0.5485-1.1725)	1.4848 (0.9580-2.3011)
Remdesivir	0.0721 (0.0039-1.3200)	1.8918 (1.4011-2.5545)	1.2470 (0.8529-1.8233)	-	1.8515 (1.4104-2.4306)
Standard care	0.0390 (0.0022-0.7042)	1.0218 (0.8898-1.1732)	0.6735 (0.4346-1.0438)	0.5401 (0.4114-0.7090)	-

Table 2: Treatment estimate (sm = 'OR'): Random effect model with 95%-confidence limit

Treatment	Antivirals	Lopinavir-ritonavir	Placebo	Remdesivir	Standard care
Antivirals	-	26.2308 (1.4557-472.6701)	17.2905 (0.9268-322.5623)	13.8653 (0.7576-253.7646)	25.6722 (1.4200-464.1354)
Lopinavir-ritonavir	0.0381 (0.0021-0.6870)	-	0.6592 (0.4207-1.0329)	0.5286 (0.3915-0.7137)	0.9787 (0.8523-1.1238)
Placebo	0.0578 (0.0031-1.0789)	1.5171 (0.9682-2.3771)	-	0.8019 (0.5485-1.1725)	1.4848 (0.9580-2.3011)
Remdesivir	0.0721 (0.0039-1.3200)	1.8918 (1.4011-2.5545)	1.2470 (0.8529-1.8233)	-	1.8515 (1.4104-2.4306)
Standard care	0.0390 (0.0022-0.7042)	1.0218 (0.8898-1.1732)	0.6735 (0.4346-1.0438)	0.5401 (0.4114-0.7090)	-

Table 3: Estimated rank P-score of fixed and random model of treatments from the COVID-19 dataset obtained from the “netmeta” R package.

S. No	Treatment	P-score (fixed)	P-score (random)
1	Antivirals	0.0234	0.0234
2	Lopinavir-ritonavir	0.8930	0.8930
3	Placebo	0.4794	0.4794
4	Remdesivir	0.2723	0.2723
5	Standard care	0.8319	0.8319

Table 4: Estimated rank probabilities of treatments from the COVID-19 dataset obtained from the “pcnetmeta” R package

Treatment	Rank1	Rank2	Rank3	Rank4	Rank5
A	0.0498	0.2451	0.4834	0.2216	0.0000
B	0.0788	0.4072	0.1067	0.3181	0.0000
C	0.0682	0.2418	0.3719	0.4073	0.0000
D	0.0000	0.0000	0.0000	0.0000	1.0000
E	0.8031	0.1059	0.0380	0.0530	0.0000

Discussion

Coronavirus disease caused unprecedented challenges to the healthcare¹⁴. The result of Pairwise meta-analysis shown that lopinavir-ritonavir (0.8319) is the best intervention for treating COVID-19 patients followed by standard care (0.8319), placebo (0.4794), remdesivir (0.2723) and other antivirals (0.0234). During the SARS outbreak, treatment with lopinavir in combination with ritonavir, was explored with some success in nonrandomized clinical trials¹⁵. Patients with SARS-CoV treated with lopinavir/ritonavir showed a progressive decrease of viral load¹⁶.

Lopinavir-ritonavir combination is a protease inhibitor that has in vitro antiviral activity against SARS-CoV and Middle East Respiratory Syndrome (MERS) coronaviruses¹⁰. In an earlier study, the clinical efficacy of lopinavir/ritonavir was evaluated in the treatment of 47 COVID-19 patients from Ruian people’s hospital China¹. The results shown that 42 patients who received lopinavir/ritonavir has significant and speedy recovery to normal body temperature than control group who received standard adjuvant therapy (test group: 4.8 ± 1.94 days vs control group: 73 ± 1.53 days, $p = .0364$). In a systematic review and meta-analysis of COVID-19 clinical features and/or treatment found that treatment with lopinavir-

ritonavir showed no significant benefit in mortality and ARDS (acute respiratory distress syndrome) rates while corticosteroids were associated with a higher rate of ARDS ($P = .0003$)¹⁶. Similarly, a randomized clinical trial was conducted in 199 patients and found that patients who received lopinavir-ritonavir have no significant clinical improvement compared to control group with a standard of care¹⁸.

Remdesivir is a prodrug of nucleoside analogue and viral RNA-dependent RNA polymerase competitive inhibitor that has antiviral activity against broad spectrum of RNA viruses including MERS and SARS-CoV^{19, 20}. A randomized clinical trial involving 596 COVID-19 patients, revealed that patients received 10 days course of remdesivir has no significant improvement in health status compared to the control group randomized with standard care²¹. On the other hand, those who received a 5-day course had better outcome than standard care with uncertain clinical effect.

A systematic review and meta-analysis of randomized controlled trials to evaluate the efficacy of remdesivir versus placebo or standard of care and found that placebo group had a higher risk of mortality as compared to the intervention group with significant odds ratio (OR=0.61; 95% CI 0.45- 0.82; $P=0.001$), findings suggested that remdesivir extends

clinical benefits by reducing mortality, adverse events and oxygen support in moderate to severely ill COVID-19 patients²².

Favipiravir is a purine nucleotide analogue that inhibits the viral RNA-dependent RNA polymerase also has potential to combat several viral diseases including COVID-19¹⁰. The efficacy and safety of the drug favipiravir was estimated and found that there was a significant clinical improvement in the favipiravir group on the 14th day compared to the control group (RR=1.29, 1.08-1.54). There was no significant differences between the two groups on viral clearance (day 14: RR=1.06, 95% CI= 0.84-1.33), non-invasive ventilation or oxygen requirement (OR=0.76, 95% CI=0.42-1.39), and adverse effects (OR=0.69, 95% CI=0.13-3.57).

The result revealed that placebo (0.8031) has better role in recovery of COVID-19 than other treatments followed by remdesivir (0.4072), standard care (0.4834), lopinavir/ ritonavir (0.4073) and other antiviral (1.0000). In contrary to our study a study found that both 10-day and 5-day remdesivir regimens were associated with higher odds of clinical improvement (OR of 10-day regimen: 1.35, 95% CI=1.09-1.67); OR of 5-day regimen: 1.81, 95% CI=1.32-2.45, and higher probabilities of clinical recovery (RR of 10-day regimen: 1.24, 95% CI=1.07-1.43; RR of 5-day regimen: 1.47, 95% CI=1.16-1.87 compared with placebo²⁴.

The standard care and glucocorticoids probably reduce death, mechanical ventilation and duration of hospitalization and the clinical impact of remdesivir on mortality, mechanical ventilation, and length of hospital stay is uncertain, but it probably reduces duration of symptoms¹¹. Remdesivir improves the recovery rate in both moderate and severe patients²⁶. The result outcome of remdesivir treatment for 10 days increased the recovery rate on day 14 by 50% among severe COVID-19 patients (RR = 1.5, 95%CI = 1.33-1.7), while on day 28 it was increased by 14% among moderate and severe COVID-19 patients (RR = 1.14, 95% CI = 1.06-1.22). Additionally, remdesivir decreased the mortality rate, when treatment started on day 14 by 36% among all patients (RR = 0.64, 95%CI = 0.45-0.92) but not when treatment started

on day 28 (RR = 1.05, 95%CI = 0.56-1.97). None of the mechanically ventilated COVID-19 patients showed better response to remdesivir in the recovery (RR = 0.3, 95%CI = 0.13-0.7) and mortality (RR = 2.33, 95%CI = 1.24-4.4) rates on day 14.

Conclusion

The result of pairwise and network meta-analysis suggests that remdesivir, other antiviral and standard care found marginal clinical benefit in COVID-19 patients while placebo and lopinavir/ritonavir may safely and effectively improve clinical outcomes of COVID-19. This analysis may help in further improvement in the treatment of COVID-19 patients. Consequently, further large scale randomized clinical trial are wanted to refine the outcomes of this intervention on the treatment of patients with COVID-19.

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Competing interests: Nil

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Knowledge and Awareness of General People about Covid19 Infection, an Online Study in Eastern India

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Abstract

Background: The biggest pandemic of this decade has caused global, social, and economic disruption ⁽¹⁾. Misinformation spread via news and social media has created widespread xenophobia, discrimination, fear, misbehavior to people, doctors, other health care workers ⁽²⁾. All these factors put a huge burden on the mental health of the population. In this background, we tried to assess the awareness about covid 19 after about one year of struggle during the second wave.

Methodology: An anonymous questionnaire was prepared by the Department of Psychiatry of College of Medicine & Sagore Dutta Hospital, Kolkata. The Questionnaire includes basic knowledge of the people, epidemiological characteristics, anxiety, and depression. The Questionnaire circulated through the online platform. Responses were recorded in the excel sheet.

Result: Most of the respondents (594, 98.7%) know that Covid 19 is a viral disease. 82.6% (497) people believe that the most important aspect of this disease is infectivity and not mortality (93,15.4%). 80.6% believe that hand washing, social distancing, lockdown all three are essential in containing the disease. Most of the participants were happy with the steps taken by Government.

Discussion: Most of the participants in this study knew that covid 19 is a viral infection and the important aspect of the disease is infectivity, not mortality. So the majority of the persons were aware of the basic pathology of the disease. And they believe that safety measures will restrict disease.

Key Word: Covid 19, HADS, Depression, Anxiety.

Introduction

Covid 19 pandemic, the biggest pandemic of

this decade is caused by the SARS CoV2 virus. It originated in Wuhan, China in December 2019 and

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rapidly infected over 4.89 million people in over 188 countries taking a toll of 323000 deaths up to May 2020⁽³⁾. WHO has already declared it to be a global pandemic on 11 th March 2020⁽⁴⁾. It is a highly infectious and contagious disease, spreads via droplets while talking, coughing, sneezing, or by touching the face after touching the infected surface⁽⁵⁾⁽⁶⁾. Common symptoms are fever, fatigue, cough, anosmia. Serious symptoms are shortness of breath, pneumonia, Acute Respiratory Distress Syndrome⁽⁷⁾. Though many remain asymptomatic throughout the illness. No specific therapy is available to date. Ignorance, unpreparedness, and casual approach by many countries have already taken the lives of a huge number of people, mainly the elderly and those with comorbidities. The pandemic has caused global, social, and economic disruption including the biggest recession of the world economy in this decade⁽¹⁾⁽⁸⁾. It has led to postponement and cancellation of sporting, academic, political, religious, and cultural events, widespread shortage of supply of food, medicine, industrial raw material, human Resource, etc leading to exacerbation of panic buying, storing, and black marketing. Misinformation spread via news and social media has created widespread xenophobia, discrimination, fear, misbehavior to Chinese people⁽⁹⁾, doctors, other health care workers, a particular religion, overseas, migrant population, and those belonging to regions of high infection rate⁽¹⁰⁾.

All these factors put a huge burden on the mental health of the population. These constant worries have put them in a higher incidence of stress, anxiety, worry, obsession, post-traumatic stress, depression. They are stressed by their rigorous daily duty and along with that being isolated⁽¹¹⁾, cornered, abuse, and sometimes getting assaulted by neighbors for fear of spreading infection.

Older people are likely to be less tech-savvy- so social isolation/ distancing have made them more worried about non-Covid health issues⁽¹²⁾⁽¹³⁾, running out of money due to lesser interest rates on fixed deposits imposed upon them by the Government, procuring food by going outside, paying bills of electricity, telephone, medicine due to inadequate money, lack of Government supply

initiative, inadequate knowledge of digital payments, uprising cost of daily commodities due to ample black marketing. Covid affects mainly the elder age group with comorbidities. This is another cause of worry in the elderly age group. All these hinder elderly people from venting out or sharing their anxiety, worry with others.

People belonging to a lower socioeconomic group like daily wagers, migrant workers stationed away from home who merely have any savings for the future are worried about getting daily food either by Government supply or on payment with the higher price due to inadequacy or black marketing. They are likely to develop anxiety, depression, suicidality, worry, stress, impulsivity, etc⁽¹⁴⁾.

In this background, we tried to assess the awareness about covid 19 after about one year of struggle during the second wave.

Methodology: An anonymous questionnaire was prepared by the Department of Psychiatry of College of Medicine & Sagore Dutta Hospital, Kamarhati, Kolkata. The Questionnaire was based on knowledge of people regarding this pandemic, basic epidemiological data, and questions based on the Hospital Depression and Anxiety Scale (HADS) which is a patient rating questionnaire having 14 questions. Score 0-7 is normal, 8-10 borderline abnormal, 11-21 abnormal. The questionnaire was prepared in Google forms and relevant links sent via SMS, mail, WhatsApp, and Facebook. The inputs of participants were automatically stored in an Excel sheet which later was analyzed in statistical software. There were no inclusion and exclusion criteria, all inputs were taken into account.

We followed Helsinki guideline and obtained informed consent in digital formal. As it was an anonymous questionnaire participant's identity was not disclosed.

Result:

Most of the respondents (594, 98.7%) know that Covid 19 is a viral disease. 82.6% (497) people believe that the most important aspect of this disease is infectivity and not mortality (93,15.4%).

Table 1: Distribution of the participants according to their awareness regarding COVID-19 and its effect
Awareness regarding COVID-19 and its effect

Awareness regarding COVID-19 and its effect		Frequency	Percent
Heard about COVID-19 pandemic	No	8	1.3
	Yes	594	98.7
COVID-19 caused by	Bacteria	17	2.8
	Virus	585	97.2
Most dreadful aspect of this disease	Infectivity	497	82.6
	Morbidity	12	2.0
	Mortality	93	15.4
Most important step to stop its spread	All of them	485	80.6
	Hand washing	2	.3
	Lock down	18	3.0
	Social distancing	97	16.1
Lockdown will affect economy of India	No	31	5.1
	Yes	571	94.9
Lockdown will affect state (West Bengal) economy	No	47	7.8
	Yes	555	92.2
Lockdown will affect World economy	No	32	5.3
	Yes	570	94.7
Lockdown will affect personal economical status	No	96	15.9
	Yes	506	84.1
Lockdown will affect personal mental health	No	218	36.2
	Yes	384	63.8
Lockdown will affect the mental health of the children	No idea	130	21.6
	No	217	36.0
	Yes	255	42.4

Most (80.6%) believe that hand washing, social distancing, lockdown all three are essential in containing the disease. Most people believe that lockdown is going to affect the world economy

(94.7%), Indian economy (94.9%), the economy of West Bengal (92.2%), personal economic status (84.1%), personal mental health status (63.8%), mental health of children (42.4%).

Table 2: Distribution of the participants according to their satisfaction regarding the steps taken by the Government

Satisfaction regarding the steps taken by Government

Satisfaction regarding the steps taken by Government		Frequency	Percent
Happy with lockdown	No	126	20.9
	Yes	476	79.1
Happy with the forced social distancing	No	99	16.4
	Yes	503	83.6
Happy with procuring essential services	No	234	38.9
	Yes	368	61.1

Most of the participants were happy with the steps taken by Government e.g, Lockdown (79.1%),

forced social distancing (83.6%), procuring essential services (61.1%).

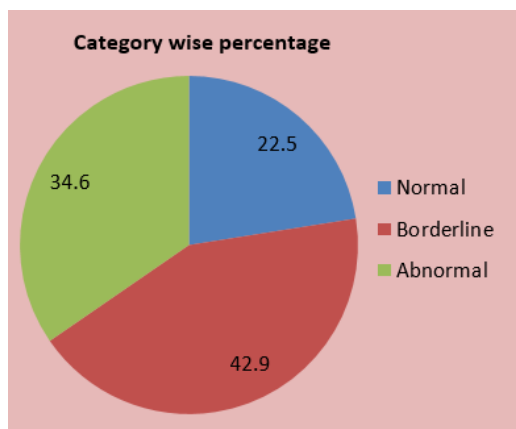
Table 3: Distribution of the participants according to their health-seeking behavior during the last week

Health seeking behavior

Health seeking behavoiur		Frequency	Percent
Called the doctor regarding minor issues (throat pain, feverish,bodyache etc)	0	305	50.7
	1-2	289	48.0
	3-5	7	1.2
	> 5	1	.2
Thought of checking routine blood tests	0	324	53.8
	1-2	256	42.5
	3-5	18	3.0
	> 5	4	.7

The health-seeking behavior during this pandemic increased. 48% (289) participants thought at least once or twice to call doctor regarding minor issues like throat pain, feverish feeling, body aches, etc. 42.5% (256) participants thought at least once or twice in last week to check blood for fear of coronavirus infection. The most important finding of the study shows that 34.6% population qualified for abnormal scores in HADS indicating depression and anxiety both.

Figure 1: Distribution of participants according to their Category based on HAD scale



the majority of the persons were aware of the basic pathology of the disease. So they believe that safety measures will restrict disease and for that reason they support the steps taken by the Government and knows sanitization, social distancing will stop the spread of the virus. Though lockdown will affect the country’s, as well as the state economy, and will affect all segments of the society, it is helpful to survive.

During the lockdown of the first wave, many people lost their job and is running into a financial crisis. Even with all those odds most of the people were happy with the Governments role regarding lockdown, social safety measures, and providing essential services.

But the uncertainty of the course of the disease makes the people psychologically distressed. Health-seeking behavior is increased and people are more anxious about minor issues and frequently see the doctor in trivial issues and go for lab tests.

Though we reside in a third-world country our people are aware of the basic pathophysiology of Covid 19 which helps us to fight the disease efficiently with limited resources.

Discussion

In our study, most of the participants knew that covid 19 is a viral infection and the most important aspect of the disease is infectivity, not mortality. So

Conclusion

After about one year of struggle, we have gained the basic knowledge of Covid 19 infection and preventive measures. We have sacrificed our job,

our entertainment at the cost of survival. During the lockdown, many people lost their job which put a lot of burden on our economy. People are using health services from the government sector and it caused a lot of pressure in the government-run health sectors. In this hugely populated area where the doctor-patient ratio is also low, it is very difficult to serve all the people. It is necessary to increase the health care staff in the health sector to improve the service and to serve the increased number of people who are going through psychological problems in this crisis.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest

Ethical Clearance: Informed consent was obtained from each participant. Only willing parents participated in the study. They were assured to keep the information confidential.

Respondents were asked that they have full right to withdraw from the study if they feel embarrassed to answer any question. Ethical clearance was not obtained for the study.

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Macronutrients level in Commonly Consumed South Indian Breakfast Meals: An Analytical Study

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Abstract

The present study aims to develop a database on the macronutrient contents in 23 types of commonly consumed South Indian breakfast meals. AOAC methods were followed analysing protein, fat, total dietary fibre (TDF) and ash, whereas modified-Anthrone for available-carbohydrates to document the macronutrient contents. The macronutrient contents of all the breakfast meals were investigated on both meal (since all the foods are consumed in wet form) and dry basis. On meal basis, moisture ranged from 40.9 to 82.8%, protein 1.8 to 5.9%, ash 1.2 to 2.8%, fat 0.9 to 8.5%, TDF 0.9 to 5.2% and available-carbohydrate 12.2 to 41.4% respectively. Whereas on dry basis, moisture content ranged from 1.1 to 4.4%, protein 6.8 to 13.8%, ash 2.5 to 7.1%, fat 5.4 to 20.3%, TDF 2.2 to 12.4% and available-carbohydrate 49.6 to 71.8%. The data could be used for monitoring the macronutrient intake from breakfast foods while dealing with energy balance.

Keywords: Macronutrients, Carbohydrate, Protein, Fat, Ash, Total Dietary fiber.

Introduction

Macronutrients are the nutrients that provide calories or energy and are required for the body in large amounts to carry out daily life activities rhythmically and adequately. In addition to water, humans require four primary macronutrients from their staple foods, including carbohydrates, proteins, fats, and dietary fiber, which are often called proximate principles since they are the main bulk of the food [1].

The Food composition database symbolise significant role to analyse the dietary pattern and problems while dealing with public health nutrition, where only accuracy in the food composition databases can help in quantifying the nutrients to assess nutritional consumption [2]. Hence, it is paramount to keep the National food composition databases comprehensive and up-to-date by maintaining the inherent quality for nutritional monitoring [3]. Arabic comprehensive food composition database was developed in myfood24 by incorporating parameters, like food identification,

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cleaning, mapping, translation, allocating portion sizes, and quality checking [4]. In some way this kind of databases seems less implicit in addressing the actual energy balance.

The importance of carbohydrates in human nutrition has less been explored than those of macronutrient like proteins and fats, whereas, many foods composition database available in the world used the old and indirect, by "difference" method to analyse the carbohydrate content rather than analysing it directly [5]. Since the possible errors that arise from the individually analysed macronutrients (protein, fat, water, alcohol, and ash) are directly reflected on by "difference" value of carbohydrates, hence sophisticated method for estimating carbohydrate in food samples is the current trend among researchers because of its degree of accuracy in result which is also necessary for calculating the energy balance [6].

Indian citizen consumes cereals in excess quantity and neglects the intake of proper amounts of protein-based foods whereas in western countries, consumption of an excessive amount of animal protein is prevalent [7]. Insufficient protein consumption may cause many health complications like kwashiorkor, marasmus, impaired mental coordination, oedema, and failure in the organ system, wasting, and shrinkage of muscle tissues and the immune system [8]. Carbohydrates provide energy and contribute to subsequent weight gain if taken in excess [9], and linked with an elevated risk of mortality [10]. Breakfast foods are the part and parcel in almost all Indian households [11], such as idly, dosa, upma etc are more popular in South-India and most of them are prepared with cereals [12]. Children and adolescents of nuclear families consumed breakfast remarkably regularly compared to its counterpart. Apart from enhancing macro- and micronutrient intake and adjusting body weight, breakfast is a highly critical meal for increasing cognitive and academic accomplishments. Despite that, breakfast is the most disregarded meal in adolescent and school-going children's diet [13].

The macronutrient database in composite foods with all the items of ready-to-eat foods and food product is scanty. Therefore, the present study is an

initiative to develop a database on macronutrients of commonly consumed south-Indian breakfast meals to help the consumers, aware of the amounts of macronutrients they are availing from their regular breakfast meals

Material and Methods

Sampling: It is a cross-sectional study with multi-stage random sampling procedures applied to collect the food samples. A total of 391 commonly consumed breakfast foods such as Idly sambar (20), MLA pesarattu (18), Onion dosa (19), Open dosa (26), Paneer dosa (14), Pesarattu (12), Rava paneer dosa (16), Set dosa (18), Vegetable dosa (21), Vada sambar (20), Onion dosa (18), Plain dosa (25), MLA dosa (8), Bisi bele bhath (7), Open vegetable dosa (14), Tomato bhath (14), Lemon rice (18), Chapathi (16), Tomato rice (15), Vegetable biryani (18), Curd rice (16), Parota (21) and Mysore bonda (17). All the food items of each breakfast foods were made into a fine paste using a mixer grinder, and the homogenate was dried in an oven at 45°C for 12 hrs. The dried sample was made to flour, followed by passing through a 250 µm sieve. The obtained flour was used to develop the database of macronutrients.

Estimation of macronutrients:

Macronutrients such as fat, moisture, crude fiber, and ash contents were analysed in the powdered samples by using AOAC-2006 (934.01, 942.05, 962.09, and 920.39, respectively) [14], and crude Protein by the AOAC Kjeldahl method (984.13) [14]. The estimation of available carbohydrates was carried out by using the modified Anthrone method as described by Buckan DS, 2015 [6].

Estimation of available carbohydrates:

Reagents:

Sugars: Glucose (>99.5 % purity; Sigma Chemical Co., St. Louis, MO, USA) was used in this study.

The standard glucose Stock solution: 100 mg glucose in 100 ml of distilled water.

Working standard: 10 ml of stock solution was diluted to 100 ml with distilled water (100 µg/ml).

Anthrone reagent: 200 mg of anthrone was dissolved in 100 ml of ice-cold sulphuric acid.

Enzymes: Total Dietary Fiber Kit (Sigma, TDF-100A) was used. This kit includes 10 ml heat-stable α -amylase, 500 mg protease, and 30 ml amyloglucosidase.

Phosphate buffer (0.08 M, pH 6.0): Dissolve 1.400 g anhydrous dibasic sodium (Na_2HPO_4) and 9.68 g monobasic sodium phosphate monohydrate ($\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$) in 1000 ml distilled water. Check the pH level and adjust if necessary.

NaOH (0.275 N): Dissolve 11.00 g NaOH in 1000 ml distilled water.

HCL (0.325 M): Dilute 325 ml 1 M HCL to 1000 ml distilled with water.

Procedure:

Triplicate test portions of commonly consumed breakfast food samples were treated with heat-stable α -amylase, protease, and amyloglucosidase in order to hydrolyze proteins and starch under laboratory conditions, as given in the following:

Food samples (100 mg) were taken into 16 X 125 mm tubes with screw caps in duplicate. 5 ml of (0.08M) phosphate buffer pH 6.0 was added to the tubes and stored at 4°C for 12 h for hydration of the matrix. After 12 h, hydration samples were subjected to enzyme hydrolysis to degrade soluble starch. The- amylase solution (50 μl) was added, and the tubes were placed in a water bath at 95°C for 30 min. After 30 min, the tubes were removed and cooled to 60°C and adjust to pH 7.5 with 1 ml of 0.275 M NaOH. Protease solution (50 μl) was added to the test tubes and then incubated at 60°C for 30 min. After that, 1 ml of 0.325M HCl was added to the tubes to decrease the pH to 4.5. After adjusting the pH, amyloglucosidase solution (150 μl) was added and then incubated at 60°C for 30 min. The residue was separated by centrifugation. The liquid portion was placed to a 100 ml volumetric flask and made up to the mark with deionized water. The concentration of glycemic sugars in the supernatant was determined by using anthrone reagent. Different volumes of supernatant, 0.2–1 ml into a series of test tubes were taken, and the volume was made up to 1 milliliter with distilled water to each tube. 4 ml of anthrone reagent were added, and the tubes were placed in a boiling water bath for 8 min. and then cooled rapidly

under running tap water. The optical density of green to dark green was measured at 630 nm against a blank, and the concentration of glycemic carbohydrate was calculated using a standard glucose curve.

Statistical analysis

All experimental analysis was repeated 3 times. The results were presented as mean from three replications with standard deviation (SD). The mean values were tested for existence of difference by using Analysis of variance (ANOVA) and between the groups using t-test. Data was analyzed using SPSS 15.0 version.

Results

The individual breakfast foods, weight of individual items of each breakfast foods, total homogenate wet-weight and dry weight of the commonly consumed Indian breakfast meals are taken. The total wet weight of homogenate samples of each breakfast meals ranges from 159g (mysore bonda) to 665g (bisi bele bhath), and the dry weight of homogenate breakfast meals ranges from 71 g (mysore bonda) to 231g (open vegetable paneer dosa). For the first time macronutrient content of the various commonly consumed breakfast meals was investigated on a meal or wet and dry basis. The results of the macronutrients are represented in Figure 1 on meal or wet basis. Moisture content showed the lowest of 40.9% in set dosa and the highest of 82.8% in curd rice, protein percentage ranged from 1.8% in curd rice to 5.9% in rava paneer dosa, ash content represents the microelements which was falling within the range of 1.2% in curd rice to 2.8% in set dosa, fat content was observed in the range from 1% in curd rice to 8.5% in parotta, TDF content varied from 0.9% in pesarattu to 5.2% in mysore bonda, carbohydrate content was resulted in very high in all the foods. The percent of carbohydrates ranged between 12.2% in curd rice and 41.4% in set dosa.

The results of macronutrient content on dry basis are represented in Table 1. The percent of the moisture content was ranged from 1.1% (plain dosa) to 4.4% (mysore bonda), the percent of protein ranged from 6.8% in tomato rice to 13.8% in rava paneer dosa, ash content ranged from 2.5% in parota to 7.1% in curd rice, fat content was 5.4% in curd rice, 20.3% in vada

sambar, TDF ranged from 2.2% (set dosa) to 12.4% (vada sambar), carbohydrate content was very high in all the foods except vada sambar and the percent range observed from 49.6% (vada sambar) to 71.8% (vegetable biryani).

Table 1. Macronutrient composition of commonly consumed South Indian breakfast meals (g/100g on dry basis) ^a

Breakfast foods/ Plate	Moisture	Protein	Ash	Fat	TDF	Ava, CHO	Energy
Idly sambar	1.3±0.1	12.1±0.3	4.5±0.0	15.9±0.4	8.2±1.1	59.0±0.0	443.5
MLA pesarattu	2.4±0.0	9.5±0.4	5.0±0.0	13.4±0.7	4.4±0.9	66.3±0.1	432.8
Onion rava dosa	1.7±0.0	7.4±0.0	4.9±0.0	12.8±1.0	5.5±0.9	71.0±0.5	439.1
Open dosa	2.9±0.3	7.5±0.0	4.8±0.1	12.2±0.4	3.3±0.6	70.3±0.6	427.5
Paneer dosa	1.8±0.0	12.0±0.1	4.7±0.0	13.2±0.8	2.9±1.1	68.7±0.5	447.8
Pesarattu	2.0±0.2	8.9±0.0	4.9±0.1	15.8±0.3	2.3±1.1	65.8±0.2	445.4
Rava paneer dosa	2.2±0.3	13.8±0.2	4.7±0.0	13.3±0.9	3.8±0.6	65.2±3.1	442.7
Set dosa	1.5±0.1	9.3±0.3	4.8±0.0	13.9±0.3	2.2±0.6	69.9±0.2	445.9
Vegetable dosa	3.6±0.1	7.0±0.1	4.1±0.0	13.3±0.2	5.3±1.3	69.6±3.0	436.4
Vada sambar	1.2±0.1	13.1±1.0	4.2±0.6	20.3±0.2	12.4±1.7	49.6±1.5	458.8
Onion dosa	1.8±0.0	9.0±0.4	4.0±0.0	13.2±0.5	4.7±0.5	70.0±0.3	444.3
Plain dosa	1.1±0.1	8.1±0.1	5.2±0.0	12.6±0.1	3.4±0.6	70.8±1.6	435.8
MLA dosa	1.5±0.7	8.3±0.2	5.0±0.1	13.6±0.8	4.2±1.1	70.1±0.5	444.3
Bisi bele bath	3.0±0.5	8.5±0.6	5.4±0.0	20.2±0.7	8.4±0.7	57.0±0.2	460.7
Open vegetable. paneer dosa	1.8±0.1	9.7±0.1	5.5±0.0	16.2±0.5	2.7±0.9	66.3±0.9	455.8
Tomato bath	2.0±0.1	10.6±0.0	4.2±0.2	17.6±0.5	6.8±0.3	61.5±2.0	460.6
Lemon rice	2.7±0.3	7.6±0.1	4.7±0.1	12.7±0.3	3.8±0.5	70.4±0.0	433.9
Chapati	1.9±0.2	10.3±0.0	3.6±0.1	15.2±0.9	6.2±0.6	66.1±2.2	454.9
Tomato rice	2.6±0.1	6.8±0.0	3.9±0.1	12.3±0.9	5.6±0.6	71.4±0.3	434.2
Vegetable biryani	2.2±0.6	7.8±0.2	4.8±0.0	12.0±0.4	3.5±0.5	71.8±3.2	433.2
Curd rice	3.1±0.1	10.2±0.5	7.1±0.0	5.4±0.2	5.4±1.3	71.0±0.7	383.5
Parota	2.7±0.1	7.2±0.3	2.5±0.2	15.1±0.4	9.2±0.8	63.5±1.4	437.4
Mysore bonda	4.4±0.2	7.4±0.5	3.2±0.4	12.2±0.3	4.0±0.5	70.4±0.1	428.7

^a Each value is the average of triplicate determinations.

±, One SD.

Note:

TD: Total dietary fiber

Ava, CHO: Available carbohydrates

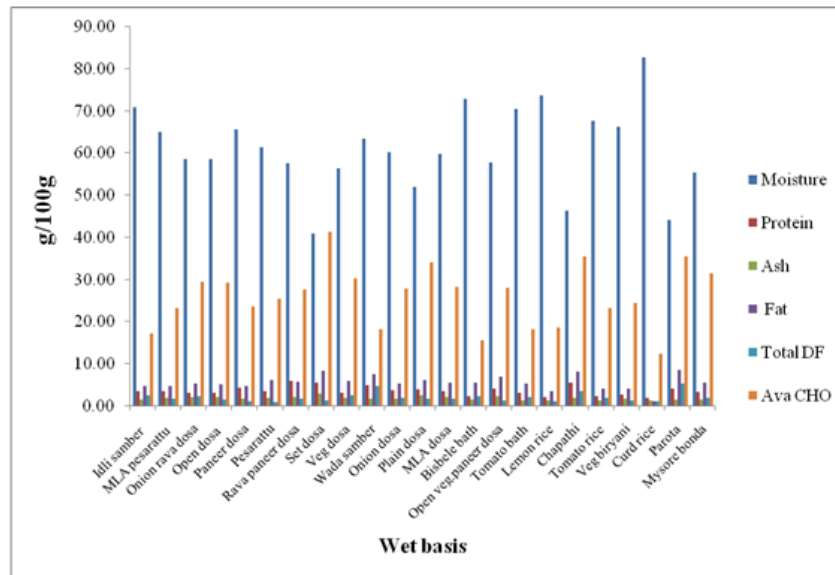


Figure 1 Macronutrient composition of commonly consumed South Indian breakfast meals (g/100g on wet basis)

Discussion

To our knowledge, this is the first study to report that, the accurate analysis of macronutrients in ready to eat breakfast foods. In the present trend for the macronutrient levels of meals was calculated using different methods: data from printed food composition tables, electronic databases, and food industry data. Data on macronutrients content of meals in the collective nutrition, obtained from food composition tables are mostly informative but not accurate because there were differences in macronutrient estimations depending upon the choice of the food composition tables. Though from the literature, many study available reporting the nutrient contents of ready-to-eat or cooked foods by researchers such as [15], who have reported the proximate composition of ready to eat foods of street foods in Nairobi. Sanni *et al.* [16] have reported the proximate composition of seven Nigerian street foods such as, cooked yam, cooked fufu, cooked rice, cooked beans, fried fish, stew and vegetable soups. Singh *et al.* (2003) [17] have analysed the proximate composition of commonly consumed sesame-based recipes of Himachal Pradesh, India. Das *et al.* [18] have assessed the nutritional composition of regional recipes of Assam and were observed a diversified range of nutritional profile. Pikuda and Ilelaboye [19] have reported the proximate composition of Street

Snacks of Lagos, Nigeria. Atinuke [20] have analysed the proximate composition of ready-to-eat food such as Kilishi and rice. Koodagi *et al.* [21] have studied the macronutrient status of popular street foods in Karnataka. Amadi *et al.* [22] have studied the nutritional composition of traditional dishes such as Kekefiyai, Kiri-igina, and Opuru-fulou of Bayelsa State, Nigeria. Israel and Samuel (2020) [23] have studied the proximate composition in eight street foods such as roasted plantain, fish, yam, corn and dough nuts, suya, eggroll, meat-pie from parts of Lagos Nigeria. Similarly, Calubaquib and Suyu [24] have also examined the proximate contents of six fortified Filipino snacks. But the nutrient analysis of a complete meals category was lacking and our present study is stepping towards addressing the nutrient analysis by categorizing meals like breakfast meals

Conclusion

Many food composition databases are available on raw food basis; a negligible amount of data has reprinted so far to address the actual nutritional intake. We are reporting the actual consumption of macronutrients through commonly consumed south-Indian breakfast meals for the first time. The study indicated that almost all the breakfast meals' macronutrient composition are promising since they

contribute a large percentage of macronutrients as per the dietary guidelines for Indians. The data will serve as a foundation for calculating the macronutrient intake through breakfast meals. Nevertheless, the study was only an initial move toward developing a macronutrient database of commonly consumed breakfast meals. Therefore, more extensive research needs to be carried out in this direction for a complete database on ready to eat foods and food products of Indian, which has further applications in various health and nutritional issues.

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Conflict of Interest: Nil

Abbreviations:

AOAC: Association of Official Analytical Chemists

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Qualitative Content Analysis in Community Health Nurses: Principles Measures Adopted Rural Areas in India

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Abstract

Qualitative content analysis as described in published literature shows conflicts opinions and unsolved issues regarding meaning and use of concepts, procedure and interpretation in primary health care. This paper provides an overview of important concepts related to qualitative content analysis; illustrations the use of concepts related to the research procedure, and proposes measure to achieve community health nurses and community health worker in rural areas throughout the steps of the research procedure. Interpretation in qualitative content analysis is discussed in light of practice aspects of community health nurses and community health worker in rural areas.

Keywords: Community health Nursing ,Credibility ,Manifest content, Qualitative content analysis, Transferability, Home visit , Principles of community ,Primary care

Introduction

Healthcare research is a systematic inquiry intended to generate robust evidence about important issues in the fields of community health nursing and healthcare settings. Qualitative research has ample possibilities within the arena of healthcare research. This article aims to inform healthcare professionals regarding qualitative research, its significance, and applicability in the field of Community health Nursing. A wide variety of phenomena that cannot be explained using the quantitative approach can be explored and conveyed using a qualitative method. The major types of qualitative research designs are narrative research, phenomenological research,

grounded theory research, ethnographic research, historical research, and case study research. The greatest strength of the qualitative research approach lies in the richness and depth of the community health exploration and description it makes. In community health research, these methods are considered as the most humanistic and person-centered way of discovering and uncovering thoughts and actions of human beings¹. Community Health research is a systematic inquiry intended to generate nursing care evidence about issues in the field of Community health and Community Health nursing care. The three principal approaches to health research are the quantitative, the qualitative, and the mixed methods approach. Qualitative information with an objective

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to solve different but related questions, or at times the same questions².

Overview concepts

Ensuring access to Community healthcare is a complex, multi-dimensional health challenge. Since the inception of the health care settings, this challenge is more pressing. These dimensions of access are particularly evident in rural health systems where additional structural barriers make accessing healthcare more difficult. Thus, it is important to examine healthcare access barriers in rural-specific areas to understand their origin and implications for resolution³.

Five key themes emerged from analysis:

1) a friction exists between aspects of clients' rural identities and community healthcare systems; 2) facilitating access to community healthcare requires application of and respect for cultural differences; 3) communication between community healthcare providers is systematically fragmented; 4) time and resource constraints disproportionately harm rural health systems in the field areas and 5) profits are prioritized over addressing barriers to healthcare access in India

Need for the study

The qualitative data approximately 13.3% of adults in India did not have a usual source of community healthcare. Millions more did not utilize services regularly, and close to two-thirds reported that they would be debilitated by an unexpected natural calamity in the rural areas. Findings like these emphasized a fragility in the financial security of the total population⁴. These concerns were exacerbated by the health care when a sudden surge in unemployment increased un- and under health care modalities. Indeed, employer- health care covers close to half of total cost of illness. Unemployment linked to health care cut off the lone outlet to healthcare access for many. Health-related financial concerns expanded beyond individuals, as healthcare organizations were unequipped to manage a simultaneous increase in demand for specialized healthcare services and a steep drop off for routine revenue-generating healthcare services in the rural health care in the countryside. These consequences of the health risk of

all put additional, unexpected pressure on an already fragmented community healthcare system⁶.

Other structural barriers to healthcare access exist in relation to the rural-urban divide. Less than 15% of Indian healthcare resources are located in rural areas where approximately 65% of the Indian population resides. In a country with substantially fewer providers per capita compared to many other developed countries, persons in rural areas experience uniquely pressing healthcare provider shortages in rural health care. Rural inhabitants also tend to have lower household income, higher rates of disease prevalence and more difficulty with travel to healthcare clinics than urban dwellers. Subsequently, persons in rural communities use healthcare services at lower rates, and potentially preventable hospitalizations are more prevalent. This disparity often leads rural residents to use services primarily for more urgent needs and less so for routine care⁸.

Methods

Qualitative methods were utilized for this interpretive, exploratory study because knowledge regarding barriers to healthcare access within Tripura rural health system. We chose West Tripura healthcare providers, rather than patients, as the population of interest so we may explore barriers to healthcare access from the perspective of those who serve many persons in rural settings. Inclusion criteria required study participants to provide direct healthcare to patients at least one-half of their time⁹. We defined 'provider' as a healthcare organization employee with clinical decision-making power and the qualifications to develop or revise patients' treatment plans. In an attempt to capture a group of providers with diverse experience, we included providers across several types and specialties. These included Community health worker and Community Health nurses, who worked in community health care, family health care, pediatrics, psychiatry, and urgent community health care. We also included community health workers and clinical field specialist who specialize in community behavioral healthcare provision. We recruited participants via direct field visit snowball sampling approach we opted for this approach because of its effectiveness in time-pressured contexts, such as the time bound study,

which has made healthcare provider populations hard to reach. Considering additional constraints with the community care and the rural nature of Tripura, interviews were administered and recorded function enabled. All interviews were conducted by the first author between December and March 2021.

Results

Illustrations of the use of concepts

In the following we illustrate the use of concepts and analysis procedures for two texts based on interviews and observations respectively. One rationale behind giving two examples is to show various ways to develop themes. The processes of analysis are described and shows in Fig 1-3 , Even

if there description point to a linear process, it is importance to bear in mind that the process of analysis involves a back and forth movement between the whole and parts of the text.

Qualitative content analysis of an interview text

The unit of analysis in this example is interview text about experiences of heaving rural health care. The content consists of a larger study aimed at describing coping strategies related to the everyday routine in rural health care. Twenty community health nurses aged 25-59 years, participated in the study. Interviews were performed addressing various aspects of rural health challenges.

Table 1: Examples of meaning units, condensed meaning units and codes

Meaning Unit	Condensed meaning unit	Code
There is a curious feling in the head in some way, empty in some way	Curious feeling of emptiness in the head	Emptiness in the head
It is more unpredictable so tosay,you can never be sure about anything	An unpredictable and unsure situation	uncertainty

Table 2: Lack of control and struggle for regaining in community connectivity

Theme	Lack of control and struggle for regaining in community connectivity				
Category	Sensations		Actions		Cognitions
Sub-category	Unfamiliar	familiar	Unfamiliar	Familiar	Action difficulties
Codes	Route map and modification of concept mapping in community field	Logical changes in the route mapping in agencies	Rural health system health management disruption	Urge to know about connectivity in the rural health sector	In ability of thinking clear concept on rural health system with clear concepts on health

Our sample included 12 health providers do with intensive care providers in community health in the field and one in behavioral health Our participants averaged 9 years (range 2-15) as a healthcare provider; most reported more than 5 years in their current professional role. The diversity of participants extended to their patient populations as well, with each participant reporting a unique distribution of age, race and level of medical complexity among their clients in the community. Most participants reported

that a portion of their patients travel up to two hours, sometimes across district , to receive care.

Theme 1: A friction exists between aspects of patients’ rural identities and healthcare systems

Our participants comprised a collection of medical professions and reported variability among health-related reasons their patients seek care. However, most participants acknowledged similar characteristics that influence their patients’ challenges

to healthcare access. These identified factors formed categories from which the first theme emerged. There exists a great deal of 'rugged individualism' among country side people, which reflects a self-sufficient and self-reliant way of life. The system marked a primary factor to characterize this quality. One participant explained: True country side people are difficult to treat medically because they tend to be a tough group. They don't see doctors. They don't want to go, and they don't want to be sick. That's an aspect of Montana that makes health culture a little bit difficult.

There is a real perception of a punitive nature in the medical community, particularly if I observe a health issue other than the primary reason for one's hospital visit, whether that may be predicated on medical neglect, delay of care, or something that may warrant a report to social services. For many of the patients and families I see, it's not a positive experience and one that is sometimes an uphill barrier that I work hard to circumnavigate.

Analysis of these factors suggests that low use of healthcare services may link to several characteristics, including access problems. Separately, a patient's perceived stigma from healthcare providers may also impact a patient's willingness to receive services. One participant put it best by stating.

Sometimes, families assume that I didn't want to see them because they will come in for follow up to meet with me but end up meeting with another provider, which is frustrating because I want to maintain patients on my panel but available time and resource occasionally limits me from doing so. It could be really hard adapting to those needs on the fly, but it's an honest miss. When a patient arrives for a healthcare visit and experiences this frustration, it may elicit a patient's perceptions of neglect or disorganization. This 'honest miss' may, in turn, exacerbate other acceptable-related barriers to care.

Theme 2: Facilitating access to healthcare requires application of and respect for cultural differences

The biomedical model is the standard of care utilized. However, the state comprises people with diverse social and cultural identities that may not directly align with conceptions of health

and wellness concept of government of India. Approximately 11.5% of the Tripura population falls within an ethnic minority group. 6.4% are of Christians, 65% are of bengalis. Cultural insensitivity is acknowledged in health services research as an active deterrent for appropriate healthcare delivery. Participants for this study were asked how they react when a patient brings up a cultural attitude or behavior that may impact the proposed treatment plan. Eight participants noted a necessity for humility when this occurs. One participant conceptualized this by stating: When this happens, I learn about individuals and a way of life that is different to the way I grew up. There is a lot of beauty and health in a non-patriarchal, non-dominating, non-sexist framework, and when we can engage in such, it is really expansive for my own learning process.

Facilitating factors to react to cultural attitude/behavior that does not align with treatment path

Consensus among participants indicated that the use of these protective factors to promote cultural sensitivity and apply them in practice is not standardized. When asked, all but two participants said they had not received any culturally-based training since beginning their practice. Instead, they referred to developing skills through "on the job training" or "off the cuff learning." The general way of medicine, one participant remarked, was to "throw you to the fire." This suggested that use of standardized cultural humility training modules for healthcare providers was not common practice. Many attributed this to time constraints.

Individual efforts to gain culturally appropriate skills or enhance cultural humility were mentioned, however. For example, three participants reported that they attended medical conferences to discuss cultural challenges within medicine, one participant sought out cultural education within their organization. Participants described these additional efforts as uncommon and outside the parameters of a provider's job responsibilities, as they require time commitments without compensation.

Theme 3: Communication between healthcare providers is systematically fragmented

Healthcare is complex and multi-disciplinary,

and patients' treatment is rarely overseen by a single provider. The array of provider types and specialties is vast, as is the range of responsibilities ascribed to providers. Thus, open communication among providers both within and between healthcare systems is vital for the success of collaborative healthcare. Without effective communication achieved between healthcare providers, the appropriate delivery of healthcare services may be become compromised. Our participants noted that they face multiple challenges that complicate communication with other providers. Miscommunication between departments, often implicating the health Department (ED), was a recurring point noted among participants. One participant who is a primary care physician said:

This concern was highlighted with a specific example from a different participant:

I have been unable to troubleshoot instances when I send people to the primary health centers with a pretty clear indication for admission, and then they're sent home. For instance, I had an older fellow with pretty severe chronic kidney disease. He presented to another practitioner in my office with shortness of breath and swelling and appeared to have newly onset decompensated heart failure. When I figured this out, I sent him to the ER, called and gave my report. The patient later came back for follow up to find out not only that they had not been admitted but they lost no weight with outpatient dialysis. I feel like a real opportunity was missed to try to optimize the care of the patient simply because there was poor communication between myself and the primary health care.

In some cases, communication breakdown was reported as the sole cause of a poor outcome. When communication is effective, each essential member of the healthcare team is engaged and collaborating with the same information. Some participants called this process 'rounds' when a regularly scheduled meeting is staged between a group of providers to ensure access to accurate patient information. Accurate communication may also help build trust and improve a patient's experience. In contrast, ineffective communication can result in poor clarity regarding providers' responsibilities or lost information. Appropriate delivery of healthcare considers the fit

between providers and a patient's specific healthcare needs; the factors noted here suggest that provider-provider miscommunication can adversely affect this dimension of healthcare access.

Theme 4: Time and resource constraints disproportionately harm rural health systems

Several measures of system capacity suggest the healthcare system in the Tripura under-resourced. There are fewer health care providers and hospital beds per capita compared to most comparable states , and the growth of healthcare provider populations has stagnated over time. Rural areas, in particular, are subject to resource limitations. All participants discussed provider shortages in detail. They described how shortages impact time allocation in their day-to-day operations. Tasks like patient intakes, critical assessments, and recovering information from diseases take time, of which most participants claimed to not have enough of. There was also a consensus in having inadequate time to spend on medically complex cases. Time pressures were reported to subsequently influence quality of care. One participant stated.

Theme 5: Profits are prioritized over addressing barriers to healthcare access in the health department in India.

The Indian healthcare system functions partially for-profit in the public and private sectors. The government provides funding for national programs such as Medicare, but a majority of Americans access healthcare through private employer plans. As a result, consumer rates influence healthcare access. Though the rate of the uninsured has dropped over the last decade through expansion of the Affordable Care , it remains above 28 percent. Historically, there has been ethical criticism in the literature of a for-profit system as it is said to exacerbate healthcare disparities and constitute unfair competition against nonprofit institutions. One participant shared their views on how priorities stand in their practice.

Eight participants echoed a similar concept, that addressing barriers to healthcare access in their organizations is largely complicated because so much attention is directed on matters that have nothing to do with patients. A few other participants supported

this by alluding to a “cherry-picking” process by which those at the top of the hierarchy devote their attention to the easiest tasks. One participant shared an experience where contrasting work demands between administrators and front-line clinical providers produce adverse effects:

Discussion

This study explored barriers and facilitators to healthcare access from the perspective of rural healthcare providers in Tripura. Our qualitative analysis uncovered five key themes: 1) a friction exists between aspects of patients’ rural identities and healthcare systems; 2) facilitating access to healthcare requires application of and respect for cultural differences; 3) communication between healthcare providers is systematically fragmented; 4) time and resource constraints disproportionately harm rural health systems; and 5) profits are prioritized over addressing barriers to healthcare access in India. Cultural competence is achieved through a plethora of trainings designed to expose providers to different cultures’ beliefs and values but induces risk of stereotyping and stigmatizing a patient’s views. Therefore, cultural humility is the preferred idea, by which providers reflect and gain open-ended appreciation for a patient’s culture.

Implications for Practice

Perhaps the most substantial takeaway is how embedded rugged individualism is within rural patient populations and how difficult that makes the delivery of care in rural health systems. We heard from participants that stoicism and perceptions of stigma within the system contribute to this, but other resulting factors may be influential at the provider- and organizational-levels. Stoicism and perceived stigma both appear to arise, in part, from an understandable knowledge gap regarding the care system. For instance, healthcare providers understand the relations between primary and secondary care, but many patients may perceive both concepts as elements of a single healthcare system. Any issue experienced by a patient when tasked to see both a primary and secondary provider may result in a patient becoming confused. This may also overlap with our third theme, as a disjointed means

of communication between healthcare providers can exacerbate patients’ negative experiences..

Implications for Future Research

It is important for future health systems research efforts to consider issues that arise from both individual- and system-level access barriers and where the two intersect. Although mental health did not come up by design in this study, future efforts exploring barriers to healthcare access in rural systems should focus on access to rural healthcare. In many rural areas, Tripura included, rates of suicide, substance use and other mental health disorders are highly prevalent. These characteristics should be part of the overall discussion of access to healthcare in rural areas. Optimally, barriers to healthcare access should continue to be explored through qualitative and mixed study designs to honor its multi-dimensional stature.

Ethical clearance: Ethical clearance taken from Institutional Ethical clearance committee before going to the study.

Source of funding: Source of funding is self for the study

Conflict of Interest: There is no conflict of interest for the study

Conclusion

The divide between urban and rural health stretches beyond a disproportionate allocation of resources. Rural health systems serve a more complicated and hard-to-reach patient population. They lack sufficient numbers of providers to meet population health needs. These disparities impact collaboration between patients and providers as well as the delivery of acceptable and appropriate healthcare. Our qualitative study explored rural healthcare providers’ views on some of the social, cultural, and programmatic factors that influence access to healthcare among their patient populations. We identified five key themes: 1) a friction exists between aspects of patients’ rural identities and healthcare systems; 2) facilitating access to healthcare requires application of and respect for cultural differences; 3) communication between healthcare providers is systematically fragmented; 4) time and

resource constraints disproportionately harm rural health systems; and 5) profits are prioritized over addressing barriers to healthcare access.

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Enhancing Knowledge on Prevention of Dengue Hemorrhagic Fever (DHF) through Focus Group Discussion (FGD) and Training of Trainers (TOT) Approaches during the Pandemic Period at Dupak Health Center, Surabaya

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Abstract

Objective: The COVID-19 pandemic that has occurred over the past 2 years has had a very significant impact on various sectors, especially public health. Indonesia, which is a tropical country, especially has to deal with cases of dengue disease which are still quite high. The government's social distancing policy that was in effect during the COVID-19 pandemic caused the control and prevention of dengue fever to be neglected by the public.

Purpose: This study aims to increase public understanding of dengue prevention through Focus Group Discussion (FGD) and Training of Trainer (TOT) approaches.

Method: This research was conducted using 2 approaches, namely FGD and TOT, which were followed by 15 and 30 public workers participants. The FGD and TOT were carried out by discussing and giving lectures to participants, then participants were given a pre-test and post-test question sheets.

Result: As many as 93.3% of participants already know the causes, methods of prevention, and types of dengue mosquitoes. However, there were still 60% of participants understood the handling of mosquito larvae correctly. After the FGD and TOT were carried out, it was seen that there was an increase in participants' understanding.

Conclusion: The FGD and TOT approaches can increase public understanding of the causes, prevention, and proper inspection of DHF mosquito larvae.

Keywords: covid-19, dengue virus, medicine, health, public health.

Introduction

The COVID-19 pandemic that has occurred over

the past 2 years has had a very significant impact on various sectors, especially public health. Dengue Hemorrhagic Fever (DHF) is one of several infectious

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diseases that is a health problem in several countries, especially sub-tropical, tropical and sub-tropical countries.¹ genotype, and lineage information Indonesia, which has a population of 251 million, is one of the largest countries in the DHF endemic area. In 2015 there were 129,650 cases of DHF in Indonesia. In most cases, single outbreak reports, and clinical and virological studies in DHF patients in a particular geographic area and year have been used to describe the epidemiology of dengue in Indonesia.² dengue vector-density and human mobility cause rapid spread of dengue virus in Indonesia. We investigated the changes in dengue haemorrhagic fever (DHF

According to data from the East Java Provincial Health Office, as of January 1-27 2022, there were 1,220 dengue fever sufferers in East Java, with 21 deaths (CFR = 1.7%) dominated by ages 5-14 years. This figure increases when compared to 2021 when dengue patients in East Java were recorded as 668 people with 5 deaths. The total number of dengue patients in 2021 in East Java was 6,417 people, with a total number of deaths of 71 people (CFR = 1.1%).³

Dengue virus (DENV) is one of the Flaviviridae group and has 2 genetically different serotypes (DENV 1-4), which are transmitted to humans by *Aedes aegypti* and *Aedes albopictus* mosquitoes.⁴ we aimed to systematically review and analyze the association between different blood groups and severity of dengue. We searched nine databases for eligible papers reporting prevalence, distribution, and frequency of blood group type among dengue patients. Network meta-analysis using R software was used to analyze the data. Of a total of 63 reports screened, we included 10 studies with total sample size 1977 patients (1382 DF and 595 DHF DENV infection usually occurs once a year and as many as 95% have symptoms. A research model predicts that by 2085, half of the world's population may experience massive DENV transmission.⁵ clinical presentation, and virology will facilitate appropriate clinical management and public health policy. Methodology/Principal findings A multicenter observational cohort study was conducted in Indonesia to assess causes of acute fever requiring hospitalization. Clinical information and specimens were collected at enrollment, 14-28 days, and 3 months from 1,486 children and adults. Total of 468

(31.9% In Indonesia, clinical presentation, standard laboratory evaluation, and rapid diagnostic tests are usually used to establish the diagnosis of DENV infection.⁶

The pandemic that occurred in 2020 required all activities to be carried out from home because the lockdown and social distancing made the control and prevention of dengue fever neglected. This certainly has an impact on the incidence of dengue infection, considering that the *Aedes aegypti* mosquito infects more often from inside the house. Health workers' service has a very important role to provide education to the public to reduce dengue infection.⁷ One of the ways to prevent dengue fever is by examining mosquito larvae in clean puddles of water. The community needs to understand how to properly check larvae, therefore this training aims to increase public understanding of how to carry out larval checks properly so that dengue prevention can be carried out optimally.

Method

According to the situation analysis, it is necessary to make efforts to increase the understanding and awareness of the public and geologists, especially in the Dupak area, Surabaya, as the key to disseminating information, especially during the pandemic to overcome DHF. The methods used to overcome these problems include:

1. Partner Problem Analysis

The Covid-19 pandemic has resulted in the government requiring lockdown and social distancing (social restrictions) to be enforced. This resulted in the control and prevention of dengue fever being disrupted because most of the resources and medical personnel were directed to control the spread of Covid-19. In addition, the activity of reducing the DHF vector population requires a lot of participation from the community and bums, where this activity is often hampered due to social restrictions. This makes dengue vector control activities during the pandemic also limited so that the proliferation and spread of dengue vectors will increase and affect the number of dengue cases.

2. Prevention Socialization of DHF

The dissemination of DHF prevention was carried out through an approach to the community through discussions (FGD), interviews, and training (TOT) on monitoring mosquito larvae that cause DHF. The target population for the TOT activity is 30 public workers at the Dupak Health Center. The target population for the FGD activities was 2 community groups, each group consisting of 7-8 people, with the total FGD participants being 15 people. This area was chosen as the target area because the population is quite dense and there has been an increase in dengue cases in recent times.

This community service activity will be carried out for 2 days. The Training of Trainer (TOT) activities for health cadres will be held on the first day by inviting participants, implementing partners, and 3 resource persons. On the second day, FGDs will be held in 2 community groups by inviting participants, implementing partners, and 2 resource persons. Evaluation of this community service activity was carried out pre-test and post-test before and after the TOT and FGD activities.

Result

The last level of education distribution

Table 1. Distribution of the last level of education FGD participant

The last level of education	n	Percentage (%)
SD	0	0
SMP	2	13.3
SMA	3	20
SLTA	7	46.7
SMK	1	6.6
D3	1	6.6
S1	1	6.6

Table 1 shows that participants have the latest education S1 6.6% (1 person), D3 6.6% (1 person), SMA 20% (3 people), Senior High School 46.7% (7 people), SMK 6.6% (1 person), SMP 13.3% (2 persons). Most of the participants had the last education equivalent to SMA/SLTA.

Table 2. Distribution of the last level of education TOT participant

The last level of education	n	Percentage (%)
Not in School	1	3.3
SD	2	6.7
SMP	6	20
SMA	10	33.3
SMEA	2	6.7
SMK	3	10
D3	1	3.3

Table 2 shows that participants have the latest education D3 3.3% (1 person), SMA 33.3% (10 people), SMEA 6.7% (2 people), SMK 10% (3 people), SMP 20% (6 people), SD 6.7% (2 people) and not in school 3.3% (1 person). Most of the participants had the last education equivalent to high school.

Training of Trainer (TOT)

The TOT activity was attended by 30 people who were public workers service. The implementation of the TOT is carried out by providing counseling through presentations on dengue prevention. During the TOT, participants were given a pre-test and a post-test with 10 questions each. The results of the pre-test and post-test are shown in Figure 1.

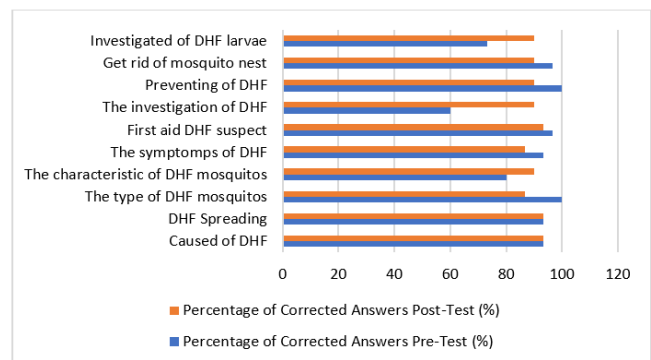


Figure 1. An overview of the pre-test and post-test values of the TOT public workers, in Dupak Health Center, Surabaya.

Figure 1 shows that most of the participants (90%) (28 people) already understand the causes, transmission, and types of DHF mosquitoes. However, only 60% (18 people) of the participants understood the proper epidemiological investigation of DHF.

The mean pre-test and post-test TOT scores are presented in Figure 2.

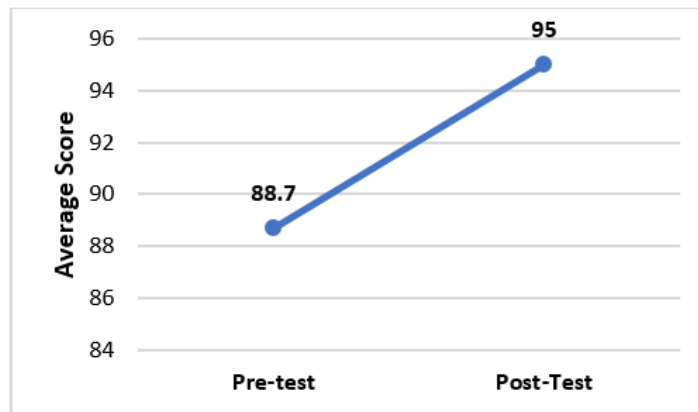


Figure 2. Average results of pre-test and post-test TOT Dupak Health Center, Surabaya.

Focus Group Discussion (FGD)

The Focused Group Discussion (FGD) was attended by 15 people, 8 women and 7 men from Dupak, Surabaya. The age range is between 28-55

years with junior high school until diploma education. The results of the pre-test and post-test are presented in Figure 2.

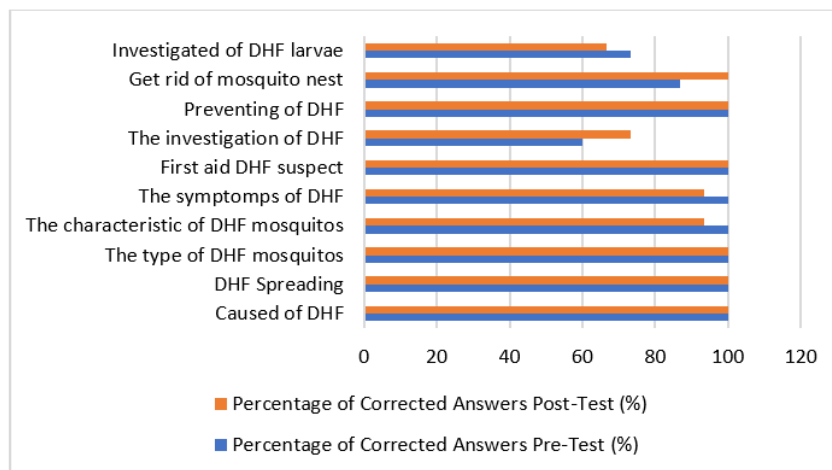


Figure 3. Description of the pre-test and post-test scores of the FGD public workers, Dupak Health Center, Surabaya.

Figure 3 shows that most of the participants (15 people) already understand the causes, modes of transmission, and types of DHF mosquitoes. However, it was seen that only about 60% (9 people) of the participants had understood the investigation activities and how to check mosquito larvae correctly.

After the FGD was conducted, it can be seen from Figure 3 that there was an increase of 20%. The mean value of pre-test and post-test FGD is shown in Figure 4, there is only a difference of 0.7%.

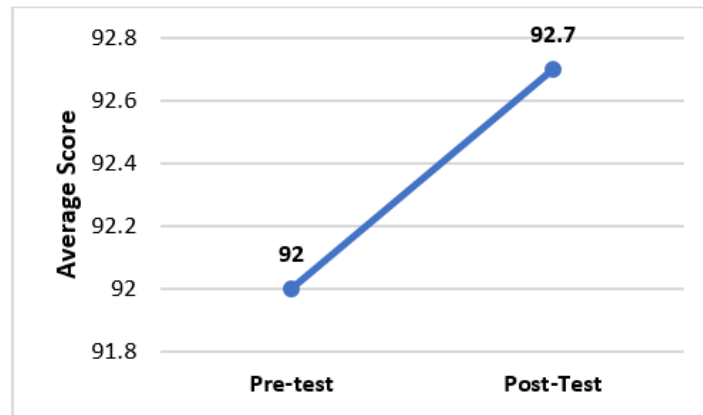


Figure 4. Average results of pre-test and post-test FGD Dupak Health Center, Surabaya.

Discussion

This study found that most people in the Dupak area, Surabaya already have good knowledge about DHF. The results of the TOT pre-test showed about 93.3% of the participants already knew about the prevention and transmission of DHF. Participants also understood the scientific name of the mosquito that causes DHF. Dengue fever is caused by *Aedes aegypti* and *Aedes albopictus* mosquitoes with body characteristics having black and white stripes. This mosquito originated in Africa but is now found in tropical and sub-tropical countries with warm temperatures. In Asia, the first dengue vector is *Aedes aegypti*, and *Aedes albopictus* is a secondary vector.⁶ The natural habitat of the Aedes mosquito, especially in clean water puddles, is a breeding ground for mosquitoes, especially during the rainy season.⁸

There are four serotypes of the virus called DENV, DENV-1, DENV-2, DENV-3, and 4. All of these virus serotypes have been found in several parts of Indonesia. The results of research in Indonesia show that DENV-3 is strongly associated with severe dengue cases and is the serotype with the most widespread distribution followed by DENV-2, DENV-1, and DENV-4. If a person is infected with one of the four serotypes, it will cause immunity lifetime against the infecting viral serotype, but not for other serotypes. Although the four serotypes of the virus have the same antigenic power, they have differences in generating cross-protection, even though it has only been a few months since the virus infection occurred.⁹

Dengue virus that enters the human body will multiply in cells that last 5-7 days. As a result of the infection, an immune response, both humoral and cellular, appears, among others, anti-hemagglutinin, anti-neutralization, and anti-complement. IgG and IgM are antibodies that generally appear, in primary dengue infection antibodies begin to form, and in subsequent infections, antibody levels in the body will increase. In primary infection, antibodies that have neutralizing activity are formed that can recognize protein E and monoclonal antibodies against NS-1, Pre-M, and NS-3 from viruses that cause infection. In the end, many viruses are eliminated and the patient recovers, then there is lifelong immunity to the same virus serotype, but if there are non-neutralizing antibodies that stimulate viral replication, the patient's condition will become more severe.¹⁰

The results of the discussions and interviews showed that many public workers already understood how to control and prevent the spread of DHF. One of the efforts that can be done to overcome the increase in DHF is to do 3M. Activities 3M's activities include, firstly, draining (cleaning) bathtubs, flower vases, pet drinking containers, or dispenser mats. Second, close the meeting of the Water Shelter. For landfills that cannot be drained or closed, you can give larvicides. Third, get rid of or recycle used items such as plastic bottles, used cans, etc.³ Several factors that influence the spread of DHF are population density, population mobility, community behavior, global climate change, economic growth, and availability of clean water.⁹

Environmental health is an important factor in social life. The environment is one of the influential factors in supporting the occurrence of various diseases, one of which is DHF. Environmental changes in the long term determine the pattern of spread of dengue and malaria vector infectious diseases in an ecosystem.¹⁰

According to Dawe *et al.*, (2020)¹¹ The factors that influence the spread of the dengue virus are mosquito density. The higher the density of the *Aedes aegypti* mosquito, the higher the risk of contracting dengue disease. Mosquito density can increase in flower vases, used cans, and water storage containers. The second factor is the density of houses. The *Aedes aegypti* mosquito has a short flight of 100 meters. So that mosquitoes need a place to rest before returning to fly to another place. If people's houses are close to each other, mosquitoes will easily move from one place to another, making it easier for transmission.

The last level of education also affects knowledge about the handling and prevention of DHF. The higher a person's level of education, the level of knowledge will also increase. Health workers have a role as a driver or reinforcement of healthy behavior in the community to achieve health. The existence of active community participation, accompanied by adequate education in this program is believed to be able to accelerate the eradication of vector breeding sites.¹² The results of this study are supported by research by Nuryanti *et al.*, (2011)¹³ which states that there is a relationship between the role of health workers and the behavior of eradicating dengue mosquito nests in Karangjati village. The results of this study are also following Green's theory that good dengue prevention is not only influenced by knowledge as a predisposing factor but also influenced by the role of officers in this case health workers.

Conclusion

The results of this study indicate that FGD and TOT training can increase public knowledge in efforts to prevent and treat DHF. Health workers and public workers have a very important role in providing education to the public regarding the prevention, transmission, and proper handling of DHF.

Ethical Clearance

This research has been approved by the ethical commission Faculty of Medicine, Universitas Airlangga with the number 194/EC/KEPK/FKUA/2022.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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Measles Related Complications: A Hospital-Based Study in Kumaon Region of Uttarakhand

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Abstract

Background: Measles is a contagious vaccine-preventable illness caused by the measles virus.¹

Aim: To study complications of measles in pediatric patients & to determine the course of measles based on various factors i.e. age, nutritional status, socio-economic status, immunization status, other host factors.

Methods: It is a prospective descriptive study done in pediatric OPD & IPD over one year

Results: The average age of a child with confirmed measles is 21 months & 15.8 months in complicated measles with a male predisposition. Patients in 2nd degree PEM had a risk of developing complicated measles. There exists a positive correlation between lack of vaccination and the development of complications due to measles.

Conclusion: Universal implementation of two doses of MMR Vaccine and screening & management of malnutrition can prevent the severity of complications associated with measles.

Keywords: Measles, Complications, Vaccination, Immunization, Socioeconomic

Introduction

Measles is a contagious vaccine-preventable illness caused by the measles virus.^[1] Usually, it is a mild illness but in children with risk factors such as malnutrition, overcrowding, etc. the disease progress to complicated measles. It is a highly contagious disease with a secondary attack rate of more than 90% in susceptible individuals with high case fatality rates.^[2]

Every year about 39.9 million cases of measles are reported worldwide. Out of which mortality occurs in 777,000 cases.^[3] India reported 17,250 measles cases in 2016 & accounted for about 50% of global measles mortality in 2010.^[4] In India, due to the introduction of the second measles dosage in the National Immunization Programme in 2010 and good surveillance activities, the measles specific mortality rates have fallen by 51 % between 2010

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and 2015.^[5] NFHS 4 2015-2016 of Uttarakhand has given statistics of measles vaccine coverage in 12-23 months age group of 77.7% in urban and 81.6 % in rural Uttarakhand. Under the Global Vaccine Action Plan, measles and rubella are targeted for elimination in five WHO Regions by 2020.^[6]

This study was done to know the current scenario and complications of measles in the era of the verge of eradication in kumaon region of Uttarakhand.

Material And Methodology

It is a Prospective descriptive study done in age group 6 months -14 years in Pediatric Ward and Pediatric OPD over a period of one year (December 2018 to December 2019)

The standard case definition of the CDC was used as a diagnostic of measles.^[7]

Major criteria:

1. A child with high fever (more than 101 degree Celsius) for 3 days or more
2. Characteristic rashes that started behind the ears starting at hairline

Minor criteria:

Presence of 1. Cough; 2. Coryza or 3. Conjunctivitis

Patient was considered to suffer measles if the case presented with one of the major criteria and any of the three minor criteria.

Table no. 1 showing the age distribution of clinically detected measles (n=343), Confirmed measles(n=109), Complicated measles (n=34)

Age	Clinically detected measles	Confirmed measles	Complicated measles
6-11 months	91(26.53%)	24(22.02%)	7(20%)
12-23 months	138(40.23%)	51(46.79%)	22(65%)
4-9 years	98(28.57%)	32(29.36%)	3(9%)
10-14 years	16(4.66%)	2(1.83%)	2(6%)

Anthropometry:

Anthropometry in 2nd degree PEM had a risk of developing complicated measles (p <0.05).

Questionnaire Tool was used to collect information about sociodemographic data, History of contact with measles, Immunization status. Nutritional status was assessed by using Modified Gomez classification, patients whose weight was above 80% of expected were considered well-nourished and weight below 80% of expected for age was considered malnourished. Presence of measles-specific IgM antibodies was used for laboratory confirmation of Measles.

Results

In our study, a total number of 343 pediatric patients were screened for measles & 337 patients fulfilled the selection criteria; out of which 109 patients were measles IgM positive by ELISA. The rest were false positive. Out of 109 IgM positive patients, 34 patients were admitted with complications of measles. No mortality secondary to measles was observed in the study population.

Age distribution:

The average age of a child with confirmed measles was 21 months with SD- 4.4 with male to the female distribution of 1:1.07 & the average age of a child with Complicated measles was 15.8 months with males to the female distribution of 2.1:1 with a peak incidence in the age group 12-23 months (n=22, 65%).

Table no. 2 showing anthropometry amongst confirmed and complicated measles as per Modified Gomez classification.

WEIGHT FOR HEIGHT % of expected	Confirmed measles (n=109)	Complicated measles (n=34)
Normal (> 90%)	45% (n=49)	36 % (n= 12)
1 st degree PEM (75-90 %)	32.11 % (n= 35)	14.7% (n= 5)
2 nd degree PEM (60-75%)	15.59 % (n=17)	38.23 % (n=13)
3 RD degree PEM <60 %	7.34 % (n= 8)	11.7 % (n= 4)

Socioeconomic status:

59% of all children with confirmed measles belonged to lower-middle socioeconomic strata as per the modified kuppuswamy scale and 20% belonged to upper-middle-class and rest 21% belonged to upper lower socioeconomic class.64% complicated measles belonged to upper lower socioeconomic strata and 16% each belonged to the lower and lower-middle-class of SES.4% belonged to the upper-middle class of SES.Upper lower socioeconomic strata were significant for developing complicated measles ($p < 0.05\%$)

Locality:

Out of 109 confirmed IgM measles patients; 41 (37.61%) were from nainital district, almora (n= 21, 19.26%), champawat (n=19, 17.43%), bageshwar (n=9,

8.25 %) pithoragarh (n=15, 13.76 %) and udham singh nagar (n= 5, 4.58%).Out of 34 complicated measles; 24 (70.58 %) were from nainital district, almora (n= 3, 8.82%), champawat (n= 3, 8.82 %), bageshwar (n= 2, 5.88%) pithoragarh (n=1 ,2.94 %) and udham singh nagar (n=1, 2.94 %)

Vaccination status:

48% received the measles vaccine at 9 months, 94% received the MR vaccine and 67% received 1 or more dosage of measles/MR at the encounter. There was a positive correlation between the lack of vaccination and the development of complications. Confirmed exposure to the indexed case was found in 4.23% of clinically diagnosed measles, 7.33% of confirmed measles, and 23.8% in complicated measles.

Clinical features of confirmed and complicated measles**Table no 3 showing clinical features of confirmed and complicated measles**

Clinical features	Number of confirmed measles (n= 109)	Percentage of all confirmed cases	Number of complicated measles (n= 34)	Percentage of all complicated cases
Rhinorrhoea	77.0	28.83%	10.0	30.2%
Cough	26	9.73%	22.0	65 %
Vomiting	42	15.7%	7.0	20%
Diarrhoea	34	12.73%	19.0	55.7%
Conjunctivitis	9	3.37%	9.0	26%
Koplik spots	21.0	7.86 %	3.0	9%
Mouth ulcer	12	4.49 %	12.0	34%

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Clinical features	Number of confirmed measles (n= 109)	Percentage of all confirmed cases	Number of complicated measles (n= 34)	Percentage of all complicated cases
Dyspnoea	22	8.24 %	22.0	65%
Sore throat	16	5.99 %	15.0	44%
Prurulent eye discharge	8	2.99 %	8.0	23.7%

Investigations:

In Confirmed measles, Anemia for age was found in 17(15.59%), Leucopenia in 51(46.79%), Lymphocytosis in 43(39.44%), Abnormal chest in 2(1.83%) whereas in Complicated measles, Anemia for age was found in 21(61.76%), Leucopenia in 23(67.74%), Lymphocytosis in 29(85.29%), Abnormal chest in 32(94.11%). Infants had a lower risk than children >12 months of developing lymphopenia (OR, 0.029, 95% CI, 0.003-0.244) and conjunctivitis (OR 0.294, 95% CI 0.103-0.843) but a higher risk of developing diarrhea (OR 3.248, 95% CI 1.125-9.379)

The percentage of measles patients who developed pneumonia did not differ significantly regarding sex ($P = 0.9485$) but it did differ significantly in the age groups ($P < 0.001$).

Complications:

Out of clinically diagnosed cases of measles, 31.19 % of children developed complications. A total of 62 complications were noticed in 34 patients. Most common complication of confirmed measles were pneumonia in 32(51.61%) followed by diarrhea in 11(17.72%), febrile seizures in 1(1.61%), dysentery in 3(4.83%), encephalitis in 2(3.22%), croup in 1(1.61%), otitis media in 1(1.61%), stomatitis in 5(8.06%), sinusitis in 1(1.61%), sepsis in 4(6.45%), pharyngitis in 1(1.61%), clouding of cornea in 1(1.61%). 90.9 % of all 34 patients showed one or more general danger signs at the time of presentation. One complicated measles patient was found to have autoimmune hemolytic anemia. No case of SSPE was observed in the study population.

Infants had a lower risk than children >12 months of developing lymphopenia (OR, 0.029, 95% CI, 0.003-0.244) and conjunctivitis (OR 0.294, 95% CI 0.103-0.843) but a higher risk of developing diarrhea (OR 3.248, 95% CI 1.125-9.379)

Number of hospital day

Hospital stays in days were 4.66 with SD 1.86 in complicated and 7.3 with SD 1.9 in severe complicated measles cases. Clinically detected and confirmed IgM positive measles cases were managed on an OPD basis.

Discussion

Gender distribution of complicated measles

The male predominance of children with confirmed measles in our study was consistent with previous researchers ranging from 1.5:1 to 1.69:1.^[8,9] An Indian study by Bhatt et al found male gender in 61.7 % of complicated patients with measles.^[9] But an international study by Khan et. al. found male gender in 60%.^[8] Similar male preponderance has been seen in a study by Sathapathy et al^[10]. However, another study by Junejo et. al. has reported female preponderance.^[11] This gender difference could be due to the gender bias towards females in providing medical care as our society is male dominant and males are brought to health care facilities preferentially.

Age distribution of complicated measles

In our study Age group, 12-23 months was the most severely affected (n=51, 46.79%). This was in contrast to an Indian study by Bhatt et al who found the most common age group affected as below 1 year.^[15] An international study by Khan et al and Li et al found the most common age group affected with complicated measles as 4.5 -13 years and 5-8 months respectively.^[8,12] Bronzwaer et al found in their study that age under 2 years was significantly related to complicated measles.^[13]

Risk factors for complicated measles

Morbidity and mortality of measles are affected by different factors like age, sex, vaccination, malnutrition, vitamin A deficiency, crowding, and immunosuppression.

Anthropometry and measles complications:

In our study, we found that anthropometry in 2nd degree PEM had a higher risk of developing complicated measles ($p < 0.05$). In our study, nutritional status of complicated measles was 36% well nourished, 14.7% Mild Malnutrition, 38.23% Moderate Malnutrition, 11.7% severe malnutrition

In a study by Samsi et. al., they also found malnutrition as a risk factor for severe measles. They also found that the outcome of measles infections depends on the presence of malnutrition and complications which is further determined by the nutritional intake, exposure, susceptibility, and constitution of the patients. [14] Complications were more commonly seen in malnourished children in the study by Hussain et. al. [15]

Similar to our study, Zahidie et. al. concluded that Measles cases were more likely to be classified as low weight as per Modified Gomez classification. The odds ratio for mortality because of low weight-for-age was elevated for death due to diarrhea, pneumonia, malaria, and Measles and for all-cause mortality. [16] It is evidenced that 44.8% of deaths among malnourished children were due to Measles and for deaths because of Measles, 60.7% of deaths were because of diarrhea. [16] (16) matched for age and gender. Studied variables were analyzed by multivariate conditional logistic regression analysis adjusted for age and gender. Results: Measles cases were more likely to have mothers with 'lower education' [adjusted matched Odds Ratio or mOR: 3.2 (95% CI: 1.2 - 7.6) On the contrary Bronzwaer et al found no significant relation for the presence of associated illnesses or malnutrition.

Socioeconomic status and complicated measles:

Similar to our study, Hussain et. al. found

that nearly half of the patients belonged to families whose monthly income was less than 20000 PK Rs. [15] Samsi et al. also found 91.1% came from lower socio-economic levels [14] Rashid et al also found that 68% of patients belonged to a poor socio-economic background and the majority 77 (77%) of mothers of patients were uneducated while only 18 (18%) had primary education. [17]

Vaccination status and complicated measles:

We found a positive correlation between the lack of vaccination and the development of complications ($p < 0.05$).

A similar pattern was seen in a study by Vemula et al where the majority (89.7%) had not received measles, mumps, and rubella (MMR) vaccination and 10.3% had only 1 dose. [18] Marafu et al also found that the risk of complications was higher in unvaccinated cases and vaccination was protective against the occurrence of complications. [19] Similar to our study, an Indian study by Bhatt et al found a positive correlation between lack of immunization and development of complications. [9] Zahidie et. al. found that measles cases were also more likely to have never received any vaccination and having no other children vaccinated at home. [16]

Exposure to the indexed case:

Confirmed exposure to the indexed case was found in 4.23 % of clinically diagnosed measles, 7.33 % of confirmed measles, and 23.8% in complicated measles.

Complications:

Out of clinically diagnosed cases of measles 31.19 % of children developed complications

Table no. 4 showing a Comparison of various complications of measles and mortality observed in various studies:

Complications	Our study	Samsi et al ¹⁴	Rashid et al ¹⁷	Li et al ¹⁸	Khan et al ⁸	Bhatt et al ⁹	Hussain et al ¹⁵
Pneumonia	51.61%	94.4%	68%	100%	56.29%	57.44 %	29.41 %
Diarrhoea	17.72%	25.9%	31%	Nil	17.22%	12.8%	26.47 %
Otitis media	1.61%	Nil	nil	Nil	2.98%	4.25 %	7.35 %
Stomatitis	8.06%	Nil	Nil	nil	2.34%	Nil	20.58 %

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Eye lesions	1.61%	Nil	31%	Nil	Nil	Nil	2.94%
Encephalitis	3.22%	88.9%	Nil	Nil	7.28%	2.13 %	2.94%
Myocarditis	Nil	Nil	Nil	Nil	Nil	Nil	2.94 %
Tonsillitis	1.61%	Nil	Nil	Nil	Nil	2.13 %	Nil
UTI	Nil	Nil	Nil	Nil	Nil	2.13 %	Nil
Febrile convulsions	1.61%	Nil	Nil	Nil	6.95%	4.25 %	Nil
Dysentery	4.83%	Nil	Nil	nil	0.99%	Nil	Nil
Emphysema	Nil	Nil	Nil	Nil	1.32%	Nil	Nil
Croup	1.61%	Nil	Nil	Nil	3.31%	Nil	Nil
pneumothorax	Nil	Nil	Nil	Nil	0.66%	Nil	Nil
Mortality	Nil	10.3%	3%	5.17%	5.29%	Nil	1.47 %

No mortality was seen in our study.

Investigations:

Abnormal chest X-ray, lymphocytosis, and anemia for age were more common in complicated measles compared to confirmed measles and were significant for developing complicated measles ($p < 0.05\%$).

Infants had a lower risk than children >12 months of developing lymphopenia (OR, 0.029, 95% CI, 0.003–0.244) and conjunctivitis (OR 0.294, 95% CI 0.103–0.843) but a higher risk of developing diarrhea (OR 3.248, 95% CI 1.125–9.379). Similar results were seen by a study of Vemula et al.¹⁸ In our study, the percentage of measles patients who developed pneumonia did not differ significantly regarding sex ($p = 0.9485$) but it did differ significantly in the age groups ($p < 0.001$).

Conclusion

The average age of a child with confirmed measles is 21 months as compared to 15.8 months with a male predisposition. A positive correlation was found between lack of vaccination and the development of complications due to measles. Therefore, Universal implementation of two doses of MMR Vaccine is required to prevent the severity of complications associated with measles. Patients with 2nd degree PEM had a risk of developing complicated measles, thus Malnutrition in children should also be addressed and managed under the National Programme at community level.

Conflict Of Interest: Nil

Source Of Funding: Self

Ethical Clearance: Taken from Institutional Ethical Committee(IEC),Government Medical College, Haldwani

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Study of the Orbital Vessels by Color Doppler in Known Diabetic Patients for Evaluation of Diabetic Retinopathy

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Abstract

Introduction: Diabetic retinopathy is a vascular disorder affecting the microvasculature of retina. It is caused by changes in the blood vessels of retina. If untreated, it may lead to blindness which is usually preventable if retinopathy is diagnosed early and treated promptly. As the prevalence of diabetes is rising, the systemic complications that include retinopathy, nephropathy, neuropathy and involvement of cardiovascular system are also increasing. Diabetic retinopathy is the leading cause of blindness in the world. Prevention of retinopathy needs early diagnosis. ⁽¹⁾ In ophthalmology, Color Doppler imaging is a new method that enables us to assess the orbital vasculature. It allows for simultaneous two dimensional anatomical and Doppler evaluations of retinal artery.

Objective and Aim: Aim of the study is to evaluate the ocular blood flow in patients with diabetes mellitus with no ocular symptoms.

Materials and Methods: Color Doppler evaluation of 50 diabetic patients (100 eyes) was done with SIEMENS SONOLINE G- 50 machine with High frequency probe (5-7.5 Mega Hertz). Doppler spectral analysis of ophthalmic arteries (OA) and central retinal arteries (CRA) were done. The peak systolic velocity (PSV), end diastolic velocity (EDV), resistive index (RI) and S/D ratio were calculated. PSV, EDV, RI were measured in all patients in both the eyes.

Results: The PSV of CRA in diabetics was significantly reduced ($p < 0.05$). The EDV of CRA in diabetics was also significantly reduced ($p < 0.05$). The RI of CRA is significantly increased ($p < 0.05$) in diabetics. The 95% confidence interval is observed in PSV, EDV, RI of CRA in diabetics.

Conclusion: There was statistical significant difference between the PSV, EDV and RI of CRA in diabetics. This significant difference could be due to the circulatory changes in blood vessels in diabetics. No significant difference was made in OA in diabetics. This study concludes that retinal hemodynamic changes were present even before the clinical manifestations of retinopathy in diabetics.

Keywords: Central retinal artery, ophthalmic artery, hemodynamic, resistance, diabetic.

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Background

Despite the improvement in ophthalmoscopic examination in outpatient department (OPD) in Ophthalmology, in order to diagnose early changes in retinal arterial flow velocity, a newer imaging modality may be used for diagnosis of early changes in central retinal artery before clinical manifestation of retinopathy. Color Doppler imaging is the most promising modality that produces conventional gray-scale ultrasound images along with information regarding the direction and velocity of blood flow.⁽²⁾ The present study was attempted to evaluate clinically diagnosed diabetic patients without retinopathy by measuring the retinal arterial RI by duplex Color Doppler study. Retinal artery ultrasound, Color Doppler imaging was first used to image various organ systems in 1979. Later in 1989 Color Doppler imaging in orbit was described by Erickson. Eye is located superficially and cystic in nature. The normal anatomy and vasculature can be clearly seen by high frequency transducer. Color Doppler imaging of eye is a non-invasive procedure. It allows visualization of the grey scale imaging and color coded imaging both at the same time⁽³⁾. The peak systolic and end diastolic velocities of the ophthalmic and central retinal arteries can be measured using Doppler. The resistive index can then be calculated using peak systolic and end diastolic velocities. Orbital blood flow velocity can be qualitatively and quantitatively measured by color Doppler imaging.⁽⁴⁾ As Doppler shift detection sensitivity is higher than conventional grey scale resolution, evaluation of very small vessels supplying the orbit can be done non invasively. Wolfgang E. Lieb et al examined 40 normal eyes and they were able to locate the central retinal artery (CRA), posterior ciliary arteries (PCA) and ophthalmic arteries (OA) in all patients. Using Doppler spectrum, the blood flow velocity in these vessels are assessed quantitatively.

Anatomy Of Retina - Retina is a sensory tissue which lines the back of the eye. It is multilayered (10 layers) and contains photoreceptors namely rods and cones. The rods and cones convert light energy into signals which are then carried to brain through optic nerves and interprets the signal as visual images. Tiny blood vessels in retina take the oxygen and essential nutrients to the walls of the retina. In the centre of the

retina, there is a simple dimple called fovea, which is responsible for the sharp vision in eye. Optic nerve is a collection of nerve fibers which carries electric signals from retina to brain. Retina is supplied by central retinal artery which supplies the inner retinal layer and choroidal arteries which supplies the outer retinal layers. Central retinal artery is a branch of ophthalmic artery. Choroidal artery is a branch of posterior ciliary artery. Diabetic retinopathy is a vascular disorder affecting the microvasculature of retina. It is caused by changes in the blood vessels of retina. If untreated, it may lead to blindness. Therefore, if diagnosed and treated promptly, blindness is usually preventable.^(5,6) In ophthalmology, color Doppler imaging is a new method that enables us to assess the orbital vasculature. It allows for simultaneous two dimensional anatomical and Doppler evaluations of hemodynamic characteristics of retinal artery.^(7,8)

Material and Method

Color Doppler Imaging (CDI) is a safe, non invasive and highly reproducible procedure for evaluating hemodynamic alterations in the blood vessels. Color Doppler Imaging (CDI) combines with two dimensional (2D) ultrasonography and Doppler spectral analysis to evaluate the vascular structure. Blood flow velocities and flow pattern in orbital vessel are very useful for early detection of diabetic retinopathy.

Indices of Measurement

- (1) Resistance index (RI)
- (2) Peak systolic velocity (PSV)
- (3) End diastolic volume (EDV)

Methods

Retro bulbar blood flow velocity were assessed by using orbital Doppler and gray-scale sonography by SIEMENS SONOLINE G 50 Color Doppler machine. Imaging of the eyes were performed in all individuals by using a Color Doppler with a 5-7.5 MHz linear-array transducer. The patients were placed in the supine position and USG gel was applied to closed eyelids and 2D and color Doppler images were obtained by using high frequency linear probe. Ophthalmic artery was identified in the nasal

side of an eyeball, superior to the optic nerve, and it abuts the visible hypo reflective stripe representing the optic nerve. The central retinal artery arises from the ophthalmic artery and can be found anterior to the optic nerve, which is around 7.5 mm behind the ocular bulb. The posterior ciliary arteries are also supplied with blood by the ophthalmic artery, and they divide into multiple branches to supply the pial arteries. These arteries have a diameter of around 0.2 mm and form the pial network which adheres to the optic sheath and contributes to the vascularization of the optic nerve.

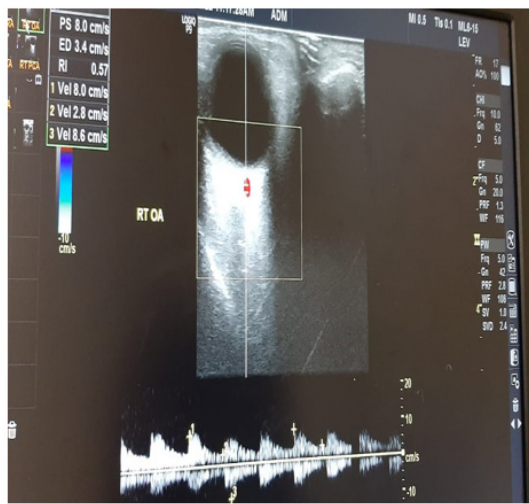
STUDY DESIGN- Prospective Study.

INCLUSION CRITERIA-

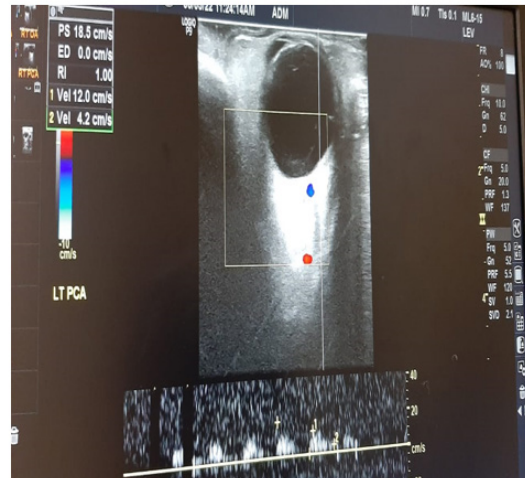
- Diabetic patients without retinopathy.
- Age group of 40-70 years.- Both sexes were included in the study.

EXCLUSION CRITERIA - Patients having infections or inflammatory lesions, benign or malignant lesions in orbit.

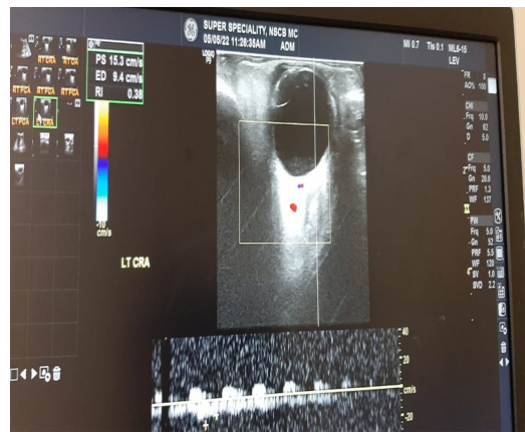
Statistical Analysis plan : All the records will be recorded by using structural schedule (Case Report Forms) and entered in Microsoft Excel Sheet. All the records will be rechecked for their completeness and consistencies. Non numeric entries will be coded numerically into nominal / ordinal distribution before analysis. Categorical variables was summarized in frequency and percent distribution and Chi-square or Fishers exact test will be performed as appropriate.



Color Doppler image showing high resistance flow in ophthalmic artery.



Color doppler image showing high resistance flow in Posterior ciliary artery.



Color Doppler evaluation of central retinal artery showing high resistance flow

Results

We studied 50 patients (100 globes), 30 men and 20 women, divided into age groups, average age was 55 years. Majority (54%) of subjects were in 5th decade of life with predominance of males. The mean duration of diabetes was 8.4 ± 1.2 years. Mean peak systolic velocity (PSV) in 50 diabetic patients without retinopathy was 8.90 ± 1.50 cm/sec ranging 5.30–11.01 cm/sec. Mean end diastolic velocity (EDV) in 50 diabetic patients without retinopathy was 3.21 ± 0.59 cm/sec ranging 2.5 –5.10 cm/sec . Mean resistive index (RI) in 50 diabetic patients without retinopathy was 0.92 ± 0.05 ranging 0.87–0.91.

Table 1: Distribution of patients according to age

Age	Number	Percent
40-50 Years	09	18%
51-60 Years	27	54%
61-70 Years	14	28%
TOTAL	50	100

Maximum number of patients seen in 51-60 (54%) years of age and minimum number of patients seen in 40-50 (18%) years of age.

Table 3: Average of PSV, EDV and RI in ocular vessels

VESSELS	PSV (Mean)	EDV (Mean)	RI (Mean)
Ophthalmic artery	8.11+ ₋ 1.12 cm/sec	3.4+ ₋ 1.2 cm/sec	0.57+ ₋ 0.08 cm/sec
Central retinal artery	8.90 + ₋ 1.50 cm/sec	3.21+ ₋ 0.59 cm/sec	0.92+ ₋ 0.05 cm/sec
Posterior cilliary artery	12.0+ ₋ 1.20 cm/sec	4.21+ ₋ 1.1 cm/sec	0.92+ ₋ 0.04 cm/sec

PSV, EDV and RI was increased in diabetic patients without retinopathy in all vessels.

Discussion

Due to characteristics eyeball location and constitution, ocular ultrasound has become an ideal method for the visualization of ocular structures and for the diagnosis of diseases that cannot be displayed on the fundus examination. The color Doppler ultrasound and pulsed Doppler has the advantage of being easily accessible, besides having no ionizing radiation and repeatedly performed as often as necessary, without leading to any additional risk to the patient, and do not need any medication prior to examination. Diabetes causes disturbances in the microcirculation by endothelial dysfunction⁽⁹⁾ causing perfusion disorders⁽¹⁰⁾, which will result in ultrasound significant decrease VPS in patients with ocular ischemic syndrome⁽¹¹⁾, central retinal artery occlusion⁽¹²⁾ and venous thrombosis⁽¹³⁾. The flow of the CRA should be antegrade, low resistance, with rounded systolic peak and continuous flow in diastole⁽¹⁴⁾. A study done by Mendivil A, Cuartero V, Mendivil MP,⁽¹⁵⁾ Titled -Ocular blood flow velocities in patients with proliferative diabetic retinopathy and healthy volunteers: a prospective study. British Journal of ophthalmology he compared 43 blood flow velocity in ocular vessels (ophthalmic artery, posterior ciliary arteries, central retinal vessels, and vortex veins) of 25 patients and showed that the diabetic patients had lower blood velocities than the volunteers. Ocular blood flow velocity was decreased

Table 2: Distribution of patients according to gender

Gender	Number	Percent
Male	30	60%
Female	20	40%
Total	50	100%

Maximum number of patients were male (60%), and female were (40%) in our study.

in diabetic patients with proliferative diabetic retinopathy. Schmetterer L, Wolzt M.⁽¹⁶⁾ who assessed Ocular blood flow and associated functional deviations in diabetic retinopathy. The total number of subjects included in this study is 80. Each group containing 40 patients. Both eyes were examined under this study. Hence there are a total of 160 eyes with 80 eyes in each group.

Conclusion

From the present study it can be concluded that, there is statistically significant increase in retinal arterial RI of type 2 diabetic patients without retinopathy. Increased RI in CRA, OA, and PCA showed that RI can be used to assess a index in the progression of diabetic retinopathy in patients or can also be used post pan retinal photocoagulation. Even though further investigations are needed to assess orbital hemodynamics in diabetic retinopathy, based on our study the results suggest that Color Doppler imaging has the ability to give the information on hemodynamic changes and can be used as a supportive modality for diagnosis of diabetic retinopathy in patients.

Conflict of interest – None to declare.

Acknowledgement – None to declare.

Ethical clearance – Taken by Ethical Committee

Source of Funding- None

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A Study on Morbidity Pattern in Under-Five Children between Urban and Rural Field Practice Areas of a Tertiary Care Hospital, Andhra Pradesh

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Abstract

Background: First few years of life are most crucial for the physical and psychosocial development of the child. The care in these few years almost reflects the entire life of a person both physically and mentally. The objective is to compare the morbidity pattern in under-five children in urban and rural field practice areas of a tertiary care hospital in Andhra Pradesh.

Methodology: A cross-sectional study in under five age children (6 months to 5 years) in urban and rural field practice areas.

Results & Conclusion: The prevalence of acute respiratory tract infections, acute diarrhoeal diseases and fever were found to be 34 %,5.3 % and 11.3 % respectively in rural areas and 26.7 %,1.3 % and 2.7 % respectively in urban areas. The difference is significant ($p = 0.003$). The significant difference($p<0.05$) was found between urban and rural areas in morbidity pattern, mothers' education, mothers' occupation, defecation practice ,indoor air pollution, initiation of breastfeeding, exclusive breastfeeding, water purification practices, birth weight of the children, immunization status.

Keywords: acute respiratory tract infections , morbidity, under-five children ,urban rural gap

Introduction

Children constitute most of the vulnerable groups of the population and constitute the majority of the population who are more prone for the morbidities, especially infections. Any adverse influences during this period may result in severe limitations in this age group is most affected by various common and easily

treatable illness. Three in four episodes of childhood illnesses are caused by one of these conditions - acute respiratory tract infections (pneumonia), diarrhoea, measles, malaria, malnutrition or a combination of these conditions. These causes became the most common causes of morbidity and mortality in under five-year children. ⁽¹⁾

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Child mortality or the under-five mortality rate refers to the probability of a child dying between birth and exactly 5 years of age, expressed per 1,000 live births. In 2020, 5.0 million children under 5 years of age died. This translates to 13,800 children under the age of 5 dying every day in 2020. Globally, infectious diseases, including pneumonia, diarrhoea and malaria, remain a leading cause of under-five deaths, along with preterm birth and intrapartum-related complications.

The global under-five mortality rate declined by 61 per cent, from 93 deaths per 1,000 live births in 1990 to 37 in 2020. Despite this considerable progress, improving child survival remains a matter of urgent concern. In 2020 alone, roughly 13,800 under-five deaths occurred every day, an intolerably high number of largely preventable child deaths. ⁽²⁾

More than half of under-5 child deaths are due to diseases that are preventable and treatable through simple, affordable interventions. ⁽³⁾ Infectious diseases like diarrhoea, acute respiratory infections, malaria and whooping cough are the world's leading cause of morbidity and premature death especially in children in developing countries. 6.9% of deaths in children were attributed to respiratory infections, 2.2% to malarial fever and 2.0% to other childhood diseases. ⁽⁴⁾

Finally, to help understand the changing urban-rural gap in child health and nutritional status, the investigator tries to examine possible linkages: whether urban children are better off than rural children in terms of nutritional status, socioeconomic profile, proper health care utilization and how these two factors between urban and rural areas are changing the trends in child health.

Aims & Objectives

To compare the morbidity pattern in under-five children in urban and rural field practice areas of a tertiary care centre, Andhra Pradesh.

Methods

Study Design: Cross-sectional study
Study population: Under-five (6 months to 5 years) age children in urban and rural field practices
Study period: 6 months (November 2019 – April 2020)

Inclusion criteria: Children from six months to five years of age

Sample size: Taking into consideration of National Family Health Survey - 4 factsheet of Andhra Pradesh, number of diarrhoea cases in under five children reported to health facility in last two weeks preceding the survey in urban areas and rural areas respectively is P1=83.2 % and P2 = 69.4 % .

$$n = \{(1-\alpha/2) + z_{(1-\beta)}\}^2 \times p(1-p) / (p_1 - p_2)^2$$

$$\text{Where } (1-\alpha/2) = 1.96$$

$$(1-\beta) = 0.84$$

$$p_1 = 83.2 \%$$

$$p_2 = 69.4 \%$$

$$p = (p_1 + p_2)/2 = 76.3$$

$$n = 149$$

Thus the sample required for each group is 149

Total sample size is 298 rounded off to 300.

Exclusion criteria:

1. Children below six months
2. Congenital anomalous child
3. Severely ill child
4. Children who were absent for at least three consecutive visits
5. A non-cooperative child while taking anthropometry
6. Parents who did not give consent.

Sampling method: Systematic random sampling was followed. Every 10th house was selected for the study.

Ethical considerations: The study population will be explained the purpose of the study, and consent will be taken from the subjects in the local language. This study is purely descriptive in nature, and no drug intervention is included. Ethics committee approval is obtained from the institution.

Study tools:

A pre-tested questionnaire was used for collecting the required information. Data was collected from the mothers of the children under five years of age

regarding socio-demographic profile, any existing illness, past morbid conditions of the child and clinical examination along with anthropometric

measures was done in urban and rural field practice areas .

Results

Table 1. Prevalence of morbidity among the study population

MORBIDITY	URBAN		RURAL	
ADD	2	1.30%	8	5.30%
ARI	40	26.70%	51	34%
FEVER	4	2.70%	17	11.30%
UTI	5	3.30%	3	2%
NO HISTORY	99	66%	71	47.30%
TOTAL	150	100.00%	150	100.00%

*ADD - Acute diarrhoeal diseases , ARI - Acute respiratory tract infections ,

UTI - Urinary Tract Infections

Chi-square = 18.217 df = 5

p value = 0.003

Prevalence of acute respiratory tract infections, acute diarrhoeal disease and fever are higher in rural areas when compared to urban areas, and the difference observed is found to be significant statistically.

Table 2. Nutritional status of the study population.

GRADING OF MALNUTRITION BASED ON MID UPPER ARM CIRCUMFERENCE	PLACE OF STAY	
	URBAN	RURAL
Severe malnutrition (<11.5 cm)	43(28.7%)	49(32.7%)
Moderate malnutrition (11.5 - 12.5 cm)	65(43.3%)	60(40%)
Mild or no malnutrition (>12.5cm)	42(28%)	41(27.3%)
TOTAL	150	150

Chi-square = 0.603 df = 2

p value = 0.740

There is no significant difference in the grading of malnutrition (according to MUAC) between urban and rural areas.

Table 3. Association of the utilization of Anganwadi services among the mothers of study population and place of stay

ANGANWADI SERVICES	PLACE OF STAY	
	URBAN	RURAL
TAKEN	96(64 %)	108(72 %)
NOT TAKEN	54(36 %)	42(28 %)
TOTAL	100 %	100 %

Chi-square = 2.206 df = 1

p value = 0.137

In this study, among 150 study population each

in rural and urban areas,39.3% belong to the age group of 12 - 23 months and 44.7 % respectively. Female children outnumber male children in both urban and rural areas.

In the urban area, 55.3% of the study population belongs to Hindu religion, 22.7 % of the study population belong to the Muslim religion, 22 % of the study population belong to Christianity as compared to in the rural area, 60% of the study population belong to Hindu religion, 22.7% of the study population belong to the Muslim religion, 18 % of the study population belong to Christianity.

Most of them, i.e., 35.3% belong to the middle socioeconomic class in both urban and rural areas, 32 % belong to the upper-middle class in urban and rural areas. The difference is not significant.(p=0.766)

In urban areas,50.7% of the fathers have education above the intermediate, and above and in rural areas, it is 43.3%. Illiteracy is higher in rural areas (14%) than in urban areas (6%). The difference in the fathers' education is not significant between urban and rural

areas.(p=0.223)

In the rural area, 90% of the fathers are employed, and 10% are unemployed as compared to in the urban area where 94.7% are employed, and 5.3 % are unemployed. (p=0.129)

In urban areas, 36% of the mothers' have education up to primary school, and in rural areas, it is 28.7%. Illiteracy is higher in rural areas (16.7%) than in urban areas (5.3%). The difference in the mothers' education is significant between urban and rural areas.(p= 0.034)

In the rural area, 46.7 % of the study population have overcrowding, 51.3 % of the study population have no overcrowding as compared to in the urban area, 46 % of the study population have overcrowding, 54% of the study population have no overcrowding.

Table No 4 . Association of immunization status and place of stay

IMMUNIZED UP TO DATE	PLACE OF STAY	
	URBAN	RURAL
YES	123 (82%)	136(90.7%)
NO	27 (18%)	14(9.3%)
TOTAL	150 (100%)	150 (100%)

Chi-square = 4.774 df = 1

p value = 0.043

Discussion

In this study, the prevalence of acute respiratory tract infections, acute diarrhoeal diseases and fever were found to be 34 %,5.3 % and 11.3 % respectively in rural areas and 26.7 %,1.3 % and 2.7 % respectively in urban areas. The difference is significant (p = 0.003). In rural areas, the social factors like overcrowding, sanitation, indoor air pollution etc. may contribute to the increased prevalence of infectious diseases than the urban areas.

In a study conducted by Goel et al. (2012) ⁽⁵⁾, the prevalence of ARI was found to be 52%. It was higher in children with lower socioeconomic status (35.89%), illiterate mother (49.14%), overcrowded conditions (70.94%), inadequate ventilation (74.35%), and use of smoky chullah (56.83%), malnutrition (26.49) and parental smoking (78.20%)

In a study conducted by Ahmed et al. (2008) ⁽⁶⁾, period (last 15 days) and point (24 hr), prevalence rates of diarrhoeal diseases among children under the age of 5 years were calculated which came to the order of (25.2%) and (9.3%) respectively. Prevalence of diarrhoea decreased significantly with increased age and in summer months.

In this study, in a rural area, 32.7% of the study population suffer from severe malnutrition, 40 % have moderate malnutrition and 27.3 % have mild or no malnutrition. In the urban area, 28.7 % of the study population suffer from severe malnutrition, 43.3 % have moderate malnutrition and 28 % have mild or no malnutrition. The difference is not significant (p = 0.740).

In a study conducted by Gaurav et al. (2014) ⁽⁷⁾ in Nepal, seventeen per cent of under- 5 children were moderately, and 10.4 % were severely underweight.

In this study, the prevalence of low birth weight of the children is higher in rural areas than in urban

areas, and the difference is significant ($p=0.000$).

In a study conducted by Kaur et al.⁽⁸⁾, the prevalence of low birth weight infants was 6.38%. Rural mothers had more low birth weight infants than urban women (9.8% vs 2.0%, $p=0.03$).

Low birth weight depends on both maternal, placental and foetal factors right from the intrauterine life. Prevalence of low birth weight is more in rural areas than in urban areas due to poor maternal nutrition during the antenatal period in rural areas.

There is a significant difference between urban and rural areas in the immunization status of the study population due to the availability of immunization services is easy in rural areas. ($p=0.043$).

In a study conducted by Bhatt et al. (2015)⁽⁹⁾, proportions of fully immunized children (12 – 23 months) were 86.4% (urban) and 83.4% (rural) and those “not vaccinated at all” were 2.3% (urban) and 1.6% (rural). DPT/ OPV booster coverage (24 – 35 months) were 87.5% (urban) and 74% (rural) were main hurdles in completing immunization. Reasons for missing doses were sickness of a child, and no felt need, fear of adverse effects following immunization (AEFI), unawareness about session site etc.

Summary and Conclusion

Being the majority of the Indian population belong to rural areas, the accessibility, affordability of the health services is still doubtful in remote regions of the country.

This study gives an explicit knowledge of the urban-rural disparities in the under-five children health status, and the findings may help out to move towards the erasing the gap.

The following strategies should be followed to reach the target:

1. Consideration of maternal and child component of health as a single entity.
2. Strengthening of existing maternal-child services through proper implementation of the plan and programme.

3. Identifying at-risk children and prompt intervention.
4. Overall improvement of the socioeconomic, environmental factors responsible for the urban-rural gap.

Conflict of interest: Nil

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Thiamine responsive Pulmonary Hypertension among exclusively breastfed babies –A Hospital based prospective study from southern India

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Abstract

Pulmonary hypertension remains leading cause of mortality despite many advances in its management. Thiamine deficiency is identified as a reversible cause of pulmonary hypertension in exclusively breastfed infants whose mothers are thiamine deficient. The present study is planned to find out the reversible pulmonary hypertension in association with thiamine deficiency.

Objectives: To study the pattern of pulmonary hypertension and its associated factors due to thiamine deficiency.

Methodology: It is hospital based study in a tertiary care hospital of tumkur. Pretested and pre designed questionnaire was used to collect patients socio demographic data, clinical data and the data regarding investigations and treatment and prognosis.

Results: Total of 300 babies were included in the present study after taking into consideration of all inclusion and exclusion criteria. All the babies, 300 (100) belonged to Hindhu community. 234 (79.3%) belonged to class 3 socio economic status according to modified kuppuswamy classification. Majority 212 (70.6%) had only primary education and 32 (10.6%) were illiterates. 88(29.3%) had come with severe gasping. 287(95.6%) of babies had hepatomegaly and oliguria was present in 144 (48%) of babies. The majority of the infants were presented with shock 256 (85.3%), which was managed. Repeat echo was done serially and the difference in reduction of pulmonary pressure after administration of thiamine was statistically significant (p value <0.005) **Conclusion:** Thiamine responsive pulmonary hypertension presents as an acute condition with severe respiratory distress, vomiting in a previously well and exclusively breast fed baby. Hence clinical suspicion to recognise the symptoms early and diagnose and mere thiamine administration is life saving and which reverses the fatal condition. Health education to mothers and family members about food taboos related to use of polished rice to prevent deficiency of thiamine is also important and supplementation of thiamine as prophylaxis can also be considered in the programmes related to antenatal and postnatal care.

Key words: Pulmonary hypertension, Thiamine, Breastfeeding, food taboos

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Introduction

Pulmonary hypertension remains leading cause of mortality despite many advances in its management. Pulmonary hypertension occurs in an idiopathic form or in association with underlying diseases or conditions. Thiamine deficiency is identified as a reversible cause of pulmonary hypertension in exclusively breastfed infants whose mothers are thiamine deficient. Shoshin beriberi a fulminant form of cardiovascular beriberi characterized by tachycardia, hypotension, severe pulmonary hypertension and lactic acidosis and has been designated as 'a rapidly curable hemodynamic disaster' which is mainly due to thiamine deficiency¹. Thiamine, also called vitamin B1, is an essential micronutrient. The human body's supply of thiamine depends almost entirely on dietary intake; there is no endogenous synthesis, though some forms of bacteria in the intestine can produce a small amount of thiamine².

Although the availability of noninvasive measurement of pulmonary hypertension with echocardiography has made the diagnosis of pulmonary hypertension easier than before³, thiamine deficiency, of which early recognition and accurate diagnosis is imperative, is not assumed to be a cause of pulmonary hypertension⁴. The present study is planned to find out the reversible pulmonary hypertension in association with thiamine deficiency.

Objectives

- To study the pattern of pulmonary hypertension and its associated factors due to thiamine deficiency.
- To study the effect of thiamine administration on the resolution of pulmonary hypertension.

Methodology

It is an hospital based study in a tertiary care hospital of tumkur. Analysis of cases of pulmonary hypertension which were likely to be due to thiamine deficiency admitted to hospital between December 2020 to December 2021. Pretested and pre designed questionnaire was used to collect patients socio demographic data, clinical data and the data regarding investigations and treatment and prognosis.

Inclusion criteria:

All babies admitted to hospital with confirmed pulmonary hypertension by ECHO who are exclusively breastfed.

Exclusion criteria:

Babies admitted with other co- morbid condition

Breastfeeding infants with pulmonary hypertension diagnosed by echocardiography^{4,5} was included in the study. Since quick serial echocardiography was helpful in diagnosis, treatment and follow up of the patients⁶. PH was defined as pulmonary artery systolic pressure (PASP) more than 50mmHg as measured by tricuspid regurgitation (TR) jet with the presence of dilated right atrium and right ventricle^{5,10}. Infants with other related diseases like left to right shunts, pulmonary stenosis were excluded from the study by comprehensive performance of echocardiogram. Thiamine levels were not done as RBC transketolase activity reflective of thiamine status is not easily available. Only clinical response after thiamine supplementation was taken into consideration of thiamine deficiency.

Detailed history of socio demographic status, symptoms, birth and postnatal history was taken. Details regarding development and immunization history was obtained. Maternal dietary patterns, more about type of rice used, cooking patterns, exclusive breastfeeding and use of foods which inhibit thiamine absorption⁷. Food taboos and food fads related to post partum period were elicited. Hemodynamic status, systematic examination were performed. Hemogram, Chest x ray, echo cardiogram was performed as the protocol.

Interventions:

Babies with the symptoms of pulmonary hypertension were admitted to pediatric ICU. Oxygen and intravenous fluids were given. Babies with severe respiratory distress, poor perfusion were treated with dobutamine. To all the babies thiamine was given IV 100mg diluted in 10ml normal saline every day for 3 days. Echocardiography was done initially and after 24 hrs and everyday till the baby was discharged. Follow up was done after 1month and 6months.

Outcome measures:

Reduction in the pulmonary pressure after thiamine administration [8] detected by echo and resolution of heart failure clinically are the primary outcomes.

Institutional ethical clearance was taken before the study was conducted .

Data analysis:

Mean and SD was used for Quantitative data. Frequency and percentages were calculated for socio demographic data . Paired t test was used to compare before and after treatment with thiamine . P value of <0.01 was considered statistically significant. Epi info 3.5 software was used for statistical analysis.

Results

Total of 300 babies were included in the present study after taking into consideration of all inclusion and exclusion criteria. Among 300 infants, 11(3.6%) babies died and 289 (96.4%) showed complete reversal of pulmonary hypertension after thiamine therapy. The mean age was 3.6 ± 1.5 months. 61% (183) were male babies and female babies were 117(39%).The mean weight was 6.1 ± 1 kg. None of them had developmental delay and all babies were immunized appropriately as per age. All the babies,300 (100) belonged to Hindu community. 234 (79.3%) belonged to class 3 socio economic status according to modified kuppaswamy classification. Maternal education was known to be directly related to maternal nutrition status. Majority 212 (70.6%) had only primary education and 32 (10.6%) were illiterates.

Tachypnea and Tachycardia was present in all the babies. 245 (81.6%) of babies had irritability and poor feeding and all babies had vomiting. None of the babies had symptoms of fever , productive cough. Aphonia was present in majority 216 (71%) of babies which is supposed to be the characteristic feature of thiamine deficiency . 88 (29.3%) had come with severe gasping. 287(95.6%) of babies had hepatomegaly and oliguria was present in 144 (48%) of babies.

Polished rice was consumed by majority of the mothers during their post partum period combined with sambhar with very little dhal , that too for all the 3 major meals. Cooking of rice was seen in the open

vessel with throwing away the excess water which usually contains thiamine,was found in majority of the family.Diagnosing Pulmonary hypertension in babies with the mothers who are have nutritional deficiency was need of the hour [9]. Consumption of coffee, tea and beetal nuts immediately after food was found by coffee, tea ,beetal nuts and cooking soda was found to have anti thiamine activity .

On examination ,fever was absent in all babies. All the babies had Tachycardia and Tachypnea. 95.6% of the babies had hepatomegaly. Auscultation revealed clear breath sounds. Findings on chest X ray was cardiomegaly with right atrial and pulmonary artery dilatation(Fig 1) in almost majority of infants that is 286 (96.4%). Echocardiography showed dilated RA and RV.Severe Tricuspid regurgitation was found in 95% of infants.Mean PASP was 73.2 ± 15.4 (51-116). Right ventricular dysfunction was present in 199 babies but left ventricular function was almost found to be normal in all babies. Severe Lactic Acidosis was found in 11% of the babies with severe PH.

PH completely resolved in 94%of the babies after thiamine administration. Hepatomegaly,Tachypnea ,Tachycardia ,vomiting all reduced within 24hours. PASP at discharge was 20.2 ± 6.2 (9-34) mmhg. The Mean reduction in pulmonary pressure was 53mmHg.

Table 2 presents baseline laboratory features of the infants. Acute metabolic acidosis was a universal feature with a mean PH 7.12 ± 0.2 . All the babies had negative blood culture report with elevated C reactive protein was found in 18% of babies. Median lactate level was 4.6 (6.8). All other lab investigations were within normal limit.

The majority of the infants were presented with shock 256 (85.3%) ,which was managed with normal saline, dopamine, dobutamine and adrenaline perfusion as per the schedule and dosage along with intravenous thiamine. Mechanical ventilation was needed in almost 72% of the babies and the mean duration of stay was 3days. Intravenous thiamine of 100mg / kg was given till the reversal of pulmonary hypertension which was later switched to oral thiamine of 10mg/day. Repeat echo was done serially and the difference in reduction of pulmonary pressure after administration of thiamine was statistically significant (p value <0.005).

Table 1: Study population based on Signs and symptoms:

CVS	N (%)
Tachycardia	300(100%)
Shock	256(85.3%)
Central cyanosis	191(63.6%)
Cardiomegaly	286(95.6%)
TR murmur	285(95%)
Respiratory	
Tachypnea	300(100%)
Gasping breathing	88(29.3%)
CNS	
Irritability	245(81.6%)
Renal	
Oliguria	144(48%)
Hepatobiliary	
Hepatomegaly	287(95.6%)
Vomiting	300(100)

Table 2: Echocardiographic features:

Pulmonary artery systolic pressure at admission (mean±SD)	73.2±15.4(51-116) mm Hg
Pulmonary artery systolic pressure at discharge (mean±SD)	20.2±6.2 (9-34) mm Hg
Fall in pulmonary arterial systolic pressure after treatment	53.0 (95% CL 49.8-54.8) mm Hg ,p <0.001
Tricuspid regurgitation (n)	Mild 126 Moderate 112 Severe 62
Right ventricular dysfunction(n)	199

Table 3: Baseline laboratory data of study participants:

Parameter	Value
PH(mean +-SD)	7.12±0.20
Hco3(mean+-SD)	11.7±5.23 m Eq/L
Lactate(median IQR)	4.6 (6.8) mmol/L
PCO2(mean +-SD)	29.32±7.46 mm Hg
Total leukocyte count(median IQR)	14600 (7886) c mm
Hemoglobin(mean +-SD)	12.3±1.8 gm/dl
Blood urea(median IQR)	39 (25) mmol/dl
Serum creatinine(median IQR)	0.8 (0.53)mg/dl
Serum aspartate amino transferase	45(69)

Continue.....

Parameter	Value
Serum sodium(mean +-SD)	137±6.9
Serum potassium(mean +-SD)	4.3±0.75
Negative blood cultures (%)	300 (100)
Positive C reactive protein (%)	6 (18)

Discussion

The global prevalence of thiamine deficiency is poorly documented due to a dearth of population-level biomarker data ^{9 12}. Total of 300 babies was included in the study and mean age in months was 3.6 months as compared to mean age at presentation which was 78.5±30.7 days in a study from northern India ⁵. The mean weight of the baby was 6.1±1 in this study in contrary to mean weight of the study population which was 5.1 kg in a study done by J J bhat et .al ⁴ and it was appropriate for age in all infants. Table 2 shows the clinical features of the study population. The male to female ratio was 183:117 as compared to 155:83 in a prospective study conducted by Sastry et al ¹³. Quite interesting fact was all the babies belonged to Hindhu community. No babies belonged to other community propably due to maternal thiamine levels which might be good in non vegetarians or the etiology is not completely known. Majority 79.3% (234) of them belonged to class 3 socioeconomic status according to modified kuppuswamy classification ,which was similar in a study conducted by Sastry et all., where all the babies had belonged to low socio economic strata ,which probably tells us about the corelation between maternal malnutrition, thiamine defeciency and socio economic status.

70.6% (212) of the babies mother had only completed primary education which indirectly tells us about the unawareness regarding dietary requirement of thiamine in exclusively breast fed babies and practice of food taboos during lactation which might be the cause for thiamine defeciency in lactational mothers. Tachycardia, Tachpnea Hepatomegaly, Vomiting was common in almost all cases which was similar in other studies too ^{14,15}. Other symptoms and signs were Oliguria, edema which was also present in study conducted by JJ Bhat ⁵.

The maternal diet was predominantly of polished rice as rice is the staple diet of south Indians and was consumed for almost for all the 3times a day with use of sambher ,with little amount of dhal. Food fads and food taboos was also present in nursing mothers in south India and which was similar in almost all case studies and studies done so far.

Thiamine defeciency is a reversal cause of severe pulmonary hypertension and acute right heart failure. Response to thiamine administration of 100mg IV with its resolution after it , is the diagnostic criterion of pulmonary hypertension, as estimation of serum thiamine levels, low erythrocyte transketolase activity are expensive and not routinely available and not used in any study for diagnosis of thiamine defeciency.

The reduction in pulmonary pressure was 53.0 (95% cl 49.8-54.8). After infusion with thiamine. There was reversal of all the changes and was found in all cases except for babies with mortality, were reversal happened but the initiation of theraphy was almost very late.

Strength of the study:

Sample size is really huge compared to any other studies done in India .More number of cases were recognized.

Limitations of study:

Thiamine levels was not measured directly because it was difficult to measure ETKA and TPPE. cardiac catheterisation was not performed which would show pulmonary hypertension equivocally, instead ECHO was used to diagnose pulmonary hypertension which was not the gold standard investigation.

Conclusions

Thiamine responsive pulmonary hypertension presents as an acute condition with severe respiratory distress, vomiting in a previously well and exclusively

breast fed baby. Signs of severe tachycardia, tachypnea, hepatomegaly which was diagnosed by echocardiography. Administration of thiamine lead to rapid improvement of cardiac changes. Food fads and taboos during lactation and use of polished rice are the contributing features.

Lack of awareness about the clinical scenario among health care workers leads to late diagnosis of the condition or often mis diagnosis which is leading to high mortality among them. Hence clinical suspicion to recognise the symptoms early and diagnose and mere thiamine administration is life saving and which reverses the fatal condition. Health education to mothers and family members about food taboos related to use of polished rice to prevent deficiency of thiamine is also important and supplementation of thiamine as prophylaxis can also be considered in the programmes related to antenatal and postnatal care.

Recommendation:

Encouragement of thiamine supplements along with iron and folic acid tablets in the various community nutritional programmes leads to reduction of mortality and morbidity among children. Health education and creating awareness among family and community regarding use of unpolished rice which is rich in thiamine.

Source of fundings: self

Ethical clearance: taken

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Study on Seroprevalence of Hepatitis B Surface Antigen among Patients Visiting Tertiary Care Centre

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Abstract

Introduction: Hepatitis caused by hepatitis B virus is potentially a fatal liver infection. It causes acute and chronic liver disease and puts people at high risk of death from cirrhosis and hepato-cellular carcinoma. The study of the prevalence of a disease helps in establishing the magnitude of the problem.

Aim: To estimate HbsAg sero-positivity among patient attending tertiary care centre.

Materials and Methods: Present study was conducted in department of microbiology at district hospital attached to Kodagu institute of medical sciences from june 2019 to may 2021. A total 20,676 samples were tested for hepatitis B surface antigen using qualitative one step rapid immune chromatographic test kit. Details of various socio-demographic variables of the patients were collected. The test results of the patient were noted and analyzed.

Results: Total of 20,676 serum samples were tested of which 135 (0.65%) were sero-positive for HBsAg. Among 135 sero-positive, 55 (0.26%) were males and 80(0.38%) were female patients. The age ranging from 21-31 years showed the highest prevalence. 8.88% had HIV & HBV co-infection.

Conclusion: Present study highlights the prevalence of hepatitis B infection among patients attending tertiary care centre in Kodagu. Apart from knowing the sero-prevalance, age & sex correlation, HIV;HBV co-infection was also assessed, it was found that the prevalence was higher in young adults. Knowing the prevalence leads to better understanding about the magnitude of the disease in a particular geographical area and highlights the importance of control measures.

Key Words: Acute and chronic Hepatitis ,Hepatitis B infection (HBV), Hepatitis, HIV- HBV coinfection, Immunochromatography.

Introduction

Hepatitis B infection is a global and public health affliction. [1] Hepatitis B virus (HBV) is one of the prime cause of severe liver disease, leading to

morbidity and mortality, not only because of the acute illness but also due to its chronic sequelae like chronic hepatitis, cirrhosis, and hepatocellular carcinoma.[2] HBV is distributed worldwide, prevalence however

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varies significantly between different regions of the world but is more rampant in tropical and developing countries. [3] India is at the intermediate endemic level of hepatitis B prevalence between 2% and 7% among the populations studied. [3]

A large number of patients suffering from HBV infection are asymptomatic. About 2 billion people (or 30% of world population) worldwide have serological evidence of current or past HBV infection and an estimated 296 million people living with chronic hepatitis B.[4,5,6] HBV infections are known to be the 10th leading cause of death worldwide and approximately 1 million deaths annually from HBV related chronic liver diseases including severe complications such as liver cirrhosis and hepatocellular carcinoma (HCC). HCC is the 5th most frequent cancer worldwide. [5,7]

HBV are DNA viruses belonging to hepadnaviridae family and measuring 40-42 nm in diameter with an outer lipoprotein envelope that contains envelope glycoproteins (or surface antigens). The most abundant protein on the virion surface is hepatitis B surface antigen (HBsAg) or S protein.[2] The inner core contains DNA dependant polymerase. [8] HBV has a strong predilection to infect liver cells.

HBV is a blood borne virus which is transmitted predominantly through parenteral means, contact with HBV-contaminated blood and body fluids, during blood transfusions, sharing of needles and syringes by drug users, accidents that involve blood exposures and contact with a broken skin, acupuncture and tattooing . Occupational transmission from HBV infected patients to health care workers are also major modes of transmission having fourfold increased risk of acquiring HBV infection compared to general population. Hepatitis B is also spread by sexual route and mother -to - child transmission is also quite common. [1,9,10]

Most of the HBV infected individuals do not experience any symptoms. It is a silent killer causing liver disease including chronic hepatitis,

hepatocellular carcinoma and cirrhosis related end stage liver disease, with many carriers not realising that they are infected with the virus and can transmit the disease to healthy population.[2,5]

The silent nature of the disease with severe morbidity and mortality necessitates early and reliable diagnostic methods. [11] It is difficult to differentiate hepatitis B from hepatitis caused by other viral agents on clinical grounds, hence laboratory diagnosis is essential, thus diagnosis is based on laboratory findings of serological markers.[2] HbsAg being the first sero hall marker of HBV infection which was earlier called as Australia antigen is used for rapid detection of HBV. [12] It becomes detectable 2 to 10 weeks after exposure and its persistence for more than 6 months suggest chronic HBV infection or development of a carrier state. [2,9]

HIV & HBV co infection has also become a major factor in co morbidity & mortality sharing the similar transmission routes, people at risk of HIV are also at a high risk of HBV infection.[13] Underlying HIV infection increases the chance of HBV chronicity and antiretroviral treatment regimens have been shown to increase the risk of hepatotoxicity.[14] Since HBV is more infectious than HIV, to understand the magnitude of transmission in the community and for prevention and treatment, this study was conducted to tackle epidemiological data of HBV infection of patients attending our health care centre along with age and sex related prevalence.

A tertiary care centre attached to medical college, catering to the needs of a huge population thus represents an effective centre for serological surveys. The present study highlights the prevalence of HBV infection and HIV -HBV coinfection, thereby providing reference for future studies on epidemiology of HBV infection and also to formulate strategies to reduce the seroprevalence rate.

Objectives of the study; To estimate HbsAg seropositivity among patient attending tertiary care centre

Materials & Methods

The present retrospective study was conducted at district hospital attached to Kodagu Institute Of Medical Sciences, Madikeri, over a period of 2 years from June 2019 to May 2021 after obtaining institutional ethics committee clearance (Ref: KOIMS/IEC/06/2021-22).

Inclusion criteria;

Both inpatients and outpatients who were advised HbsAg serological investigation based on the clinical findings of HBV infection, as a part preoperative screening and antenatal screening were included in the study.

Exclusion criteria:

Patients with previously diagnosed Hepatitis B infection were excluded from the study.

Sample size; A total of 20,676 samples tested over a period of two years.

After receiving Fresh blood samples in Non EDTA vacutainers, serum was separated by centrifugation. The sera was then analyzed by “ABON Biopharm co ltd Hepatitis B surface antigen detection” Test kit, a qualitative one step rapid test for HbsAg that utilizes the principle of agglutination of antibodies with respective Antigen in immune chromatography format using the standard protocol. Qualitative detection of HbsAg was done and interpretation of the result was done according to the manufacturer’s instruction. The test results of the patient were noted and analyzed. Details of various socio demographic variables age, sex, type of work, etc were collected.

Statistical analysis; The test results of the patient were noted and analyzed. Statistical analysis was done by tabulating the data & analyzed using Microsoft Excel & SPSS version 20 for windows. Chi square test was applied wherever necessary.

Results

A total of 20,676 patients tested over a period

of two years showed that 135(0.65%) patients were sero positive for HBsAg surface antigen. Among 135 seropositive, 55 (0.26%) were males and 80(0.38%) were female patients. The observations made from the study are shown in following tables and figures

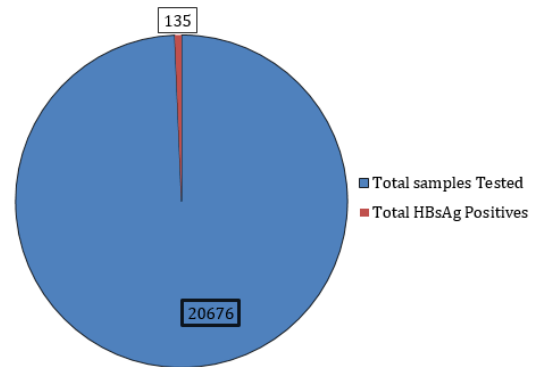


Fig - 1: Prevalence of HBsAg.

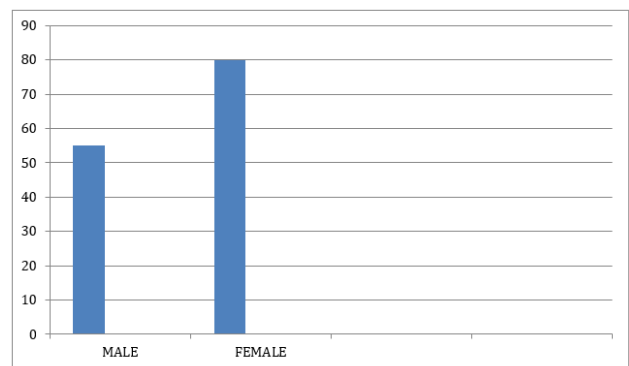


Fig - 2; Sex distribution of HBsAg sero positive patients.

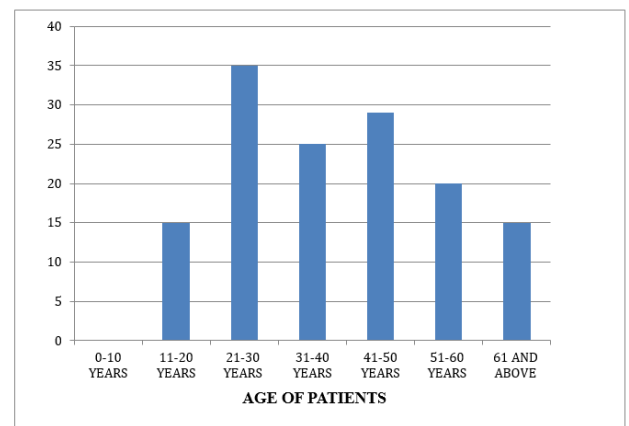


Fig - 3; Age distribution of HBsAg Positive Patients

Table - 1: HIV & HBV co infection

GENDER	HBV & HIV COINFECTION
MALE	11
FEMALE	1
TOTAL	12

Among 135 HBsAg sero positive patients 12 (8.63%) were positive for HIV .

Discussion

The prevalence of hepatitis B virus infection varies among different geographical location. It depends upon a complex of environmental, behavioral & host factors. Generally prevalence is lesser in high standard countries and vice versa. However vaccination, diagnosis and treatment of HBV also plays a major role in the prevalence and prognosis of the disease. HBV immunization has decreased the prevalence of HBV infection in health care workers.

Because of common routes of transmission, frequent co-infection of HBV and HIV is common. 5-25% of people living with HIV are also infected with HBV. However, the management of HIV/HBV co-infection has become increasingly important since the management of the co-infected patients is complex, as the presence of one infection can affect the management of the other in a number of ways. Therefore, to achieve the WHO viral hepatitis elimination target, evidence at the regional level to know the prevalence of viral hepatitis infections and liver disease may prove valuable.

In present study out of 20,676 serum samples 135(0.65%) were sero positive for HBsAg. A study conducted by Thriпти et al shows seroprevalence of 0.58%^[15] and study by Sood S et al. have noted 0.87% prevalence which are concordant to present study.^[16] Study by K.S Rashmi et al. shows positivity rate of 2.12% (287/13560) and study by sayed A Quadi et al. 1.63% which was higher in comparison to our study.^[11,17] Another study by lodha R et al. has concluded 1-2% as positives and study by Manish dwivedi et al. shows prevalence of 0.9%.^[18,19]

In present study We reported higher prevalence in females (0.38%) than males (0.26%) which is concordant with study conducted by Sudheendra kulkarni et al. [females (59. 90%) and males (40.05%)].^[20] Study by Megha et al and Patil S.R showed prevalence of 2.65 % and 2.63% in males and 2.03%, 1.96% in females respectively.^[1,5] HBV infected women can transmit the infection to their newborns, children, other household members and sexual partners or spouses. Vertical transmission contributes significantly to the chronic HBV infections.^[8]

Prity P. Narwade et al. showed majority of patients belonged to 21 - 40 yrs of age.^[7] Which is concordant to our study showing similar age specific prevalence between 21 - 30 age group followed by 41 -50 and 31 - 40 age group. Studies by kumar S et al showed age range 31-45 years was found to have highest prevalence rate with seropositivity of 5.38 %.^[8] Sudheendra kulkarni et al. showed high prevalence in age group between 21-30 years.^[20] Prevalence is more in economically productive age groups leading to a loss to the economy. This could be because of the increased exposure of this population to the risk factors like parenteral drug abuse, promiscuity, higher exposure to occupational risk factors etc.

In present study among 135 HBsAg sero positive samples 8.63% were positive for HIV. A study done by Manisha jain et al in patients infected with HIV the prevalence of co-infection with HBV was found to be 9.9%.^[21] Study by Jayatha surkar et al showed 8.33% HIV reactive cases that was also found to be reactive for HBsAg.^[12] Study by Suneeta koli. et al. showed that Among 1160 HIV infected patients, prevalence of HBsAg was 16.6 %^[14] and a study by Nyalika B S shows 8% of coinfection.^[9] This study throws light on the seroprevalence of hepatitis B infection and seroprevalence of HIV/HBV coinfection and also highlights the necessity of awareness about viral hepatitis in community and amongst population with high risk behaviour.

Limitation;

The present study had some limitations. Study would have been made more clinically oriented if correlation with other marker like Liver function

tests was done and also by knowing history including risk factors of patients. Implication of HBV or HCV coinfection in patients with HIV is a serious concern in developing countries, hence to know the real magnitude of the infection sero-prevalence of all hepatitis viruses is required.

Conclusion

India's stands in the intermediate zone in prevalence of hepatitis B. Hence present study on seroprevalence of HBsAg and its association to HIV with age / sex distribution provides good source of data for future studies to understand and assess the magnitude of disease in community and is a cause for concern and warrants urgent intervention. Such studies also outlines the optimal treatment options whether the patient is treated for HBV first, HIV first or HIV and HBV together.

Ethical clearance; Taken from institutional ethics committee.(Ref: KOIMS/IEC/06/2021-22)

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Conflict of Interest; Nil

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Evaluation of Dexmedetomidine and Fentanyl as Additives to Ropivacaine for Epidural Anaesthesia and Post-Operative Analgesia in Lower Abdominal and Lower Limb Surgeries

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Abstract

Background: The regional anaesthesia has lot of benefits compared to general anaesthesia for lower abdominal and lower limb surgeries. Epidural anaesthesia is an ideal anesthetic technique for lower abdominal and lower limb surgeries. The additives are used with Anesthetics for Early onset of action, To prolong the duration of action, Analgesia and Improving the quality of block.

Aims and Objectives: The aim of this study was to study the clinical efficacy of Dexmedetomidine versus Fentanyl as an additive to Ropivacaine for lumbar epidural anaesthesia and post-operative analgesia.

Materials and Methods: This study is a prospective randomised controlled study involving 90 patients undergoing infraumbilical and lower limb surgeries who will be divided randomly into three groups Group R (n = 30): received 18 ml of 0.5% ropivacaine for epidural anaesthesia and 10 ml of 0.2% ropivacaine boluses for postoperative analgesia; Group RF (n = 30): received 18 ml of 0.5% ropivacaine with 25µg fentanyl for epidural anaesthesia and 10 ml of 0.2% ropivacaine with 10 µg fentanyl boluses for postoperative analgesia; and Group RD (n = 30): received 18 ml of 0.5% ropivacaine with 25 µg dexmedetomidine for epidural anaesthesia and 10 ml of 0.2% ropivacaine with 5 µg dexmedetomidine boluses for postoperative analgesia.

Results: Addition of additives have enhanced the onset of action, prolong duration of analgesia. Quality and duration of epidural anaesthesia provided by ropivacaine with dexmedetomidine is more effective than fentanyl. Better efficacy of analgesia evidenced with Dexmedetomidine than with Fentanyl.

Conclusion: It can be concluded that RD (Ropivacaine and Dexmedetomidine) when given epidurally can be a safe and effective combination for epidural blockade in lower abdominal and lower limb surgeries.

Key Words: Ropivacaine, Fentanyl, Dexmedetomidine, Epidural

Introduction

The regional anaesthesia has lot of benefits compared to general anaesthesia for lower abdominal and lower limb surgeries. Epidural anaesthesia and Intrathecal anaesthesia are currently most used and patient friendly regional anaesthetic techniques applied for lower abdominal and lower limb surgeries. Intrathecal anaesthesia has some limitation to it like, shorter duration of anaesthesia, therefore epidural anaesthesia is an ideal anesthetic technique for lower abdominal and lower limb surgeries. The additives like Opioids, Ketamine, Neostigmine, Midazolam, $\alpha 2$ agonists (Clonidine and dexmedetomidine) are being with Local Anesthetics for Early onset of action, To prolong the duration of action, Analgesia and improving the quality of block. **Fentanyl**, is an opioid analgesic which when added to Ropivacaine in epidural, delivers better duration of analgesia and lesser systemic toxicity and central side effects. The addition of Opioids to local anesthetics has its own disadvantages like, pruritus and respiratory depression.¹ **Dexmedetomidine**, an Alpha-2 Adrenoreceptor agonist, acts on the spinal cord and has been used as an effective adjuvant to Ropivacaine for regional and central neuraxial blocks.² Different local anesthetics are used for epidural anaesthesia, most popular in India being Lidocaine and Bupivacaine. The drawback of lidocaine is its intermediate duration of action and the drawback of bupivacaine though long acting, is increased incidence of fatal cardiac toxicity after accidental intravascular injection, because of narrow cardiovascular collapse/central nervous system toxicity (cc/cms).³ For this reason, there has been a search for alternative drugs with desirable blocking properties of bupivacaine but with a greater margin of safety. Ropivacaine and levobupivacaine are the newer long acting amide local anesthetics which have a wide margin of safety compared to bupivacaine, with all its advantages. Recently Ropivacaine has been introduced and since Ropivacaine has all the advantages of bupivacaine with less cardiac toxicity. It appears that it may be an ideal local anaesthetic for epidural anaesthesia.⁴ Various studies have found, Ropivacaine to be an effective local anaesthetic for epidural anaesthesia, in their comparative pharmacokinetics of bupivacaine and ropivacaine

have found that when applied directly to an isolated vagus nerve preparation, ropivacaine was less potent than bupivacaine in terms of conduction blocks of A β fibers, but ropivacaine blocked A δ and C fibers to a greater extent than did bupivacaine. It is also been found that, lipid solubility of Ropivacaine is 2.9 compared with 3.9 of bupivacaine. Hence in our study ropivacaine was selected as the study drug. The fear of surgery, the strange surroundings of the operation theatre, the sight and sound of sophisticated equipment, dynamicity of an operation during regional anaesthesia and the masked faces of so many strange personal makes the patient panic to any extent. The intense sensory and motor block, continuous supine position for a prolonged duration and the inability to move the body during regional anaesthesia brings a feeling of discomfort and phobia in many of the patients. The high cephalic spread of analgesia with local anesthetics may be significant but still its quality sometimes may not correlate with the level of sensory analgesia. At this stage, the impulsive use of large doses of sedation or even general anaesthesia with mask, defeats the novel purpose of regional anaesthesia, whereby a continuous verbal contact with the patient is lost. Sedation, stable hemodynamics and an ability to provide smooth and prolonged post-operative analgesia are the main desirable qualities of an adjuvant in neuraxial anaesthesia. α -2 adrenergic agonists have both analgesic and sedative properties when used as an adjuvant in regional anaesthesia.

Dexmedetomidine is a highly selective $\alpha 2$ adrenergic agonist with an affinity of eight times greater than clonidine. Various studies have shown that the dose of clonidine is 1.5 - 2 times higher than dexmedetomidine when used in epidural route.⁵

The anesthetic and the analgesic requirement get reduced to a huge extent by the use of dexmedetomidine because of its analgesic properties and augmentation of local anesthetic effects as they cause hyperpolarization of nerve tissues by altering transmembrane potential and ion 4 conductance at locus coeruleus in the brainstem. The stable hemodynamics and the decreased oxygen demand due to enhanced sympathoadrenal stability make it a very useful pharmacologic agent. Hence a study was undertaken to compare dexmedetomidine and

fentanyl as additives to ropivacaine for epidural anaesthesia and post-operative analgesia in lower abdominal and lower limb surgeries.

Materials and Methods

Study Setting: The present study was conducted at Department of Anaesthesiology, Deccan College Of Medical Sciences, Hyderabad, Telangana, India.

Study Duration: 18 Months (January 2020 to July 2021)

Study Design: This was a prospective randomized control study.

Sample Size: A total of 90 patients were included in the study.

Inclusion Criteria:

1. Patients between ages 18 and 60yrs.
2. BMI <40
3. Patients with ASA Physical status 1 & 2
4. Elective lower abdominal and lower limb surgeries

Exclusion Criteria:

1. Patient not willing for regional anaesthesia.
2. Patient allergic to local anesthetics.
3. Patients with coagulation abnormality.

4. Emergency surgeries.
5. Difficulty airway, spine deformities.
6. Cutaneous infection on the back.
7. Full stomach and pregnant patients.
8. Patients with GERD.
9. Surgery involving prone position.

The patients were divided randomly into three groups Group R (n = 30): received 18 ml of 0.5% ropivacaine for epidural anaesthesia and 10 ml of 0.2% ropivacaine boluses for postoperative analgesia; Group RF (n = 30): received 18 ml of 0.5% ropivacaine with 25µg fentanyl for epidural anaesthesia and 10 ml of 0.2% ropivacaine with 10 µg fentanyl boluses for postoperative analgesia; and Group RD (n = 30): received 18 ml of 0.5% ropivacaine with 25 µg dexmedetomidine for epidural anaesthesia and 10 ml of 0.2% ropivacaine with 5 µg dexmedetomidine boluses for postoperative analgesia.

Statistical Analysis: Statistical analysis was performed using the statistical software IBM SPSS Version 22.0. The data was collected and compiled in Microsoft Excel. To analyze the data, descriptive statistics was used to draw the graphs and frequencies and percentages, and quantitative data was analyzed using One- way ANOVA test. Then qualitative data was analyzed using chi square test. If p- value is <0.05, it is considered statistically significant.

Observation and Results

Table No. 1: Onset Of Sensory Block In The Study Groups

	N	Mean	Std. Deviation	F value	p-value
Group R	30	5.67	1.322	22.804	0.001*
Group RF	30	4.80	.847		
Group RD	30	3.73	1.112		
Total	90	4.73	1.356		

Analysis of parameter **onset of sensory block** was analysed, and it shows that in **group R (Ropivacaine)** the mean value is **5.67 minutes**, and in **groupRF (Ropivacaine and Fentanyl)** the mean value is **4.80 minutes** and in **group RD (Ropivacaine and Dexmedetomidine)** the mean value is **3.73 minutes**,

respectively. The output of One-way ANOVA analysis shows that there is a statistically significant difference in the onset of the sensory block i.e., the onset of sensory block was faster in the group RD, followed by group RF and group R, respectively (F value= 22.804; p-value= 0.001).

Table No. 2: Onset Of Motor Block In The Study Groups

	N	Mean	Std. Deviation	F value	p-value
Group R	30	11.37	1.351	93.505	0.001*
Group RF	30	7.73	1.285		
Group RD	30	6.77	1.478		
Total	90	8.62	2.411		

Analysis of parameter **onset of motor block** was analysed, and it shows that in **group R (Ropivacaine)** the mean value is **11.37 minutes**, and in **group RF (Ropivacaine and Fentanyl)** the mean value is **7.73 minutes** and in **group RD (Ropivacaine and Dexmedetomidine)** the mean value is **6.77 minutes**,

respectively. The output of One-way ANOVA analysis shows that there is a statistically significant difference in the onset of the motor block i.e., the onset of motor block was faster in the group RD, followed by group RF and group R, respectively (F value= 93.505; p-value= 0.001).

Table No. 3: Time For Complete Sensory And Motor Block In The Study Groups

	N	Mean	Std. Deviation	F value	p-value
SENSORY BLOCK					
Group R	30	15.53	1.776	154.484	0.001*
Group RF	30	11.13	1.306		
Group RD	30	8.93	1.311		
Total	90	11.87	3.124		
MOTOR BLOCK					
Group R	30	27.03	1.810	76.221	0.001*
Group RF	30	23.63	1.921		
Group RD	30	20.83	2.102		
Total	90	23.83	3.195		

Analysis of parameter **time for complete sensory block** was analysed, and it shows that in **group R (Ropivacaine)** the mean value is **15.53 minutes**, and in **group RF (Ropivacaine and Fentanyl)** the mean value is **11.13 minutes** and in **group RD (Ropivacaine and Dexmedetomidine)** the mean value is **8.93 minutes**, respectively. The output of One-way ANOVA analysis shows that there is a statistically significant difference in the time for complete sensory block between the study groups, respectively (F value= 154.484; p-value= 0.001). Analysis of parameter

time for complete motor block was analysed, and it shows that in **group R (Ropivacaine)** the mean value is **27.03 minutes**, and in **group RF (Ropivacaine and Fentanyl)** the mean value is **23.63 minutes** and in **group RD (Ropivacaine and Dexmedetomidine)** the mean value is **20.83 minutes**, respectively. The output of One-way ANOVA analysis shows that there is a statistically significant difference in the time for complete motor block between the study groups, respectively (F value= 76.221; p-value= 0.001).

Table No. 4: Total Duration Of Analgesia In The Study Groups

	N	Mean	Std. Deviation	F value	p-value
Group R	30	180.38	37.36	43.276	0.001*
Group RF	30	200.17	25.94		
Group RD	30	218.83	40.68		

Analysis of parameter **time of first rescue analgesia** was analysed, and it shows that in **group R (Ropivacaine)** the mean value is **200.12 minutes**, and in **group RF (Ropivacaine and Fentanyl)** the mean value is **220.78 minutes** and in **group RD (Ropivacaine and Dexmedetomidine)** the mean

value is **250.35 minutes**, respectively. The output of One-way ANOVA analysis shows that there is a statistically significant difference in the time of first rescue analgesia between the study groups, respectively (F value= 63.141; p-value=0.001).

Table No. 5: Maximum Sensory Levels Achieved In The Study Groups

	Group			Total	Chi-square	p-value
	R	RF	RD			
T10	4	3	0	7	28.864	0.001*
	13.3%	10.0%	0.0%	7.8%		
T8	19	16	5	40		
	63.3%	53.3%	16.7%	44.4%		
T6	7	11	20	38		
	23.3%	36.7%	66.7%	42.2%		
T4	0	0	5	5		
	0.0%	0.0%	16.7%	5.6%		
Total	30	30	30	90		
	100.0%	100.0%	100.0%	100.0%		

Analysis of the parameter, **Maximum sensory level** shows that in **group R (Ropivacaine)**, T8 showed maximum sensory level (**63.33%**) and in **group RF (Ropivacaine and Fentanyl)** T8 showed maximum sensory level (**53.33%**) and in **group RD (Ropivacaine and Dexmedetomidine)**, T6 showed maximum sensory level (**66.67%**), respectively. The output of chi- square test shows that there is a statistically significant association between the study groups and the maximum sensory level (Chi- square= 28.864; p- value= 0.001).

5.93 ± 1.47 and in group RD was 3.65 ± 0.72. The mean time of motor block in Group R was 26.14 ± 4.71, group RF was 23.37 ± 2.58, group RD was 19.52± 2.51.

There was statistically significant difference with regard to onset of sensory and motor block.

Arindam Sarkar et al,⁶ Dexmedetomidine seems to be a better alternative to fentanyl as an epidural adjuvant due to early onset of sensory anesthesia, prolonged postoperative analgesia, and lower consumption of rescue analgesia.

Discussion

Onset Of Sensory And Motor Blockade:

In our study, the mean time for onset of sensory block in Group R was 6.87 ± 0.68, In group RF was

Different trials have shown that multimodal analgesia through different techniques is associated with superior pain relief. Opioids as epidural adjunct to local anesthetics have been in use for long and α2

agonists are being increasingly used for same. The present study aims at comparing the hemodynamic, sedative, and analgesic effects of epidurally administered fentanyl and dexmedetomidine when combined with bupivacaine.

Casati et al.⁷ in their study reported that patients receiving 0.5% Ropivacaine more frequently had an inadequate motor blockade during surgery than those receiving bupivacaine.

Amba paul et al.⁸ dexmedetomidine as an adjuvant to epidural bupivacaine is a better alternative to fentanyl as it shows faster onset of sensory block, lesser time to attain maximum sensory level, prolonged duration of analgesia, and longer motor blockade with higher sedative property.

The sedative effect of dexmedetomidine is probably mediated by the activation of presynaptic α -2 adrenoreceptors in the locus coeruleus, leading to inhibition of release of norepinephrine, along with it, inhibition of adenylate cyclase may lead to hypnotic response. From the above studies, we conclude that group RD have faster onset of motor and sensory blockade.

We have seen that dexmedetomidine group had higher sedation scores which was supported by Salgado et al. who found that patients were more sedated with lower bispectral values in dexmedetomidine group

HIGHEST LEVEL OF SENSORY BLOCK:

In our study, patients of group R attained the following level of sensory block 23.33 % attained T6 level, 63.33% attained T8 level and 13.33% attained T10 level. In group RF 36.67 % attained T6 level followed by 53.33% attained T8 level and 10% attaining T10 level. In group RD 66.67% attained T6 level followed by 16.67% attaining T8 level.

Kaur S et al.⁹ in their study has revealed that, Dexmedetomidine has augmented motor and sensory blockade, during epidural anesthesia with Ropivacaine and prolonged the post-operative analgesic effect.

From the above study highest level of sensory block was more in RD group than the other 2 groups.

TOTAL DURATION OF ANALGESIA:

In our study, the mean duration of analgesia in group R was 180.38 ± 37.36 , In group RF it was 200.17 ± 25.94 and in group RD it was 218.83 ± 40.68 . There was statistically significant difference with regard to total duration of analgesia.

Meister et al., in a randomized study involving 50 labouring women compared epidural analgesia with 0.125% ropivacaine versus 0.125% bupivacaine both combined with fentanyl during labour using a patient-controlled epidural analgesia technique, with settings of: 6-mL/hr basal rate, 5-mL bolus with 10-min lockout interval and 30-mL/hour dose limit. They found that Ropivacaine 0.125% with Fentanyl 2 microgram/mL produces similar labour analgesia with significantly less motor block than an equivalent concentration of Bupivacaine/Fentanyl.¹⁰

Berti et al., (2000) in a Prospective, randomized, double-blind study involving 32 patients evaluated the effects of addition of low dose Fentanyl (2 microgram/ml) to either 0.2% Ropivacaine or 0.125% Bupivacaine on postoperative analgesia through PCA pumps after major abdominal surgery. They used a basal epidural infusion of 4ml/hour with incremental dose of 1.5ml and 20 minutes lockout interval. They found no differences in pain relief, motor block, degree of sedation and recovery of gastrointestinal motility between the two groups. However, they reported the request for incremental doses and more analgesic solution consumption in patients receiving Ropivacaine alone than patients receiving the Ropivacaine/ Fentanyl mixture and also a significant decrease in peripheral SpO₂, lasting up to 48 hours after surgery in the latter group. They concluded that 0.2% Ropivacaine with or without Fentanyl provided adequate pain relief in most patients with a very low degree of motor blockade and adding 2 microgram/ml Fentanyl to 0.2% Ropivacaine reduced total consumption of local anesthetic and also need for incremental doses. But there were no clinically relevant advantages in quality of pain relief and incidence of motor block with addition of Fentanyl.¹¹

Rabie Soliman et al.¹² Epidural analgesia is a common method for the management of postoperative pain after total knee replacement. The

aim of the study was to compare the postoperative analgesic effect of dexmedetomidine and fentanyl as an adjuvant to epidural bupivacaine in adult patients undergoing total knee replacement. Dexmedetomidine is an ideal adjuvant to epidural bupivacaine for postoperative analgesia compared to fentanyl in patients undergoing total knee replacement. It provides a better postoperative analgesia and reduces the postoperative narcotics requirements and complication such as nausea and vomiting, pruritis, urinary retention, and respiratory depression compared to fentanyl.

Conclusion

It can be concluded that RD (Ropivacaine and Dexmedetomidine) when given epidurally can be a safe and effective combination for epidural blockade in lower abdominal and lower limb surgeries.

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee.

Source Of Fnding: None

Conflict Of Interest: No Conflict of interest.

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Comparison of Chloroprocaine and Bupivacaine for Spinal Anaesthesia in Patients Undergoing Day Care Surgery: A Double Blind Randomized Controlled Study

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Abstract

Background: In the last few years, the number of surgical procedures performed on day care basis has increased worldwide, nearly between 20% - 30% surgeries are being performed as outpatient procedures. Ambulatory surgery has become increasingly popular due to advantages for the individual patient and the positive economic impact for the health care system. In the near future, ambulatory surgery is likely to expand further.

Objectives: The objectives of this study were to compare chloroprocaine and bupivacaine for spinal anaesthesia in patients undergoing day care surgery.

Methods: Patients between 18-60 years' age of either sex, belonging to ASA I and ASA II undergoing day care surgeries lasting 45-60 min were included in this study after approval of Institutional Review Board and obtaining informed consent. Preanaesthetic check-up was done one day before surgery patients were evaluated for any systemic diseases and laboratory investigation recorded the procedure of spinal anaesthesia was explained to the patients and written informed consents was obtained. Hundred patients were randomly divided into two groups of fifty each. Fifty patients received 0.5% heavy 10mg (2cc) bupivacaine. Fifty patients received 40mg (4cc) preservative free 2-chloroprocaine. The primary outcome of this study, I. e., the time to eligibility for discharge from hospital, was measured from the time spinal anaesthesia was performed to the time the patient attained all of the discharge criteria.

Results : Intrathecal 1% 2-chloroprocaine 40 mg provides spinal anaesthesia of adequate duration for day care surgeries with the advantage of earlier onset and faster regression of spinal block resulting in earlier ambulation and earlier voiding with stable hemodynamic as compared to 0.5% hyperbaric bupivacaine 10 mg.

Conclusion: Thus we conclude that 2-chloroprocaine can provide spinal anaesthesia with a shorter recovery profile than bupivacaine, permitting earlier discharge from hospital after day care surgeries.

Keywords: Chloroprocaine, Bupivacaine, Day Care Surgery, Spinal Anesthesia

Introduction

In the last few years, the number of surgical procedures performed on day care basis has increased worldwide, nearly between 50% - 70% surgeries are being performed as outpatient procedures. Ambulatory surgery has become increasingly popular due to advantages for the individual patient and the positive economic impact for the health care system. In the near future, ambulatory surgery is likely to expand further.

The economical benefits of ambulatory surgery consist mainly of an increased efficiency of the operation theatre, reduce Personal costs and the reduction in rendered services. Clinical advantages include less postoperative infections, less postoperative delirium and increased mobility.^{1,2}

In former times, ambulatory surgery was mainly restricted to healthy ASA (American Society of Anaesthesiologist classification of physical status) 1 and 2 patients undergoing minor surgical interventions. However, nowadays, also patients with significant co-morbidities are regularly scheduled for ambulatory surgical interventions, with the interventions become significantly more complex. Two main reasons can be identified for this evolution. First, the implementation of endoscopic techniques allowed for an unprecedented widening of indications of ambulatory surgery. Second, anaesthetic techniques have continuously evolved with anaesthesia become short acting and treatable with less hangover.

Investigation of medical outcomes show that the safety of day surgery is similar if not better than procedure that are performed on an inpatient basis. Mortality is extremely low, and the incidence of significant postoperative surgical and anaesthetics complications is at an all-time low.

Majholm et al.³ reported a mortality related to day surgery of 0.78/100000, and the incidence of postoperative complications such as deep venous

thrombosis or postoperative bleeding was as low as 2/10,000 and 0.5%, respectively. The rate of complication-related readmissions is described in the literature to be extremely low (.15%).

In the past, lack of ideal spinal local anaesthetic & availability of drugs like remifentanyl & propofol have made general anaesthesia the anaesthetic technique of choice for short procedures of around 30 minutes. Later on lidocaine became the anaesthetic of choice for years in context of outpatient procedures.^{4,5} However, it uses has been abandoned due to its association with a significant risk of transient neurological symptoms. Then, Bupivacaine was used but it produced sensory & motor blocks of longer duration.⁶⁻¹⁰

Preservative free 2-chloroprocaine seems to be a promising alternative. It is an ester type of local anaesthetic with shortest duration of action. In comparison with bupivacaine, chloroprocaine showed faster offset times to end of anaesthesia, unassisted ambulation and discharge from hospital. Findings suggest that chloroprocaine may be a suitable alternative to low doses of long acting local anaesthetics in ambulatory surgery.^{11,12} This study was designed to compare chloroprocaine and bupivacaine for spinal anaesthesia in elective ambulatory settings for surgeries lasting 45-60 min.

Materials and Methods

STUDY CENTER

OWAISI HOSPITAL AND RESEARCH CENTRE and PRINCESS ESRA HOSPITAL, DECCAN COLLEGE OF MEDICAL SCIENCES

DURATION OF THE STUDY

January 2020 to March 2022

STUDY DESIGN

Interventional prospective comparative randomised double blinded study

SAMPLES

Patients between 18-60 years' age of either sex,

belonging to ASA I and ASA II undergoing day care surgeries lasting 45-60 min were included in this study after approval of Institutional Review Board and obtaining informed consent.

INCLUSION CRITERIA

- Age: 18-60 yrs.
- Duration of surgery < 60 min
- ASA I and ASA II status.
- Infra umbilical surgeries (lower abdominal).

The following surgeries were included: urologic surgeries (cystoscopy, circumcision, transurethral bladder tumour resection, varicocelelectomy, and hydrocelelectomy), general surgeries (haemorrhoidectomy, rectal biopsy, or any short anorectal surgery), and gynaecological surgeries (hysteroscopy, vulvar or vaginal biopsy, cystocele repair, dilatation, and curettage).

EXCLUSION CRITERIA

- 1. ASA Grade > 2
- Platelets < 75000, bleeding diathesis

- Use of anticoagulant drugs
- Neurological diseases (multiple sclerosis, symptomatic and lumbar herniated disc, spinal stenosis).
- Allergy or intolerance to local anaesthetics including both the study drugs or paraaminobenzoic acid.

STATISTICAL ANALYSIS

Incidence data (incidence of hypotension bradycardia, pain requiring analgesia, postoperative nausea and vomiting (PONV), and postoperative complications) were compared using Chi square test or Fisher's exact test (when the expected values in any of the cells of a contingency table were greater than 5). Student's t test was used to compare the other variables, including the primary outcome (time to eligibility for discharge) and secondary outcomes (time for complete regression of the sensory and motor blocks, and time to ambulation and micturition). Continuous variables are presented as mean (standard deviation) "categorical data or presented as number of cases recorded (%), software used for analysis: R studio 1.2.5001.0.

Results

Table No 1: Level Of Maximum Sensory Block Attained

LEVEL ATTAINED	GROUP A	GROUP B
T4	15	0
T5	23	27
T6	20	23
T7	2	6
T8	0	4

Table No 2: Time To Onset Of Sensory Block Upto T10 Level In Minutes, Level Of Maximum Sensory Block & Time To Regression Of Sensory.

TIME TO ONSET OF SENSORY BLOCK UPTO T10 LEVEL IN MINUTES						
GROUP A		GROUP B		T value	Df	P value
Mean	SD	mean	SD	6.7014	97.3	0.001436
4.098	0.7	3.036	1.3			
LEVEL OF MAXIMUM SENSORY BLOCK						
65.35	0.64	49.7	0.34	0.8472		0.4003
TIME TO REGRESSION OF SENSORY.						
245.8	0.85	117.2	1.8	54.93		0.002

TABLE NO 3: DEGREE OF MOTOR BLOCK

DEGREE OF MOTOR BLOCK	GROUP A	GROUP B
4	0	0
5	0	2
6	50	48
Chi square	2.06	
P value	0.15 (Not Significant)	

TABLE NO 4: TIME TO ONSET OF MOTOR BLOCK / DURATION OF MOTOR BLOCK

GROUP A		GROUP B		T value	Df	P value
Mean	SD	Mean	SD	5.08	95.3	0.0014
5.08	0.77	3.98	1.42			
DURATION OF MOTOR BLOCK						
144.70	5.8	81.634	6.7	30.124		0.0022

TABLE NO 5: DURATION OF ANALGESIA, TIME TO SUCCESSFUL AMBULATION & TIME TO SUCCESSFUL VOIDING

GROUP A		GROUP B		T value	P value
Mean	SD	mean	SD	0.96	0.001
286.9	32.1	127.6	9.81		
TIME TO SUCCESSFUL AMBULATION					
269.7	16.4	210.4	10.09	1.0103	0.003
TIME TO SUCCESSFUL VOIDING					
357.4	14.68	259.2	9.864	39.25	0.0022

Discussion

Onset Of Sensory Block

The onset of sensory block was 4.098 ± 0.7 min versus 3.036 ± 1.3 min in Groups A and Group B respectively with significant p value < 0.0001 . thus, we observed that the onset time was significantly earlier in Group B. this finding could be attributed due to higher concentration of chloroprocaine (40 mg) used as compared to bupivacaine (15 mg). this parameter was also observed by **Dr. Kannan bojaraj et al**¹³ Where they found that the onset of sensory block was comparable in chloroprocaine group and bupivacaine group respectively. (150.42 ± 7.77 sec. and 156.5 ± 10.21 sec., $p=0.77$).

Maximal Level Of Sensory Block

The maximum level of sensory block attained in group A was T4 and in group B was T5. T10

level of sensory block was attained in both the groups. However, higher level of sensory block was noticed in bupivacaine group (T4-T7) compared to chloroprocaine group (T5-T8).

Regression Of Sensory Block

Regression of sensory block to L1 was 65.35 ± 0.64 and 49.7 ± 1.3 in group A and B Respectively Thus, we observed that it was significantly shorter in Group B. Regression to S1 was 245.8 ± 0.85 and observed that the time for regression of sensory block to S2 in 2-chloroprocaine group was 2.3 times faster than hyperbaric bupivacaine.

Our principal finding was that spinal anaesthesia with 2-CP can provide a satisfactory surgical block while permitting an earlier discharge from hospital than spinal bupivacaine. This advantage is due to a more rapid regression of the sensory and motor block, which help patients ambulate and void faster.

The finding that shows the most significant advantage is the time for regression of the sensory block to S2, as 2-CP was 2.3 times faster than bupivacaine. In a volunteer study of eight patients comparing equivalent doses of spinal 2-CP and bupivacaine, **Yoos et al.**¹⁴, Demonstrated a 1.7 times faster regression of the sensory block with 2-CP (a difference of 78 min).

Laccases et al¹⁵ Also demonstrated 2.3 times faster regression with chloroprocaine in comparison with bupivacaine, but in this study the level of sensory block was assessed using loss of cold sensation to ice, whereas **Yoos et al** and our study utilized loss of sensation to pinprick with a dermatome tester. Although the same nerve fibres transmit pain and cold information, there is a subtle distinction. Pinprick sensation is conducted by the A delta fibres, while cold sensation is transmitted by both the A delta fibred and the C fibres.

On Set Off Motor Block

We noticed that the mean time for on set off motor block was 5.08 ± 0.77 min with bupivacaine and 3.98 ± 1.42 min with chloroprocaine p value < 0.0014 . Thus, we observed that the onset was significantly earlier in chloroprocaine group. Our results also coincide with **Dr Kannan Bojaraaj et al** study (7.35 ± 1.27 min and 5.85 ± 1.6 min, $p=0.04$), **Arvind Khare et al**¹⁶ (4.1 ± 0.6 min versus 3.7 ± 0.6 min).

Duration Of Motor Block

In our study we found the duration of motor block was 144.7 ± 5.8 min and 81.63 ± 6.7 min in group A and B respectively. Thus, we observed that the time for complete regression of motor blocks modified broamge scale 1 in 2- chloroprocaine group was 2.3 times faster than hyperbaric bupivacaine group. Our results were similar to some earlier studies, where it was found that duration of motor block was shorter in chloroprocaine group than bupivacaine ($p < 0.05$).

Duration Of Analgesia

Duration of analgesia was 286.9 ± 32.01 min Vs 127.6 ± 9.81 min in group A and group B respectively with significant p value < 0.001 . Our results coincide with other studies. Thus, we observed that the duration of analgesia was shorter in group B due to early regression of sensory block.

Time To Return Of Successful Ambulation And Voiding

We found the time to return to ambulation was 269.7 ± 16.4 and 210.4 ± 10.09 in group A and group B. The time to return of voiding function was 357.4 ± 14.68 min versus 259.2 ± 9.86 in Group A and Group B respectively with significant p value < 0.001 . Thus, we observed that the time to return of ambulation and voiding function was significantly earlier in Group A. Our results coincide with **Tops and Yoos and Kopacz, Casati et al, Lacasse et al, Dr. Kannan Bojarrjet al, Manulata Tandan et al**¹⁷ studies, where they found that Return of voiding function was earlier in chloroprocaine group than bupivacaine group ($p < 0.05$). Similar findings were observed in C. camponovo et al and Jessica et al they found anaesthetic properties of both the groups were similar except anaesthetic recovery in chloroprocaine was fast.

The primary outcome me of this study i.e., the time to eligibility for discharge from hospital, was measured from the time spinal anaesthesia was performed to the moment the patient attained all of the discharge criteria. As to this outcome, a significant difference of 76 min was observed in favour of the 2-CP due to faster regression of the block, resulting in earlier ambulation and earlier voiding. Delayed discharge due to urinary retention was particularly problematic in the bupivacaine group. Even with good block regression and successful ambulation many patients who received bupivacaine experienced a longer delay between their First attempt and their eventual successful complete voiding. This delay may be explained by the need for a regression of the sensory block to at least the S3 dermatome in order to obtain normal detrusor function.

After surgery, all of our parents were transferred to the PACU for routine observation, where they remained for a mean of 67 to 68 min. Although there was no difference between the groups in our study, there may be an opportunity to institute changes that could optimize the time spent in the PACU, e.g., permitting patients to be discharged earlier when they are stable and when the block has shown signs of regression. According to our results, this milestone would be achieved sooner in patients with 2-CP spinal anaesthesia.

It is noteworthy to mention that more patients in the 2-CP group experienced pain in the PACU. Also, the total dose of fentanyl given in the PACU was higher in the 2-CP group. This may not necessarily represent a disadvantage of 2-CP administration. The patients in the 2-CP group experienced more pain in the PACU because their spinal anaesthesia regressed more rapidly.

One of the biggest limitations of this study is that it was not perfectly double-blinded. Since the block in the 2-CP group regressed earlier and faster, the blinded observer could guess the group to which the patient had been assigned. Although this limitation was identified prior to enrolment of the first patient, no better alternative to the protocol was determined. An additional limitation of this study was determining the precision of the sensory level of the block within two dermatomal levels. This imprecision was minimized by having the same blinded observer responsible for collecting all data during the study.

Also, our design could be criticized for not using opioids to supplement the local anaesthetic, as is common clinical practice. In this study, opioids were not added to the spinal in order to reduce possible confounding factors.

Although this study was not designed to measure healthcare costs, our results would be significant when considered from a cost savings perspective. As health care cost determined, in part, by the length of hospital stay, achieving faster discharge from hospital through the utilization of 2-CP spinal anaesthesia could provide potential cost savings without compromising the quality of patient's care.

The anaesthetic techniques chosen should have minimum stress and provide maximum comfort to patient in addition to minimal residual effects. It should have rapid onset and offset, early return of cognition and minimal PONV, dizziness or drowsiness. While these are properties desirable for all anaesthetic techniques, they are particularly important in the day surgery patients due to the requirement for rapid return to oral nutrition, mobilisation and full cognitive function.

The availability of reliable and safe short-acting

local anaesthetic has recently renewed interest in spinal technique for outpatient surgery, offering an alternative to general anaesthesia.

Intrathecal 1% or 2% 2-CP represent an interesting alternative to lidocaine for surgical blocks and short or ultra-short surgical procedures. When compared with spinal bupivacaine, it resulted in a significantly faster offset of sensory and motor blocks with similar onset time. The safety of intrathecal use of the preservative-free 2-CP formulation is currently sustained both by volunteer and clinical studies. Literature suggest a dose ranging between 30 and 60 mg for procedures lasting 60 minutes or less, while 10 mg is considered the no-effect dose.

Conclusion

Intrathecal 1% 2-chloroprocaine 40 mg provides spinal anaesthesia of adequate duration for day care surgeries with the advantage of earlier onset and faster regression of spinal block resulting in earlier ambulation and earlier voiding with stable hemodynamic as compared to 0.5% hyperbaric bupivacaine 10 mg. Thus we conclude that 2-chloroprocaine can provide spinal anaesthesia with a shorter recovery profile than bupivacaine, permitting earlier discharge from hospital after day care surgeries.

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Perspective Study of Surgical Myocardial Revascularisation in Rural Maharashtra Population

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Abstract

Background: Atherosclerotic coronary artery disease causes more morbidity, mortality and loss of economic capacity than any other group of disease. The modalities of revascularisation myocardium have undergone rapid advances in latest and alternate surgical techniques.

Method: Out of 430 patients 390 (90%) treated with CPB and 40 (9.13%) with OPCAB which includes 15 (3.48%) single vessels disease, 25 (5.8%) double vessel diseases. These are treated by grafting, conduits and IABP methods.

Results: We had successful surgical myocardial revascularisation with only 4% mortality.

Conclusion: CABG is the treatment of choice for multi-vessel coronary artery disease for myocardial revascularisation at different age groups.

Keywords: Myocardial, Revascularisation, CABG, IABP, Maharashtra

Introduction

Re-vascularising the myocardium jeopardised by atherosclerotic coronary artery disease (CAD) ⁽¹⁾. It is an area where cardiac medicine and surgeries are making fascinating advances every year. The scene is changing so rapidly that every time the subject is reviewed because in the text books, It was said that, man is as old as his arteries ⁽²⁾.

There are two main approaches to myocardial revascularisation, coronary artery bypass graft (CABG) and per coetaneous coronary intervention

(PCI) ⁽³⁾. In patients with advanced coronary arteries disease CAD, CABG is associated with improved long term out comes while PCI is associated with lower periprocedural complications ⁽⁴⁾. Minimally invasive techniques for bypass surgery have played a significant part in bringing CABG heart beat, and HMR (hybrid myocardial revascularisation) approaches in contemporary practice ⁽⁵⁾. Hence attempt was made to evaluate the surgical myocardial revascularisation with latest methods for early heal and short hospital stay of the MI patients.

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Material and Methods

430 adult patients admitted at ICU ward of MGM Medical College hospital Aurangabad-431005 Maharashtra were studied.

Inclusive Criteria: Patients more than 20 years having diagnosed MI, and fit for anaesthesia were selected for study.

Exclusion Criteria: Patients with Ischemic cardiomyopathy with congestive cardiac failure and portal Hypertension. Unfit for anaesthesia were excluded from study.

Methods

Patients were administered with general anaesthesia, surgical techniques include CABG. It has two types (a) Arterial conduits internal thoracic artery, Radial artery, Gastro-epiploic artery. (b) Venous conduits - Great or long saphenous vein. Technical considerations of grafting in CABG had on-pump CABG, OPCAB minimally invasive direct coronary artery bypass surgery (MI DCAB) and Hybrid revascularisation as per the need for vascularisation of MI was performed.

Duration of surgery was March 2012 to March 2015

Statistical analysis: Different age groups patients were classified with percentage. Various techniques and number patients, mortalities were also classified

Table 1: Distribution of age groups in MI patients

(No of patients: 430)

Age (Years)	Number of patients (430)	Percentage (%)
45-50	19	4.41
51-59	111	25.8
60-69	235	12.7
70-79	55	12.7
>80	10	2.32

with percentage. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1.

Observations and Results

Table-1: Distribution of age groups in MI patients - 19 (4.4%) were aged between 45-50 , 111 (25.8%) between 51-59 years of age, 235 (54.9%) were between 60-69 of age, 55 (12.7%) were between 70-79 of age, 10 (2.32%) were more than 80 years of age.

Table-2: Study of surgical techniques in MI patients 390 (90%) were treated with cardio-pulmonary bypass (CBP) and 40 (9.13%) were treated with OPCAB (heart beat) among them 15 (3.48%) had single vessel disease, 25 (5.8%) had double vessel disease.

Grafts - 28 (6.5%) patients received more than 3 graft (up to 5 grafts), 119 (27.6%) received 2 graft, 41 (9.5%) received only one graft

Conduits - 358 (83.2%) received LIMA to LAD, 18 (4%) received addition Radial artery (RA)

Balloon Pumping support - 35 (8.1%) received IABP in post-operative period for cardiac output (Mean hours of support was 52 hours)

Mortality - Total 16 (4.6%), 8 (1.8%) due to refractory low cardiac output, 4 (0.93%) due to Acute Renal failure and 2 (0.93%) due to DIC.

Table 2: Study of different techniques

(No of patients: 430)

Technique	Number of patients (430)	Percentage (%)
CPB	390	90%
Beat heart (OPCAB)		
Single vessel disease	40	9.13
Double vessel disease	15	3.48
More than one 3 grafts (up to 5 grafts)	28	6.5
Received 3 graft	119	27.6
Received 2 graft	242	56.2
Received one graft	358	83.2
Conduits		
Received LIMA to LAD	358	83.2
Received additional RA	18	4
Intra-aortic Balloon pumping (IABP) support in immediate post-operative period for low cardiac output maximum period of IABP support (Mean 52 hrs) (28 hours to 98 hours)	35	8.13
Mortality	16	4.6
Cause of death was refractory low cardiac out put	8	1.86
Acute renal failure	4	0.92
DIC	2	0.46
Mediastinitis	2	0.46

DIC = Disseminated intravascular coagulation

IABP = Intra-aortic Balloon Pumping

Discussion

Present perspective study of surgical myocardial revascularisation in Maharashtra population. The age group of patients was 19 (4.4%) were 45-50, 111 (25.8%) were 51-59 of age, 235 (54.6%) were 60-69 of age, 55 (12.7%) were 70-79 of age, 10 (2.32%) were above >80 years (Table-1). 390 (90%) patients undergone CPB, 40 (9.1%) Beat heart (OPCAB) among them 15 (3.48%) had single vessel disease, 25 (5.8%) had double vessel disease, 28 (6.5%) had more than 3 grafts (up to 5 grafts), 119 (27.6%) treated with 3 grafts, 242 (56.2%) treated with 2 grafts, 41 (9.5%) treated with one graft, 358 conduits were received IMA to LAD, 18 (4%) received additional RA, 35 (8.13%) IABP support was given post-operatively, 16 (4.6%) mortality (Table-2). These findings were more or less in agreement with previous studies ⁽⁶⁾⁽⁷⁾⁽⁸⁾.

The issue of stent Vs CABG is beyond the scope of this article patients prefer CABG for LMCA (Left main coronary artery disease), TVD or diffused triple vascular disease especially in Diabetic patients where incidence of stents blocked is very high. Single or double vessels or multiple blocks, calcified coronaries, the introduction of stents is of no use. In LAD ostial stenosis stenting may jeopardise a normally flowing circumflex artery. In complications of acute MI such as acute ischemic mitral regurgitation due to papillary muscle rupture post MI ventricular septal defect and left ventricular Aneurysm the CABG is of great value. In acute complications of stenting dissection, thrombus formation and coronary perforation patients require valve replacement. It is reported that approximately 80,000 patients undergo CABG in India every year ⁽⁹⁾. Incidences of CAD in Diabetic patients because vessels frequently require

endarterectomy i.e. removal of atheromatous plaque from lumen. The requirements of endarterectomy patients with diffuse disease undergo CABG ⁽¹⁰⁾.

Conduits for CABG for IMA/ITA – left internal mammary artery (LIMA) have been described as god gifts to mankind for revascularisation. Patients will be free from atherosclerosis, as it runs just above the heart in the chest wall and has an ideal lumen match with native coronary arteries ⁽¹¹⁾. The free conduct i.e., proximal and attached to Aorta the patency with LIMA to LAD is almost as high as with prescribed graft. The pedicled LIMA has been likened to a “drug eluting live graft” as its endothelium continues to secrete endothelium derived relaxing factor and prostacyclin which are important contributing factors for its high patency ⁽¹²⁾.

In OPCAB the cardiopulmonary bypass is avoided and the heart is allowed to beat, hence the name is beating heart surgery. The first anatomises done is LIMA to LAD on the anterior surface after stabilizing the heart with the help of positioning systems (octopus). Apart from this Robotic CABG Hybrid Revascularisation, anatomising devices are also used as per the status of cardiac diseases.

Summary and Conclusion

The present study of surgical myocardial revascularisation CABG is the treatment of choice for multi vessel coronary artery disease and left main coronary artery disease especially in type-II DM patients.

Conventional on pump CABG is a time tested safe modality for multi vessel grafting off pump/ beating heart surgery has been largely abandoned due to concerns of under grafting and diminished long term graft patency. OPCAB practice in India is largely confined to private hospitals due to cost-effectiveness. Left internal mammary artery (LIMA) is best drug eluting “graft with 90% patency”.

Latest technique to access for myocardial vascularisation facilities must be available in every government hospitals so that patients with low economic status can avail these facilities.

Limitation of Study – Owing to tertiary location research centre, small number of patients and lack of latest techniques we have limited findings and results.

- **This research paper was approved by Ethical committee of MGM Medical college and hospital Aurangabad-431005, Maharashtra**
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The Effect of Busy Book Stimulation in Fine Motor Development of Preschool Children

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Abstract

Backgrounds: Child development involves few main aspects: cognitive, speech and language, fine motor, gross motor and social emotional development. Many preschool-aged children suffer from neurodevelopmental disorder, including impaired fine motor development. We can use our hands in a coordinated way due to fine motor abilities. We depend on these abilities to complete important tasks in play, education, and daily life. Early infancy is where fine motor skill development starts and it lasts through preschool and the first few years of primary school.

Aim: This study aimed to determine the effect of busy book stimulation in fine motor development of preschool children.

Methodology: This study used pre-experimental with one group pretest posttest design. The instrument used was observation sheet. The total sample was 20 children who attended Sunshine Preschool, Bogor, Indonesia. The sampling method was Saturated Sampling. The Wilcoxon Signed Rank Test used to test whether or not there was a significant difference between two population means.

Result: The results of the pre-test showed that out of 20 participants, 11 participants had deviant fine motor development (55%). The post-test showed that out of 20 participants, 17 participants (85%) had proper fine motor development. In the intervention group, the average fine motor development of children before busy book stimulation was 62.47 ± 7.539 , while after busy book stimulation it increased to 86.08 ± 4.104 . The statistical test results of the Wilcoxon signed ranks test obtained a p-value 0.000 (p-value <0.05).

Conclusion: There was a significant effect of busy book stimulation in fine motor development of preschool children.

Keywords: Busy book, Fine motor development, Preschool children

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Introduction

The preschool age is a golden period, in which the development of a child will show many significant changes. During the development period, children need to be given appropriate stimulation in all aspects so that they can grow optimally.¹

The World Health Organization (WHO) reported that 5-25% of preschool aged children suffer from minor brain dysfunction, including impaired fine motor development.² According to UNICEF (2020), the incidence of growth and development disorders in children under five was still high, especially fine motor development disorders (27.5%).³

The incidence of fine motor disorders in preschool children in the United States ranges from 12-16%, in Thailand 24%, Argentina 22%, and in Indonesia between 13%-18%. Based on these epidemiological figures, it is important to perform early detection for children with developmental disorders to prevent delays in growth process.⁴ If not handled properly, this disorder can continue into adolescence or adulthood.⁵

Impaired growth and development of children in Indonesia reached 35.7% and it was classified as a high public health problem because the rate was more than 30%.⁶

According to the Indonesian Ministry of Health, 16% of toddlers experienced fine motor development disorder due to inability in coordinating their body movements.⁷ In the Bogor Regency, the incidence rate of normal fine motor development was 68.5%.⁸

The most common disorders found were fine motor disorders.⁹ Fine motor skills are movements that use smooth muscles or certain parts of the body, which are influenced by opportunities to learn and practice, for example: the ability to move objects from the hands, scribble, arrange blocks, cut, write, and so on.¹⁰

This fine motor development can be achieved with practice, for example by practicing writing, scribbling, or squeezing wax. Disorders of fine motor development usually cause children to have learning difficulties. Fine motor development is influenced by two factors, namely internal factors which

include: genetics, motivation to practice, health, nutrition, and practice opportunities and external factors which include: parental knowledge, parental education, parental attitudes, family, socio-economic, socio-cultural, environmental, health workers, and parenting.¹¹ The impact caused by delays in fine motor development is difficulty in several activities as described in the characteristics of children with good fine motor intelligence.¹²

Children should be introduced to different various activities that attract the desire to learn and play.¹³ Activities that can be done are playing puzzles, cutting paper, making stories, pasting pictures, sewing, practice pre-writing skills, counting, coloring and finger painting.¹⁴

Fine motor skills are skills that required the ability to control small or fine muscles in order to achieve successful execution of different skills. One way to optimize fine motor development in children is by playing.¹⁵ Use of appropriate and interesting learning media can improve fine motor development in children, namely by using busy book.¹⁶

Fine motor development is related to the child's ability to observe things, perform movements that involve only certain body parts, with the help of small muscles and require careful coordination of the eyes, hands and fingers. Fine motor skills are fine coordination of small muscles that play a major role.¹⁷

Ramadhani & Sudarsini (2018) stated that busy books have benefits, namely that media are designed to help develop cognitive abilities and are useful in developing children's fine motor skills.¹⁸ Romadhona (2017) also supported the idea that busy books contain concise material in the form of interesting pictures, stimulate basic skills in the form of fine motor skills, improve hand-eye coordination, and practice concentration.¹⁹

The purpose of this study was to determine the effect of busy book stimulation in fine motor development of preschool children at Sunshine Preschool, Bogor, Indonesia.

Methodology

The type of research used in this research was quantitative research in the form of pre-experimental

and did not have a control variable. The research design used one group pretest-posttest design with the instrument of collecting data from the Pre-Screening Development Questionnaire.

This type of pre-experimental was done by giving intervention and then observing it to see its impact. The results of intervention can be known more accurately, because it can compare the conditions before and after intervention, namely experiments conducted in one group without a comparison group.

The research was carried out at Sunshine Preschool Children of Bogor from 20 June 2022 to 20 July 2022. The population in this study were all children aged 3-6 years who attended Sunshine Preschool Children of Bogor as many as 20 people (8 boys and 12 girls). The sampling technique in this study used saturated sampling.

Before conducting the research, the researchers provided informed consent to be signed by the participant's parents and explained that participation in the study was free without any coercion and participant's parents could accept or refuse to join the study.

The data collection tool used in this study was a checklist in the Pre-Screening Questionnaire according to the age of each child, namely 3, 4, 5 and 6 years.

In this study, there was one group of participants consisting of 20 people. Before the treatment, the respondent was given pretest with the measuring instrument to determine the initial value of the participants before the intervention. During busy book stimulation activity, participants were divided into groups based on age and given treatment in 4 meetings, in which each meeting was held for 15 minutes during 4 days. After intervention, a post-test

was performed on all participants to determine the effect of busy book stimulation on participants.

The variables in this study consisted of 2 variables: the independent variable was busy book and the dependent variable was fine motor development in children aged 3-6 years. Data processing and data analysis used SPSS computer program. Analysis of the data used is a prerequisite test which includes homogeneity test, normality test, and hypothesis testing.²³

Results

Table 1. Frequency Distribution by Age of Participants in Sunshine Preschool Children of Bogor

Age	Frequency	Percentage (%)
3 Years	5	25
4 Years	5	25
5 Years	6	30
6 Years	4	20
Total	20	100

Based on the results of table 1 above, it can be seen that out of 20 participants, 6 participants (30%) were 5 years old and 4 participants (20%) were 6 years old.

Table 2. Homogeneity and Normality Test

Test	N	Pre-test	Post-test
Homogeneity	20	0.324	0.324
Normality	20	0.000	0.000

Table 2 showed that the results of the Homogeneity Test using the Levene Statistic formula was 0.324 and this means that the data comes from populations with homogeneous variance. The results of the normality test using the Saphiro Wilk formula was 0.000 at the pre-test and 0.000 at the post-test. Thus, the significance value < 0.05 and the data distribution was not normal.

Table 3. Frequency Distribution Fine Motor Development Before and After Stimulation Busy Book in Sunshine Preschool Children of Bogor

Fine Motor Development	Pre-test		Post-test	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Deviant	11	55	0	0
Doubtful	9	45	3	15
Appropriate	0	0	17	85
Total	20	100	20	100

Table 3 above showed that from 20 participants, there were 11 participants with deviant fine motor development (55%) before stimulation busy book intervention (pretest), and 17 participants (85%) after stimulation busy book intervention (posttest).

Table 4. Non-Parametric Hypothesis Test Results

Intervention	Fine Motor development of children			
		N	Mean ± up	to P-Value
Pre-test	Negative Ranks	20	62.47 ± 7.539	0.000
Post-test	Positive Ranks	20	86.08 ± 4.104	0.000

Table 4 showed that p-value was 0.000 and the value was $0.000 < 0.05$ (H_a was accepted, H_o was rejected). Therefore, there was a significant difference between the results of the pre-test before intervention with busy book and the post-test results after busy book intervention.

Discussion

A. Busy Book Stimulation of Fine Motor Development in Sunshine Preschool Children of Bogor (Pre-test)

Based on the frequency distribution of Busy Book Fine Motor Development of Children aged 3-6 years, pre-intervention showed that from 20 participants there were 11 participants with deviant fine motor development (55%).

This research is in line with the research conducted by Qonitah Faizatul Fitriyah et al. (2021) with the title Busy Book Media Development Fine Motor Learning for Children aged 4-5 years. This type of study was research and development using the Borg and Gall in data from instrument validation in the form of descriptive data by experts, namely media experts, material experts and users.

Based on the description above, before intervention with busy book, most of participants' fine motor development was deviated and most of the participants were 5 years old.

According to Piaget (2018), children aged 5 years old are able to understand and receive information.²⁵he believed a child's knowledge and understanding of the world developed over time, through the child's interaction with the world. By observing that interaction, Piaget was able to perceive how children created schemas that shaped their perceptions, cognitions, and judgment of the world. He classified the child's development into four sequential periods: (1 The impact caused by delays in fine motor development is difficulty in several activities as described in the characteristics of children with good fine motor intelligence.¹²

B. Busy Book Stimulation of Fine Motor Development in Sunshine Preschool Children of Bogor (Post-test)

Based on the frequency distribution, it showed that of the 20 participants, most of the participants had appropriate fine motor development, namely 17 participants (85%).

This research is in line with the research conducted by Astrinia Ristia Putri et al. (2019) with the title "Cognitive Comprehension of Dental Health Education Using Let's Brush Our Teeth Busy Book". The study was carried out among Down Syndrome children showed that the educational toy busy book appeared to be an effective learning tool for dental health education in Down Syndrome children.²⁰

Based on data from this study, after given the intervention, most of the children's fine motor development was improved.

This is in line with the study by Soetjningsih (2010). The research stated that fine motor development is related to the child's ability to observe something, perform movements that involve only certain body parts, with the help of small muscles and require careful coordination of the eyes, hands and fingers.¹

C. The Effect of Busy Book Stimulation in Fine Motor Development at Sunshine Preschool of Bogor

Based on the statistical test results of the Wilcoxon Signed Ranks, busy book children's fine motor development post-test positive rank was

lower than the pre-test positive rank. The value of ties= 0 showed that busy book effect in fine motor development of post-test was higher than busy book effect in fine motor development of pre-test children.

Fine motor activity is defined as skills that require the ability to coordinate or regulate small/smooth muscles, such as eye and hand movements that are efficient, precise and adaptive. The development of fine motor control or eye-hand coordination skills represents an important part of motor development. Examples of fine motor activities include the ability to move objects from their hands, scribble, arrange blocks, cut, and write.¹⁴

Nilmayani, Zulkifli, and Risma (2019) revealed that in its application, busy book can develop aspects of early childhood development including cognitive development. Busy book can be adjusted based on needs during the learning process for students because busy book is a new form of creative and innovative media in developing the abilities possessed by children.²⁶

Development is a pattern that develops continuously throughout life. This change lasts until it gives rise to new traits in the individual. For example, the selfish nature of children will develop after getting to know social interactions and mutual need between humans so that they change these attitudes.¹⁷

Based on the results of the study, after given the busy stimulation, most of the children's fine motor development was improved significantly and most of the participants were 5 years old. According to Piaget (2018), children aged 5 years are able to understand and receive information, are able to understand and receive information related to busy books stimulation.²⁵ he believed a child's knowledge and understanding of the world developed over time, through the child's interaction with the world. By observing that interaction, Piaget was able to perceive how children created schemas that shaped their perceptions, cognitions, and judgment of the world. He classified the child's development into four sequential periods: (1

Romadhona (2017) stated that busy books contain concise material in the form of interesting pictures

and the busy book itself has benefits for stimulating basic skills in the form of fine motor skills, improving hand-eye coordination, and training concentration in children.¹⁹

Conclusion

There was an effect of busy book stimulation in fine motor development of preschool children at Sunshine Preschool of Bogor.

Ethical Clearance: Ethical permission was not required.

Conflicts of Interest: There was no conflict of interest in the research.

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Effect of COVID-19 on Working Women's Physical and Mental Health: A Descriptive Study of Pre and Post Pandemic Era

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Abstract

Background and Aim: In 2019, the World Health Organization (WHO) recognized the coronavirus outbreak as a pandemic and a public health emergency of global significance. Recent studies have revealed that these restrictions and women's anxiety of the virus itself may have had an adverse effect on their mental health. Children and family members are spending more time at home; thus, society needs to be conscious of how this is affecting working women's emotional and physical health especially in the absence of any assisting maid. Thus, the purpose of this study was to evaluate how the COVID-19 pandemic lockdown affected working women's physical and mental health.

Materials and Method: To examine the effects of COVID-19 on the physical and emotional health of working women, a cross-sectional survey was conducted. Data is collected using an online survey platform. To investigate the impact of lockdown on the women's mental and physical health, a semi-structured questionnaire comprising a number of open- and closed-ended questions was prepared. Additionally, any mental health disorders and emotional difficulties that developed during lockdown or became worse were enlisted. Another goal was to gauge how much family members understood and were sympathetic to the physical and mental strain the working women were under.

Results: The study involved 200 women from different states of India. The hours spent in the kitchen and other associated activities increased from 1.5 hours to 5.5 hours when the time between before and during the lockdown was compared. The amount of time spent engaging in physical activity, such as yoga and morning and evening walks, significantly decreased during the lockdown and are coming to normal after the lockdown. 68 per cent of those surveyed said that women's behaviour had changed. About 58 per cent of the women suffered physical changes such as fatigue, headaches, lower back discomfort, and other issues with women's weight gain.

Conclusion: Additional research is required to better understand the long-term effects of the COVID-19 pandemic on women's mental health, particularly in regard to the identification of additional variables that may be connected to the pandemic's potentially multiplicative effects on women.

Key Words: Women, Pandemic, Women, Mental Health, COVID-19, World Health Organization.

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Introduction

The novel coronavirus, which was eventually given the COVID-19 designation, is an infectious disease that can pass between people. It first became known in the Chinese city of Wuhan in late December 2019, when cases of pneumonia with an undetermined origin were reported. The World Health Organization (WHO) deemed the coronavirus outbreak a public health emergency of global significance and recognized it as a pandemic. The majority of the globe's regions are badly impacted, including the US, Brazil, India, Russia, and Europe, which have experienced more cases and fatalities than the rest of the world.^{1,2}

Many nations then implemented nationwide lockdowns, shut down businesses and schools, forced citizens to learn online, enforced social isolation policies, and put in place restrictive measures that barred people from going to public places or interacting with people from other families.³ Recent studies have revealed that these restrictions and individual's anxiety of the virus itself may have had an adverse impact on their physical and mental health.⁴ According to prevalence studies, between 11 per cent and 28 per cent of women in non-pandemic settings experience psychological distress as a result of gender-related violence and discrimination.^{3,4} During the COVID-19 pandemic, numerous national public health mandates and recommendations put the mental health of millions of women at risk.^{5,6,7}

Because of the stress and uncertainty in their own lives, it has become challenging for family members to soothe their fears. Women's occupational or emotional issues interfere with their normal capacity to care for their family members and children, which has increased their stress levels. Negative feelings like anxiety, disappointment, grief, worry, anger, and loss are not uncommon for people to feel, but the extended, constrictive, and broad nature of the COVID-19 pandemic has made the situation worse. In addition to contributing to the strained family relationships, the increased household responsibility placed on women as a result of the lack of a housekeeper has presented other difficulties.^{8, 9,10}

The family members must be aware of the changes in the women's mental and physical health as a result

of the increased time spent by women on domestic duties. Family members' influence on the women's mental and physical health will be considerable because they are the women's primary caregivers. Thus, the purpose of this study was to evaluate how the COVID-19 pandemic lockdown affected working women's physical and mental health.

Materials and Methods

To examine the effects of COVID-19 on the physical and emotional health of working women, a cross-sectional survey was created. With the use of an online and offline survey platform, the data is collected. Potential respondents were contacted via social media, and after providing informed electronic consent, they were instructed to complete a Google form. It was optional and anonymous to participate in the study. The study included women who worked full-time and were between the ages of 25 and 50 and had a minimum of four family members. Exclusion criteria included (a) refusal to participate, (b) any family members who had a physical health condition or mental disease that was either inherited or acquired, or (c) any working women who, according to their own self-reports, had any psychiatric or cognitive impairments.

The target population in across India was enlisted using a non-random convenient sampling technique. Although the sample size was not determined prior to the study's execution, maximum involvement was desired and anticipated given the topic's present social importance. To determine how the lockdown affected the working women's physical and emotional health, a semi-structured questionnaire containing a number of open-ended and closed-ended questions was created. Variables such as the women's current level of (Physical Activity) PA, time spent in the kitchen, time spent on other home tasks including cleaning, washing, and, the quality and pattern of sleep, time spent working, and usage of digital devices were used to evaluate PA characteristics.

Along with the rate of any family disputes, any mental health concerns and emotional difficulties that developed or worsened during lockdown were also recorded. Finding out how much family members understood the value of PA and mental tranquillity

for the women was another goal. It was reported that there had been noticeable changes in physical and emotional behaviour prior to COVID-19 and during lock down periods, which were then examined.

Result

The study involved 200 working women in total. Table 1 shows the included participants' average age

Table 1: Mean Age of the Study Participants

S No.	Variable	Mean	Standard Deviation
1	Age Group (Years)	40	6.6

Table 2 shows the average amount of time spent on household tasks increased from 1 to 1.5 hours to 5.5 to 6 hours, and the average amount of time spent sleeping declined from 6.5 hours to around 4.8 hours.

was 40, with a standard deviation of 6.6. According to the study's findings, more time is now being spent using digital appliances, cooking, and doing housework. When the time periods before and after lockdown were compared, it was discovered that the number of hours spent on mobile had grown from an average of 1.28 hours to 4.28 hours.

The amount of time spent engaging in physical activity significantly decreased. It shrank daily from 1.13 hours to 0.23 hours.

Table 2: Comparison of Various Parameters before, during and after Lockdown

S No.	Variable (Daily average in Hrs)	Before Lockdown	During Lockdown	After Lockdown	Change before and after lockdown (%)
1	Time spent on household work	1.23	5.96	1.79	45.52
2	Time spent on digital devices	1.28	4.28	2.77	116.40
3	Time spent on PA	1.13	0.23	1.23	8.84
4	Sleep Time	6.43	4.82	6	-6.68

Table 2 also shows that after the lockdown, time spent on digital devices recorded highest growth in terms of per day usage (116.4 per cent), however the sleep time is negatively impacted (-6.68 per cent). For household work and time spent on PA, positive growth of 45.52 per cent and 8.84 per cent is reported.

It was found that 85 per cent of the working women who were participating spent an excessive amount of time in the kitchen, ranging from 4 to 9 hours. Sixty-eight per cent of those surveyed said that women's behaviour had changed. Irritation, impatience, excessive rage, anxiety, frustration, melancholy, and agitation were the main behavioural shifts among the women.

The working women had visible bodily changes. Approximately 58 per cent of working women suffered bodily changes such weariness, neck pain, headaches, lower back pain, and a significant issue with a woman's weight gain. Affected by high stress

were detected in about 61per cent of the women. By taking part in this study, the family members have been more aware of and sensitive to the increased amount of time that women spend in the kitchen, whether it be cooking with limited ingredients or juggling work online while taking care of the needs of the family and kids. The necessity for physical activity and mental wellness for women was universally acknowledged, although several family members also emphasized the need for greater understanding in this area.

Discussion

73 per cent of working women during the lockdown said it was difficult to work from home because of demands from family members. 39 per cent said their pay had been cut, 17 per cent said they had been fired, and 8 per cent said they had quit because they couldn't combine their personal

and professional life. 5 per cent of respondents also mentioned domestic abuse in some form.

Although the lockdown was progressively lifted and certain businesses and organizations were permitted to reopen, some routines were disturbed by the addition of additional regulations, such as the requirement to wear a mask at work, switch to online or hybrid employment, and occasionally work on odd or even days. Recent studies have revealed that these restrictions and women's dread of the virus itself may have had an adverse effect on their mental health. The social fabric and norms' unexpected disturbance has had an impact on women's behaviour and mental health.

Indian women's mental health has been impacted in a variety of ways as a result of marriage, having children, juggling job and family obligations, and learning to control their emotions.^{8,9}

Few research have been done in the field to investigate this association in working women. Several studies in adults throughout the pandemic have identified consistent associations between reduced physical activity and poorer mental health and between increased screen usage and poorer mental health.^{11,12}

In order to highlight the pandemic's possible effects on mental health, researchers have drawn on pre-pandemic studies. They have also urged for further study and improved mental health facilities. Few research, however, have particularly looked at the relationship between physical activity and kitchen time and mental health in nationally representative samples, or the mental health of working women before, during and after the pandemic.¹³

Lockdown was highlighted by all family members as the main element that had an impact on adult physical activity. Prior to lockdown, research showed that working women spent more time being active and had higher PA levels on the weekends than they did during the week. Especially those who have desk jobs, working women often get fitter over the holidays.¹⁴ It is possible that the lengthy lock down due to offline work closure lasting a year or more will have significant effects on working women's overall physical and mental health. There

have been disruptions in behaviour throughout the whole 24-hour day due to an increase in the amount of time spent on housework, managing personal and professional obligations, and disrupted sleep patterns/quality during the COVID-19 lockdown.

Finally, the majority of the poll participants had advanced degrees and higher-than-average household incomes. Working women who live in lower-income homes may not be covered by the findings. Future studies on the effect of COVID-19 on women's behaviour will benefit from data gathered from a more varied sample and from lower-income families.

Conclusion

We still have a lot to learn about the long-term effects of the COVID-19 pandemic on the mental health of working women, particularly when it comes to identifying the protective variables present in females who may have been less impacted by the pandemic. There are still many unsolved problems, such as whether aspects of living conditions influence women's ability to adapt to serious public health emergencies like the COVID-19 epidemic.

Declaration of Ethical clearance- Taken from ethical committee of institute. All participants' written informed consent were obtained.

Source of funding: Self.

Conflict of Interest: None declared.

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Knowledge, Acceptability and Misconceptions Regarding Menstrual Cup among College Students of Kerala: A Cross-Sectional Study

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Abstract

Background: Menstrual cup is a good, safe, hygienic, eco-friendly and economical option for menstrual management than other menstrual products. The present study aims to find knowledge, acceptability, and misconceptions of menstrual cup among female college students in Kerala.

Materials and methods: A cross-sectional study was conducted among 187 participants studying in Engineering or Arts College of Ernakulam district using consecutive sampling technique. A semi-structured expert validated questionnaire containing socio-demographic details and questions regarding awareness, acceptability and misconceptions of menstrual cup was used. Data was analysed using SPSS software.

Results: Mean age of the participants was 20.49 ± 2.07 years. 40(21.3%) were aware of hand hygiene before insertion, 43(24.6%) knew average emptying time, 117(62.6%) sterilisation method, and 60(32.1%) knew regarding storage of cup. But only 2[1.07% (95% CI= 0.00 - 2.5)] participants were using menstrual cup regularly. The main misconceptions regarding menstrual cup were, the insertion of device is painful [107(57.2%)], and someone with heavy menstrual flow cannot use the cup [48(25.7%)].

Conclusion:

Knowledge and acceptability regarding use of menstrual cup were poor. Many misconceptions were still prevailing among the potential users. Proper awareness and health education should be implemented to increase its acceptability and to correct the prevailing misconceptions.

Key words: Acceptability, Awareness, College students, Knowledge, Menstrual cup, Misconceptions

Introduction

Menstrual cup was first invented by an American actress, Leona Chalmers, who patented the cup in

1937.¹ It is a device that is inserted into the vagina during menstruation. It acts by collecting menstrual fluid. They are usually made of flexible medical grade silicon or rubber and shaped like a bell with

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a stem. The cup has to be removed, emptied, rinsed and reinserted depending on the amount of the flow (usually every 6-12 hours).²

India is considered as the second most populous country. According to Sample Registration System 2018, among the total number of Indian women 67.5% belong to the reproductive age group.³ According to state of India's environment 2019 survey the menstrual hygiene alliance of India (MHAI), has approximated that there were 336 million menstruating women in India of which 64.4% of women aged 15-24 use sanitary napkins, 49.6% use cloth, 15% use locally prepared napkins and only 0.3% use menstrual cups.⁴ Menstrual cups are more advantageous than other menstrual products in many aspects. As it is manufactured using health-grade, non-toxic, non-allergic silicon side effects are minimal. Some people find menstrual cups more comfortable than tampons that cause vaginal dryness.⁵

Menstrual hygiene problems can be challenging in a resource poor setting. The use of unhygienic clothes and insanitary use of sanitary pads/tampons can lead to various health problems such as reproductive tract infections and toxic shock syndrome which can even lead to death. Over the years the use of clothes has been replaced by use of sanitary pads. But it still can cause restriction in movements, skin irritation, concerns regarding bad odour, leaking and even urogenital infections. In addition, more than 12 billion used pads are dumped in India every year causing huge environmental issues.⁶⁻⁸ On a long run tampon and sanitary pads are not economically viable and is not environment friendly. Menstrual cup is a good, safe and economical option for menstrual management that has been used globally.⁶ But the awareness and acceptability of menstrual cup is very less. This could be due to lots of misconceptions in the society, which has not yet being explored. There are very few studies regarding menstrual cup in Kerala, a state which is known for its good health indicators. So, good quality studies in this field are needed, hence this study is aimed to find out the knowledge, acceptance and misconceptions regarding menstrual cup in central Kerala.

Materials and methods

Study setting:

An Institution based Cross sectional study was conducted in Sree Narayana Engineering and Arts College, in Paravoor taluk of Ernakulam district

Study population

Inclusion criteria: Females students of age group 18-40 years of age studying in the selected colleges, and had given consent to participant in the study.

Exclusion criteria: those who are having severe physical or mental illness

Sample size

According to a study by Siji C in a selected school in Thrissur, knowledge about menstrual cup was present in 96% of students.⁹ Sample size was calculated using the formula Z^2pq/d^2 at 5% significance level and an allowable error of 3% and was found to be 164. By considering 2% non-response, the final sample size is approximated to 196.

Sampling Method: Consecutive sampling

Study duration: 2 month (September to October 2022)

Study tool and Data Collection:

Study tool used for data collection was a semi-structured expert validated questionnaire containing socio-demographic details and questions regarding awareness acceptability and misconceptions regarding menstrual cup.

The questionnaire was administered to female students of the selected institution after taking written informed consent.

Statistical Analysis

Collected data was entered in Microsoft Excel and was analyzed using SPSS version 20 software. Descriptive statistics was expressed in percentage and frequencies.

Ethical Consideration

Informed consent was obtained from the study subject prior to data collection. Before analysis, data collected were anonymized to protect the privacy of participants. The study adhered to the terms of the Declaration of Helsinki for the research in humans.

Results

A total of 196 study participants were approached, out of which 187 responded (response rate was 95.41%). Mean age of the study participants is 20.49 +/- 2.075 years and 71 (37.96%) were undergraduate students and 116 (62.04%) were postgraduate students. Out of 187 participants, 182 (97.3%) were unmarried and only five (2.7%) were married. Among the five who were married three of them had children. 94 (50.3%) participants were from urban area and rest 93 (49.7%) were from rural area. 128 (68.4%) study participants belong to APL category and the remaining 59 (31.69%) belong to BPL category. It was observed that 10(5.38%) of participants had co-morbidities, of which three had

asthma, three had migraine, two had PCOD, and two had thyroid disorders. Remaining 177(94.6%) had no co-morbidities.

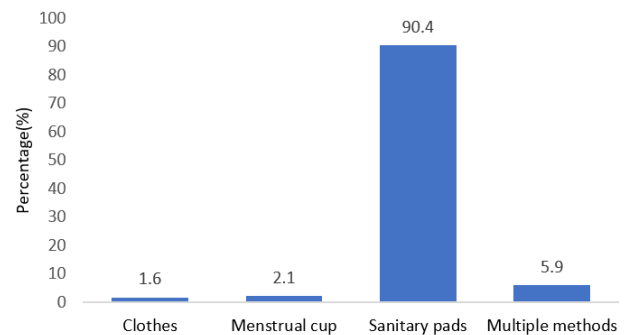


Figure 1: Distribution of study participants based on present method of menstrual sanitation (n=187)

Among the participants, majority were using sanitary pads (Figure 1). Monthly expenditure for buying menstrual hygiene products by participants ranged from zero to Rs 500. The mean monthly expenditure for buying menstrual products was Rs 91.9 ± 96.8.

Table 1: Knowledge regarding menstrual cup among the study participants

Sl No	Knowledge regarding menstrual cup	Number (n=187)	Percentage (%)
1	Ever heard of menstrual cup	180	96.3%
2	Menstrual cup is made of		
	Silicone	88	47.2%
	Latex/ Plastic/ Natural gum rubber	5	2.6%
	Don't know	94	50.2%
3	Aware that cup comes in various sizes	136	72.8%
4	Precautions before inserting a menstrual cup		
	Yes (hand washing)	40	21.3%
	No	147	78.7%
5	Mechanism of action of the cup		
	Absorption	3	1.6%
	Collection	116	63.1%
	Don't know	66	35.3%

Continue.....

SI No	Knowledge regarding menstrual cup	Number (n=187)	Percentage (%)
6	Average emptying time of menstrual cup for a person with normal menstrual flow		
	1-2 hrs	1	0.5%
	3-6 hours	46	24.6%
	7-12 hrs	43	23.5%
	More than 12 hours	5	2.7%
	Don't know	92	48.7%
7	Cleaning of the menstrual cup at the end of the menstrual period		
	Boiling water	117	62.6%
	Running water	1	0.5%
	Warm water	4	2.1
	Don't know	65	34.8%
8	Aware that menstrual cup can be reused	148	81.4%
9	Usability of menstrual cup while swimming		
	Yes	78	41.7%
	No	4	2.1%
	Don't know	105	56.2%
10	Storage of menstrual cups after your periods		
	Airtight container	20	10.7%
	Cotton pouch	60	32.1%
	Don't know	107	57.2%

From the table 1, it is evident that majority (96.3%) of students had heard of menstrual cups. But the detailed knowledge regarding menstrual cups was poor. More than two third of the participants do not know the average emptying time of the menstrual cup for a person with normal menstrual flow(10-12 hours) and the correct storage method (cotton pouch). More than one third do not know about the method of cleaning (boiled water) of the menstrual cup.

Among the study participants 125 (67.4%) didn't received any health education regarding menstrual cup. Among those who were informed/educated 61(32.6%) received health education from the health department. Majority got information about menstrual cup from social media (Figure 2).

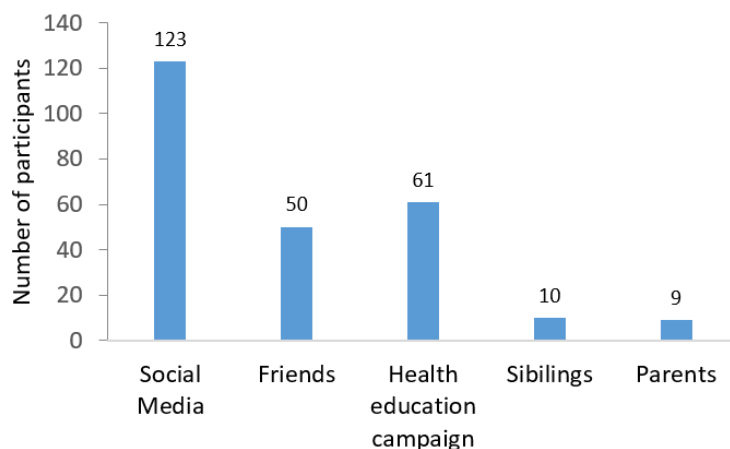


Figure 2: Distribution of study participants according to the sources of knowledge about menstrual cup (Multiple responses)

Table 2: Acceptability of menstrual cup among the study participants

SI No	Acceptability of menstrual cup	Number (n=187)	Percentage (%)
1	Have you ever used menstrual cup?		
	Yes, Regularly for more than one year	2	1.07
	Yes, occasionally	9	4.81
	Never	176	94.12
2	Are you willing to use menstrual cup in future?		
	Yes, currently using(regularly/occasionally)	11	5.6
	Yes, after marriage	31	16.4
	No	146	78

Table 2 shows the acceptability of menstrual cup among the study participants. 2[1.07% (95% CI= 0.00 - 2.5)] study participants were using menstrual cup. More than three fourth of the participants were not

willing to use menstrual cups in future. Reasons for not being willing to use menstrual cup in future is given in Table 3.

Table 3: Distribution of study participants according to the reasons for not willing to use menstrual cup

Reasons for not willing to use menstrual cup	Number (n=146)	Percentage (%)
Fear of using	45	30.8
Satisfied with current method	26	17.8
Don't know how to use	24	16.4
Not available	16	11
Conventional believes	14	9.6
Not interested	11	7.6
May be uncomfortable	10	6.8

Among the misconceptions regarding the usage of menstrual cup, more than 50% of them believed that the insertion of the device is painful (Table 4).

About 25 % of them said that someone with heavy menstrual flow cannot use the cup.

Table 4: Misconceptions among study participants

SI No	Misconceptions regarding menstrual cup	Number [n (%)]
1	Insertion of menstrual cups is painful	107(57.2%)
2	Someone with heavy menstrual flow cannot use a menstrual cup	48(25.7%)
3	There is a need of backup protection while using menstrual cups	38(20.3%)
4	Long term use of menstrual cups can cause reproductive tract infections	25(13.4%)
5	Usage of menstrual cups can cause Urinary infection	22(11.8%)
6	Menstrual cups can get lost in the vagina	21(11.2%)
7	Using menstrual cup cause loss of virginity	14(7.5%)
8	The size of menstrual cup may not suit all	13(7%)
9	Usage of menstrual cups can cause irregular menstrual cycles	12(6.4%)
10	Menstrual cups can be used as a method of contraception	7(3.7%)
11	Usage of menstrual cups can cause infertility	3 (1.6%)

Discussion

Menstrual cup is a device that is inserted into the vagina during menstruation. It acts by collecting menstrual fluid. They are usually made of flexible medical grade silicon or rubber and shaped like a bell with a stem. The stem helps for easy insertion and removal. The bell shape of the cup helps it to get sealed against the vaginal walls below the cervix. The cup has to be removed, emptied, rinsed and reinserted depending on the amount of the flow (usually every 6-12 hours).¹

The present study made an attempt to find out the knowledge, acceptability and misconceptions regarding menstrual cup in Central Kerala. The mean age of the study participants in the present study was comparatively lower than most of the studies where the age group of 20-50 years.^{1,6} This was because in this study, participants were college students pursuing undergraduate and post-graduate courses in different streams.

In the present study, majority of the participants had heard of menstrual cup and this was higher than studies done by Deepa et al, Meghana et al, and Ballal et al.^{10,11,12} This might be due to a recent awareness campaign (Cup of life) on menstrual cup that was conducted in all colleges of Ernakulam district.

The study conducted by Meghana S et.al found

similar results, where only 44% were aware that menstrual cups are made of silicone. In the present study, the awareness regarding the method of cleaning of menstrual cup was much better (62.6%) in contrast to just 7.5% in the study conducted by Meghana S et al. Less than one fourth of the individuals who had participated in the present study knew the correct emptying time of the cup; but in the above-mentioned study 35.8% were aware of it.¹²

In another study conducted by Ballal et al among women in the reproductive age group in Karnataka, they found that a total of 82% participants were aware of the menstrual cup but only 2.6% have used it.¹⁰ In the present study usage was even lesser and majority were not willing to use in future. The reasons were fear of using menstrual cup, satisfied with current method, lack of knowledge, conventional beliefs, non availability, not interested and remaining felt it would be uncomfortable. A study done in Kerala among menstrual cup users found that majority didn't faced any side effects.^{5,13} They found 0.5% had allergy, 1% rashes, 2.5% faced dryness, and 2% suffered from infection. They also noted that, 46.9% felt uncomfortable during their first use of menstrual cup and in subsequent use, only 1.9% felt it to be uncomfortable.⁵ Kuhlmann et al also found that, the difficulties in usage of menstrual cup while inserting, removal, and leakage are usually seen during the first

time of use only. These difficulties had decreased gradually on subsequent use.^{5,14} Hence there were only minimal problems associated with usage of menstrual cup.

Shetty et al had done a study on myths and misconceptions of adapting menstrual cup in adolescent girls and young females of Mangalore. They found that more than half of the respondents feared the process of insertion. The present study also had similar findings. Around 10% of respondents of Shetty et al study feared that insertion can cause unknown infections which were similar to the present study. Other myths and misconceptions, in Shetty et al study were regarding religious beliefs, lack of awareness of product cost, and family reluctance on experiment of this new invention.¹⁵ In contrast, in our study we have found other misconceptions like the usage can cause loss of virginity, infertility and it can act as a contraceptive method. A newspaper article published by Times Of India (dated March 28th 2022) breaks some of the myths around menstrual cup like the menstrual cup can affect virginity, one size fits all, can't micturate while using a cup, cup can get lost in vagina ,cannot sleep with a cup .¹⁶

There was only one study regarding the myths in usage of menstrual cups in the literature. This study had not addressed many of the common myths. The present study seems to be a step towards exploring the reasons for decreased acceptability, the misinformation and misconceptions related to the use of menstrual cups. This should be addressed with scientific reasons so that young girls and women adopt this method without any apprehension and hesitation. The information regarding different menstrual sanitation methods, including menstrual cup could be included in the curriculum of students from the school level onwards.

The study had a limitation that it was done in a single locality. If the sample was collected from multiple colleges more extrapolatable results might have been obtained. Qualitative studies can be done to explore more about misconceptions in the future.

Conclusion

Most of the college students had heard of menstrual cup but the detailed knowledge regarding

the various aspect of use of menstrual cups was inadequate. Acceptability of menstrual cup was very low. Majority of them were not willing to use it in future. Many misconceptions regarding its use are still prevailing among potential users. Many students still have the false notion that it's insertion is painful, it causes leakage, need a backup protection for use etc. Proper awareness and health education should be implemented to increase its acceptability and to correct the prevailing misconceptions from the society. By increasing its acceptability, it can be more advantageous to women as they are more cost effective and reusable.

Source of funding: Self

Conflict of Interest: Nil

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Correlation of Menstrual Abnormalities with Endometrial Histopathology: A Review

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Abstract

Background: AUB (Abnormal uterine bleeding) is defined as excessive menstrual blood loss which interferes with women's physical, social, emotional and maternal quality of life. Any uterine bleeding outside the normal volume, duration, regularity or frequency is considered abnormal uterine bleeding (AUB).

Objective: To study the various types of menstrual abnormalities prevalent in women and to correlate it with different histopathology features in endometrial curettage.

Study Design: The study design was prospective observational study with study population being abnormal uterine bleeding newly registered at the opd/ ipd of Saraswathi Institute Of Medical Sciences, Hapur Uttar Pradesh. A sample size of 136 patients were included during study periods from august 2020 to march 2021.

Result: Most common endometrial lesion was endometrial hyperplasia (38.2%), followed by proliferative change (35.29%), others were polyp, fibroid, atrophic endometrium. Endometrial carcinoma was detected in 0.78% of cases.

Hyperplasia when further categorised, showed simple hyperplasia as the dominant sub-type. Hyperplasia was the dominant change observed in menorrhagia, polymenorrhoea, metrorrhagia, and postmenopausal bleeding.

Conclusion: Most common cause of AUB was hormonal imbalance around perimenopausal age group. In elderly age hyperplasia and malignancy was more commonly seen.

Key Words: Histopathology, hysterectomy, menorrhagia.

Introduction

AUB (Abnormal uterine bleeding) is defined

as excessive menstrual blood loss which interferes with women's physical, social, emotional and maternal

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quality of life. Any uterine bleeding outside the normal volume, duration, regularity or frequency is considered abnormal uterine bleeding (AUB).⁽¹⁾The acronym PALM-COEIN subdivides all the causes of AUB into nine main categories. The first few causes under the group PALM (P-Endometrial Polyps,A-Adenomyosis,L-Leiomyoma,M-Malignancy) are structural or histologic causes.⁽²⁾ The second group of causes, under "COEIN" (C-Coagulopathy, O-Ovulatory dysfunction, I- Iatrogenic, E- Endometrial, N-Not otherwise specified). Perimenopause also called the menopausal transition is the interval in which a woman's body makes a natural shift from more-or-less regular cycles of ovulation and menstruation towards permanent infertility, or menopause.⁽³⁻⁴⁾ This phase generally occurs at around 40-50 years of age. Abnormal uterine bleeding is a commonly encountered gynaecological problem in this age group. AUB is a significant cause of hysterectomy therefore it is a major health problem.⁽⁵⁾ Our study aimed to study the various types of menstrual abnormalities prevalence in women and to correlate it with different histopathology features in endometrial curettage.

Material and methods

This study was conducted on all patients with diagnosis of abnormal uterine bleeding, attending Saraswathi Institute Of Medical Sciences , NH-24, Hapur, Uttar Pradesh . The study design was prospective observational study with study population being abnormal uterine bleeding newly registered at the Opd/IpD of Saraswathi Institute Of Medical Sciences, Hapur Uttar Pradesh. The sample size of 136 patients were included during the study periods from august 2020 to march 2021.

Inclusion Criteria:

- All cases of AUB including postmenopausal bleeding in the age group of 21 to 50 years.

Exclusion Criteria:

- Women more than 50 years of age were not included.

- Bleeding due to cause other than endometrial in origin.

Methodology

- Sample received were examined grossly and then kept in 10% formalin for sufficient time for fixation before tissue processing. Blocks were prepared from processed tissue and raw slides were prepared. The raw slides were stained by routine hematoxylin and eosin stain. No special stains were used.

Results

All cases of AUB including in the age group 21 to 50 years were included. Most common age group presenting with AUB was perimenopausal 41-50 years.

Menorrhagia was the commonest clinical condition. Pathology was diagnosed in 41% of endometrial biopsies.

Most common endometrial lesion was endometrial hyperplasia(38.2%), followed by proliferative change (35.29%), others polyp, fibroid, atrophic endometrium.

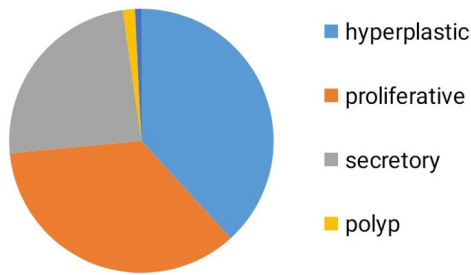
Endometrial carcinoma was detected in 0.78% of cases.

Hyperplasia when further categorised, showed simple hyperplasia as the dominant sub-type. Hyperplasia was the dominant change observed in menorrhagia, polymenorrhoea, metrorrhagia, and postmenopausal bleeding.

AUB was more common in multiparous women.

Ca endometrium diagnosed in women presenting with postmenopausal bleeding.

In the perimenopausal cycles, there was unopposed estrogen stimulation which leads to hyperplasia of the endometrium which can progress to endometrial cancer.



Different Endometrial Pattern

ENDOMETRIAL PATTERN	TOTAL	PERCENTAGE
PROLIFERATIVE	48	35.29%
SECRETORY	33	24.26%
HYPERPLASIA	52	38.2%
POLYP	2	1.47%
CA ENDOMETRIAL	1	0.78%

Incidence of different symptoms

Symptom	Percentage (%)
Menorrhagia	52.16%
Metrorrhagia	18.25%
Polymenorrhoea	15.49%
Polymenorrhagia	4.79%
Continuous bleeding p/v	7.91%
Post menopausal bleeding	1.40%

Discussion

Abnormal uterine bleeding is one of the commonest gynaecological complaints presenting in a wide age range, from perimenarchal age group to postmenopausal age group. It occurs in maximum frequency in the extreme periods of reproductive life, during menarche and menopause. It is at these times that an-ovulatory cycles was most often seen.

The age distribution of AUB in our study revealed that 42.85 % of cases belonged to the 5th decade (41-50 years). The reason for the increased incidence of abnormal uterine bleeding in this age group (41- 50 years) may be due to the fact that these patients were in their climacteric period. Similarly, the study conducted by Abdulla et al. 2011 showed 33.1% cases of AUB in the 5th decade which coincides with the present study⁽⁶⁾.

In the early reproductive life, most cases of abnormal bleeding is due to pregnancy related causes. In peri-menopausal and postmenopausal bleeding hyperplasia as well as malignancy is the leading cause.

In present study most women present with AUB are multiparous (40.39%) that correlates with study of archana bhosalet⁽⁷⁾ 32.41% and fl cornitescu et al.⁽⁸⁾ (41%) . Similarly, Sinha p et al. conducted a prospective study found that the incidence of AUB increased as the parity increased⁽⁹⁾.

In the present study among physiologic patterns, proliferative was the most common followed by secretory i.e (36.1%) and (20.2%) respectively which is similar to Bhatt s et al. (26.23% and 16.39%), Mehnaz roohi et al.(21.74% and 12.42%) and Talat mirza et al⁽¹⁰⁾ (35% and 30%).

While Layla A et al. found secretory pattern more than proliferative (21.7% and 24.7%)⁽¹¹⁾ .

In our study, patients presented with different types of AUB; the commonest presenting feature was menorrhagia (52.16 %). Nayak et al. 1996⁽¹²⁾ found menorrhagia in 49.1% of cases similar to our study. This study focuses to categorize the patient of AUB as per the PALM- COEIN classification.

In perimenopausal age group in present study most common presenting complain is also menorrhagia that correlates with studies of Wahda M et al.⁽¹³⁾(34%). Most common is simple hyperplasia followed by complex without atypia that correlate with Lalya s et al . Incidence of hyperplasia in present study is high in age group 41-50 yrs 38.2% of all patients having hyperplasia that correlate with layla s et al. 45.19% , baral r et al. 67.27% and mohhamed s et al.64.06% studies.⁽¹¹⁾

Conclusion

The dilatation and curettage was found to be an appropriate approach with a good diagnostic yield. Most common cause of AUB is hormonal imbalance around perimenopausal age group. In elderly age hyperplasia and malignancy is more commonly seen. Therefore patients with hyperplastic endometrium, a histopathological study of the endometrium is

warranted to rule out atypical changes or endometrial malignancy.

INFORMED CONSENT: written informed consent was taken from patients.

ETHICAL APPROVAL: ethical committee approval was taken from the AIMSR institutional committee of ethics.

SOURCE OF FUNDING- No funding

CONFLICT OF INTEREST - No conflict of interest

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Intimate Partner Violence and use of Family Planning Methods in India: Results from National Family Health Survey- 5

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Abstract

Background: Intimate partner violence (IPV) has several impacts on women's mental, sexual, and reproductive health. It is likely that women experiencing IPV use more contraception to avert pregnancy under unfavourable conditions or vice-versa. Present study evaluated the association between IPV and use of family planning methods among married women in India.

Methods: This study is based on the secondary data derived from the National Family Health survey-5 (NFHS- 5, 2019-21). A total of 53,151 married women aged 15- 49 years selected for domestic violence survey were included in the study. Data was analysed using statistical software SPSS version 28.0. Complex sample logistic regression was used to see the effect of intimate partner violence (IPV) on use of family planning methods.

Results: Results indicated that 26.2% of the women suffered from one or other form of IPV in past one year. Female methods (52.9%) were found to be most commonly used methods of family planning. Women suffered less severe physical violence by intimate partner were 1.2 times more likely to adopt family planning methods. Severe physical violence, sexual violence and emotional violence were not found to be associated with use of family planning methods.

Conclusion: Women who experienced less severe physical violence were more likely to adopt family planning methods. Intervention efforts should focus on screening for IPV, improving access to assistance for women who have experienced spousal violence, and providing greater accessibility to female-controlled contraception.

Keywords: NFHS-5, Intimate partner violence, family planning methods

Introduction

Violence against women is increasingly recognized as a significant public health and human

rights concern¹. Intimate partner violence(IPV) is one of the most common forms of violence against women that includes physical, sexual, and emotional

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abuse and controlling behaviours by an intimate partner. Violence against women has several impacts on women's mental, sexual, and reproductive health². According to **National Family Health Survey (NFHS-4)**, 23% of ever-married Indian women reported past-year physical IPV, while 5% of ever-married women nationwide reported past-year sexual IPV³. IPV affects women's reproductive health both directly, through injury and constrained access to healthcare and nutrition and indirectly through stress and trauma⁴. It is likely that women experiencing IPV use and seek less contraception out of fear of additional violence from their partners. On the other hand, women who experienced IPV may be more willing to use contraception to avoid pregnancy and born a child into abusive marriages or relationships.

In the low-and-middle income-countries, which account for almost all maternal and infant mortalities in the world,⁵ optimum utilization of family planning services is regarded as a pivotal strategy for attaining the sustainable development goals 3 and 5. IPV itself is an independent risk factor for unintended pregnancy globally⁶ and around half (48%) of the pregnancies are reported to be unintended in India⁷.

Various studies have explored the possible impact of IPV on contraceptive use among the sufferers. In the Indian context, IPV has been found to be associated with decreased likelihood of modern contraceptive use^{8,9}. However, studies conducted in other settings have found that IPV and contraceptive use are positively associated¹⁰. Purpose of this study is to evaluate the association between IPV and use of planning methods among married women aged 18-49 years old in India using the secondary data from the National Family Health Survey (NFHS-5, 2019-21).

Materials and Methods

Sources of data

Present study is based on the secondary data derived from National Family Health Survey (NFHS-5, 2019-2021) conducted in India. NFHS- 5 was conducted in 2019-21 in total 36 states and Union territories.

Study Participants:

A total of 72,320 women (never-married 8,469,

currently in union or married 60,480 and others 3371) aged 15-49 years were interviewed to assess the intimate partner violence during NFHS-5 survey. Women who were currently in union or married were included in the present study. Women who were pregnant and whose uterus had been removed were excluded. After applying national domestic sample weight and inclusion-exclusion criteria final sample size reduced to 53,151.

Dependent Variables:

Family planning method currently adopted by study participant was taken as dependent variable. It was categorized into two categories; a) Not using any method and, b) using any method either traditional or modern.

Traditional family planning methods: Standard Days methods, Lactational Amenorrhea Method, Rhythm Method, Withdrawal and other traditional methods

Modern family planning methods: Modern female Methods (Female sterilization, IUD, Pills, Female condoms, Injectables, implants, Emergency contraceptive and other female methods) and Modern male methods (Condoms, Male sterilization, other male methods)

Independent Variables

Intimate partner violence, Socio- economic and socio- demographic variables were taken as independent variables. Intimate partner violence was categorised as less severe physical violence, severe physical violence, sexual violence, and emotional violence. In NFHS-5 survey, following questions were asked to measure the different forms of intimate partner violence experienced by the respondent in past 12 months:

Less severe physical violence: (i) Pushed, Shaked or thrown something at respondent by Husband (ii) arm being twisted or hair being pulled (iii) Slapped (iv) Punched with fist or with something that could hurt.

Severe physical violence: (i) Kicked, dragged or beaten up (ii) Tried to choke or burn on purpose (iii) Threatened or attacked with a knife, gun, or any other weapon.

Sexual violence: (i) Physically forced to have sexual intercourse with even when she did not want to (ii) Physically forced to perform any other sexual acts she did not want to (iii) Forced with threats or in any other way to perform sexual acts she did not want to,

Emotional violence:(i) Said or did something to humiliate in front of others (ii) Threatened to hurt or harm her or someone close to her (iii) Insulted or made to feel bad about herself.

Data Analysis:

Data was analysed using statistical software SPSS version 28.0. Frequencies and percentages were computed to summarize qualitative data. Weighted counts were computed in order to take into account for the national domestic weights. In order to account

for the complex survey design during analysis, complex sample logistic regression was used to see the effect of domestic violence (IPV) on use of family planning methods. The results of regression analysis were presented as Adjusted odds ratios(AORs) along with their 95% CIs as an indicator of significance as well as the precision of the AOR values. All tests of hypothesis were 2-tailed, with a type -1 error fixed at 5%.

Results

After applying inclusion and exclusion criteria, total sample size was 53,151 married women aged 15-49 years. The details of Socio-demographic and socio-economic characteristics of the respondents is described in table 1.

Table 1: Distribution of Socio-demographic and socio-economic characteristics of respondents

Variables		Count (weighted)	Percentage
Respondent Age (in years)	15-24	7754	14.6%
	25-34	19506	36.7%
	35-49	25891	48.7%
Place of residence	Urban	16484	31.0%
	Rural	36667	69.0%
Religion	Hindu	41967	79.0%
	Muslim	8571	16.1%
	Christian	1355	2.5%
	Sikh	446	0.8%
	Others	812	1.5%
Wealth index	Poorest	10229	19.2%
	Poorer	11080	20.8%
	Middle	11199	21.1%
	Richer	10946	20.6%
	Richest	9697	18.2%
Respondent educational level	No education	14324	26.9
	Primary	7347	13.8
	Secondary	25301	47.6
	Higher	6179	11.6
Respondent's Type of earning	Not Paid	37732	71.0%
	Paid	15419	29.0%
Husband's education	No education	9526	17.9%
	Primary	8082	15.2%
	Secondary	27735	52.2%
	Higher	7808	14.7%

Variables		Count (weighted)	Percentage
Husband Working Status	Not working	6883	12.9%
	Working	46268	87.1%
Respondent earning more than husband	Not Earning/earning less	46980	88.4%
	Earning same or more	6171	11.6%
Living children	No child	3745	7.0%
	One son only	5554	10.4%
	Two sons only	5629	10.6%
	One daughter only	4669	8.8
	Two daughters only	3243	6.1
	One son and 1 daughter	11816	22.2
	More than 2 children	18495	34.8

Majority of the women (72.5%) were using family planning methods either traditional or modern while 27.5% women were still not using any family planning method (Figure 1). Analysis of NFHS-5 data

showed that 26.2% of the women experienced one or other form of violence during last twelve months. (Figure 2)

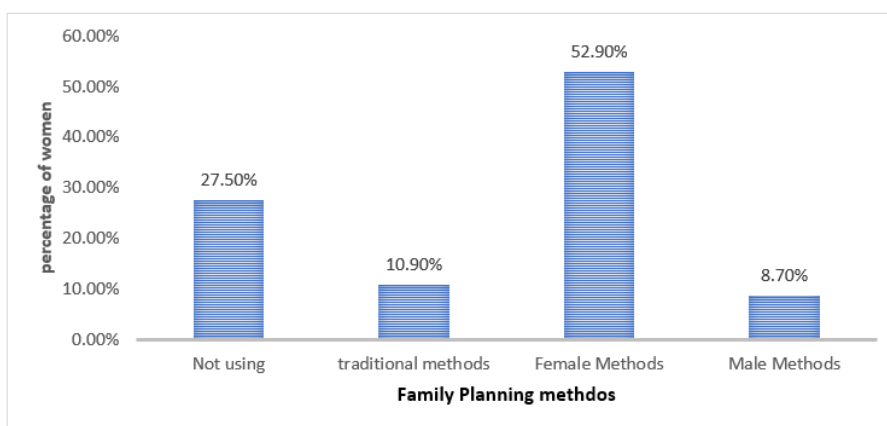


Figure 1. Distribution of Family Planning Methods

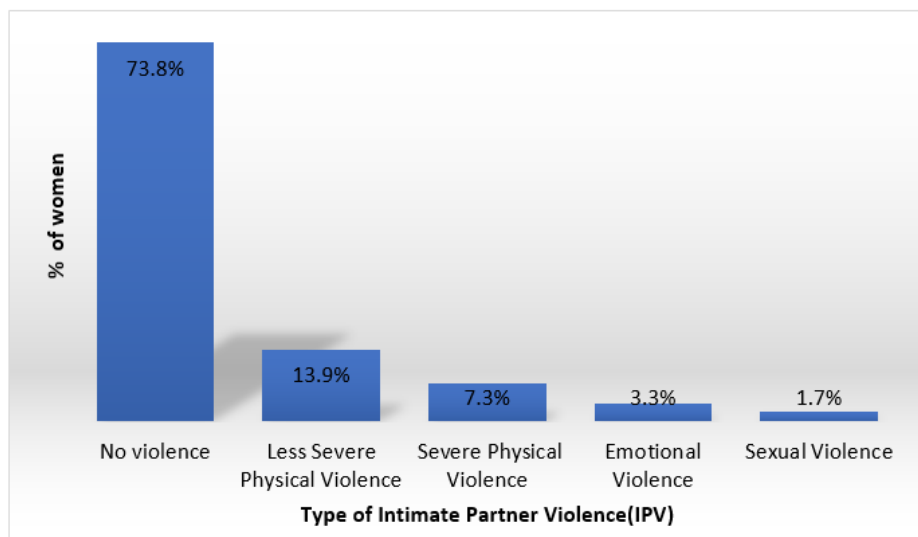


Figure 2: Prevalence of various types of Intimate Partner Violence among study respondents

Table 2 summarizes the logistic regression on the association between intimate partner violence and use of family planning methods taking into consideration the confounding socio- demographic and socio-economic variables. Odds of using family planning methods were found to be 1.25 ($p < .001$) more in women suffered from less severe physical violence than the women who did not suffer from the violence. On the other hand, severe physical violence, sexual violence and emotional violence were not found to be significantly associated with the use of family planning methods.

It was observed that odds of using family planning methods increased in married women with increase in age and wealth index. As compared to the women aged 15-24 years, women aged 25-34 years and women aged 35 years were 1.7 times ($p < .001$) and 2.1 times ($p < .001$) more likely to

use family planning methods respectively. Use of family planning methods was found to be 1.6 times ($p < .001$) more in respondents having richest wealth index as compared to women belonged to poorest wealth index. Women belong to other religion (Jain, Buddhist, Parsi, no religion) were 1.7 times more likely to use family planning methods followed by Hindu (1.4 times) as compared to women belonging to Muslim religion.

It was observed that the women whose husbands working were 1.2 times more likely to use family planning methods than the respondents whose husbands were not working. Odds of using family planning methods is 17 times ($p < .001$) more in women having two sons only and 15 times ($p < .001$) more in women having one son and one daughter than the women who did not have any child respectively.

Table 2: Logistic regression: Association of Intimate Partner Violence with use of Family Planning Methods

Independent variables		Use of Family planning methods [#]		Adjusted Odds Ratio	95% Confidence Interval		P value
		No(%)	Yes (%)		Lower	upper	
Less Severe Physical violence in past 12 months	No	28.7	71.3	1.000			Ref
	Yes	23.3	76.7	1.249	1.115	1.400	<.001**
Severe physical violence in past 12 months	No	27.7	72.3	1.000			Ref
	Yes	24.2	75.8	.880	.750	1.032	.128
Emotional violence in past 12 months	No	27.9	72.1	1.000			Ref.
	Yes	24.0	76.0	1.066	.937	1.213	.326
Sexual violence in past 12 months	No	27.6	72.4	1.000			Ref.
	Yes	25.4	74.6	1.079	.815	1.428	.597
Respondent age (in Years)	15-24	50.7	49.3	1.000			Ref
	25-34	27.1	72.9	1.734	1.535	1.958	<.001**
	35-49	20.8	79.2	2.086	1.840	2.364	<.001**
Place of residence	Rural	28.7	71.3	1.000			Ref.
	Urban	24.9	75.1	1.104	.996	1.224	.059
Religion	Muslim	32.4	67.6	1.000			Ref.
	Hindu	26.4	73.6	1.366	1.196	1.559	<.001**
	Christian	32.5	67.5	.918	.737	1.143	.442
	Sikh	23.6	76.4	1.470	.975	2.216	.066
	Others	25.5	74.5	1.705	1.067	2.723	.026*
Wealth Index	Poorest	32.2	67.8	1.000			Ref
	Poorer	28.2	71.8	1.210	1.084	1.351	<.001**
	Middle	27.3	72.7	1.285	1.147	1.441	<.001**
	Richer	25.5	74.5	1.483	1.304	1.686	<.001**
	Richest	24.2	75.8	1.647	1.392	1.948	<.001**

Independent variables		Use of Family planning methods [#]		Adjusted Odds Ratio	95% Confidence Interval		P value
		No(%)	Yes (%)		Lower	upper	
Respondent educational level	No education	25.8	74.2	1.097	.927	1.298	.281
	Primary	23.9	76.1	1.243	1.050	1.470	.011*
	Secondary	28.1	71.9	1.179	1.020	1.363	.026*
	Higher	32.9	67.1	1.000			Ref.
Respondent's type of earning	Not Paid	29.3	70.7	1.262	1.143	1.394	<.001**
	Paid	22.9	77.1	1.000			Ref.
Husband's education	No education	27.9	72.1	1.033	.871	1.224	.709
	Primary	23.6	76.4	1.286	1.083	1.527	.004**
	Secondary	27.6	72.4	1.047	.906	1.209	.534
	Higher	30.6	69.4	1.000			Ref.
Husband Working Status	Not working	31.5	68.5	1.218	1.089	1.362	<.001**
	working	26.9	73.1	1.000			Ref.
Respondent earning more than husband	Not Earning/ earning less	28.0	72.0	1.065	.919	1.234	.403
	Earning same or more	23.9	76.1	1.000			Ref.
Number of Living children	No child	78.9	21.1	1.000			Ref.
	One son only	38.9	61.1	5.576	4.639	6.704	<.001**
	Two sons only	16.2	83.8	16.909	13.903	20.565	<.001**
	One daughter only	44.3	55.7	4.425	3.596	5.445	<.001**
	Two daughters only	25.6	74.4	9.611	7.831	11.796	<.001**
	One son and 1 daughter	17.6	82.4	15.207	12.640	18.296	<.001**
	More than 2 children	19.5	80.5	14.753	12.465	17.462	<.001**

Family planning method used is dependent Variable: reference category = Not using any method; *Significant;

**Highly Significant

Discussion

The analysis of nationally representative survey

NFHS 5(2019-21) data revealed that among women chosen for domestic violence survey, still 27.5% of

women were not using any type of family planning method which is a huge number in absolute term. The main responsibility of family planning is on the females which is also evident from our study results as the female methods were found to be the most commonly used methods for family planning (52.9%). Use of male methods of family planning was far less prevalent as only 8.7% males were using modern contraceptive methods. Similar findings were also reported by study done by Ross, J., and Hardee K¹¹.

Use of family planning methods found to be two times higher among women aged 35–49 years than those aged 15–24 years probably because these couples would have completed their family and these results are similar to other studies^{12,13,14}.

Usage of family planning methods was significantly 1.4 times higher among women belongs to Hindu religion as compared to Muslim women. This result is consistent with the similar study done by Osborn JA et al¹⁵. Lower usage of family planning methods among the Muslim could be due to religious and cultural beliefs on family planning. Hence, religion still plays a predictor role on deciding the adoption of family planning methods.

In our study, contraceptive use was significantly higher among women who were earning as they are more likely to be educated and their socioeconomic status is supposed to be better than the non-earning women. This finding was similar to study done by Mukherjee et al¹⁶.

Present study found that with increase in wealth index, usage of family planning methods increased. This may be due to the fact that the higher socioeconomic status individuals have better accessibility and availability of contraception and they have better awareness regarding family planning methods. Similar results were found by Singh and Shukla¹⁷.

Number of living children had a significant impact on contraceptive usage. Women who had two more than two children were using contraception higher than the women having no child. This may be due to the fact that many couples decided to complete their family with two children and also female sterilization (after institutional deliveries) was

emphasized for women after they bear two children. Similar results were reported in the study done by Gothwal M, et al¹⁸.

Present study shows that a total of 26.2% of women had experienced one or other form of intimate partner violence in last 12 months. Physical violence (21.2%) was the most common form of IPV experienced by the respondents. And this finding is consistent with the study done by Garg P et al¹⁹. In India, prevalence of violence against women may be due to different reasons like acceptability of violence in the society, patriarchy society, women being financial dependent on male partners and unawareness of women regarding laws²⁰.

Our analysis revealed that intimate partner violence affects the contraceptive behaviour of the women. Women experienced less severe physical violence were more likely to use any method for family planning. Similar results were reported by other studies viz Fanslow J. et al¹⁰, Alio A et al²¹ and Dalal K et al²². Reason for this could be that increased availability of family planning services increases the options for these battered women to seek outside help and empowerment. Another reason could be that women did not want to give birth to child in an abusive relationship.

An important limitation of the present study was the inability to establish a temporal relationship between intimate partner violence and use of family planning methods because of the cross-sectional nature of the data rather they provide an indication of the associations between contraception and IPV. Another potential limitation of this study is the possible underreporting of intimate partner violence due to social stigma or, in the case of contraceptive use, overreporting given the respondent's awareness of the survey being done in the context of a family planning intervention.

Conclusion

The present study contributes to understanding of the impact of domestic violence on the adoption of family planning methods in India. The findings suggest at national level, married women aged 15–49 years who suffered less severe physical violence by intimate partner were significantly more likely

to adopt family planning methods. Women may purposely go out of their way to avoid pregnancies so their children are not born into unsafe home environments. Interventions should be made to prevent violence against women and programs should be implemented to create awareness against gender-based violence and gender equality aimed at preventing violence and promoting family planning programs.

Ethical Approval: This is a secondary analysis of a nationally representative survey dataset NFHS-5 (2019–21) which is freely available in public domain. The ethical approval for the NFHS-5 surveys were obtained from the ethics review board of the International Institute for Population Sciences, Mumbai, India. These surveys were reviewed and approved by the ICF International Review Board.

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Conflict of interest: None

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Prognostic Relevance of Serum Ferritin on Short Term and Long term Outcome In Patients With Acute Myocardial Infarction

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Abstract

Objective-Over the decades coronary artery disease appears to be an emerging cause of mortality and morbidity. Elevated serum ferritin as a risk factor for development of AMI. However its role with regard to outcome and prognosis of AMI still remains a matter of debate. Hence, the present study was aimed to estimate the prognostic relevance of serum ferritin in relation to short term and long term survival outcomes in patients with AMI.

Methods- Out of a total number of 100 patients, with first AMI (50 of STEMI & 50 of NSTEMI diagnosis) admitted within 12 hours of the onset of chest pain to coronary care units at MKCG Medical College & Hospital over a period of 1 year. Serum ferritin was measured using an ELISA assay by a special kit. The patients were divided into three groups according to Serum ferritin level. i.e. (1st tertile: <120 ng/ml, 2nd tertile: 120 to 220 ng/ml and 3rd tertile: >220 ng/ml). Baseline characteristics, LVEjection Fraction, Killip functional class and outcomes were compared among three different groups of serum ferritin.

Results: There was a significant correlation between serum ferritin and LV ejection fraction ($p=0.01$), Killip class ($p=0.03$) and mortality ($p=0.03$). Lower and higher levels of ferritin (1st and 3rd tertiles, ≤ 120 ; >220 ng/ml, respectively) were associated with a higher incidence of HF during hospitalization and death at 1 year.

Conclusion: Raised serum ferritin is associated with worse short term and long term outcome following myocardial infarction.

Key Words: Acute myocardial infarction, Coronary Artery Disease, Prognosis, Serum Ferritin,

Introduction

Acute myocardial infarction (AMI), is currently a

leading cause of mortality and morbidity with high economic costs worldwide.

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Smoking, hypertension, obesity, diabetes and dyslipidemia have been established as useful predictors for AMI. Also emerging risk factors like elevated blood levels of homocysteine, fibrinogen, inflammation and infection, atherogenic lipoprotein, elevated triglyceride, and number of genetic polymorphism are of particular interest. Oxidative free radicals have a role in the development of degenerative diseases including coronary heart disease (CHD)¹. Serum iron is essential for oxygen metabolism, especially in the chain that generates adenosine triphosphate through oxidative respiration in the mitochondria². In myocardial tissue iron is causative of myocardial infarction especially in genetically vulnerable individuals. Excessive iron is converted intracellularly into hemosiderin, ferritin and free iron which in turn promotes free radical induced oxidative damage^{3,4}. Ferritin is the most accurate yardstick of total body iron. The connection between body iron and coronary artery disease was first noted by Jerome Sullivan in 1981. National Health and Nutrition Examination Survey (NHANES III), first time reported a significant positive association in iron storage and heart disease risk between 1988-1994. Since then several studies have been conducted to assess the association of serum ferritin and AMI. Results of some studies have been in favour of ferritin being a risk factor for AMI (Salonen JT et al⁶, Klipstein-Grobusch et al.⁴) while others have not (Ascherio et al.)⁷. The conflicting results could be due to methodological variation in measuring iron stores or study design. Hence, the role of serum iron store (or its surrogate ferritin) in AMI is unclear. However a few literature is available regarding prediction of serum ferritin in outcome of AMI⁸. That's why we have taken up the study to find out both short term and long term outcome of AMI in relation to serum ferritin.

Materials and Method

Study design:

Our study was a hospital based observational prospective study conducted in M.K.C.G. Medical College, Berhampur from June 2019 to June 2020. A total no of 100 patients of acute myocardial infarction (50 STEMI and 50 NSTEMI) were included in the study. STEMI was diagnosed from typical chest pain associated with ST-segment elevation ≥ 0.1 mV in ≥ 2 contiguous precordial leads (for the diagnosis of anterior wall MI) as well as ≥ 0.1 mV in II, III, and a VF leads (for the diagnosis of inferior wall MI) except in V2, V3 where the following cut points apply: ≥ 0.2 mV in men ≥ 40 years, ≥ 0.25 mV in men < 40 years, or ≥ 0.15 mV in women. NSTEMI was diagnosed from typical chest pain with raised troponin I values.

Definitions:

Killip classification of acute myocardial infarction

Class I- No evidence of heart failure

Class II- Findings consistent with mild to moderate heart failure (e.g. S3 gallop, lung rales less than one-half way up the posterior lung fields or jugular venous distension).

Class III- Overt pulmonary edema

Class IV- Cardiogenic shock

Inclusion criteria

Patients having typical chest pain with any two of the following criteria.¹⁴ (1) Chest pain of < 12 hours duration, (2) ST elevation > 1 mm in at least two consecutive leads, (3) increased cardiac markers (creatinine phosphokinase -MB (CPK-MB) two times the upper limit of normal), and (4) presumably new onset bundle-branch block were included for the study

Exclusion criteria

Patients with

- Neoplastic & liver disease
- Primary/ secondary haemochromatosis,
- Alcohol abuse,

- Tuberculosis
- Oral anticoagulant use 4-week prior to study
- Smoking, cardiomyopathy, hemodynamically significant valvular heart disease
- Diabetes & surgery or trauma within the previous month
- ESR > 20 mm/hr, were excluded from the study.

Variables

Hemogram, renal function test, lipid profile, liver function test, ECG, Transthoracic echocardiography. Serum ferritin analysis was done by ELISA kit for all cases.

The normal reference value of serum ferritin was 10-120 ng/ml. Patients were divided into three groups on the basis of serum ferritin (1sttertile:<120 ng/ml, 2nd tertile:120 to 220 ng/ml and 3rdtertile:>220 ng/ml)⁸.

The study protocol was approved by Institutional Ethical Committee, M.K.C.G. Medical College, Berhampur. Informed consent was obtained from each of the individual patient. Study was conducted according to Declaration of Helsinki & its subsequent amendment.

Aim & Objective

To assess the prognostic significance of serum ferritin on short term and long term outcome of AMI.

End point

In-hospital death and 1-year death, in-hospital heart failure (Killip Class ≥ 2) and 1-year follow-up (L.V ejection fraction < 50% and NYHA Class ≥ 2) were the parameters for assessing short term & long term outcomes respectively. Other secondary endpoints were reinfarction and ischemic cerebrovascular accident at 1 year of follow-up. Medical records were reviewed to determine vital status and cause of death. When this information was unavailable in the medical record, we telephoned patients or their families. Information regarding cardiovascular events such as non-fatal AMI, stroke/CVA, and re-hospitalization due to recurrence of AMI was also obtained.

Statistical Analysis

The program IBM SPSS Statistics, version 20 for Windows 10, was used to perform the statistical analysis. Continuous variables were shown as mean \pm standard deviation and compared according to serum ferritin tertiles by ANOVA. Categorical variables were shown as absolute values and/or percentages and compared using the chi-square test. The associations were considered statistically significant in the presence of a p-value < 0.05. The predictive value of ferritin levels over the risk of in-hospital and 1-year adverse events was determined by the odds ratio, with a 95% confidence interval (95%CI) using Kaplan-Meier survival curves analysis.

Result

Out of total of 100 AMI patients studied, maximum no of patients belonged to high ferritin tertile followed by low value of ferritin tertile and minimum no of patients of myocardial infarction belong to medium tertile (Figure 1). On transthoracic echocardiography, there was a statistically significant reduction in LVEF in 2nd & 3rd third tertile of Serum Ferritin (table-1). Killip classification for functional status had no significant association among three values of serum tertiles. (Table-2).

Prognosis & Outcome

In-hospital outcome was compared amongst the three groups for short-term prognosis. Recurrent angina showed a trend towards relation with ferritin (2 in first tertile, 10 in second tertile and 8 in third tertile) but statistically not significant (p=0.09). Heart failure showed a similar pattern (4 in first tertile, 6 in second tertile and 8 in third tertile) but p value of 0.1. Mortality was statistically strongly correlated with ferritin level (1 in first tertile, 2 in second tertile and 5 in third tertile) with a p value of 0.03 (table-3). In our population, regarding ferritin levels, the 2nd and 3rd tertiles were associated with occurrence of more adverse events, with statistical significance in terms of in-hospital HF, recurrent angina and death within 1 year follow up. Table-3 depicts that on short-term prognosis, around 1% (n = 1) of the patients died during hospitalization and 10% (n = 10) showed evidence of heart failure.

Long-term impact, approximately 6% (n = 6) of the patients died in the first year of follow-up at 1 year, out of which maximum belonged to highest tertiles of serum ferritin value (>220ng/ml) i.e. n=4 and 10% (n = 10) developed HF criteria during the clinical follow-up of 1 year out of which maximum belong to high ferritin tertile (n=5) followed by low serum ferritin value (n=4). Regarding the serious outcome in the form of reinfarction and Cerebrovascular Accidents at 1 year follow up, maximum incidence of reinfarction occurred in high serum ferritin tertile (n=10) followed by medium serum ferritin tertile (n=6) which is statistically significant with p value of 0.0138 (<0.05). Similarly occurrence of CVA at 1 year follow up is maximum in high serum ferritin tertile (n=2) with 1 in each low and medium serum ferritin tertile which is statistically not significant. Kaplan-Meier survival curves analysis (Figure 2 & 3) shows adverse events i.e. HF and Death during follow up year. In our population, regarding ferritin levels, the 2nd and 3rd tertiles were associated with the occurrence of more adverse events, with statistical significance in terms of in-hospital HF and 1-year death. (log-rank P<0.0001 and P=0.0002, respectively).

Discussion

Raised ferritin is associated with worse NYHA class and lower ejection fraction. Also, mortality and raised serum ferritin show a statistically significant correlation. Similar findings were found in a study conducted by Tatiana Duarte et al, 2018 who conducted a study taking 280 pts and analysing both short term and long term prognostic outcome of Acute Coronary Syndrome in relation to serum Ferritin level.⁸

Iron is an important element in multiple physiological processes in the body but excess iron is known to accelerate atherosclerosis.⁹ Iron deficiency has been proven to be a frequent finding in heart failure worsening the outcome. Also, its correction leads to reduced morbidity and sense of well being. Hence, parenteral iron is indicated in HF ref patients with iron deficiency (class IIa in ESC guidelines)¹⁰. However, the importance of iron and ferritin in coronary artery disease remains to be elucidated. Serum ferritin (>200 ug/l) has been found to increase the risk of MI by 5 times.

¹¹Serum ferritin levels could be a prime decisive factor of myocardial ischemic burden during periods of ischemia.¹² A raised ferritin level has been found to double the risk of AMI in males.¹³ Dominguez-Rodriguez showed that reduced serum iron and ferritin is associated with adverse outcome in acute coronary syndrome.¹⁴ A study on young patients of CAD revealed that ferritin was an independent discriminating factor for CAD in males with the highest quartile having an odds ratio of 1.62 compared to the lowest quartile.¹⁵ Hoque et al found a significant correlation between serum ferritin and acute coronary syndrome (p<0.001).¹⁶ A recent meta-analysis of 11 studies concluded that serum ferritin in AMI is higher than in controls.¹⁷

On the contrary, Frey concluded that there was no relation between MI and ferritin.¹⁸ Similarly, Sempos et al negated any relation between serum ferritin and cardiovascular disorders or mortality.¹⁹ Ascherio also concluded that serum iron does not increase risk of CAD in men.⁷

The plausible mechanisms of the culpability of serum ferritin are many. There is a significant rise in ferritin concentration of monocytes when exposed to hydrocortisone. Stress which is an established risk factor for AMI could trigger this process.¹⁹ Ferritin could act along with other traditional risk factors by promoting free radical generation which in turn causes LDL oxidation and plaque formation. This could also explain raised CRP levels in AMI.²⁰ A genetic component to causality has also been proposed. For example, persons with wild allele of tag SNP rs9366637 were more likely to suffer from CAD than mutant allele.¹⁵

Tuomainen reported an association between increased body iron stores and excess risk of AMI. The concentration ratio of serum transferrin receptor (TfR) / ferritin was utilized as indicator of body iron stores.²⁵ Salonen, reported in the Kuopio Ischemic Heart Disease Risk Factor Study (KIHD) that the high stored iron level, as assessed by elevated SF concentration, is a risk factor for CAD.²⁶ On the other hand Bozzini's angiography based study could not support a role for biochemical or genetic markers of iron stores as predictors of the risk of CAD or its thrombotic complications.²⁷ In our population, the 1st and 3rd tertiles of ferritin levels were associated with the occurrence of more adverse events, with statistical significance in terms of in-hospital HF and 1-year death.

Conclusion

The current study revealed raised serum ferritin was associated with worse outcomes and increased mortality following AMI.

Table 1. Left ventricular Ejection Fraction values according to Serum Ferritin tertiles.

s	1 st Ferritin tertile <120 ng/ml	2 nd Ferritin tertile 120-220 ng/ml	3 rd Ferritin tertile >220 ng/ml	P value
<35	2	4	9	0.01
35-45	12	18	8	
45-55	10	15	5	
>55	2	12	3	

Results expressed as n (%) or mean \pm median.

In the first tertile, 2 patients had EF less than 35%,12 had EF 35 to 45%,10 had EF 45 to 55% and 2 had EF more than 55%.In the second tertile,the corresponding numbers were 4,18,15 and 12.In the highest tertile,the distribution was 9,8,5 and 3.There was a significant difference between the 4 groups(p value:0.01).

Table 2. Comparison of in-hospital short term outcomes among three tertiles of Serum ferritin values

Outcome	1st ferritin tertile <120 ng/ml	2nd ferritin tertile 120-220 ng/ml	3 rd ferritin tertile >220 ng/ml	P value
Recurrent Angina	2	10	8	0.09
Heart Failure	4	6	8	0.1
Death	1	2	5	0.03

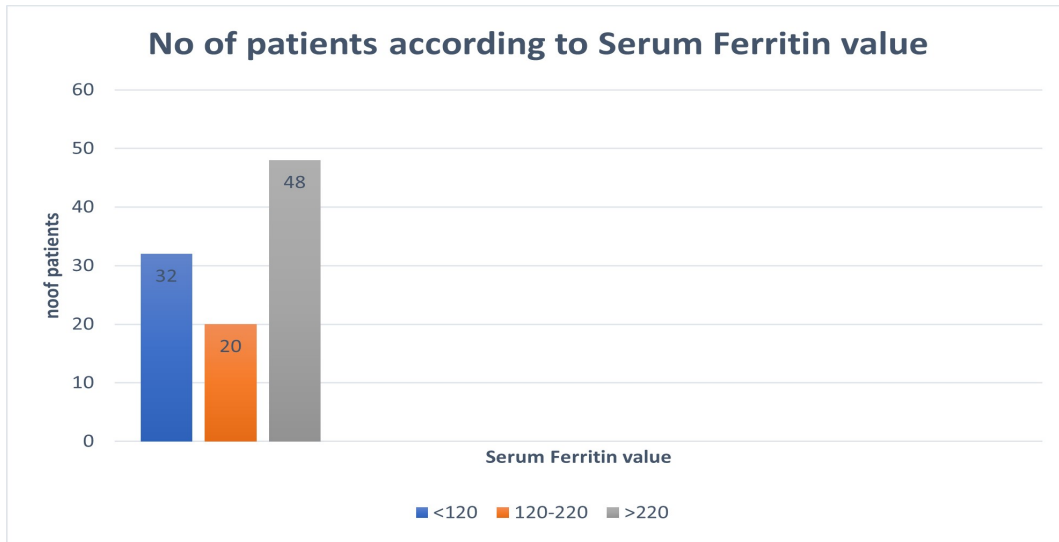
The in-hospital outcome was compared amongst the three groups. Recurrent angina showed a trend towards relation with ferritin (2 in first tertile,10 in second tertile and 8 in third tertile) but statistically not significant(p=0.09).Heart failure showed a similar pattern (4 in first tertile,6 in second tertile and 8 in third tertile) but p value of 0.1.Mortality was statistically strongly correlated with ferritin level (1 in first tertile,2 in second tertile and 5 in third tertile) with a p value of 0.03.

Table-3. Short and Long-term outcomes according to Serum Ferritin Levels

Events	1st ferritin tertile (< 120 ng/mL)	2nd ferritin tertile (120 -220 ng/mL)	3rd ferritin tertile (> 220 ng/mL)	P value
HF at 1 year	4	1	5	0.0446*
Reinfarction at 1 year	1	6	10	0.0138*
CVA at 1 year	1	1	2	0.786
Death at 1 year	1	1	4	0.616

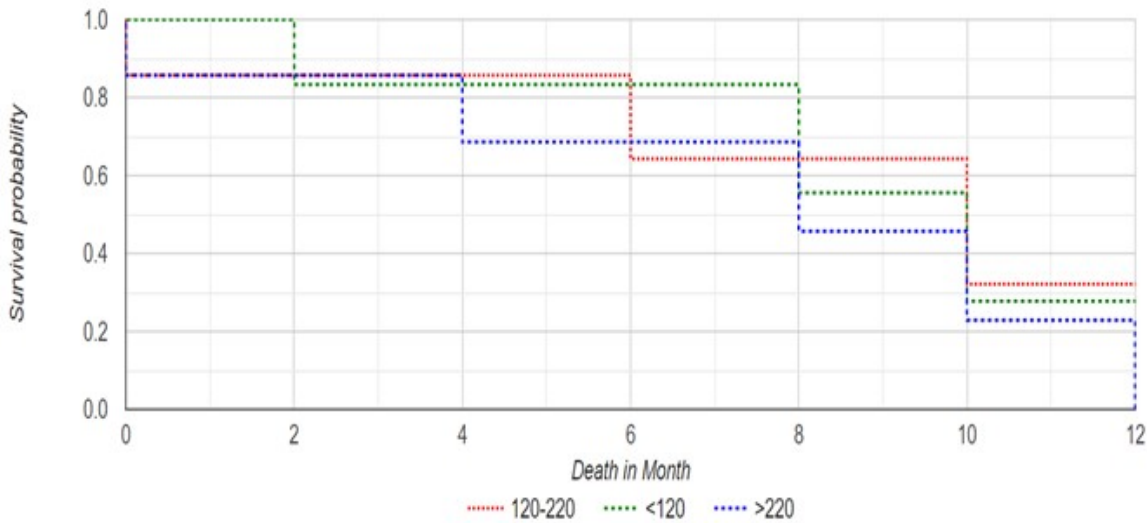
HF: heart failure; CVA: cerebrovascular accident, p<0.05 significant

Figure-1: Serum ferritin concentrations among patients with with myocardial infarction.



The distribution of serum ferritin among patients with AMI indicated maximum no of patients belonged to high ferritin tertile followed by low value of Ferritin tertile. Minimum no of patients of myocardial infarction belong to medium tertile.

Figure-2. Kaplan–Meier event survival curves for mortality or readmission for HF in patients with three serum ferritin tertiles.



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