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Prof. Vidya Surwade

Deptt. of Community Medicine, Dr Baba Saheb Ambedkar, Medical College & Hospital, Rohini, Delhi

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Evaluation of Local Control in Buccinator Muscle Excision with the Skin Versus Buccinator Muscle Excision without the Skin in Buccal Squamous Cell Carcinoma: A Randomized Clinical Trial

Ahmed Yousef[1], Mohamed Ahmed Farid Shehab[2], Sherif Ali[2], Hosam Abd El-Kader El-Fol[3], Ahmed Mokhtar EL-Mardendly[4]

[1]Associate Lecturer, Oral & Maxillofacial Surgery Department, Faculty of Dentistry, Cairo University, Egypt, [2]Associate Professor, Oral & Maxillofacial Surgery, Faculty of Dentistry, Cairo University, Egypt, [3]Professor, Surgical Oncology, Faculty of Medicine, Menofia University, Egypt, [4]Professor, Oral & Maxillofacial Surgery, Faculty of dentistry, Cairo University, Egypt

Abstract

Background: The aim of this study was to compare local control and maximum mouth opening in excision the buccinator muscle with the skin versus excision the buccinator muscle without the skin.

Methodology: This study was conducted on 40 patients with buccal squamous cell carcinoma (BSCC) without previous treatment, also T1 to T3 and N0 to N2 squamous cell carcinoma was involved in this study. The patients were divided randomly in 2 groups, 20 patients for each group. All patients were assessed for local recurrence for 1 year. Maximum mouth opening was measured preoperative and compared by postoperative measuring.

Results: The local control was (100%) in the study group and (95%) in the control group, but There were no statistically significant differences between the two interventions (P value 1). The maximum mouth opening was decreased postoperatively than preoperatively and in study group than the control one,but there was no statistically significance difference (**P- value 0.22**).

Conclusions: Excision the buccinator muscle with its associated skin seems to decrease the local recurrence and seems to decrease the maximum mouth opening, but with no statistically significant differences between the two interventions. Indicating the needs for further studies.

Keywords: *Buccal squamous cell carcinoma, buccinator muscle, local control.*

Introduction

Squamous cell carcinoma is the most common type of cancer occurs in the head and neck region, it represent about 90% of all cancers in this area.[1] It was reported that in developing countries oral carcinoma has a high incidence of mortality. One of its aggressive types is the buccal squamous cell carcinoma; it has a low grade of local control that decreases the patient's survival rate.[2]

Among the reasons for the high recurrence rate, to buccal squamous cell carcinoma, is the lack of information about the accurate depth of the tumor cell according to the anatomical architecture. Clinical palpation only cannot determine the depth of surgical margin, so the need for clinical classification to the depth of tumor cells invasion is mandatory.[3] A highly accurate

Corresponding Author:
Ahmed Yousef
MSc, Associate Lecturer, Oral & Maxillofacial Surgery Department, Faculty of dentistry, Cairo University, Egypt
e-mail: dr.ayousef@ymail.com

image of ultrasonography (US), CT and MRI are required for diagnosis the depth of tumor cells invasion on anatomical architectures. The most important anatomical architecture in the cheek is the buccinator muscle. It may represent an anatomical barrier toward the tumor cells invation.[3]

The buccal squamous cell carcinoma has been treated by surgical excision of the buccinator muscle without the skin, based on the concept that the buccinator muscle represents an impediment for spreading of the neoplasmic cells.[4] The recurrence rate is highly correlated with the positive or closed resection margins of the tumors. Resection with at least 5 mm cuff of the surrounding normal histopathological tissue is correlated by a poor prognosis, this due to the compact and complex anatomy of the oral cavity. This made the achievement of tumor free margins, in the cheek that has a low thickness, remains a challenge.[4]

Study in oral squamous cell carcinoma that evaluate shrinkage in the resected margins of the tumors, introduced a technique that excises the skin with the buccinator muscle aiming to decrease the recurrence rate in the cheek area[4]. Improving the prognosis and the survival rate of the patient is goal of this technique, but the defect in the face will need an immediate reconstruction with a soft tissue flap to improve the patient appearance. The aim of this study is to assess whether the excision of buccinator muscle with the associated skin will improve the local control (recurrence rate) when compared to buccinator muscle excision without the associated skin.

Patients and Method

This was a randomized controlled trial conducted on 40 patients with buccal squamous cell carcinoma attending outpatient clinic in Oral and Maxillofacial Surgery Department- Faculty of Dentistry- Cairo University and El Monofia Hospital - Oncology Department- El Monofia University between November 2017 and July 2020. The patients were allocated randomly in two equal groups: control group, 20 pateints underwent excision the buccinators muscle without the skin. While for the intervention group, 20 patients underwent excision the buccinators muscle with the skin. All cases were subjected to surgical resection of the primary site according to the standard protocol for each site.

Eligibility Criteria:

Inclusion Criteria: All primary buccal SCC lesions with no previous treatment were involved. T1 to T3, N0 to N2 squamous cell carcinoma of the oral cavity. Patients were physically and psychologically able to tolerate procedures. Patients should be free from any systemic disease that may affect normal healing, and predictable outcome. Cooperative patients, who accept the procedure and return for follow up, examination and evaluation. Patients with secondary oral carcinoma, history of head and neck carcinoma of any other anatomical site apart from the primary site, history of radiotherapy or chemotherapy for tumors in the head and neck region, recurrent disease, and positive metastasis in remote areas were excluded.

Preoperative records and evaluation: A preoperative assessment of all patients was carried out including history taking, clinical and radiographic examinations. Each patient was interviewed in order to obtain a medical and dental history: Full medical history, Clinical examination of the primary tumor through inspection, palpation, determination of primary site, size, the lymph node involvement and staging, Multi Slice CT scan or MRI for pre-operative evaluation of nodal status, Ultrasonography to measure the depth of the tumor, Laboratory investigations (CBC, Coagulation profile, liver function tests; ALT, AST, serum albumin, kidney function tests; serum creatinine, blood urea and random blood glucose level), Preoperative anesthesia assessment for fitness for general anesthesia, Radiological examination (chest x-ray)

Surgical Procedures: Following confirmation of the diagnosis by incisional biopsy from the primary tumor site and histopathologic analysis, all cases were subjected to surgical procedure and the following was performed: Resection of the primary tumor site with surrounding safety margin from 1-2 cm. The extent of tumor was assisted by visual exam, palpation, and imaging. The borders of the tumor were determined by visual inspection and palpation. Where the primary site was the buccal mucosa invading the buccinator muscle with or without clinical palpable LN, the excision included buccal mucosa, buccinator muscle, and buccal fat pad together with the marginal mandibular branch *en block* with neck dissection fig. Also excision the skin in the study group **(figure: 1)** or without excision the skin in the control group **(figure: 2).**

For regional control the neck management includes radical neck dissection (RND), modified radical neck dissection (MRND) and/or supraomohyoid neck dissection depending on the primary tumor size and location, clinical presentation and involvement of cervical lymph nodes. **(Figure: 3)** Postoperatively, patients with unfavorable pathologic features including involved margin, nodal extracapsular extension, > 2 positive cervical nodes, perineural invasion, or lymphovascular permeation were scheduled to receive adjuvant radiotherapy and/or chemotherapy.

Figure(1): Post resection Specimen the blue arrow show the resected skin associated to the buccinator muscle. The black arrow show the lymph node specimen.
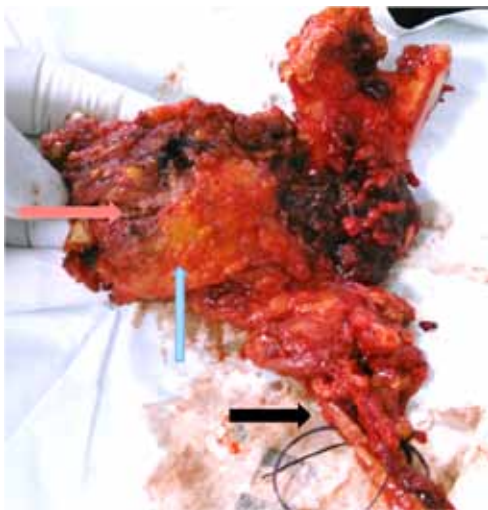
Figure (2): Post resection Specimen, Red arrow show buccinators muscle, Blue arrow show subcutaneous tissue and black arrow show lymph node specimen.

Figure (3): Post-resection appearance

Postoperative Evaluation: Postoperative follow up will carried out every week for the first month to evaluate the wound healing, then every 2 weeks for the 2 & 3 months, then every month for the first year to evaluate the local control (recurrence). Intraoral and extra oral clinical photographs will take three months postoperatively.

Outcome Results:

The following assessment surveys (clinical evaluations) will be carried out for both groups:

The local control (recurrence) will be observed clinically (binary) by the surgical team in the follow up time this carried by inspection, palpation and biopsy for the recurrence lesions. This observation started at the 3rd month after surgery and persisted until the first year.

The second outcome is the maximum mouth opening. It will be calculated by the researcher preoperative and postoperative at the 3rd month using a ruler in mm (continuous). It was done by measuring the distance from the incisal margin of the upper incisors to the incisal margin of the lower incisors.

All measurements were collected and tabulated for statistical analysis.

Statistical Analysis: Statistical analysis was performed using SPSS (Statistical package for the social sciences- IBM® SPSS® Statistics Version 20 for Windows, IBM Corp., Armonk, NY, USA). Quantitative data is represented as mean ± standard

deviation. Qualitative data is represented as percentage and frequency. Student's t-test was used to compare quantitative variables between the two groups. Fisher's exact test was used to compare qualitative variables between the two groups. The results were considered statistically significant if the p value was less than 0.05.

Results

This study was conducted on fourteen patients with buccal squamous cell carcinoma. The patients were allocated randomly in two equal groups. For the control group, 20 pateints underwent excision the buccinators muscle without the skin. While for the intervention group, 20 patients underwent excision the buccinators muscle with the skin.

The mean age of patients presented in control group was (50.2 ± 12.32). 11 male were presented in this group (55%) and 9 female (45%). The mean age of patients presented in study group was (56.55 ± 11.27). 10 male were presented in this group (50%) and 10 female (50%).

Clinical Results: In the control group, all patients underwent surgery without complications, unless one patient had dehiscence the intraoral flap by the first week but by good oral hygiene and daily irrigation, it disappeared. On the other hand the patients of the study group had no dehiscence all over the follow up period.

Primary Out Comes:

1. **Recurrence (local control):** The control group had recurrence rate (5%) only one patient has recurrence after 4 weeks in the primary site. The patient underwent radiotheraby after surgery and scheduled to another surgery after completing his radiotherapy. On the other hand the study group had no recurrence (0%) over the follow up period. There was no statistically significance difference between the 2 groups. (**P – Value 1).**

2. **Maximum mouth opening:** In the control group, the maximum mouth opening was (41.5 ± 2.6) preoperatively, and it decreased to (26.3 ± 5.12) postoperatively. The difference between the preoperative and post operative MMO was decreased by (15.2 ± 4.5).

In the study group, the maximum mouth opening was (38.55 ± 4.16) preoperatively, and it decreased to (21.8 ± 4.08) postoperatively. The difference between the preoperative and post operative MMO was decreased by (16.75 ± 3.35).

The decrease of MMO in the study group was more than the control one, but there was no statistically significance difference between the change in MMO of the control and study group with (**P- value 0.22**).

Discussion

Buccal squamous cell carcinoma is aggressive type of oral carcinoma with high invasion pattern. In D2 classification, in which the tumor invades the buccinator muscle without loss of muscle continuity, the recurrence rate is high comparing the D1(tumor invade mucosal and submucosal layer) and D3 (tumor invade until subcutaneous or cutaneous layers)classification.[3] In this study we excised the skin plus the buccinator muscle in the study group in a trail to increase the local control. On the other hand we excised the buccinator muscle only in the control group.

Aggressive treatment was done to decrease the recurrence rate of the BSCC with its high invasion pattern. *Parsonset al.,* reported the higher invasion of BSCC in oral SCC, and explained the large discrepancy of BSCC than other sites of oral SCC.[5] also, *Strome et al.,* reported the disappearance of the buccinator muscle in the resected specimen, in patients with local recurrence of stage I and II buccal SCC without tumor cells in the mucosal margin were examined histopathologically.[6]

A high rate of local recurrence was be reported in local excisions of T1 and T2 buccal mucosa cancers with pathologically negative margins. Low T-stage and negative margins are not adequate predictors of local control. Even patients with early buccal tumors may benefit from adjuvant therapy to enhance local control, **Sieczka et al.**[7]

According tothe clinical classification of SCC of buccal mucosa *Diaz et al.* considered the buccinator muscle to be the most important layer, due to the potential role of this muscle as a barrier against tumor invasion.[2] The explained the tumor invasion beyond the mucosa to include the buccinator and then spreads further to the buccal fat, there is no longer any good anatomic barrier beyond which to spread.[2]

Yoshihide et al,[3] reported the tumor invasion into the deep layers, including the buccinator and buccal fat, even in those buccal mucosal tumors classified as having early stage disease. They concluded that this could account for why, when resection was performed based on tumor size, the tumor may still remain in the

deep surgical margin, thus frequently resulting in local failure.

Lubek et al, concluded the aggressive pattern of buccal SCC, and they considered it as an aggressive subsite within the oral cavity, with high rates of locoregional disease recurrence independent of surgical margin status. Elective neck dissection (END) and adjuvant therapy should be considered for early-stage disease. Successful salvage is rare in cases of early recurrence.[8]

As the previous studies reported the aggressive pattern of buccal SCC, its invasion in cheek layer and the recurrence rate of D2 (14.3%) which is higher than D1 (0%) and D3 (7.7%), we choose D2 for this research hoping decrease this recurrence rate percentage.[3]

Therapeutic neck dissection was recommended by Lubek J et al, in clinically invaded lymph nodes[8].also, Eicher et al. recommended elective neck dissection (END) for patients whom had moderately or poorly differentiated SCC, radiological or histological signs of bony invasion, and tumors in the mandibular symphyseal region[9].

The END recommended as first-line treatment for all intermediate and advanced stage patients, with the exception of patients with stage T1 tumors, who have a low risk of nodal metastasis and for whom observation (OBS) may be an acceptable alternative to END if the patients strictly comply with a cancer surveillance protocol, Feng et al.[10]

They concluded that the follow-up compliance of patient populations was the vital factor in adopting the OBS strategy for the cN0 neck. They stated that early detection of regional recurrence led to a 100% cervical salvage rate irrespective of T stage, the salvage rate otherwise dropping as remarkably low as <30.0%.[10,11]

One of the important predictor of BSCC prognosis is the local control.[12,13] in the current study, the local control was (95%) in the control group in which we excised the buccinator muscle without the skin. The local control was (100%) in the study group in which we excised the buccinator muscle with the skin. There was no statistically significance difference between the 2 groups but there is high in the local control percentage comparing the results of *Yoshihide et al* study as it had local control (85.3%) with the same classification D2 the limit of this study is the sample size was law due to the less income of cases, the statistical results may have significance differences with large samples.[3]

Conclusion

With the limitation of this study, we pointed out that removal the buccinator muscle with its associated skin in buccal squamous cell carcinoma seems to decrease the local recurrence. However, we recommend further studies with longer follow up periods to elucidate more about this topic.

Ethical Clearance: The study followed the declaration of Helsinki on medical research and the study was approved by the research ethics committee - Faculty of Dentistry- Cairo University.

Conflict of Interest: No

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Prevalence of Hamstrings Tightness Using Active Knee Extension Test among Diamond Assorters

Akshata Chaphekar[1], Sneha Somarajan[1], Meeti Naik[2],
Divyesh Kothiya[2], Janvi Nakrani[2], Surbhi Trivedi[2], Monali Chaudhary[2]

[1]*Assistant Professor, Shrimad Rajchandra College of Physiotherapy, Uka Tarsadia University,*
[2]*Intern, Shrimad Rajchandra College of Physiotherapy, Uka Tarsadia University*

Abstract

Background: Hamstrings is a key component of flexibility in the human body. People involved in certain occupation are more prone to develop hamstrings tightness. It is defined as the inability to achieve more than 160 degrees of knee extension when the hip is flexed to 90 degrees. This study aimed to find out prevalence of hamstrings tightness among diamond assorters.

Method: A descriptive cross sectional study was carried out among 150 diamond assorters. Demographic data was collected and active knee extension was used to measure the hamstrings tightness among the diamond assorters. Descriptive analysis was done by using Microsoft Excel version 2010.

Conclusion: Prevalence of hamstrings tightness is very high in diamond assorters. 95.3% subjects were found to have hamstrings tightness in right limb and 94% subjects were found to have hamstrings tightness in left limb. Proper ergonomic arrangements and healthy working conditions are recommended to prevent musculoskeletal disorders.

Keywords: *Active knee extension test, diamond assorters, hamstring tightness, popliteal angle, prolonged sitting.*

Introduction

Flexibility has been defined as the ability of a muscle to lengthen and allow one joint (or more than one joint in a series) to move through a range of motion.[1] It is a physical fitness attribute and is often evaluated from the joint range of motion,[2] an essential element of normal biomechanical functioning in sports and daily living activity.[3] Hamstring is a group of three muscles, semitendinosus, semi membranosus and biceps femoris, which makes up the posterior compartment of the thigh. They are the major knee flexors and also aid in hip extension. Physiologically full stretch occurs in this muscle only if the knee is fully extended and hip fully flexed.[4] Complete contraction occurs when the knee is fully flexed and hip is fully extended. Complete contraction and stretching rarely occurs in normal daily activity and hamstrings are therefore rarely put through their full physiological amplitude. Therefore, chance of it going into tightness are more in individuals not participating in any daily stretching routine.[5]

Muscle tightness is caused by the decreased ability of the muscle to deform and results in a decreased range of motion at the joint on which it acts.[6] It is found that the prevalence of hamstring tightness among students is high.[7] It is a common condition even among young healthy individuals and recreational athletes. Muscle length, hamstring strength, strength ratios, demographic characteristics, history of previous injury, lack of flexibility, muscular control and inadequate warm up are some common causes for hamstring strain.[8] It remains

Corresponding Author:
Dr. Akshata Chaphekar (MPT)
Assistant Professor, Shrimad Rajchandra College of Physiotherapy, Uka Tarsadia University, Maliba Campus, Bardoli-Mahuva Road, Tarsadi- 394350, Dist: Surat, Gujarat, India
e-mail: akshata.chaphekar@utu.ac.in
Mobile No: 9429329681/9662302885

a primary concern for rehabilitation professionals as they result in a debilitating injury characterized by acute loss of functional performance, prolonged periods of recovery, and resultant increased incidence of recurrence. Limited flexibility causes neuro-musculoskeletal symptoms. These musculoskeletal symptoms may lead to decrease in strength, stability, endurance and much more.[6] Decreased hamstring flexibility is a risk factor for the development of patellar tendinopathy and patello-femoral pain syndrome.[2] Tightness in hamstring muscle causes posterior pelvic tilt which leads to decrease in lumbar lordosis resulting in low back pain and gait abnormality.[7]

The diamond trading profession includes; diamond mining, diamond cutting, diamond polishing, diamond assortment, and diamond selling.[9] Assorters are required to work around 8-10 hours a day for 6 days a week with limited interval periods. The main work of diamond assorters is to segregate the diamonds according to the cut, color, and clarity for further sell. The position attained by them is mostly sitting. Their profession demands various physical activities like repetitive/sustained movements, prolonged sitting in awkward posture, exposure to vibrations leading to various mechanical stresses on various parts of body like neck, upper and lower back, knee, elbow, wrist or hand and fingers.[10] The prolonged sitting hours can affect flexibility of soft tissues, especially two joint muscles. In prolonged sitting, constant shortened position develops hamstring trigger points and cause muscle tightness.[11]

Hamstring tightness maybe measured using the active unilateral SLR test,[12] the passive unilateral SLR test, [13] the sit and reach test, [14] and the active knee extension test (AKET).[15] The AKET measures hamstring tightness by the angle subtended by knee flexion after a maximum active knee extension, with the hip stabilized at 90 degrees. Hamstring muscle tightness is defined as Knee Extension Angle (KEA) greater than 20 degrees where KEA is the degree of knee flexion from terminal knee extension.[16]

The aim of the study was to find out the prevalence of hamstring tightness among diamond assorters who have long sedentary hours of sitting as a part of their profession. This study will help to create awareness about the lack of normal flexibility maintenance, especially among professions involving prolonged sitting.

Methodology

A descriptive observational study was carried out among total 150 Diamond Assorters from Maruti Exports in and Harikrishna Diamonds in Surat with convenient sampling method. Participants were selected according to inclusion and exclusion criteria. All the participants agreed and signed informed consent form to extend full co-operation for data collection.

Inclusion criteria included diamond assorters of age 25 to 50 year having more than 7 working hours in sitting position. Individual with any musculoskeletal and neurological impairment, any structural deformity, any trauma or surgical procedure of hip and knee in past 6 months were excluded from study. Purpose of the study was explained to the participants. Preliminary measurements and demographic data including age, gender, height and weight were collected. Active Knee Extension Test was used as a test to measure hamstring flexibility level. Degree of popliteal angle was measured in both lower quadrants bilaterally as an outcome measure.

Active Knee Extension test: This test was selected based upon established criteria and its high test-retest validity[15]. Materials used were pen, paper, plinth (bed) and Universal goniometer. The subject lay supine on a plinth with their right knee and hip flexed to 90^0. They monitored the position of the femur with their hand, and were instructed not to allow the femur to move away from the hand at any point during the test. The participants were instructed to extend their right leg as far as possible; keeping their foot relaxed and hold the position for 5 seconds. Each participant performed a single repetition of the movement to familiarize themselves with the action. A second repetition was performed and at the end of the 5 second holding period the angle of knee extension was measured. The center of the goniometer was positioned over the axis point previously marked on the lateral joint line, and the goniometer arms were positioned along the lines marked on the femur and fibula. Same was performed in left lower limb.[17]
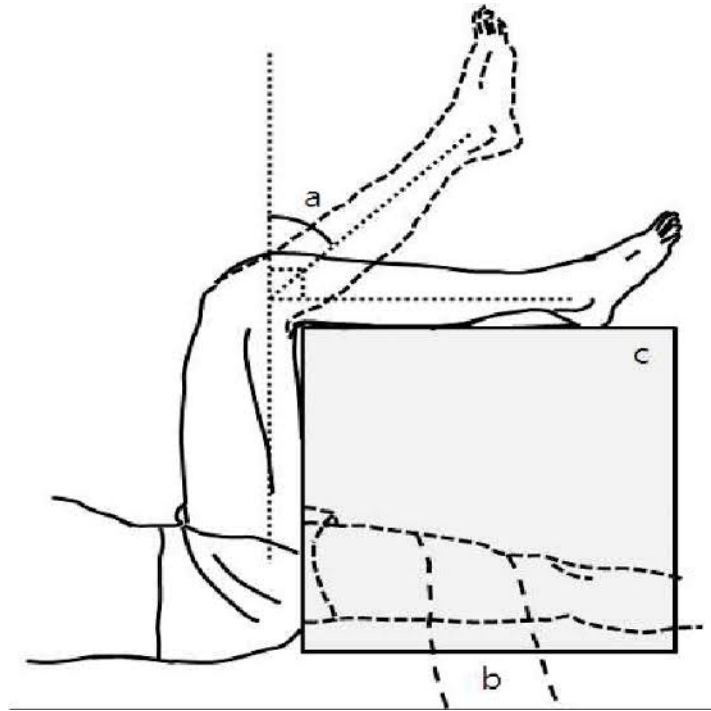
Fig 1: Measurement of popliteal angle

Statistical Analysis and Results: The data was analysed in Microsoft excel 2010. Prevalence of hamstring muscle tightness using active knee extension test was calculated. The mean age of the participants was 35.98 ±7.98 years.

Table 1 represents mean and standard deviation of popliteal angle of both lower limbs.

Table 1: Mean and standard deviation of popliteal angle of both lower limbs

	Degree of popliteal angle in Right limb	Degree of popliteal angle in left limb
Mean	38.23	39.38
Standard deviation	11.09	11.26

Table 2: Prevalence of hamstring tightness

Degree of popliteal angle	Right lower limb	Left lower limb	Bilateral
0-20	9(6%)	7(4.66%)	6(4%)
20 and more	141(94%)	143(95.33%)	140(96%)

Table 2 shows that 94% of the subjects had hamstring tightness in their right lower limb, 95.33% of the subjects had hamstring tightness in their left lower limb and 94% of the subjects had hamstring tightness in bilateral lower limb.

Table 3 shows that 6% and 5% subjects had popliteal angle between 0-20° in right and left limbs respectively. 53% and 46% subjects had popliteal angle between 21-40° in right and left limbs respectively. 39% and 48% subjects had popliteal angle between 41-60° in right and left limbs respectively. 2% and 1% subjects had popliteal angle between 61- 80° in right and left limbs respectively.

Table 3: Severity of hamstring tightness

Degree of popliteal angle	No. of subjects (right limb)	No. of Subjects (left limb)
0-20	9 (6%)	7 (5%)
21-40	80 (53%)	70(46%)
41-60	58(39%)	72(48%)
61-80	3(2%)	1 (1%)
Total Participants	**150**	**150**

Discussion

The objective of the study was to find out the prevalence of hamstring tightness in diamond assorters in Surat and the results show that 96% of subjects have bilateral hamstring tightness. The mean of age of the participants was 35.98 years and the standard deviation was 7.98. 35% of the participants were of age between 25-30 years, 18% of them were of age between 31-35 years, 17% of them were of age between 36-40 years and 46-50 years and 13% of them were of age between 41-45 years. The mean of degree of popliteal angle in right limb of the participants was 38.233 and the standard deviation was 11.09 and the mean of degree of popliteal angle in left limb of the participants was 39.38 and the standard deviation was 11.267. 6% and 5% participants had 0-20° of popliteal angle in right and left limbs respectively. 53% and 48% participants had 21-40° of popliteal angle in right and left limbs respectively. 39% and 548% participants had 41-60° of popliteal angle in right and left limbs respectively. 2% and 1% participants had 61-80° of popliteal angle in right and left limbs respectively. Out of 150 diamond assorters, 94% subjects were found to have hamstring muscle tightness in right limb and 95.33% subjects were found to have hamstring muscle tightness in left limb. From this study over all prevalence of hamstring tightness is high.

Sedentary work nature is a major risk factor across a spectrum of preventable diseases that lower the quality of life. Sedentary work habits can lead to various problems like tightness of muscle, decreased joint range of motion, decreased flexibility, further adding discomfort and hampering daily activities of an individual. In the seated position, hamstring is held at shortened position due to knee flexion and posterior pelvic rotation. In prolonged sitting, this constant shortened position develops hamstring trigger points and cause muscle tightness.[18] Further, seated position increases the pressure on lumbar intervertebral disc. Therefore, prolonged sitting can increase the mechanical stress on lumbar spine.[19] Furthermore, frequent forward bending increase the mechanical stress on the spine with people having hamstring tightness.[20]

Reduction in hamstrings flexibility has been found to be one of the causes for development of low back pain. Hamstring muscle tightness leads to decrease range of motion of lumbar flexion and pelvic tilt.[21] This can alter the biomechanics of lumbar spine and may lead to back pain. Stiffness of one muscle group can cause compensatory movement at an adjoining joint that is controlled by muscles or joints with less stiffness.[22] A study suggested Patello-femoral pain syndrome due to lack of hamstring flexibility. Prolonged sitting can be a contributory factor in hamstring tightness.[23]

This study was conducted only on diamond assorters of Surat with age group of 25 to 50 years thus limiting the generalization of these results. Further studies with a large number of subjects will help to generalize the findings. Moreover, severity of prolonged sitting and its correlation with musculoskeletal disorders should be assessed in further studies.

Conclusion

Prevalence of hamstring tightness is very high among diamond assorters (95.3% in right side and 94% in left side.) It is recommended that healthy working conditions must be provided which can make the work easier and more relaxed.

Conflict of Interest: There is no Conflict of Interest.

Source of Funding: None

Ethical Approval: Yes

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Peripartum Safety: Time to Act

Alby Johnson[1], Sasi Vaithilingan[2]

[1]*Research Scholar, Department of Obstetrics & Gynecological Nursing, Vinayaka Mission's Research Foundation (DU), Salem, Tamilnadu, India,* [2]*Professor, Department of Child Health Nursing, Vice Principal Vinayaka Mission's College of Nursing, Puducherry, Vinayaka Mission's Research Foundation (DU), Salem, Tamilnadu, India*

Abstract

Peripartum safety refers to the safe care of women throughout the antenatal, intranatal, and postnatal periods. Approximately 15% of all childbearing women are likely to develop life-threatening complications. India and Nigeria accounted for one-third of global maternal deaths at the country level. Recognizing the need, the United States has initiated a Maternal safety Bundle. On a par with, The Government of India introduced various programs to reduce maternal deaths. Though the country made most of its progress, MMR state performances are varied in their extremes and failed to achieve the targeted goal. High maternal mortality is associated with medical, socio-economic, and health care system problems are evidenced. The shortfall of skilled health care providers in India hampers progress towards achieving universal health coverage. The current situation calls for more sensitization and sustainable efforts for integration and institutionalization of health system monitoring to achieve the target of Sustainable Developmental Goals. Studies need to germinate to tackle the health care insufficiencies of pregnant women and enhance the quality of care.

Keywords: *Peripartum Safety, Maternal Safety, Maternal Mortality.*

Introduction

Peripartum safety refers to the safe care of women throughout antenatal, intranatal, and postnatal periods. Safety challenges like, medication errors, interventional modifications, misdiagnosis, and emotional harm evidenced to cause maternal mortality and morbidity throughout peripartum period[1]. World Health Organization defines maternal mortality as the death of a woman during gestation or within 42 days of childbirth that involves all deaths irrespective of the duration, any event associated with pregnancy, childbirth or conditions worsened by pregnancy, and deaths related to the management of pregnancy but not from unexpected or accidental situations [2].Maternal Mortality Rate (MMR) is a crucial communal health indicator, as it gives a comprehensive view of the maternal health condition of a country as well as the quality of the health care system involved . The health outcome of pregnant women lies in the hands of health care providers[4]. One of the interventions for preventing maternal mortality and morbidity is skilled assistance throughout pregnancy and childbirth, which is possible only in the institutional deliveries.

Incidence of Maternal Mortality: World Health Organization estimates that 2,95,000 maternal deaths occurred globally in 2017, of pregnancy-related causes, and 99% of cases reported in developing countries. The problem of maternal mortality and morbidity rates in the United States highlighted over the past five years, and it is the only developed nation where MMR (approximately 700/year) has increased since the 1990s[5,6]. In the country level, India 12% and Nigeria 23% accounted for one-third (35%) of global maternal deaths[2]. Even though maternal mortality is a matter of concern, as many women do not die of causes related to pregnancy but suffer severe morbidities[7]. Global incidence of Maternal Mortality shown in Figure 1.
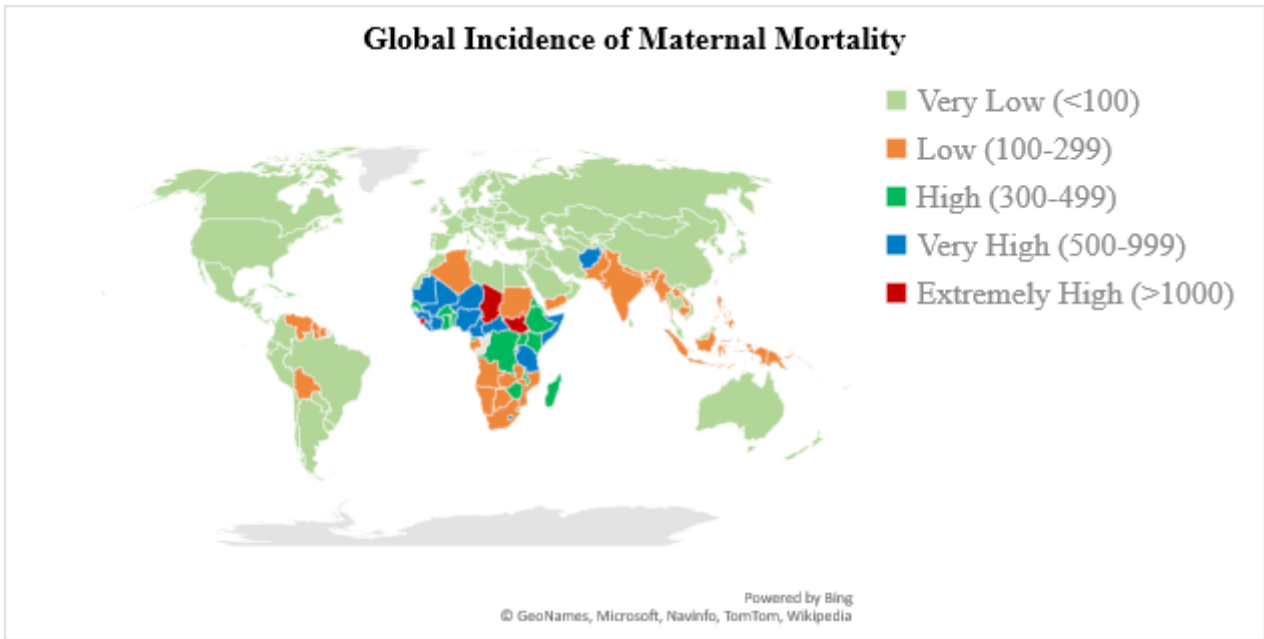
Figure 1: Global Incidence of Maternal Mortality. Source: WHO, UNICEF, UNPF and The World Bank, Trends in Maternal Mortality: 2000 to 2017 WHO Geneva, 2019

United Nation's Millennium Developmental goal (MDG) 5 targeted to reduce MMR by approximately 75% in 2015[8]. The target was not stricken, and India was nowhere near MDG. The graph below shows the MMR of India from 1997- 2013 (Figure 2).
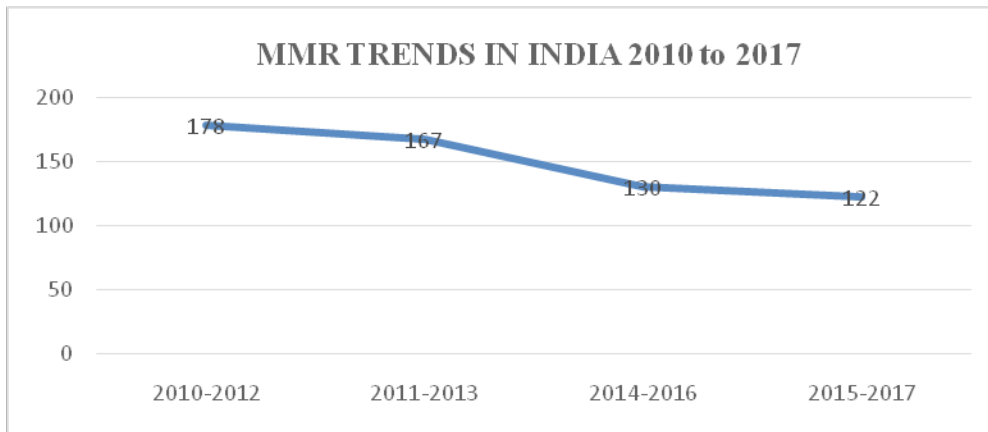
Figure. 2: MMR Trends in India 2010 to 2017. Source: Sample Registration System, Registrar General of India

Hence, the United Nations extended the goals of MDGs by introducing Sustainable Developmental goals (SDG) 2016-2030. SDG 3 includes a reduction in maternal mortality < 70 per 1,00,000 live births in each country by 2030. However, only16 countries (Angola, Belarus, Cambodia, Estonia, Iran, Kazakhstan, Lao People's Democratic Republic, Mongolia, Nepal, Poland, Romania, Russian Federation, Rwanda, Tajikistan, Timor-Leste, and Turkmenistan) were able to achieve the reduction based on the new point estimates for MMR reduction 2000 to 2017[8].

Causes of Maternal Mortality: Evidence shows that obstetric hemorrhage is the leading cause of maternal death in Africa and Asia. Whereas, in Latin America and the Caribbean, hypertensive disorders are the highest

cause for perinatal death[9]. Venous thromboembolism is the persisting cause for maternal mortality even in countries with good maternity resources[10]. Overall, the causes of maternal deaths identified are shown in Figure 3.

**Figure 3: Global Causes of Maternal Deaths.
Source: WHO analysis of causes of maternal death:
a systematic review: Lancet Global Health 2014**

The Ministry of Health and Family Welfare (MOHFW) report claims that sepsis, unsafe abortions, post-partum hemorrhage, anemia, and malaria are leading causes of maternal deaths in India. The emerging evidence underlines the causes of maternal mortality and morbidity in the United States were cardiovascular diseases (>33%), non-cardiovascular diseases (14.3%), infection (12.5%), and obstetric hemorrhage (11.2%)[6].

Strategies for Peripartum Safety: Recognizing the need to overcome the burden of MMR and to identify the potentially preventable causes for perinatal mortality and morbidity,the United States has initiated Maternal Safety Bundles[5]. This includes early identification and prevention of mental health disorders (depression and anxiety), venous thromboembolism (VTE),opioid use disorder (OUD), obstetric hemorrhage, basiccare in postpartum, prevention of retained vaginal sponge after birth, reducing the peripartum disparities and primary cesarean section, and hypertensive disorders in pregnancy. The main domains of safety bundles consist of 4Rs that are readiness, recognition and prevention, response, and reporting/system learning. Every phase of the domain comprises of key points for woman, health care provider and birthing facility as pertinent [1].

Readiness: Readiness gives an alert about what necessary to be arranged for every maternal event. This comprises of items such as training for staff, risk assessment, quick access to medication and types of equipment, in-situ drills, adoption and development and ratification of condition-specific protocol and engagement of departments outside the maternity unit[11].

Recognition: This includes distinguish the unique risks and needs of every patient by applying a standardized tool, developing systems for maternal warning signs, and match treatment response to each women's stage of recovery[11].

Response: The health care provider/team on a maternity setting should universally implement the unit's protocol in response to an impending maternal event and obtain follow-up care subsequent to discharge navigation[11].

Reporting/system learning: Maternal care involved staff should conduct a formal and non-judgmental debrief as soon as possible to identify those actions that contributed to the outcome[11]

In India, the Government committed to reduce deaths associated with pregnancy and childbearing by launching the National Health Mission (NHM). The main objective of this initiative is to strengthen the health systems, manage diseases, and promote Reproductive-Maternal-Neonatal-Child Health(RMNCH) in urban and rural settings. RMNCH and Adolescent Health (RMNCH+A) is one of the major components of NHM to reduce MMR to 100 per 1,00,000 live births by 2017[12,13]. Additionally, NHM works towards accomplishing India's global health commitment under SGD[3].

Besides, the nation has other initiatives and schemes such asJanani Suraksha Yojana(JSY)Janani Shishu Suraksha Karyakram (JSSK), Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), LaQshya,Comprehensive Abortion Care Services etc. Reports evidenced that regional variations exist in the coverage and implementation of JSY and many women had incomplete knowledge regarding the various schemes of JSSK and there is need to increase awareness[14,15]. A study found low level of utilization of antenatal services under PMSMA in rural areas[16].

Another review claims that there is a lack of trained workers and skilled providers, which causes a missed opportunity to help women to prevent from subsequent unintended pregnancy and possible abortion due to inadequate contraceptive services at the point of abortion care[17].

The country made most of its progress but, MMR state performances vary in their extremes. Maternal mortality in Empowered Action Group(EAG) states of India (Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh, Uttarakhand) exceeds the national average, and there is a long way to reach the target set out by the SDGs[18].

Inaccessibility to contraceptives, less populace expenditure on healthcare, lack of infrastructures, limited utility of drugs, and trained medical personnel are other contributing factors of maternal death[3].

High maternal mortality can be associated with medical, socio-economic, and health care system problems. Concurrently, maternal health indicator discrepancy is increasing over time. Rural inhabitants, the less educated, and the poorest receives lower health care access and coverage that deteriorates the health outcome. The shortfall of skilled health care providers in India hampers progress towards achieving universal health coverage and maternal health targets. Studies shows that health-care infrastructure in rural areas were irregularly distributed, and health care facilities have an acute shortage of doctors and nurses[3,19].

Keeping in view about the above facts, more sensitization and sustainable efforts are required for the integration and institutionalization of health system monitoring to achieve the target of sustainable developmental goals. Further studies need to germinate to tackle the health care insufficiencies of pregnant women and enhance the quality of care in rural and urban settings.

Conclusion

Given the situation of maternal health in Indian states, improvement in the performance of maternal health-related activities is very crucial. The betterment is required in all stages of peripartum health care by strengthening through skilled health care providers and quality maternity care are some of the strategies that are required in India. As the execution of this strategy, the standard protocol is necessary for all aspects of maternity health care.

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Clinical Insights into SARS-COV-2 Infection in Rural Rajasthan, India

Anand Derashri[1], Shivadatta Padhi[2], Dinesh Vaishnav[3], Anish Jain[4], Ruma Bose[5], Vandana Tyagi[6]

[1]Junior Consultant, Anaesthesia Shri Sanwaliyaji District Government Hospital, Chittorgarh, Rajasthan India, [2]Consultant Gastroenterologist, Medishine Hospital, Raipur Chattisgarh, India; Ex-senior Resident Gastroenterology, Sawai Man Singh Medical College, Jaipur, India, [3]Consultant Surgeon, Shri Sanwaliyaji Government Hospital District, Chitorgarh, Rajasthan, India, [4]Consultant Internal Medicine, Shri Sanwaliyaji Government Hospital District, Chittorgarh, Rajasthan, India, [5]Department of Anaesthesiology, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Centre, Assistant Professor, Harvard Medical School, Boston, MA, [6]Ex-attending Consultant, Department of Critical Care, Fortis Hospital, Mulund Mumbai, India; Ex-Senior Clinical fellow (Critical Care)Royal Brompton and Harefield NHS Trust UK, Ex-junior consultant, Critical Care Services Specialty, Medical ICU, SMS Hospital, Jaipur, Rajasthan, India

Abstract

Background: This study aimed to highlight the primary endpoint of death and to understand the clinical and epidemiological characteristics of COVID-19 infection in the rural community of Chittorgarh, Rajasthan, India.

Method: This was a retrospective, observational study of COVID-19 patients from March to June 2020 that collected and analysed epidemiological, clinical, laboratory, and radiological data.

Results: In 353 patients, COVID-19 affected all age groups, mainly those aged 16–49 years, followed by those aged 50–64 years; 82.43% were male; 68% of infected patients were asymptomatic at presentation and were incidentally positive on contact tracing. Among symptomatic cases, fever (88%) was the most common symptom; of 14 severe COVID-19 patients with pneumonia, 8 died. Leukopenia, lymphopenia, thrombocytopenia, and abnormal liver function tests were common lab findings. Thirty patients had radiographic evidence of pneumonia. The most common complications were acute respiratory distress syndrome, multiple organ dysfunction syndrome, and kidney injury. The case fatality rate was 0.02%, and the Sequential Organ Failure Assessment score>6 was a surrogate marker for admittance to the intensive care unit.

Conclusion: Low case fatality rate and SOFA score surrogate for ICU admittance.

Keywords: *SARS-CoV-2, novel coronavirus pneumonia, rural community, severity, SOFA score.*

Corresponding Author:
Vandana Tyagi
Ex-attending consultant, Department of Critical Care, Fortis Hospital, Mulund Mumbai, India; Ex-Senior Clinical fellow (Critical Care) Royal Brompton and Harefield NHS Trust UK, Ex-junior consultant, Critical Care Services Specialty, Medical ICU, SMS Hospital, Jaipur, Rajasthan, India
e-mail: drvandantyagi@gmail.com

Introduction

Coronavirus disease 2019 (COVID-19) is caused by coronavirus-2 (SARS -CoV-2) and may lead to severe acute respiratory syndrome; SARS -CoV-2 is an enveloped, single-stranded, positive-sense RNA virus that varies in length from 26–32 kb.[1] COVID-19 originated in Wuhan, China in December 2019, and the World Health Organization (WHO) declared it a pandemic on 11 March 2020. Phylogenetic analysis has revealed four viral clades: O (ancestral clade from China), B (from China), A3 (from Iran), and A2a (from

Iran, Europe, and other countries); these clades are in circulation in India, with A2a comprising the dominant type.[2]

Since the first laboratory-confirmed case of SARS-CoV-2 in India was reported in Kerala on 30 January 2020, patients with COVID-19 pneumonia have been presenting to hospital emergency departments with severe acute respiratory illness (SARI).[3]

The transmission of SARSCOV-2 is usually via airborne droplets to nasal mucosa in closed environments, by close contact between people, and by touching contaminated surfaces; the incubation period is 2–14 days with a basic reproduction number of 2.2.[4]

The COVID-19 infection spectrum consists of asymptomatic infection, mild upper respiratory tract illness, fever, cough, shortness of breath, pneumonia, and other respiratory tract symptoms. In many cases, these symptoms progress to severe respiratory failure and death.[4]

In India, the initial COVID-19 testing strategy included people who had an international travel history with symptoms, symptomatic contacts of lab-confirmed COVID-19 patients, and symptomatic health care workers managing patients with influenza-like illness or SARI. The case definition for influenza-like illness was a fever of >38°C, cough, and onset within the last 10 days. The SARI case definition was an acute respiratory infection with a history of or current fever >38°C, cough, and onset within the last 10 days that required hospitalisation.

Suspected cases and positive cases based on reverse transcriptase-polymerase chain reaction (RT-PCR) results were initially admitted in a separate, designated isolation area at Shri Sanwaliyaji Government District Hospital Chittorgarh starting 23 May 23 until 8 May 2020.from then onwards consistent with the dynamic health situation, the Rajasthan government established COVID-19 care facilities at Shri Sanwaliyaji Government District Hospital Chittorgarh on 8 May 2020 for mild and moderate illness, with five satellite quarantine care facilities operated concurrently; patients with severe illness were referred to the Rabindra Nath Tagore Medical College and COVID Centre, Maharana Bhupal Government Hospital Udaipur, for special and critical care facilities after initial stabilisation at our centre. The COVID care centre placed separately had 100 beds with 56 (high-dependency unit [HDU] = 6, intensive care

unit [ICU] = 4) additional 120 beds in main hospital (HDU = 48, ICU = 15). Apart from medical treatment, a nutritious diet, psychological counselling, and nursing care were provided, and patients with mild to moderate disease were provided yoga therapy. This study was carried out to document the community based clinical and epidemiological characteristics of SARSCOV-2 infection in rural Rajasthan making it distinct from urban and hospital based studies.

The testing strategy adopted was according to Indian Council of Medical Research (ICMR) guidelines. The purpose of the current study was to analyse and describe the epidemiological and clinical characteristics of COVID-19-positive SARI cases during a 4-month period from 23 March to 23 July 2020.

Method

This retrospective, observational study included adult patients with SARI admitted to the COVID care facility in Chittorgarh, the designated management centre for mild and moderate illness that included a quarantine care facility. Necessary preventive measures and management protocols for all patients with suspected infection, as suggested by the Indian Ministry of Health and Family Welfare, were followed. The study was cleared by the ethical committee of the hospital.

All patients were triaged for SARI in a separate isolation area, and all infection prevention and control practices were followed, including personal protective gear for the physicians, nurses, and paramedical staff as per the protocol of the Ministry of Health and Family Welfare. The isolation facility at the COVID care centre was assessed for preparedness according to a standardised checklist from the National Centre for Disease Control in New Delhi.

Data Collection: Epidemiological, demographic, laboratory, clinical management, and outcome data were extracted from the database of all patients with SARI admitted to the centre. The data were checked by three independent physicians; a fourth researcher adjudicated any difference in interpretation.

Study Outcomes: The primary composite endpoint was ICU admission, use of mechanical ventilation, or death.

Laboratory Procedures: Nasal or oropharyngeal swabs were obtained from all patients with SARI depending on patient cooperation and were tested for

confirmation of SARS-CoV-2 using real-time RT-PCR (rRT-PCR). Specimens were obtained on day 1 of admission and again on day 5 if the first sample was negative. After collection, the nasal and pharyngeal swabs were inserted into the same 2-mL cryovial containing viral transport medium. The swabs were pressed to the side of the cryovials and then broken off into the cryovials. Specimens were stored and transported to the laboratory at 4°C. A single positive test was sufficient to declare positive results. For patients with SARI who exhibited a highly suspicious radiological appearance on chest radiographs, two consecutive negative tests were conducted before being discharged or transferred to the non-COVID area at the facility.

Routine blood examinations included complete blood count, arterial blood gases, coagulation profile, and serum biochemical tests for renal and liver function, creatinine kinase, lactate dehydrogenase, electrolytes, and cardiac enzymes. Chest radiographs were performed for all patients. The frequency of examinations was determined by the treating physician. All epidemiological, clinical, and laboratory data were recorded.

Definitions: Fever was defined as an axillary temperature ≥37.5°C. Sepsis and septic shock were defined according to the 2016 Third International Consensus Definition for Sepsis and Septic Shock. Acute kidney injury (AKI) was diagnosed according to Kidney Disease: Improving Global Outcomes clinical practice guidelines. Acute respiratory distress syndrome (ARDS) was diagnosed as per the Berlin definition.

Secondary infection was diagnosed when patient developed signs and symptoms of pneumonia or bacteraemia and a positive culture of a new pathogen was obtained from lower respiratory tract specimens (qualified sputum, endotracheal aspirate, or bronchoalveolar lavage fluid) or blood samples after admission.

Acute cardiac injury was diagnosed if serum levels of the cardiac biomarker creatine kinase (CK)-MB was above 99th percentile of the upper reference limit or if new abnormalities were detected on electrocardiography or echocardiography. Myocarditis was diagnosed based on acute chest pain suggestive of cardiac origin, acute onset of tachycardia or bradycardia on electrocardiography, intraventricular conduction defects, and secondary ST-T wave changes.

Hypoalbuminemia was diagnosed as serum albumin <3.5 g/L. Leucopoenia was defined as absolute leucocyte count <4000/mm^3. Lymphocytopenia was defined as absolute lymphocyte count <1500/mm^3. Thrombocytopenia was defined as platelet count <150,000/mm^3. Monocytosis was defined as absolute monocyte count >950/mm^3.

As per WHO guidelines, COVID-19 pneumonia was considered as severe if the patient had fever or suspected respiratory infection plus one of the following: 1) respiratory rate >30 breaths per minute, 2) severe respiratory distress, or 3) SpO$_2$≤93%. Patients with COVID-19 pneumonia not fulfilling the criteria for severe pneumonia were considered to have non-severe COVID-19 pneumonia.

Results

Patient characteristics are reported in Table 1. There were 353 COVID-19-infected individuals, of whom 291 (82.43%) were male. The predominant age group at presentation was 16–49 years, followed by 50–64 years. Two hundred forty (68%) infected patients were asymptomatic at presentation and were determined to be positive upon active community contact tracing by public health officials. Fourteen had COVID-19 infection and were initially managed at the COVID care centre but were subsequently referred to the dedicated centre for severe COVID -19 patients at Rabindra Nath Tagore Medical College Udaipur.

In individuals who were symptomatic at presentation, the median duration from onset of symptoms to admission in the COVID care centre was 3 days. These patients included 4 health care professionals, 3 municipality staff, 2 police force members, and 8 prisoners all of these recovered.

Among symptomatic cases, fever (88%) was the most common symptom at presentation followed by sore throat (85%), body aches (72%), anosmia(,1%), altered taste sensation(,1%),dyspnoea, rhinorrhoea (<1%), diarrhoea, and abdominal pain (<1%). One young patient initially presented with myocardial infarction; no patients presented with stroke or deep venous thrombosis. Two patients, one in puerperium and another in the first trimester of pregnancy, were positive and had an uneventful recovery.

There were 14 severe COVID-19 pneumonia cases referred to the COVID care centre for further treatment:

8 of these patients died, 5 of whom had 1 or more comorbidities; the remaining 6 patients were transferred to the community COVID care facility upon stabilisation.

Thirty-nine subjects had a history of underlying chronic obstructive pulmonary disease and were predominantly male, 11 had type 2 diabetes mellitus, 17 had hypertension, 2 had an underlying malignancy, and 2 had underlying chronic kidney disease. Three patients had silent hypoxia at presentation.

Radiological and laboratory findings: The laboratory parameters and clinical characteristics of patients with COVID-19 are shown in Tables 2, 3, and 4. Thirty patients exhibited radiographic features suggestive of pneumonia. The most common pattern on chest radiograph was bilateral patchy nodular or interstitial shadows in 26 patients; other patterns included peripheral interstitial infiltrates and basal nodular interstitial infiltrates. Two patients had unilateral infiltrates. No patients had pneumothorax or pneumomediastinum.

Leucopenia was observed in 32 patients, thrombocytopenia in 9; and lymphopenia in 2; no patients displayed monocytosis. Hypoalbuminemia was present in 4 of the 14 patients with severe COVID-19 pneumonia; no other patients had hypoalbuminemia. An elevated CK-MB level was observed in 2 patients and AKI was in 8 patients with severe COVID-19 pneumonia. Accordingly, hypoalbuminemia and AKI were observed in patients with severe COVID pneumonia who one of the primary outcomes.

Vital signs and organ dysfunction: Vital signs and clinical characteristics are reported in Table 4. Patients with severe COVID-19 pneumonia more frequently exhibited tachycardia, tachypnoea, and reduced SpO_2 (<93%) and PaO_2. These patients also had one or more organ injury in the form of AKI and elevated CK-MB level and SOFA scores.

Of the 14 patients with severe COVID-19, 10 were male and 4 were female, 8 had comorbidities, and 6 had no comorbidities. Five of 8 patients who died had comorbidities, of which chronic obstructive pulmonary disease (COPD) was the most common, followed by diabetes, hypertension, and obesity; the age range of those who died was 50–80 years; 5 were male, and 3 were female. Among the 8 who died, 1 had single organ dysfunction, and 7 had multi-organ dysfunction.

Treatment and main interventions: All patients with SARI received oral antibiotics (oseltamivir 75-mg tablets twice daily for 5 days, azithromycin 500-mg tablets once daily for 5 days); those with SpO_2<92% received supplemental oxygen therapy. Patients who tested positive were given hydroxychloroquine (400 twice daily on day 1 followed by 200 mg twice daily for 4 days) and azithromycin (500 mg once daily). Those with a low bleeding score were given low-molecular weight heparin on a case-to-case basis. Ten patients received vasopressors. Thirty-three patients required oxygen, including 14 who required ICU care, 12 of whom required mechanical ventilation.

Table No: 1:Characteristics of study population

	Patients n=353		(%)
	M	**F**	
Characteristics Age (in years)			
16-49	235	46	
50-64	45	13	
>65	9	3	
Gender			
Male	291		
Female	62		
Residence			
Rural/semi urban	353		100%

	Patients n=353		(%)
	M	**F**	
Profession			
Health Workers	4		
Sanitation workers/Civic Administration including police	5		
Others (agricultural workers/businessmen, other population	340		
H/O travel to infected region H/O contact with laboratory confirmed case			
Smoker (yes)	40		

Table No. 2: Clinical profile of COVID -19 infected individuals

	All patients n=353	(%)
Signs and symptoms (at presentation/screening) Asymptomatic	240	68%
Symptomatic	113	78%
Fever	88	
Sore throat cough	85	76%
Myalgia	72	63.7%
Headache	23	20.35%
Chest pain	2	1.76%
Breathlessness	2	1.76%
Diarrhea	2	1.76%
Abdominal pain	2	1.76%
Comorbidity	n = %	
No of patients with comorbidity	57	16.1%
Type of comorbidity hypertension	17	29.82%
DM	11	19.2%
COPD	39	68.42 %
CVD	2	3.5%
Hypothyroidism	-	
CKD	2	3.5%
CLD	-	
Malignancy	2	3.5%
Obesity	17	4.81%

Table No. 3: Laboratory and radiological features of COVID -19 subjects

Investigation	Value	Subjects (n=353)
White blood cell count	>10,000/ul	12
	<4000/ul	32
Absolute lymphocyte count	<1500/ul	2
Platelet count	<1,50000/ul	9
Srcreatinine	>1.5mg/dl	14
Total Bilirubin	>3mg/dl	8
Alkaline phosphatase	>116IU/L	7
AST	>37IU/L	33
ALT	>63IU/L	22

Investigation	Value	Subjects (n=353)
SrCRP	>3mg/L	16
ESR	>20mm/hr	56
SrLDH	>234U/L	45
Raised CKMB		9
Raised Trop(I)		1
Atypical pneumonia in chest xray		30

Table No. 4: Outcomes in relation to co morbidities in severe COVID-19 cases

Number of patients n=14		Incidence of death n=8		Incidence of discharge n=6	
With Comorbidities	Without Comorbidities	With Comorbidities	Without Comorbidities	With Comorbidities	Without Comorbidities
8	6	5	3	3	3

Table No.5: Outcomes in relation to SOFA score

Number of patients			Incidence of death			Incidence of discharge		
SOFA score	SOFA score	SOFA score	SOFA score	SOFA score	SOFA score	SOFA score	SOFA score	SOFA score
0-8	9-16	17-24	0-8	9-16	17-24	0-8	9-16	17-24
4	2	8	-	-	8	4	2	-

Discussion

The progression of the COVID-19 pandemic in India can be divided into three frames of progression as follows.

The initial period of early lock down by government of India starting from March 25, 2020: During this time, cases were predominantly individuals living in urban areas, those returning from COVID-19-affected countries and predominantly affected urban areas and their contacts, including tourists.

The period starting from the migrant labour movement, somewhere in the midst of the lockdown until the guarded unlocking: During this time, cases started to rise in semi-urban and rural areas due to migrant labourers.

The period of guarded unlocking from 1 June 2020 until the date with constraints on the unlocking in containment zones. During this time, cases continued to rise in rural and semi-urban areas as the process of guarded unlocking was undertaken.

The present study represents one of the largest cohorts of a semi-urban and rural population for a COVID-19 study and is community-based, as the COVID care centre was the first point of contact in the community in association with the COVID health care facility; hence, the patients are representative of the rural population of southern Rajasthan, India. Accordingly, these data represent the community-based epidemiological and clinical pattern of COVID-19 in this rural population, which is distinct from the hospital-based data from urban centres that display different socioeconomic and demographic characteristics; the hospital-based data representing a semi-urban and rural population may represent more serious and critical patients and thus differ in their findings.

At our centre, 353 COVID-19-infected individuals were observed and treated. The median time from symptom onset to COVID care centre admission was 3 days, which included the delay in logistical arrangements and sample processing. COVID-19 affected all ages ranging 5–80 years. Most were aged 16–49 years (59.49%), followed by 50–64 years (16.43%). Male patients constituted the majority, as younger men are more likely to be mobile and hence more susceptible to infection. This finding is consistent with other studies reporting a similar male preponderance.[4,5]

The clinical spectrum of COVOD-19 varies widely from asymptomatic to critical illness. In the present series, most infected patients were asymptomatic (68%), which contradicts the findings of Gupta et al, who reported that 42.9% of patients were asymptomatic.[6] Asymptomatic subjects may recover without experiencing symptoms. More recently, the proportion of infected of mild or asymptomatic cases was estimated to comprise 60% of all infections; this is comparable to the present finding of 68%.[7] Symptomatic and asymptomatic patients exhibit a comparable viral load, suggesting a strong transmission potential; hence, this is of important public health significance in controlling spread of COVID-19.[8] Ideally, large-scale screening using antibody testing should be combined with rT-PCR; however, in our study, only rT-PCR testing of nasopharyngeal swabs was performed as per the prevalent guidelines by the regional health agency.[9]

Among 113 symptomatic patients, the most common symptoms were fever (78%), sore throat and cough (76%), and body aches and myalgia (64%). Less common symptoms included headache, abdominal pain, nasal discharge, chest pain, anosmia, vomiting, and chemosensory dysfunction. Atypical symptoms such as loose stool, altered sensorium, and painful abdomen were found in <1% of patients. Some hospital-based studies have reported dyspnoea as the most common symptom at hospital admission; however, our study showed sore throat, malaise, and body aches as the most common symptoms—this may be due to the community representation comprising our database. Most studies have reported gastrointestinal symptoms including nausea, vomiting, and diarrhoea, with an incidence of less than 10%.[9-11] In addition, Bhandari et al observed that cough was a major symptom, followed by fever, whereas Wang et al reported fever as the most common symptom.[5,12]

Of the 353 infected patients, 57 (16.1%) had comorbidities, of which COPD was the most common (39 [68.42]), followed by hypertension (17 [29.82%)]), diabetes mellitus (11 [19.2%]), cardiovascular disease (2 [3.5%]), chronic kidney disease (2 [3.5%]), and malignancy (2 [3.5 %]). Patients with severe COVID-19 infection had one or more comorbidities. The most common coexisting illness in patients who met one of the primary outcome was COPD, followed by diabetes and hypertension; these patients were also more likely to be have one or more underlying comorbidities.

In relation to complete blood cell counts, leucopenia was present in 20.96% of patients, lymphocytopenia in 4.8%, monocytosis in <1%, and thrombocytopenia in 25.49%. In similar studies, Bhandari et al and Zhang et al reported higher incidences of lymphopenia at 52.3% and 75.4%, respectively; this can likely be explained by the predominance of asymptomatic patients in the present study. In addition, serum creatinine was elevated in 16 patients (4.5%) and abnormal liver function tests were observed in 24 patients (67.98%), with elevated aspartate transferase in 65.1% and elevated alanine aminotransferase in 50.9%.[5,13] followed by elevated levels of alanine aminotransferase, aspartate aminotransferase, and bilirubin. Viral infections are often associated with "bystander hepatitis", indicating mild elevations of transaminases without compromised liver function. This may also be observed with COVID-19 infection for which liver failure has not been reported, even in the most severe and fatal cases.

AKI was observed in 16 patients and in all who met one of the primary outcome. Three postulated mechanisms include a direct viral effect on nephrons, sustained hypoxia due to type I respiratory failure, and circulatory shock. Moreover, elevated CK-MB was significantly increased in 2 patients who died, but it was not correlated with troponin-I levels or electrocardiographic changes; this may be because CK-MB is more commonly associated with thrombo-inflammation rather than a cardiac origin.

Guan et al reported that patients with comorbidities had a 1.79–2.59 times greater risk of mortality when compared to patients without comorbidities.[14] Similarly, in a meta-analysis, Yang et al stated that the odds ratio of developing severe disease in patients with hypertension, respiratory disease, or cardiovascular disease was 2.36–3.42.[12,15]

In contrast to prior results, the relative risk of death in patients with comorbidities in our series was 1.7. This may be because we studied a rural, community-based cohort, rather than a hospital-based cohort; moreover, in the prior studies, the authors defined their endpoints as invasive ventilation, severe disease, and death,further more the, populations of these studies were genetically, immunologicaolly and geographically distinct from the study population.

Furthermore, high mean SOFA scores (Table 7) are a red-flag sign and a surrogate marker for initiation of

early intensive care therapy, and Vincent et al previously stressed the role of organ failure on mortality in patients with COVID-19.[16] In our series, relative risk of death in patients with multi-organ dysfunction was higher than that compared to patients with single-organ dysfunction; moreover, the relative risk of patients with COVID-19 and a SOFA score ≥17 was more than twice that of patients ≤16; these findings are similar to those of Ruan et al.[17]

The case fatality rate in our study was 0.02. Each country and its various regions have unique advantages and problems while dealing and reporting in a pandemic; when analysed, this will provide data that can be used for more effective management of the COIVD-19 pandemic. Contact tracing, early timely lockdown measures, and guarded unlocking with use of circuit breaker lockdowns as cases spiked during guarded unlocking were actively undertaken by health authorities in Rajasthan; this led to early infection identification, partially mitigating complications because of delayed diagnosis. This may also contribute in part to the abundance of mild and moderate cases and fewer complicated severe cases in the study cohort, although there are other possible explanations such as rural demographics and population distribution, less overcrowding, and a relatively large young population. The COVID-19 fatality rate in India is among the lowest in the world (2.8% against a global average of 4.7%), and the disease has also been observed to be less severe among Indians, with a significantly higher recovery rate (60.9% versus a global average of 56.6%) and doubling time (20.3 days) as compared to populations elsewhere.[18-20]

Intriguingly, case fatality rates in India as a whole are lower than that in Western countries. There are several postulated causes that may explain this phenomenon. First, Indians are exposed to a relatively abundant microbial load early in life, conferring broad-based immunity to the population.[21,22] Second, immunological variations result from heritable and non-heritable influences. Heritable factors include germline inheritance, which exhibits only a minor influence on inter-individual and population variation in immune responses.[23,24] Heritable factors account for only 22% of the overall variation in gene expression.[25] In contrast, non-heritable influences are the major factor driving immunological variation and include environmental influences, such as infections, vaccines, stochastic epigenetic changes arising from imperfect replication machinery, and symbiotic and pathogenic microbes.[21,22] Third, owing to the endemic

nature of human immunodeficiency virus, malaria, and tuberculosis in India, there is a continuous pathogenic assault to the immune system, leading to a proactive cell-mediated immune response. Fourth spices and herbs such as turmeric, cloves, ginger, mustard, saffron, cardamom, pepper, and garlic are essential ingredients in Indian cuisine. These spices are rich in bioactive compounds and phytochemical which possess medicinal antiviral and immunomodulatory properties.[24] Fifth, chloroquine is used as an antimalarial in India and may possess immunomodulatory properties. Sixth, the Indian population manifests high genetic diversity in the human leukocyte antigen (HLA) complex, an immune response gene; this diversity is much more extensive than that in the Caucasian population—this diversity is attributed to a lifelong exposure among Indians to a high microbial load.[25] Two single nucleotide polymorphisms—S19P (common in Africans) and K26R (common in Europeans)—can potentially affect the interaction between angiotensin converting enzyme-2 (ACE2) and the SARS-CoV-2 spike glycoprotein. While the former decreases ACE2 affinity for the spike protein and lowers viral susceptibility, the latter increases receptor affinity and predisposes to more severe disease.[25] Hence, genetic polymorphisms in ACE2 receptors might be an important factor in determining susceptibility to SARS-CoV-2. Seventh, a unique micro-RNA (miRNA), hsa-mi R-27b, specifically targets the Indian SARS-CoV-2 genome; hsa-mi R-27b has not been detected in non indian population . It has been hypothesised that hsa-mi R-27b plays a specific defensive role against SARS-CoV-2 in the Indian population harbouring this unique sequence.[26] These findings indicate a possible link between host miRNAs and disease severity as well as treatment outcomes. Eighth, Indians have a higher percentage of nature killer (NK) cells compared to that in other ethnic groups.[27] It has been postulated that the development, tolerance, and activation of NK cells are regulated by killer cell immunoglobulin-like receptors (KIR) present on their surface. These receptors interact with the HLA class I molecules expressed by target cells and regulate cytolytic activity. While most KIRs are inhibitory and tend to suppress NK cell function, activating receptors such as KIR2DS1-5 and KIR3DS1 are upregulated in viral infections and host cell aberrations. All activating KIRs (except KIR2DS4) are encoded by the B haplotype, which is more prevalent in non-Caucasian populations such as Asian Indians than in Caucasian populations.[28] Accordingly, Indians might have acquired activating KIR genes through a process of natural selection that

enabled them to survive epidemics during their pre-historic migrations from Africa.[29] Ninth, live attenuated vaccines such as those for Bacillus Calmette-Guérin and mumps/measles/rubella (MMR) are commonly administered during childhood and have confer non-specific protection against unrelated lethal infections by inducing "trained" non-specific innate immune cells for a more efficient host response against a wide range of pathogens.[13] The above points comprise interesting areas for active research. In addition to development of an ideal vaccine against SARS-CoV-2, having a trade off with time bioengineered antibodies and the use of computational method and laser microscopes for drug repurposing are additional exciting areas of research for therapeutics for COVID-19.

In southern Rajasthan, the following may have helped to control infection severity: 1) constructive coordination between various nodal and inter-nodal agencies of both the central and state government; 2) an aggressive response from the civic administration; public health agencies; medical, paramedical, and sanitation workers; and police and social law enforcement agencies; and 3) implementation of hand hygiene and social distancing measures. Active contact tracing was continued even when cases started to rise and at later stages—contact tracing in the COVID-19 pandemic is important even in advanced stages of the pandemic, as COVID-19 occurs in clusters and spreads, as opposed to influenza, which manifests waves of progression—this highlights the importance of contact tracing, even at advanced stages of the pandemic.

There are several study limitations, including the retrospective design and a setting of limited resources wherein all tests could not be performed for all patients.

Conclusion

This single-centre case series from the COVID care centre in Chitorgarh examined 353 hospitalised patients with COVID-19; 14 of these patients had severe COVID-19 pneumonia that required ICU care. Of these 14 patients, eight died, for a severe case fatality rate of 0.02. The most common symptoms were fever and cough, and the most common complications were ARDS, AKI, and multiple organ dysfunction syndrome. The current data strongly suggest that active contact tracing, even in the advanced stages of the pandemic, can control the spread and help mitigate the risk. More studies are required for using SOFA score as a surrogate marker for ICU care.

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A Qualitative Study of the Implementation of Occupational Health and Safety Management Systems at Ibnu Sina Hospital, Makassar City, Indonesia

Andi Alim[1], Arlin Adam[2], Zainuddin[1], Yusrifal Jafar[3]

[1]Assistant Professor, [2]Professor, [3]College Student,
Department of Public Health, University of Pejuang Republic Indonesia

Abstract

Background: Occupational health and safety management system is a concept of managing occupational health and safety systematically and comprehensively in a complete management system. This study aims to obtain information about the level of implementation of the Occupational Health and Safety Management System at Ibnu Sina Hospital, Makassar City.

Method: This study uses descriptive qualitative method. The data obtained through in-depth interviews were then analyzed using a deductive mindset.

Results: Commitment and policies exist and have been issued in the decision of the Hospital Director. Planning is carried out by the planning subdivision which collects occupational health and safety data. Implementation is carried out by socialization/counselling on Occupational Health and Safety, training and installation of light fire extinguishers, use of personal protective equipment, installation of dangerous signs on equipment that pose a danger. Measurement is assessed by staff compliance to work while performance evaluation cannot be implemented. Monitoring has not been carried out on the Occupational Health and Safety Policy.

Conclusion: The implementation of the Occupational Health and Safety program is still not being implemented. So it is suggested to hospital managers to further increase the efforts of the Occupational Health and Safety Management System.

Keywords: Commitment and policy; Implementation; Measurement and evaluation; Monitoring; Planning.

Introduction

Development developments in all sectors of industrial and service activities are increasing in line with economic growth. However, in addition to having

Corresponding Author:
Dr. Andi Alim
Assistant Professor, Department of Public Health,
University of Pejuang Republic Indonesia, Jl. G.
Bawakaraeng No. 72, Makassar City, Sulawesi Selatan,
Indonesia
e-mail: andi_alimbagu@yahoo.co.id

a positive impact on development, it also has a negative impact, namely affecting the health and safety risks of workers[1].

Labour protection is one of the important components in the implementation of occupational health and safety programs which aim to protect workers against risks of transmission of occupational diseases and safety of their souls, as stated in Law No.36/2009 concerning health that in every workplace, it is obligatory to organize occupational health efforts if the workplace employs more than 10 workers[2].

Hospitals as a service industry have at least contributed to various labour problems because among the several cases that have occurred, health workers have

experienced work accidents, therefore it is obligatory for all hospitals to implement Hospital Occupational Health and Safety efforts[2].

A national survey in the USA of 2,600 hospitals shows that an average of 68 employees experience injuries and 6 of them experience work-related illnesses such as stab wounds, abrasions, contusions, lacerations, back injuries, burns and fractures[3].

Some cases of chronic diseases experienced by health care workers in hospitals such as hypertension, varicose veins, anaemia (mostly women), kidney and urinary tract diseases (69% women), dermatitis and urticaria (57% women) as well as spinal pain and displacement of intervertebral discs. Besides, several acute illnesses have also been experienced by health workers at the hospital, including infectious and parasitic diseases, respiratory tract, gastrointestinal tract and other complaints, such as earaches, headaches, urinary tract disorders, childbirth problems, disorders during pregnancy, diseases of the skin and muscle and skeletal system as stated by Gun (1983) in the Decree of the Minister of Health No. 432/2007[4].

Based on the preliminary survey, data on occupational diseases at the IbnuSina Hospital does not have data because employees when registering as employees are not subjected to preliminary examinations as well as after work, employees have themselves checked personally. Although management functions such as commitment and policies, planning, implementation, measurement and evaluation and monitoring have been implemented, efforts to assess the performance of the Hospital Occupational Health and Safety committee have not been implemented optimally. This can be seen by the fact that there are still jobs that experience occupational diseases and accidents. Work accidents at IbnuSina Hospital in 2014-2015 were needle sticks, burns, cuts, falls, fractures, slips, and other workplace accidents. Starting from this, the researcher wants to know the extent of the implementation of the Occupational Health and Safety Management System in the scope of the IbnuSina Hospital, Makassar City.

Method

The research used is descriptive research using qualitative analysis method that describe the implementation of the Occupational Health and Safety Management System at the IbnuSina Hospital, Makassar City. Meanwhile, the research location is the IbnuSina Hospital, Makassar City on June 20 to July 20, 2019. The informants in this study were the leadership and staff of the IbnuSina Hospital who was in the Hospital Infrastructure Installation room.

Data collection taken in this paper is primary data and secondary data. Primary data in this study were obtained by conducting in-depth interviews directly with informants. In-depth interviews are a method used in the data collection process to be able to dig deeper into information from informants, where researchers get information and data about the implementation of Hospital Occupational Health and Safety orally from informants[5].Meanwhile, for secondary data in the form of collecting documents related to Hospital Occupational Health and Safety as well as OHS policies and regulations made by the hospital management as well as other references related to this research.

Data processing was processed manually using computers and presented in narrative form and discussed descriptively on each research variable. Meanwhile, the data analysis is descriptive analysis with data collection, data reduction, data presentation, and concluding.

The emic approach (emic dimension) is used in presenting the data in this study. Emic dimension is identifying the informant's problem and describing what was heard without affecting the informant's own opinion.

Results and Discussion

Commitment and Policy: From the results of interviews conducted, the policy in implementing the Health and Safety Management System at IbnuSina Hospital, the management budgeted the OHS program, for example, the procurement of PPE in the hospital budget work plan. Policies in the implementation of the Occupational Health and Safety Management System are by providing the necessary operations, facilities and infrastructure as well as making rules and preparing hospital budget funds.

Budget allocation to support Hospital Occupational Health and Safety policies was also put forward through the research of Purba et al (2018) where the Mitra Sejati Medan Hospital also made funding allocations by the implementation of the Occupational Health and Safety program. The budget allocation is made every 3 (three) months and is coordinated again[6].

Sunandar et al (2017) in their research suggest that Makassar Haji Hospital has established a written OHS policy regarding the implementation of Occupational Health and Safety (OHS). The policy is top-down, meaning that the hospital leadership already has OHS service standards in the hospital, then it is adopted and adapted to the hospital conditions. The policy is formulated by the Hospital Occupational Health and Safety team and conducts consultation with related parties, then it is proposed to the director and signed. The policy is copied to all related units/working groups, communicated in the form of socialization or simulation activities[7].

Planning: In the planning of the Occupational Health and Safety Management System, the data collection process is carried out by each installation and then it is recapitulated and deposited in the planning section of the IbnuSina hospital. The planning form of the Occupational Health and Safety Management System is carried out by socializing, budgeting funds and recording reports that are reported to the OHS team while this is done in stages starting with the head of the OHS working group contacting the OHS chairman according to available costs. The planning process is seen at points that can cause danger and the planning process is carried out by holding counselling in collaboration with the Hospital Public Health Extension Officer which is a forum for delivering the OHS program which is carried out every Thursday. The planning of the Occupational Health and Safety Management System at the IbnuSina Hospital in terms of the results of the assessment of the identification of potential sources of danger is carried out by considering conditions and events that give rise to potential hazards and occupational disease data.

This is in line with J. Tjakra, et al. In planning OHS involving workforce personnel who are appointed to be administrators in the OHS organization. The hospital has a procedure that requires all workers, whether old, new or transferred, get an explanation of the OHS Policy and training according to the type of work[8].

Implementation: The form of implementation of the Occupational Health and Safety Management System at IbnuSina Hospital by disseminating the OHS program to nurses and other staff including cleaning services and conducting outreach by Public Health Education at the Hospital to deliver the OHS program. The implementation of hazard control at the IbnuSina Hospital by installing Light Fire Extinguishers in each treatment room and other rooms including offices, procurement of signs, and installation of dangerous signs such as gensets with fences and PPE (Personal Protective Equipment) in the form of masks, boots, helmed, and gloves.

The implementation of the Occupational Health and Safety Management System at the IbnuSina Hospital is carried out by working by the proportions, for example in the special disaster section dealing with emergencies, emergency response, and First Aid in Accidents. The source of the danger has been identified but the SOP (Standard Operating Procedure) has not been fully implemented such as in fires, fire SOP is by using a light fire extinguisher but not all employees know how to use a light fire extinguisher because there is no fire simulation. Meanwhile, the implementation of the Occupational Health and Safety Management System is carried out by applying to visitors, patients, and officers by holding OHS counselling through the Hospital Public Health Promotion so that signs or dangerous locations can be seen as often as possible.

A study conducted by Olii et al (2019) shows that the lack of hospital facilities and infrastructure will lead to inadequate implementation of the OHS program. Implementation of guidance and supervision of fire prevention and control, in this case, emergency response management has not been implemented by the hospital due to the lack of facilities and infrastructure, such as the absence of a light fire extinguisher, automatic fire extinguisher (sprinkler), smoke detector, fire alarm, hydrant[9].

Measurement and Evaluation: Measurement of the performance of the Occupational Health and Safety Management System at IbnuSina Hospital is carried out by measuring the level of staff compliance to implement the Standard Operating Procedure (SOP) for OHS prevention and control based on the OHS SOP determined by the hospital: 1) Safety and Security, 2) Disaster Plant, 3) Hazardous and Toxic Materials, 4) Utilities, 5) Fire, 6) Medical Facilities, 7) PPE, 8) Environmental Management Efforts and Environmental Monitoring Efforts and, 9) Development of No Smoking Areas. Monitoring the performance of the Occupational Health and Safety Management System at the IbnuSina Hospital is carried out by the heads of each room who will later report to the OHS team and see from the completeness of the records carried out by the OHS chairman. Meanwhile, seen from the compliance of

officers using PPE (gloves, masks, rubber boots, and helmed).

Maleke et al (2019) in their research show that reporting and evaluation related to work accidents in hospitals have been carried out according to procedures, for example if an accident occurs due to work, the staff must first report to the unit then the head of the unit where the staff works, report directly to superiors then the superior immediately reports to the head of personnel and OHS, because the OHS team will record and report when a work accident occurs[10].

Monitoring: Monitoring of the Occupational Health and Safety Management System at IbnuSina Hospital monitoring is not carried out or not achieved because there has been no periodic review of OHS policies, the OHS chairman and the OHS secretary are not OHS experts, lack of human resources at IbnuSina Hospital who are OHS experts or have ever been received OHS training, so the implementation of the Occupational Health and Safety Management System at the hospital seemed slow. The cause of not carrying out this monitoring is because the IbnuSina Hospital has not monitored the implementation of the Health and Safety Management System policy. Meanwhile, it is still in the stage of making policies, making rules, and making Standard Operating Procedures (SOP).

A study conducted by Salikunna & Towidjojo (2011), at the monitoring and evaluation stage, only 44.44% of employees stated that the hospital had carried out the monitoring and evaluation stage, while the remaining 55.56% stated that the hospital did not perform this stage. In contrast, the results of the monitoring and evaluation stages were quite good at 78%. The implementation of OHS has not been fully implemented properly, it can be caused by a lack of skilled human resources or having received OHS training so that the implementation of the OHS management system in the hospital seems to be running in place. Another factor is the lack of support from the hospital leadership and management to develop the OHS management system in the hospital and most employees do not fully understand the importance of occupational health and safety in carrying out work in the hospital[11]

Conclusion

Based on the results of research and discussion of all descriptions of the implementation of the Occupational Health and Safety Management System at the IbnuSina Hospital, in general it can be concluded that the commitment and policy of the Occupational Health and Safety Management System at the IbnuSina Hospital exists and has been issued by the Hospital Director's Decree. IbnuSina Makassar regarding OHS Policy, Commitments and policies should always be reviewed to improve work safety and occupational health. Planning is carried out by Sub. The planning division that collects OHS data, OHS management system planning that is implemented while considering risk control by applicable regulatory requirements, and identification of various sources of hazards. Implementation is carried out with OHS socialization and counseling, training and installation of light fire extinguishers, procurement of signs, use of PPE, installing dangerous signs on equipment that pose a danger and working according to SOP. The implementation of the OHS management system appoints personnel who must have qualifications by the applied system. Measurement and evaluation is assessed based on the level of staff compliance to work according to the SOP, while performance evaluation cannot be carried out. Measurement and evaluation should be carried out to determine success or to identify corrective actions. Monitoring has not been carried out on the OHS Policy. Monitoring activities should be carried out by the hospital because this monitoring becomes the material for the OHS chairman in ensuring continuity and effectiveness in achieving policy.

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Predictors of Pro-environmental Behavior of Traditional Market Traders in West Sumatra, Indonesia

Aria Gusti[1], Putri Nilam Sari[2]

[1]*Associate Professor, *[2]*Assistant Profesor, Department of Public Health, Universitas Andalas, Padang, Indonesia*

Abstract

Background: Environmental sanitation in the market is important because that is where buying and selling takes place and often takes the form of direct consumption of goods and services. The market environment, especially in developing countries, is polluted due to social error, improper disposal of domestic wastewater, poor sewage disposal, open defecation and unhygienic sanitation practices.

Aims: This study aims to assess predictors of pro-environmental behavior of traditional market traders in West Sumatra, Indonesia.

Materials and Method: The theory of planned behaviour becomes a reference in this research. The population of the study were traders in Nanggalo Market, Padang City and Ibuh Market, Payakumbuh City. The dependent variable is the pro-environmental behavior of market traders and the independent variable consists of attitude, subjective norm, and perceived behavior control.

Conclusions: Subjective norms and perceived behavioral control are predictors of pro-environmental behavior of traditional market traders.

Keywords: *Pro-environmental behavior, tradonal market, trader.*

Introduction

The idea of reducing the environmental and human health consequences arising from poor sanitation practices has been enacted by past and present government administrations.[1] One of them is pro-environmental behavior. Environmental sanitation in markets is important because that is where buying and selling takes place and often takes the form of direct consumption of goods and services.[2] The market environment, especially in developing countries, is polluted due to social error, improper disposal of domestic wastewater, poor waste disposal, open defecation and unhygienic sanitation practices.[1] Majority of the market traders do not participate in environmental sanitation programme.[3] Pro-environmental behavior refers to the involvement of citizens in the provision, use and maintenance of environmental sanitation facilities and services and compliance with environmental laws. In order to achieve the right environmental sanitation conditions in the market, good pro-environmental behavior and the availability of facilities and services must work simultaneously.

The Indonesian government established two retail classifications (markets), namely traditional markets and modern markets.[3] Traditional markets are places where sellers and buyers meet and are characterized by direct seller transactions. There is usually a bargaining process. Buildings usually consist of stalls or outlets, booths, and open bases that are opened by sellers or a market manager. Most sell daily necessities such as food ingredients in the form of fish, fruit, vegetables, eggs, meat, cloth, electronic clothing, services, and others. In the city of Padang, including traditional markets, such as; Pasar Raya, Alai Market, and Nanggalo Market. While in the city of Payakumbuh, one of the traditional markets is included in the category of healthy markets, namely the Ibuh market.

Modern markets are not much different from traditional markets, but this type of market sellers and buyers do not transact directly. Still buyers see the price tags listed in the goods (barcodes), are in buildings, and services are carried out independently (self-service) or served by salespeople.[4] Items sold, other than food ingredients such as; fruit, vegetables, meat; most of

the other items sold are items that can last a long time. Examples of modern markets in the city of Padang are Plaza Andalas, Basko Grand Mall, and Transmart.

Traditional markets in Indonesia are often uncomfortable visiting because they are identical to dirty places, smelly, muddy, stuffy. It also becomes a breeding ground for infectious animals, such as cockroaches, flies, and mice. Information from various health authorities noted that there were more than 250 types of diseases transmitted through unsafe food. An unhealthy market positively impacts the sale of unsafe food. Data from 2005 shows that 60% of Indonesians obtain food and other daily necessities from traditional markets.[5]

This study aims to assess predictors of pro-environmental behavior of traditional market traders. Furthermore, this study also tries to answer whether there are differences in predictors of pro-environmental behavior between markets that are categorized as healthy markets and those that are not.

Materials and Method

The markets studied were Nanggalo Market in Padang City and Ibuh Market in Payakumbuh City, West Sumatra, Indonesia. The Nanggalo market represents a traditional market that has not been categorized as a healthy market, while the Ibuh market is a traditional market that has received an award as a healthy market. 48 traders were taken as respondents from each market.

Systematic sampling method are used in selecting sample traders in both markets. For the administration of the questionnaire, 2% of traders in each part of the trader category were selected for the survey. Thus, a total of 96 respondents were chosen. This consists of 48 traders from the Nanggalo market and 48 from the Ibuh market

Theory of planned behavior becomes a reference in this research. The dependent variable is the pro-environmental behavior intention of market traders and the independent variable consists of their belief in the concept of pro-environmental behavior (attitude), the influence of the people they think influences them in implementing the behavior (subjective norm), and how easy or difficult it is to behave. pro the environment in which they reside (perceived behavior control).

Results

A total of 96 respondents participated in this study with an equal number in both markets. Female respondents were 65 people, more than 2 times that of male respondents (31 people).

Pro-environmental Intention Behavior: This study examines the intention to apply pro-environmental behavior to traditional market traders. It can be concluded that traders are eager to support the program of utilizing waste as an energy source (91.7%), processing waste into useful and salable materials (60.4%), reusing waste that can still be used (62, 5%), and reduce the use of materials that have the potential to become waste (43.8%).

Knowledge: Most of the traders (87.5%) strongly agree with the statement that environmental behavior can be applied by recycling waste into useful and salable goods. Meanwhile, 79.2% of traders strongly agree with the statement that environmental behavior can be carried out by avoiding using materials that have the potential to become waste, reusing waste that can still be used, and by making waste as an energy source.

Attitude toward Pro-environmental Behavior: This research finding reveals how the attitudes of traders towards pro-environmental behavior. Traders strongly agree that pro-environmental waste management will reduce environmental pollution (93.8%) followed by implementing pro-environmental waste management will make the market environment clean and beautiful (92.7%), and pro-environmental waste management will make waste useful for daily life (85.4%).

Subjective Norm: The head of the market is considered as the most likely person to influence traders' decisions to adopt or not adopt pro-environmental behavior in the market (53.1%), followed by market security officers (51.0%), and public figures (31.3%).

Perceived Behavioral Control: The factors that are considered very likely to be difficult to implement pro-environmental behavior according to market traders are the absence of specific learning about pro-environmental behavior (54.2%), followed by a lack of availability of trash cans in every corner of the market (46.9%), and trash cans there is dirty and smelly (45.8%).

Predictors of Pro-Environmental Behavior:

Table. Multiple Regression Analysis

Predictor	Beta	T	Sig. t
Knowledge	0.041	0.415	0.679
Attitude	0.052	0.532	0.596
Subjective Norm	0.210	2.188	0.031
PBC	0.323	3.273	0.002

The results of the regression analysis show that of the four predictors, subjective norms and perceived behavior control are significant and positive in relation to the intention of pro-environmental behavior. Perceived behavior control was the strongest predictor of intention to adopt pro-environmental behavior compared to knowledge, attitudes, and subjective norms with a beta estimate of 0.323. Subjective norms were also statistically significant predictors of pro-environmental intention behavior.

Discussion

Based on this research finding, knowledge and attitudes towards pro-environmental behavior have no effect on the traders intention to apply or not to implement pro-environmental behavior. This result is not similar to Gusti A, et al[8] who stated knowledge and attitudes has a significant relationship with the sustainable waste management intention behavior. Traders are more practical in thinking and behaving where they behave as other people behave and there is an ease to carry out this behavior.

This result similar to Niaura A[7] and Gusti[9] that correlations between perceived behavior control and the behavioral intentions were found the highest. But not in line with Kumar[9] who state that the strength of significant relationship between attitude and purchase intention is greater compared to the significant relationship between perceived behavioural control and purchase intention

So in general, the intention to apply pro-environmental behavior depends more on social factors, the surrounding environment (subjective norm) and the factors that are easy or difficult according to traders' perceptions to implement pro-environmental behavior in the market. However, majority of the traders do not agree that government provide sanitary facilities and equipment available in the market.[7]

Conclusion

This study assesses predictors of pro-environmental behavior of traders in Ibuh traditional markets in Payakumbuh City and Nanggalo in Padang City. This study determined that subjective norms and perceived behavioral control are predictors of pro-environmental behavior of traders. Traders will adopt pro environmental behavior depending on the people they think they care about. Traders' perceptions of complicating and facilitating factors also influence their intention to adopt or not implement pro-environmental behavior in the market.

These findings can be used as a basis for the city government to improve the pro-environmental behavior of market traders which in turn will improve the sanitation of the market environment.

Conflict of Interest: There are no conflicts of interest.

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Factors Impacting Prescription Practice in Primary Healthcare Setting in India: A Case Study in Rajasthan

**Arup Kumar Das[1], Shyama Nagarajan[2], Ruchi Bhargava[3],
Rajesh Ranjan Singh[4], Ambey Kumar Srivastava[5], Amitabh Dutta[6]**

[1]Deputy Director-Research, M&E and Learning, [2]Managing Director - Saha Manthran Pvt Ltd, [3]Research and Evaluation Manager - Lords Education and Health Society (LEHS)/Wadhwani Initiative for Sustainable Healthcare (WISH), [4]Chief Executive Officer - Lords Education and Health Society (LEHS)/Wadhwani Initiative for Sustainable Healthcare (WISH), [5]Monitoring and Evaluation Specialist - Lords Education and Health Society (LEHS)/Wadhwani Initiative for Sustainable Healthcare (WISH), [6]Senior Consultant & Professor- Institute of Anaesthesiology, Pain, & Perioperative Medicine; Senior Consultant & Professor, Institute of Anaesthesiology, Pain, & Perioperative Medicine; Member Secretary, Ethics Committee, Sir Ganga Ram Hospital, New Delhi

Abstract

Objective: To assess the prescription practices in the Indian state of Rajasthan with a view to demonstrate the effect of provider and system level factors, and their interactions on good prescription practices. The study analysed two major dimensions of good prescription practice; first, the completeness of prescription, a measure of adequacy; and second, the appropriateness of prescription, a measure of quality of care.

Design: A retrospective cross-sectional study with a mixed method approach

Setting: 24 rural and 7 urban government Primary Health Centres of Rajasthan, India

Participants: Audit of 2801 prescriptions from health facility and the service providers in these facilities, including doctors, and nurses

Primary and Secondary Outcomes: The study outcome testified the study objective that provider level factor is critical to assure adequacy and appropriateness of good prescription practice. The secondary level outcome revealed that the system level factors are equally important to ensure compliance to good prescription practice

Result: We found that the documentation of patient complaint, examination findings largely depended on system level factors, such as availability of space in the piece of paper used for writing prescription; because for the doctor documenting diagnosis, and prescribing medicines and investigations were of greater importance. Ownership compliance of doctors, measured in terms of their signature on the prescriptions, emerged as an important factor determining both adequacy and accuracy of prescriptions. Further, the treatment appropriateness, measured in terms of QoC, depends on both provider & system level factors.

Conclusion: There is a need to focus on provider and system level factors to improve prescription practices in primary health care. We recommend that institutional strengthening at systemic & provider level using innovative ways; such as task shifting to nurses as 'physician assistants', and reducing administrative activities of physicians to enhance focus on clinical work can propel better prescription practice.

Keywords: *Prescription practice, appropriateness, compliance, comprehensiveness, disease burden, primary health, signs and symptoms.*

Corresponding Author:
Dr. Shyama Nagarajan
Managing Director - Saha Manthran Pvt Ltd
A 237, 2nd Floor, New Manglapuri, M. G. Road,
Sultanpur, New Delhi-110030

Contributorship Statement: AKD and SN conceptualized and prepared outlined of the paper in consultation with other authors. AKD provided the analytical approach, conducted the data analysis and

drafted the result section. SN conducted literature review and prepared the draft manuscript review with support from RB, RRS, AKS and AD. Final draft is prepared by SN and AKD in consultation with other authors. The final draft was approved by all authors.

Strengths and limitations of this study:

- The study is unique as it uses prescription data to generate indices to measure the quality of care and appropriateness of treatment; to understand the health system perspective-the provider and system-level factors impacting prescribing practices, which is first of it's kind in the context of primary health care services in LMICs.

- The evidence-based prescription practices will be pivotal to assure quality of care, guide policy reform around primary care, especially for digital health and avoid legal battles around medical negligence.

- The study has used a mixed-method approach to summarize the statistical inferences derived from prescription data.

- However, the study was limited by the fact that it wasn't multi-locational and purposefully selecting PHCs of Rajasthan; hence generalizing findings across India can be inappropriate.

Data availability statement: All datasets available are used in the study and included in the manuscript. The datasets can be made available on appropriate request to author by e-mailing to Dr Arup Kumar Das at adas@ wishfoundationindia.org

Patient and Public Involvement statement: Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research

Introduction

Rational medicine use requires patients to receive medication appropriate to their clinical needs, in doses that meet their requirements, for an adequate period of time, and at a cost affordable to the community.[1,2,3] Unfortunately, WHO report, 2002 on rational drug use reports that more than 50% of all medicines prescribed, dispensed, or sold on a global basis are inappropriate; and around 50% of inappropriateness is contributed by patients in terms of their failure to take medicines as prescribed.[4] Bhatnagar and Mishra have reported that overuse of medicines stimulates inappropriate patient demand and leads to medicine stock-outs and loss of patient confidence in the health system.[5] Inappropriate (over or underutilization) use of medicines increases antimicrobial resistance, contributes to poor clinical outcomes,and manifests as avoidable adverse drug reactions.[4] Inappropriate usage is also a wastage of scarce economic resources.[5] Overall, 25%–70% health expenditure in developing countries is contributed by expenditure on medicines, as against 10% in high-income countries.[6] The situation as regards drug use is no different in India from rest of the world. One third of world's population living in India lacks access to essential medicine, which makes it up to 65% in India alone.[7,8] With out-of-pocket expenditure on health at 82%, 62% is spent on medicines; large percentage of which is rendered waste because of irrational prescription of non-essential medicines, and brands instead of generics.[9] A study by Kasabiet.al. in Karnataka with 200 prescriptions, in 15 PHCs in a district, reported more than 45% use of antibiotics at primary level.[9]

The WHO good prescription practice indicates% of medicine usage per encounter (<2),% of encounter with antibiotics (<30 %), % of encounter with an injection prescribed (<20 %), and % of medicines prescribed in generic name (100 %) from a defined Essential Drug List (EDL) as an objective measure.[10,11]

WHO apart, The Medical Code of Ethics prescribed by the Medical Council of India (MCI) in 2002, amended in 2016 regulates prescription practice in India; to foster rational drug use. The prescription in India is thus a legally admissible evidence to care process, generated by doctors to assure completeness of prescribed care plan to ensure patient safety.[12]

While there are some studies, they are far and few elaborating barriers to good prescription practice, its correlation to confounding factors; to draw sustainable solutions in a PHC setting. Under this backdrop, we conducted the study in Rajasthan to identify factors associated with adequacy and appropriateness of prescribing practices at primary level. For the purposes of study:

- 'Adequacy' means, compliance to completeness and comprehensiveness of prescription practices as per WHO norms and MCI Guidelines;

- 'Appropriateness' means, the extent of 'reasonableness' in practice towards quality of care (QoC) that can be justified.[13] Reasonableness

to QoC, stems from variation in qualification (knowledge gained as a medical graduate or postgraduate in specific speciality) and experience (years of relevant patient care service provision).

Method

A sequential mixed-method approach was adopted to evaluate the prescribing practices in the 31 PHCs in 11 districts of Rajasthan as shown in the flow diagram in Figure-1. Prescriptions for a period of two years from September 2016-August 2018 were reviewed.
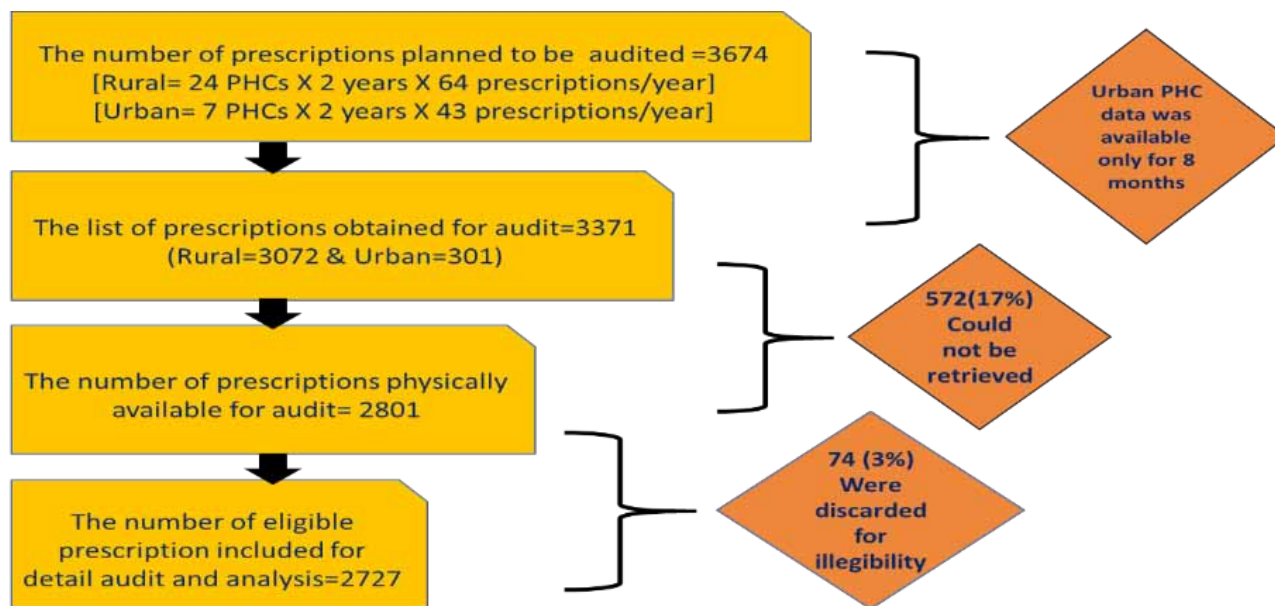
Figure 1: Targeted vs actual number of prescriptions included in the study

In-depth interviews (IDI) with PHCs' service providers were conducted to capture their profile. Subsequently a focused group discussion (FGD) was held to share findings of the quantitative study, and deliberate on barriers and facilitators to good prescription practice;to recommend possible improvements.

A total of 3698 prescriptions @ **64 per year from 24 rural and 43 per year from 7 urban PHCs each were selected**. As urban PHCs were operationalised late, from January 2018, only 8-month of prescriptions could be collected. Out of 3698 selected entries, 572 prescriptions (17%) could not be retrieved as they were physically damaged because of compromised storage conditionsin PHCs that were operating out of make shift buildings. Of the total 2801 prescriptions physically retrieved, 2727 (97%) were defined as legible for further analysis and remaining 3(%) were discardedas illegible.[14]

To ensure adequate representation of the disease profile samples from different patient categories were picked; namely (i) maternal (M), women who availed

maternity services, (ii) paediatrics (P), sub-divided into under-five(P1) and children between 5-15 years (P2); (iii) Adults (A), male and female of age between 18-59 years of age with conditions other than maternity; (iv) old age over 60yrs (O); and (v) emergency (E), to capture emergencies and trauma.

To capture seasonal variation in disease, the calendar year was split into four quarters(i) Winter-November to January, (ii) Spring-February to April, (iii) Summer—May to July, (iv) and Rainy—August to October.

Further, it was ensured that all six working days of a week has equal probability of being selected twice every season. To avoid investigator bias, serial number wise first occurrence/s for every patient category in the OP register was chosen to collect desired number (2-4) of prescriptions.

Semi-structured interviews were conducted to profile the providers @ one doctor, one nurse and one

pharmacist per facility. In all we profiled 23 doctors, 31 nurses and 28 pharmacists based on their availability during the study period. Finally, 15 medical officers, 6 GNMs/pharmacists participated in the FGD for the qualitative study to provide feedback on findings of quantitative study around barriers to good prescription practice.

The quantitative study was aimed at estimating the percentage compliance to WHO indicators and MCI requirements as follows:

a. *Completeness of prescription*—This was assessed on the seven elements of completion, as per the MCI guidelines*.*

• **Demographic compliance**--%of Prescription with complete demographic information; such as Name, Age, Sex, Date of visit, Contact Details.

• **Registration process compliance**--% of Prescription with details on unique id to support identification of patient throughout the care process.

• **Patient compliant compliance**--% of Prescription with complete in terms of recording of signs, symptoms presented by the patients.

• **Doctor examination compliance**--%ofPrescription with complete recording of weight, BP, Provisional Diagnosis, and investigation ordered.

• **Treatment compliance**--% of Prescription with complete recording of final diagnosis, prescription of medication (completeness refers to information on Name of the drug, dose, strength and Number of days to be consumed) and care plan. This also includes % of prescription with Drugs written in capital letters as per MCI requirement

• **Continuum of care compliance**--% of Prescription with complete recording of requisite conditions for a follow-up, and referral

• **Ownership compliance**--% of Prescription with complete signature of the treating clinician.

b. *Appropriateness of prescription*—refers to analysis of prescription on quality of care in terms of diagnosis, investigation and treatment prescribed. Appropriateness was analysed at two levels:

• **Facility level** to understand the systemic issues impacting appropriateness;

• **Clinical level** to understand the clinical issues as regards patients' complaints, doctor's findings, investigation advised, care plan designed and treatment offered.

We used bi-variate and multivariate analysis to correlate factors associated with good prescription practices. Multilevel logistic analysis, random slope model was used to understand the role of facility or provider level factors affecting prescription practices. The model comparison was carried out using Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC),a lower value of these statistic indicates best fit model.

Results and Discussion

The findings of the study as revealed were:

1. **Completeness of prescription:** Completeness evaluated on seven broad sections as under.

a. **Demographic Details:** The *first compliance* was documenting of basic demographics in the prescription; meaning noting of name, age, gender, address and contact details of the patients. While name and age of patient was recorded in all eligible prescriptions; sex was not recorded in 65 (2.3%) prescriptions. Highest compliance level was seen in prescriptions for elderly (29%); and lowest being that for maternity and emergency cases, at 5%. While MCI mandates capturing of data on occupation and place of living, the same was not captured in any of the audited prescriptions. These socio-economicindicators have significant bearing on the disease manifestation, its recurrence/chronicity. For instance, recurrence of dermatitis and staining of tooth in some PHCs was attributed to high fluoride content in ground water by the staff. Repeated treatment of such conditions without documentation of living condition, reduces the probability of escalating issues with relevant state authorities to systematically address the public health hazard.

b. **Registration Process Details:** *The second compliance*, includes assigning registration number to each patient and recording visit dates, tot rack patient progress during follow ups, and referrals to other/specialised services. The study reveals that while assigning registration number was almost universal; there was no inter or intra facility standard followed. Each year, the registration number began with serial number '1'; thereby creating new registration numberon each patient visit including

that for follow-up visit/s. In the absence of unique identification number, a mechanism to identify new and repeat/follow-up cases doesn't exist; except for the informal facial recognition by the hospital staff. Audited prescriptions revealed 1-8% duplication of registration numbers in 8 of 31 facilities; except for one PHC that had 56% duplication. Overall, 16% of the eligible prescriptions did not have the date recorded.

c. **Patient complaint details:** *The third compliance is towards recording of patient complaints.* Herein patient's narrative of chief complaints (symptoms) and provider's interpretation of these complaints (signs) are recorded. These signs and symptoms with clinical examination findings as noted by the doctor,enables the clinician to arrive at provisional diagnosis to decide on the investigations required to clinch the final diagnosis, design the treatment & care plan and decide referral, if required. Our study revealed that signs & symptoms were recorded in only 28% of eligible prescriptions. A substantial difference was noted in recording symptoms across 31 PHCs, ranging from zero to 100%, with SD 28%, skewed (0.696) & leptokurtic (2.28) distribution. It was noted that 'signs' and 'symptoms' were used synonymously, and handwriting was hard to decipher in all prescriptions. The terminology used for writing signs and symptoms were either incomplete or not adhered to as per the prescribed textbooks. For instance, itching or skin allergy was mentioned in 2.2 % cases as 'skin'. This was attributed to the documentation of prescriptions by the nurses or paramedics; who while were untrained and ineligible, substituted in absentia of the doctor, to respond to patient needs. Among the eligible prescriptions, majority had only one symptom recorded (19.7%) and 8.6% had more than one symptom recorded. Most frequently mentioned signs and symptoms were fever (14.7%), pain (4.7%), diarrhoea (4.1%), injury (3%), pregnancy and delivery (2.2 %).Interestingly, a clustering of symptoms around patient categories was recorded. For example, fever, diarrhoea and skin allergy was clustered around paediatric (P2), adults and old age population.

Based on the proportion of prescriptions that had recorded signs & symptoms, we classified the PHCs into five quintiles to compare their patient profiles with provider experience and facility, system level factors.[10]

No substantial difference in patient profile in the PHCs, except that the facilities under high quintile had higher load of maternity cases. However, substantial difference was noted across quintiles in terms of provider and facility, system level factors. The cluster of 6 PHCs, that had high recording of symptoms (76 %) had providers with longer work experience with our PHCs, had relatively infrequent drug stock-out, more accountable providers (measured on proportion of prescription signed), with higher provider focus on service delivery as against administrative work. **Contrary to the common belief, high OPD load was not a hindrance to recording signs and symptoms**. This was corroborated during the FGD, and doctors recommended reducing their administrative work that consumed 50% of their time, and training AYUSH practitioners and GNMs for documenting findings in the prescription, to save doctor's time for patient examination and writing the care plan.

Qualitative finding revealed that protocoled treatment for maternity cases hadrendered documentation of signs and symptoms redundant. However, in emergency, paediatric and old age patientssince non-documentation of signs and symptoms had the potential for medication error, the compliance was higher at 2.6 (1.6 – 4.0), 1.5 (0.9 – 2.15) and 1.5 (1.1 – 2.3) respectively, as necessitated.

d. **Examination Finding Details:** The *fourth* compliance on recording of *doctor's examination findings*, includes noting of patient vitals (Blood Pressure-BP, pulse, weight), investigations required, and provisional diagnosis. The compliance was low across facilities and was limited only to maternity cases. BP was recorded in 4%prescriptions and 18% of maternity cases. Weight and investigations were recorded in 2% and 6% of the total, 11%and 23% of maternity cases, respectively. The major investigations documented for maternity caseswere Haemoglobin (15 %), HIV/ELISA (6%), Random Blood Sugar (5%),Urine albumin and STI (4% in each), which were a part of protocoled treatment to be followed. Provisional diagnosis was recorded in 24% of total and 86% of maternity cases.

Three logistic regression model has been compared to identify the effect of recording symptom & investigations, their interaction on reported diagnosis and a multilevel model to identify the role of system level variations. It was evident from the best fit multilevel

model that almost 39% variations in reporting diagnosis can be attributed to system level factors. The fixed part of the model revealed that diagnosis was more likely to be written in maternal health prescriptions. The predicted probabilities of interaction suggest that a prescription that had symptom & signs recorded and investigations/tests prescribed, had 8 and 5 times higher likelihood of diagnosis being documented respectively (Table-1).

Table 1: Facility level factors impacting compliance to documentation of examination findings

Diagnosis	M1: Logistic				M2: Logistic with interaction				M3: Multilevel logistic with interactions			
	Odds Ratio	P>z	[95% Conf. Interval]		Odds Ratio	P>z	[95% Conf. Interval]		Odds	P>z	[95% Conf. Interval]	
Fixed part												
Patient category												
Maternal	1.000				1.000				1.000			
Emergency	0.054	0.000	0.034	0.085	0.060	0.000	0.037	0.095	0.042	0.000	0.024	0.072
Pediatric <5 yrs	0.019	0.000	0.012	0.030	0.021	0.000	0.013	0.033	0.007	0.000	0.004	0.013
Pediatric 5-15 yrs	0.014	0.000	0.009	0.021	0.014	0.000	0.009	0.023	0.005	0.000	0.003	0.008
Adult (16-59 yrs)	0.017	0.000	0.011	0.026	0.018	0.000	0.012	0.028	0.008	0.000	0.005	0.014
Old age(>60 yrs)	0.017	0.000	0.011	0.027	0.019	0.000	0.012	0.029	0.008	0.000	0.004	0.014
Symptom recorded												
no	1.000				1.000				1.000			
yes	8.418	0.000	6.634	10.683	9.894	0.000	7.729	12.666	7.709	0.000	5.516	10.772
Test recorded												
no	1.000				1.000				1.000			
yes	1.537	0.041	1.017	2.323	6.624	0.000	3.454	12.706	5.285	0.000	2.482	11.256
Symptom X Test												
yes#yes					0.097	0.000	0.042	0.227	0.169	0.000	0.062	0.458
_cons	4.075	0.000	2.895	5.735	3.484	0.000	2.476	4.903	4.996	0.000	2.581	9.671
Random Part												
var(_cons)									2.067		1.163	3.675
ICC									0.386		0.261	0.528
Model Comparison												
AIC	2037.676				2010.757				1580.959			
BIC	2084.964				2063.955				1640.069			

During the FGD, providers iterated on the non-essentiality of recording vitals for all clinically stable patients; except for old-age patients who could potentially deteriorate quickly and maternity cases that had protocol to monitor progress.

e. **Treatment:** The *fifth compliance* towards *treatment* dealt with polypharmacy, prescription of antibiotic and injections. The mean polypharmacy rate was 2.8 per prescription, median being 3; slightly higher than the WHO recommended reference value. Overall, 63% prescription had more than 2 drugs prescribed; highest recorded among the old age at 75% with a mean of 3.15 per prescription; and lowest in maternity cases (51%) with mean 2.6 per prescription. Polypharmacy in maternity was attributed to prescription of nutrients,such as iron and folic acid. Across PHCs, polypharmacy varied from 24% to 80%.

As for antibiotics in prescription, 63% of the patient encounters had an antibiotic prescribed, which was double the WHO reference value(<30 %); and 9% had more than one antibiotic. The prescription of antibiotics

was highest among paediatric (P1-77 %) and lowest inmaternity (31%). Since maternity is not a disease, such a high volume of antibiotic usage needs further investigation. Urban PHCs had more antibiotics (68%) per prescription, than in the Rural (62%).

Injection prescription also varied across PHCs, ranging from 0 to 46%, with an average of 15%, within WHO reference indicator. However, prescriptions for maternity and emergency cases had higher proportion of injection/s prescribed, with 23% and 25% respectively. This was attributed to the protocoled routine immunization of pregnant women with TT, and injections for pain relief during emergency. Unlike antibiotics, injection prescribed was substantially low for Urban PHCs (5%) vis-à-vis rural (16%).

Multilevel logistic model (table-2) revealed that polypharmacy and prescription of antibiotic depends largely on patient's profile. An old patient was 3.3 times more likely to experience polypharmacy than others, in the form of increased nutritional and mineral supplements. However, 8-9 times increase in polypharmacy in paediatric patients was linked to use of antibiotics. Interestingly provider or system level factors did not contribute to polypharmacy (8%) and increased antibiotic prescription (7%). However, in case of injections, the system level factors accounted for 14% variation. As for provider level factors, patients that had symptom/s recorded had 1.6 times more likely to receive an injection. Second generation aminoglycosides or broad-spectrum antibiotics were the most commonly prescribed antibiotics in the encounters wherein antibiotics were prescribed. Amoxicillin was prescribed in 28% of encounters, Ciprofloxacin on 17%, and Cephalexin was the least prescribed antibiotic. The other most frequently prescribed drugs were Analgesics, Anti-allergens, Multivitamins, Gastroenterology and respiratory drugs.

Table 2: Factors associated with treatment compliance

	Prescription with polypharmacy				Antibiotic prescribed				Injections given			
	Odds Ratio	P>z	[95% Conf.	Interval	Odds Ratio	P>z	[95% Conf.	Interval	Odds Ratio	P>z	[95% Conf.	Interval
Patient category												
Maternal	1.000				1.000				1.000			
Emergency	1.228	0.302	0.831	1.815	5.066	0.000	3.360	7.638	1.167	0.510	0.737	1.848
Pediatric <5 yrs	1.116	0.549	0.779	1.598	9.922	0.000	6.680	14.739	0.633	0.054	0.398	1.009
Pediatric 5-15 yrs	1.719	0.004	1.194	2.474	8.283	0.000	5.602	12.247	0.517	0.007	0.321	0.835
Adult (16-59 yrs)	2.181	0.000	1.541	3.087	5.535	0.000	3.841	7.974	0.562	0.011	0.361	0.876
Old age(>60 yrs)	3.237	0.000	2.246	4.665	3.532	0.000	2.443	5.105	0.725	0.157	0.464	1.131
Type of resident												
Urban	1.000				1.000				1.000			
Rural	1.208	0.501	0.697	2.093	0.886	0.657	0.520	1.511	4.256	0.003	1.636	11.072
Symptom recorded												
No	1.000				1.000				1.000			
Yes	1.085	0.499	0.857	1.374	0.816	0.109	0.637	1.046	1.589	0.002	1.180	2.139
Test recorded												
No	1.000				1.000				1.000			
Yes	0.815	0.406	0.503	1.320	0.799	0.376	0.486	1.313	0.937	0.840	0.497	1.765
Symptom X Test												
Yes	2.202	0.036	1.053	4.604	1.622	0.187	0.791	3.329	1.226	0.626	0.541	2.779
Doctor Signed												
No	1.000				1.000				1.000			
Yes	0.910	0.491	0.695	1.191	1.190	0.221	0.901	1.570	1.223	0.230	0.881	1.698
Random Part (PHC name)												
var(_cons)	0.294		0.157	0.548	0.256		0.128	0.513	0.535		0.261	1.096
ICC	0.082		0.046	0.143	0.072		0.037	0.135	0.140		0.074	0.250

As regards documentation of drug related information, 99.9%drugs were written by their generic names from the Essential Drug List (EDL) as approved by the state; 21% drugs were indicated with their strength; 79%with dose; and 92%was documented with duration of treatment. During the qualitative study, doctors explained that documentation of drug strength was irrelevant,because of availability of limited strength/s of drugs at the PHCs.

f. **Continuum of care(follow up and referral):** Referral and follow up, the two major components of primary care, had poor compliance across all facilities at 1%. While all the respondents during the qualitative study agreed on the importance of documenting follow up and referral to ensure continuum of care; the reasons for abysmal documentation was attributed to:

a) The practice of dispensing medicine for 3 days forcing patient's revisit within 72 hours for a follow-up. Providers explained that in a low literacy setting, it's important to impress upon the need & incentivise follow up, rather than documenting it; because patients hardly refer to prescription for compliance.

b) Inadequate space in the existing prescription format

c) Self-motivation of the chronic patients (TB, typhoid, diabetes, dermatitis etc.)

d) Disincentive for providers to prescribe referral, owing to absence of a system at higher centres to entertain referrals from PHCs.

g. **Ownership compliance:** Ownership compliance was measured by the proportion of prescription with documented doctor's signature. Overall 58% prescriptions had documented doctor's signature; higher in urban (78%) against rural (56%) PHCs. Contrary to the common belief that high patient footfall leads to poor completeness of prescription; a high level of correlation was witnessed between proportion of prescriptions signed by the doctors and its completeness. The several logistic regressions drawn to understand factors associated to ownership compliance revealed that the system level factors accounted for 30% of the variations in the best fit model. Prescriptions aturban PHCs had 5 times more potential of being signed by a doctor than a rural one. Similarly, maternity cases had 1.5–2 times higher likelihood of receiving signed prescription. The logistic regression model suggests that provider's age, experience, availability of medicine and ability of the clinicians to accord time for clinical practice enhances ownership compliance. The FGD corroborated our quantitative findings that lesser the doctor's engagement in administrative activities, greater was focus on clinical care and completeness of prescription.

Appropriateness of prescription (QoC): We used dual approach to understand the QoC dimension. First, a latent measure of quality was computed by considering the five important indicators of prescription practice and explored factors attributable to QoC. Second, we evaluated appropriateness of investigation & treatment from the clinical stand point.

a. **Appropriateness as a measure of facility level variation in Quality of care (QoC):** The QoC index was computed using a latent variable comprising of indicators:(i) % of prescriptions wherein sign &/or symptoms were recorded, (ii) % of prescriptions that had diagnosis (final or provisional) documented, (iii) % of prescriptions wherein diagnostic tests (investigation) were recommended, (iv) % of prescription wherein treatments were recorded (antibiotic and injection), (v) and % of prescriptions wherein follow-up/referral was documented.

Table 3: Variation across facilities on QoC indicators

Indicators	N	Mean	St. Dev	Min	Pctl(25)	Pctl(75)	Max
% of pres. sign/symptom mentioned	31	30.4	28.5	0.0	5.2	53.6	98.1
% of pres. diagnosis mentioned	31	22.6	21.5	0.0	7.0	29.5	93.0
% of pres. tests recommended	31	5.9	7.0	0.0	0.8	6.8	33.0
% of pres. <2 medicine prescribed	31	11.9	6.9	0.0	6.8	16.3	28.2
% of pres. antibiotic prescribed	31	65.3	11.5	43.1	56.4	74.7	90.1
% of pres. injection prescribed	31	13.9	11.2	0.0	5.0	19.4	44.6
% of pres. Referral/follow up mentioned	31	2.6	6.8	0.0	0.0	1.7	35.7

We noted substantial variation in all indicators across PHCs (refer table-3 and figure-4). In order to compute a latent variable, we adjusted the variables by taking deviations from WHO reference value and computed a summative score. The score was further divided into five quintiles to create an ordered variable – QoC index. Comparison of system and provider level factors across quintiles of QoC (table-4) revealed that facilities very good on QoC, had young nurses with doctors either less than 35 yrs or over 65 years of age, spending less time in administrative tasks, and experienced nurses. The facilities that were better on QoC were well-stocked with drugs.

Table 4: Profile of facilities with different level of quality of care in terms of prescribing practices

	V.Low	Low	Moderate	Good	V.Good	Total
Age of doctors						
<35 years	42.9	14.3	20.0	28.6	60.0	32.3
35-65 years	14.3	42.9	20.0	28.6	0.0	22.6
65+ years	28.6	28.6	60.0	28.6	40.0	35.5
Less time (<50%) spent on admin task	42.9	28.6	80.0	71.4	80.0	58.1
% of prescription signs by the doctor	51.9	58.1	64.0	50.1	75.0	58.3
Medicine was available (%)	42.9	14.3	60.0	57.1	60.0	45.2
Stock out in past 6 months (%)	28.6	28.6	20.0	28.6	60.0	32.3
Age of GNM <27 yrs (%)	71.4	42.9	0.0	85.7	40.0	51.6
Work experience of GNM (35+ months)	28.6	85.7	80.0	85.7	80.0	71.0
Average OPD per day	41.0	52.8	27.4	42.1	57.1	45.7
% Urban	28.6	14.3	20.0	28.6	20.0	22.6
No of PHCs	7	7	5	7	5	31
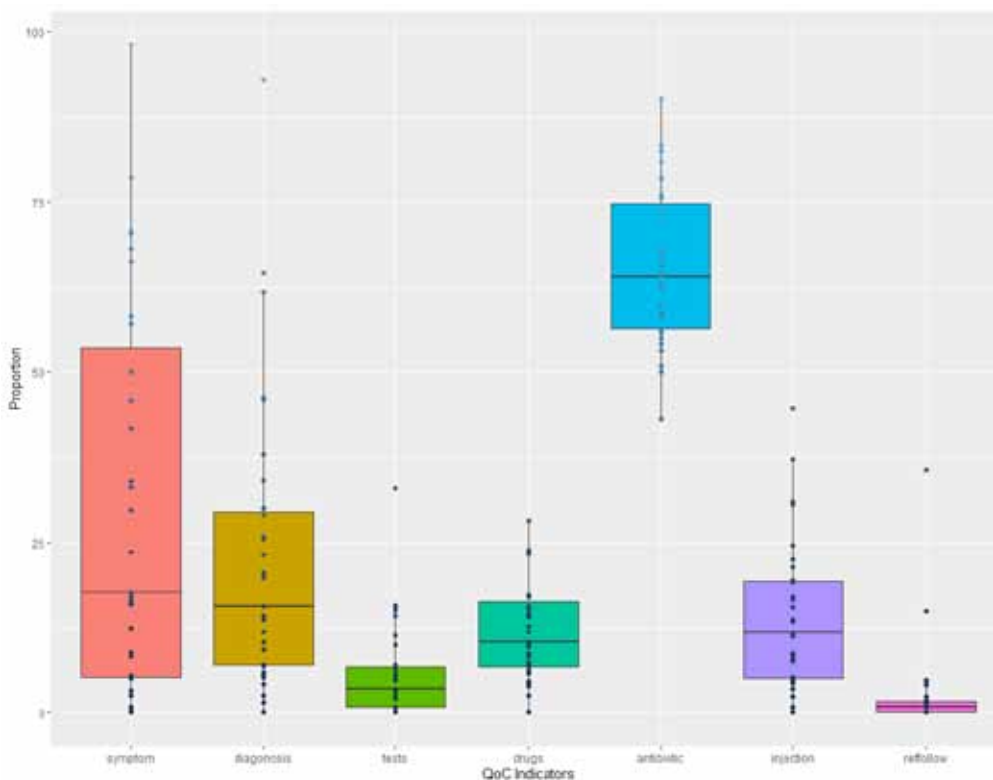
Figure 2: Box plot of QoC indicators

b. **Appropriateness as a measure of Quality of care from clinical stand point:** The appropriateness of drug use stems from the Standard Treatment Guidelines (STGs) and best practices to treat certain disease/s. Further, as signs and symptoms are sine-quo-non to patient complaints, from which the clinician draws provisional and differential diagnosis; we analysed 783 prescriptions that had symptoms and signs documented to evaluate appropriateness of drug use, using STGs recommended by government of India and WHO. As the study focused on completeness and compliance of prescription, the diagnosis made by the clinician and the treatment thereof was not questioned. Therefore, a documented justification on investigation advised, treatment given, follow up & referrals advised for such a diagnosis vis-à-vis the documented signs and symptoms was considered relevant, and hence evaluated.

Nearly 36 % of prescription were found inappropriate in terms of its documented justification for the treatment advised. The commonest inappropriateness in treatment were non-documentation of rationale for:

- Prescription of one or more antibiotics/3rd Generation Antibiotic/Anti-fungal, steroids and NSAIDs, Anti-Rabies vaccine without documentation of signs and symptoms or investigation;

- Using both Gram negative and Gram positive antibiotics for the same event;

- Prescribing Azithromycin in prescription reporting diarrhoea;

- Prescribing steroids for fever and cough in child under five without relevant clinical findings;

- Treatment of dehydration or prescription of fluids in old age without investigating for electrolyte imbalance;

- Not prescribing anti-hypertensive or not advising referral/follow-up for hypertension in pregnancy.

Commonest prescription with limited error on appropriateness were for maternity cases, wherein STG was well defined and adequately communicated to the staff.

While weight is an important criterion for calculation of drug dose, especially in case of children; only in 43 prescriptions weight was documented, which included 6 children under the age group of 5 years. Similarly, Blood pressure was documented only in 4% of cases; commonest of them being: pregnancy and all cases of gastritis, hypertension, weakness, diarrhoea, and body ache in old age patients.

Conclusion

PHCs are the first point of doctor-patient interaction in the public healthcare delivery system. It is not only an entry to the continuum of care cycle in terms of provision of diagnosis, treatment and appropriate referrals and follow-ups; but also echoes with universalization of health care as was envisaged for the first time at Alma-Ata Declaration. Therefore, early diagnosis of disease, its timely treatment and referral if the primary role of a PHC; served through a complete and comprehensive prescription. In order to improve compliance and comprehensiveness of prescription practice at PHCs, our study revealed the need for following system and provider level strengthening efforts:

- **System level Strengthening**

- **Creating facility level enabling environment by ensuring availability of:** (i) drugs and supplies, test kits at all times; (ii) prescription pad with sufficient space for recording details; (iii) unique identifier for maintaining continuum of care for each patient; (iv) referral practice to higher centres and back to be streamlined (documented, standardised, and communicated across).

- Policy reform to rationalise polypharmacy beyond WHO definition, considering Indian realities; thereby including multivitamins as nutritional supplements to all vulnerable sections of the population instead of categorising it as "Drug" in a prescription.

- Provider level strengthening

- Empowering staff nurse/GNM as "Physician Assistant" by protocoled task shifting to treat select diseases with limited allowable prescription & sign off by "Nurse Practitioner" to increase accountability of the system.

- Stakeholder buy-in to influence behaviour change management, to: (i) improve legibility of prescriptions, and documentation of justification for the treatment offered; (ii) implement Anti-Microbial Stewardship Program to build capacity of care providers on rational drug use.

Ethical Clearance: Taken from IIHMR, Delhi Ethics board

Patients Involvement: No patients were involved during the research

Source of Funding: Self

Conflict of Interest: Nil

Units of Measurement: Nil

Abbreviations and Symbols:

AIC: Akaike Information Criteria

AYUSH: Ayurveda Yoga Unani Siddha and Homeopathy system of Indian Medicine

BIC: Bayesian Information Criteria

EDL: Essential Drug List

FGD: Focus Group Discussion

GNM: General Nursing and Midwifery

IDI: In-depth Interviews

MCI: Medical Council of India

OP: Outpatient

OPD: Outpatient Department

PHC: Primary Healthcare Centre

QoC: Quality of Care

SD: Standard Deviation

STG: Standard Treatment Guidelines

WHO: World Health Organization

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14. For the purpose of the study, legibility of prescription was defined as the effortless ability of reader/data entry expert to read and copy the contents of the prescription in the content analysis sheet

A Study on Standard of Living Index (SLI) and its Influence on Rural Area Self-Poisoning Practices, Knowledge of First AID and Prevailing Traditional Practices in Rural Area of Hassan District, Karnataka (Cross-Sectional Study)

Ashok Kumar C.P.[1], M. Sundar[2], Mithun R.[1], Noor Afshan[1], Prajwal H.D.[1], Chaitra C.[1]

[1]Junior Doctor, [2]Professor and Head, Department of Community Medicine,
Hassan Institute of Medical Sciences, Hassan, Karnataka

Abstract

Suicide by pesticide poisoning consumption among young and old is preventable. More so in India, since larger population are involved in agriculture and its rampant usage for their cultivation. Also, due to weaker India's public health infrastructure and prevailing folk medicine practices, makes all the more difficult to save victims and it seems add in to huge burden.

Objectives: To estimate pattern of self-poisoning, first AID usage and folk medicine practices influenced by their standard of living.

Method: Four primary health centre (PHCs) villages of Hassan taluk were selected by simple random sampling and every fifth houses were considered as study subjects (159). To assess their socio-economic situation, standard of living index (SLI) comprising of their basic amenities was adopted to understand its influence on self-poisoning practices.

Results: The mean age of males were 44.23 (95 % CI 39.53 to 48.94) with SD (17.57) and females were 37.40 (95% CI 34.78 to 40.02) with SD (13.41). Traditional medicine (folk medicine) (125/78.6%) was practicing for their immediate self-harm (poison) relief. More than 98% respondents told that they do not have any idea or training towards first AID. 23% in higher living index said victim must be put on their back ($p<0.05$) for recovery. In logit model, predictors showed odds ratio that favoured an increase of risk for poison consumption for every one unit of increase of their education status and family members respectively- (OR 1.182, 95% CI 0.795-1.956; OR 1.081, 95% CI 0.438-2.666).

Conclusion: Neither first AID techniques were taught or put into practice which is imperative for life saving. Middle level study subjects were willing to involve themselves in first AID compared to higher class. Many people do not recognize colour marked symbols on pesticide bottle labels as an indicator of poison.

Keywords: *Self-harm, pesticide poisoning, first AID, Standard of living index (SLI).*

Corresponding Author:
Dr. M. Sundar
Professor and HOD, Department of Community
Medicine, Hassan Institute of Medical Sciences,
Hassan, Karnataka-573 201
e-mail: msundar34@gmail.com

Introduction

One of the commonest preventable method of suicide in certain countries of the world is pesticide poisoning. For every five deaths due to suicide, pesticide being the one among that[1]. Around 2 lakhs pesticide self-poisoning deaths occur each year world-wide[2]. Moreover, Suicide is the second leading cause

of death in less than 30 yrs age group [3]. India being a largely agricultural country that has contributed to 33% suicidal deaths due to poisoning. Along with that, due to improper public health infrastructure, peoplein rural India ought to travel not less than 100 kms to access health care is a reality even today[4]. As an alternative to immediate poison remedy, people use first AID and traditional method to save their kith and kin. Hence, the objective of present study was to estimate pattern of self-poisoning, first AID usage and folk medicine practices influenced by their standard of living.

Methodology

Out of 359 villages in Hassan taluk, Four villages (1.11%) (population,177 484) of Hassan district (Agile, Goruru, Nitturu, Shantigrama) were selected by simple random sampling where every fifth households were selected (by systematic sampling). One individual responsible person from these selected houses were interviewed based on pretested questionnaire and findings were recorded. People below 18 years, persons who couldn't comprehend and respond meaningfully were excluded. Standard of living index (SLI) based on household amenities and possession of some selected household items was used. The SLI can be developed by allocating scores to items. The total of scores may vary from lowest of 0 to maximum of 40. On the basis of total score, households are divided into three categories as: low-if total score is less than or equal to 9; medium-if total score is greater than 9 but less than or equal to 19; high-if the score is greater than 19. These three categories of SLI have been used in district level household surveys and NFHS in India.

The Data were analysed by SPSS software (version 22). This study obtained clearance from Institutional research committee and institutional ethical committee too.

Results

The study population for this study were selected from four primary health centers (PHC) jurisdiction. i.e. Agile PHC area-Agile village (Popl. 694) (38 households/23.9%); Gorur PHC -Kattaya village (popl. 725)(38/23.9%); Nittur PHC-Kellavathi village (Pop. 1017) (43/27.0) and Shantigrama PHC -Madenoor village (Popl. 850) (40/25.2%) from Hassan taluk of Hassan district.

The mean age of males were 44.23 (95% CI 39.53 to 48.94) with SD (17.57).In contrast, the mean age of females were 37.40 (95% CI 34.78 to 40.02) with SD (13.41). The minimum and maximum age between male and female were found to be 18 to 99 and 16 to 75 respectively. The interquartile range was almost same in both sexes (21). The sex wise tests of normality (Kolmogorov-smirnov) was significant (0.012).

With reference to their occupation, around 67 were unemployed and almost similar were agriculturist (66). Others were driver, laborer, health worker, petty business etc.

In order to find out from study subjects about recently occurred poisoned incident in their close vicinity, more than 30% said that within past one year and around 36% said even beyond one or two years-poisoning had happened. More than 90% (145) recollected from their past memory and revealed that poisoning, drowning or hanging combination type of incident very often arose. Further probing regarding type of poison used with intent of suicide, more than 61% said, it was pesticides but sometimes even rat poisons were consumed during those dire situations. For an immediate conservative measure, they depended on traditional medicine (folk medicine) (125/78.6%) as immediate relief. More than 98% respondents told that they do not have any idea or training towards first AID. By their personal intuition and understanding, more than 66% have had said, looking for breath odor or drooling of saliva in a victim is an indication of poisoning. Also, more than 55% opined that preserving poison contents or poison labels are useful and has significant role to confirm in later assessments. Around 50% depended on social media or through neighbors and friends to acquire knowledge and information regarding poisoning. Also, not more than 42% of respondents have had noticed about color marked labels on poison container/bottles etc. To the surprise, not more than 18% showed any interest in indulging themselves in first AID during emergency situations. But more than 85% of respondents said they would induce vomiting in victim as a first AID measure once or twice or even repeatedly (72%). Around 45% said, they would use soap water, salt water, butter milk or even fecal matter sometime to induce vomiting to save poisoned victims. As their belief is concerned, around 13% replied to query related to usage of edible oils saying- "it is a burden on the stomach". More than 98% do not know anything about poison countering agent's availability but some said, they prefer to use it (15%). Some specific questions about handling unconscious

victims-more than 95% said, they would take the poison affected individuals to hospital as early as possible. Not more than 37% has had any knowledge about ambulance availability (phone details) to be used for poisoned victim to seek hospital care. Almost everyone in these 4 primary health centers area, they prefer to convey to inhabitants that not to attempt on their life using poison agents.

More or less, in both the living standard(medium and high) category, (Table 1) around 77% and 80% respectively believe in practice of homemade remedies as a first AID measures. Almost similar type of observation seen about breath odor as significant signs in poisoned victims-29% and 31% respectively.

Around 58% in medium class said, there is usefulness in preserving poison content for future use. Not less than 50% subjects in lower class obtained their first AID information through friends, books and gossiping rather than from any reputed sources. A question that was asked to find their attributes towards first AID help from individuals for poisoned victims-more than 70% in medium class compared to higher class (38%) were willing to perform on victim. 61% in medium class said they would induce vomiting in victims. Among those in higher category, 37% of them said, better to rest poisoned victim comfortably so that it would calm him and give him/her a hope of survival. 23% in higher living index said victim must be put on their back ($p<0.05$).

Table 1: Relation between Standard of Living Index and responses of study subjects over self-poisoning situation

Characteristics	Pearson Chi-square value	P value
Sex	0.213	0.645
Age	5.875	0.319
Occupation	6.286	0.392
Marital status	0.142	0.706
Education	4.120	0.249
Family	0.029	0.866
Religion	0.042	0.838
Questions asked to respondents		
Any attempts in your area	2.604	0.626
Any personal experience regarding poisoning	0.009	0.924
Usual form of poison/suicide in your area	6.029	0.303
Common motives behind suicide/poison consumption	7.690	0.174
Your knowledge about different types of poison often used for poisoning	3.733	0.443
First AID practiced in your area	0.756	0.685
Did you undergo any first AID training?	2.356	0.502
Signs and symptoms that alarm for poisoning	9.604	0.212
Significance of preserving poison content	0.658	0.417
Sources of information	9.977	0.041*
Do you know the significance of colour labels on poison products?	0.362	0.547
Your choice of preference to do first AID on the site of poison	0.098	0.755
Different types of first AID practices	0.044	0.833
Do you know about poison counter agents?	0.341	0.559
Procedure to make person comfortable who consumed poison	2.684	0.443
Position to be followed in poisoned victim	7.480	0.058*
Managing unconscious poisoned victim	7.762	0.457

Characteristics	Pearson Chi-square value	P value
Your knowledge about mouth to mouth breathing	4.815	0.028*
Your knowledge about CPR	1.776	0.620
Various modes of transport used during emergencies	4.207	0.649
Preference of treatment for poisoned victim	9.365	0.025*
Do you know financial burden due to poison consumption?	1.344	0.246
Your interest to avert similar incident in your place	1.981	0.159

Note: *Denotes statistical significance

Table 2: Logistic regression of Standard of living index (SLI) and poisoning responses of study subjects

Characteristics	B value	OR	95% CI lower	95% CI upper
Poison related questions asked to respondents				
Any attempts in your area	0.042	1.042	0.824	1.319
Any personal experience regarding poisoning	0.0470	1.033	0.539	4.751
Usual form of poison/suicide in your area	0.264	1.302	0.982	1.725
Common motives behind suicide/poison consumption	0.014	1.019	0.873	1.189
Your knowledge about different types of poison often used for poisoning	0.019	1.019	0.873	1.189
Did you undergo any first AID training	0.033	1.034	0.903	1.183
Signs and symptoms that alarm for poisoning	0.021	1.022	0.897	1.164
Significance of preserving poison content	0.278	1.321	0.674	2.590
Do you know the significance of colour labels on poison products?	0.212	1.236	0.619	2.467
Position to be followed in poisoned victim	0.062	1.064	0.673	1.680
Your knowledge about mouth to mouth breathing	0.752	2.121	1.079	4.172
Your knowledge about CPR	0.440	1.553	0.775	3.115
Various modes of transport used during emergencies	0.095	1.099	0.922	1.311
Do you know financial burden due to poison consumption?	0.448	1.566	0.732	3.351

A logistic regression analysis (Table 2) was done to investigate is there a relationship between standard of living index (SLI) and practice of self-poisoning and first AID in rural areas of Hassan district, Karnataka. The predictor variables such as Age,sex, and occupation etc was tested a priori to verify there was no violation of the assumption of linearity in the logit model. The predictor variables such as age, sex and occupation in the logistic regression analysis was found not a significant contributor to the model. The estimated odds ratio for age, sex and occupation showed no increase in relation with standard of living index. Whereas education and family structure predictors demonstrates odds ratio that favoured an increase of risk for every one unit of increase of their education status and family members respectively (OR 1.182, 95% CI 0.795-1.956; OR 1.081 95% CI 0.438,2.666). apart from personal information and family, when different questions were put to elicit about poisoning and first AID from study subjects, respondents for queries such as about occurrence of poisoning in their areas, motives behind that, their knowledge and first AID training received, clinical manifestations, importance of preserving poison content, colour labels and position to be maintained for victims as predictor variables- odds ratio was more than one and showed there is an increasing influence of SLI for every one unit on predictors as mentioned above. Not only these variables, even that answered by subjects on cardio-pulmonary resuscitation, transportation and financial burden incurred also shows more than one for odds ratio. Among all the predictors, mouth to mouth breathing variable showed strong association-OR 2.121, 95% CI (1.079,4.172), that means for every two units increase of mouth to mouth breathing practice occurs

which directly bear on higher Standard of Living index (SLI).

Discussion

A rural area cross-sectional study on self-harm traditional practices using organophosphorus and other type of agents that were utilized by local inhabitants (n=159) in four primary health centre area of Hassan taluk. As literature search pertaining to self-poisoning practices was done, majority of studies were based on hospital cases reported with poisoned victims and their characteristics who had come for medical assistance. But there is a paucity of studies done at community level about people perception, problems of local traditional practices in regard to self-poisoning and their immediate rescue measures through first AID measures etc. As an alternate source, we attempted on a proxy data at the family level for better understanding on pesticide poisoning and its perspectives from those experienced self- harm in their households or neighbours in vicinity as a better indicator.

More or less as in our study responses, many who indulged in suicide ideation were males in the age group above 40 yrs. With reference to socio-demographic features, as in our study many were married, and not many even didn't had primary education apart from too many as illiterates[6,9,19]. Most of them hold farm holding activities. Especially women of younger age group and unmarried tried to get rid of their life by attempting suicide as corroborating to our findings[9,10]. Many times, as noticed in our study, family petty quarrels or family financial hardships paved way to them to consume available household poisons [5,13,16,19]. Some of the poisonous substances such as rat poison, bleaching agents and pesticides that were kept for agricultural and multiple purposes were consumed by family members with intention of self-harm leading sometime to death. These substances consumed were similar to that narrated in our study by respondents[11,13,18]. In our literature search, we could hardly find not more than few studies to support on first AID measures done on victim before being brought to hospital as observed in our study too[6]. Other than vomiting which was induced as a standard procedure to decontaminate or removal of consumed contents as reported in our study, many other traditional practices were done such as using activated charcoal and varieties of stomach emptying procedures[5,15]. Loss of consciousness was the sign that induced fear among our respondents and in other study results to convey the message for early hospitalization of victim[17]. In almost in every study opined that easy availability and access to pesticides and kerosene in rural areas were the major cause for suicide attempts[7,8,13]. Also impact on duration, costs of hospitalization[12] and education programmes[14] were observed as in our study. As a limitation, since this study was done with smaller purposive sample size with questionnaire method on study subjects at households, its findings for extrapolation need further careful assessment with rigorous procedures.

Conclusion

Rural area self-harm (pesticide poisoning) was quiet predominant and goes unreported most of the time. Obviously, only traditional medicine practices seem to be in place during emergencies. Neither first AID techniques were taught or put into practice which is imperative for life saving. Middle level study subjects were willing to involve themselves in first AID compared to higher class. Many people do not recognize colour marked symbols on pesticide bottle labels as an indicator of poison.

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Cycles in Time and Psyche: Implications for Cyclicity, Fatality and Symptomatics of COVID-like Pandemics

Asima Tripathy¹, Rajat Kumar Pradhan²

¹Post Graduate, Department of Zoology and Microbiology, ²Post Graduate, Department of Physics, Bhadrak Autonomous College (Department of Higher Education, Govt. of Odisha), Bhadrak, Odisha, India

Abstract

We explore the issue of cyclicity of cosmic time and how it might be a recorder of all events by its identification with the cosmic mind. We differentiate absolute time, universal (cosmic) time and the relative time as three distinct categories in the objective domain of temporal reckoning. Taking the idea of time generated by fundamental quantum events through natural frequencies of microsystems, we analyze the issue of generation of the cyclic time of the cosmos itself due to events undergone by all its oscillating contents. We propose that such macrocosmic processes of generation of cosmic times by the frequency of repetitive cosmic events necessarily requires the intermediary of psychic fields which being metaphysical and transcending matter, encode all information in a detailed manner in a memory that transcends space and generates repetitive events with subjects which lead to emergence of cosmic objective time. As a result, spatial as well as temporal non-locality becomes a reality, while individual free will becomes an appearance only. The difficulty in comprehending these novel ideas and conceptions only proves that our perceptions are deeply conditioned by our everyday experiences with space and time. The duration, symptomatics, fatality and cyclicity of COVID-like pandemics can be understood on this basis to have a deeper significance transcending virology and epidemiology.

Keywords: *Cosmic time, Relative time, Pandemic cycles, COVID-19, Cyclicity of impressions.*

Introduction

Since the time of Newton "Time" has collected about itself various perspectives by various scientists. Newton says '*All things are placed in time as to order of succession and in space as to order of situation*'[1]. Understanding time has become an increasingly more difficult question after the Theory of Relativity[2]. There are various concepts regarding time such as absolute time[1], event dependent view of time[3], physical and metaphysical nature of time[4], time travel[5], arrows of time[6,7], simultaneity of events in time, multidimensionality of time[8,9], Closed Time like Curves[10] emergence of time from timeless substratum[11], classical and quantum time[12], time dilation, relativity of simultaneity[2], direction of time towards increasing entropy[6], cosmological arrow of time[13], time reversal, the time-energy uncertainty principle[14], the space-time uncertainty relation[15] and so on to just list a few of the most talked about phenomena associated with time, including of course, timelessness or the unreality of time[16-18].

The notion of time in most of the above is fundamentally dependent on occurrence of events and/or our perception of them. In the sense of a happening or an occurrence, an elementary event is the physical situation associated with the point of space at an instant of time. Every event has thus a unique position and also a unique time in a particular frame of reference *i.e.* every event has definite space and time coordinates[19]. All the above mentioned definitions or forms of time is because of events-events in the form of information and as contents of our experiences and memory enable us to perceive time. Noting that the perceivers are themselves creatures

Corresponding Author:
Asima Tripathy
Post Graduate Department of Zoology and Microbiology, Bhadrak Autonomous College (Department of Higher Education, Govt. of Odisha), Bhadrak, Odisha, India, PIN: 756100
e-mail: asimatripathy09@gmail.com

in time, we propose here that it is not time which flows unidirectionally to make us perceive events, rather, it is the 'events' themselves which are already encoded in the cycles of cosmic time[20] and which unfold as per the perceiver's ongoing cycle of stored information from past experiences as memory, in the form of impressions in the psyche, that make him or her perceive the passage of time.

The continuous succession of unfoldment and recording of events as per the psychic encoding in the life of the cosmos is exactly like the continuous succession of expression of the traits and their recording in the genes in the DNA double helix that keep continuously unfolding in the life of an individual. An event is a multifaceted encoding in time as qualia of all the information concerning it and they unfold in succession to make us perceive time. The whole history of the universe is thus continuously being unfolded as well as encoded in time. The functional aspects of events such as order, form, frame etc are all embedded in the corresponding moment of time. The events are encoded by the perceiver, for the perceiver and of the perceiver itself, but neither the events nor the perceiver in any way affect the absolute time. The perceiver's psyche that records them and perceives them is part of the cosmic all-inclusive psyche[21-24]. The psyche of the individual perceiver perceives the all inclusive psyche of the cosmos. As the cycles encoded in the cosmic mind unfold, we collectively as well as individually undergo the experiences as per those encodings commensurate with our make-up.

Absolute time, Cosmic time and relative time: The events that unfold are nothing but the form of knowledge, action and the resulting experiences specific to the individual perceiver. Events do not exist independent of the perceiver and its act of perception[25] but absolute time exists independent of events, the perceiver and the act of perception.

Absolute Time has its independent, true and eternal nature irrespective the event-filled universe itself. Thus the notion of the time comes from the act of perception by the perceiver of the chain of events as causes and effects[26]. The concepts of all the properties of relative (event-dependent)time, the events themselves and the acts of perception, all have to do with the individual perceiver[27].

The universe is the perceived multiple worlds of the perceivers in the form of qualia in the infinite expanse of absolute time. The infinite time contains the ordering of causal consequence of all events. The individual consciousness brings into existence from its memory, experiences the forms, the objects and all that it perceives to be in existence. They exist because they are perceived by the individual perceiver. They are perceived by the perceiver because they were there in the perceiver prior, in the psychic domain of the perceiver in the previous cycle of its existence in the cosmic time[28].

Cosmic Governing Principles: A time slice of the universe at any instant is a space like hyper-surface which is a three dimensional snapshot or a frozen frame of all its evolving contents. A continuous succession of such causally connected time slices gives us a chart, a deeper inspection of which leads us to the underlying governing principles and the laws of nature. This gives us a block universe scenario[29] with Newtonian absolute time as the common thread connecting all the time slices through differential equations expressing natural laws as the connecting links between the causative factors in the preceding slice to the effects produced in the succeeding slice. The universe and all its laws thus exist in, and are dependent on, the cosmic time. The laws may have limited regions of validity with respect to space and time but nevertheless they are of a qualitatively of a higher category then the mere physical contents of the universe.

The universality claimed in respect of any natural law discovered by scientists is only with regard to what has been observed so far in the observable universe. The very recognition of existence of such laws requires intelligence manifest in specific self-organized complex systems such as human beings. If all the physical contents of the universe are intelligent then by their memory aspects they could encode the whole process of time evolution in the fullest details. Such a cosmic intelligence could have simultaneous knowledge of the entire time slice though all its points are space like separated having no causal connections among them. The information contained in one slice may be suitably compressed by the intelligence while encoding in to memory as in compact discs[30]. Such encoding is in the psychic domain which has a metaphysical nature transcending physical space and its contents. Thus the history of the universe is encoded beyond the universe as memory slices in psychic domain woven successively by the thread of time in a continuous fashion.

It is reasonable to assume that there must be psychic counterparts to the physical laws which determine the

causal sequence of the appearance of memory slices in the psychic domain whose physical projections correspond to the evolving sequence of time slices for the physical universe as analyzed in a series of papers basing on psychophysical parallelism[31-33]. Each time slice if considered as the physical body of a huge cosmic organism then these memory slices would correspond to the progression of cosmic thought and the all pervading intelligence would serve the cognitive and decisive purposes of a cosmic knower. The universe then becomes a cosmic person evolving psychophysically from moment to moment as a huge individual organism. For the other individuals inhabiting the universe it takes on an appearance which is a projection through the individual perceiver's mind and hence is but a limited segment of the cosmic mind.

Cycles in time and cycles in mind: Periodicity is a fundamental feature characterizing all systems in nature across all dimensions-from neutrino oscillations to cosmic cycles[34-36]. The same applies in the psychic domain too, since the physical is a manifestation of the psychic. The experiences stored as impressions in the psyche have also their cyclic patterns of repetition, even though the physical conditions may not be exactly identical across the cycles. In fact the instincts, urges and drives in an organism in the form of attention to definite goal directed activity is due to a need felt as a result of activation of previously stored impressions[37-40]. Of course to the extent the psyche is able to exactly recall from a previous memory slice the nature and structure of an experienced object, to that extent the object may become available for re-experience as such[41]. However, this is hardly the case since exact replication of physical conditions is rendered impossible by the second law of thermodynamics. Unless it is the case of a supremely conscious ordering agency enabling such exact replication of experience from its fine grained memory slice, nevertheless experiences do reoccur in cycles[42-43].

Implications for COVID-like pandemics: Pandemics like plague, Spanish flu, AIDS and COVID-19 have been observed to occur with a certain cyclicity, as if by design, to bring about a certain change in the attitudes and practices, not just to wipe out populations[44]. They have deep connections with human activities on large scale such as warfare and genocides arising out of malicious psychic factors. The biggest challenge facing us in ensuring that such havoc-wreaking pandemics don't come upon mankind is to rid ourselves of such inhuman tendencies and to endow ourselves with benevolence leading to a thoroughgoing change in our approach and attitude to life itself[45,46]. The changes in the individual and collective experiences in different cycles of pandemics that come upon mankind can be explained as being due to changes in the psychic impressions and in the causative agents.

Conclusion

To grasp the true nature of time as the encoder of events and events as the generators of time we have taken the help of the psychic dimension that facilitates both these opposing but complementary views, since time is identical with the psyche. Encoding and decoding of information on a cosmic scale and objective manifestation as matter-energy filled universe that oscillates cyclically in the space of events certainly requires a transcendental substance which is the psyche. These intricate and intriguing aspects of time and psyche are nevertheless stimulating but require much further analysis and substantiation. Time certainly is not physical, but subjective experience of its passage and its utility in everyday life, its conjugacy with energy in Quantum Theory makes us naively grant it an objective reality that can certainly be put to test. Indeed the elasticity of time in both objective and subjective domains puts a question mark over its being a rigid aspect of reality, but can we do without it? It seems that we do without it subjectively in deep sleep and objectively if we can move with the speed of light or reach a blackhole horizon. Is there a map between the speed of light movement and deep sleep, given that an observer moving with speed of light will indeed see nothing and know nothing, exactly like in deep sleep? This is because all sensory and neural processes come to a halt as one approaches the speed of light. Obviously, in such a situation of zero neural processing, no perception can occur. Further studies in these directions will pave way for a deeper appreciation of time in its relation to the cosmos.

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Analysis of Stunting Risk Factors in Toddlers

Astik Umiyah[1], Azizatul Hamidiyah[2]

[1]*Assistant Professor in Midwifery,* [2]*Assistant Professor in Public Health, Midwifery Program Study,
Faculty of Health Sciences, Ibrahimy University, Situbondo, East Java, Indonesia*

Abstract

Stunting is the impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation. In 2018, 22,2% toddlers with stunting in the world and 36,4% toddlers with stunting in Indonesia. Situbondo is a district with the third rank of stunting cases in the province of East Java, Indonesia. As of February 2019, the Banyuputih Community Health Care has the highest stunting rate of toddlers in Situbondo Regency, which is 42.7%, with details of 25.21 very short children and 17.49% short. The purpose of this study was to determine the risk factors for stunting in toddlers in the Banyuputih Community Health Center, Situbondo Regency, province of East Java, Indonesia. This research was a quantitative study with a cross-sectional design. The sample in the study was 274 toddlers in the Banyuputih Community Health Center working area. The sampling technique used was proportional random sampling. This research instrument used an observation sheet in collecting the independent and dependent variables. Data analysis was performed using univariate, bivariate and multivariate tests. The results showed that anemia (Pvalue 0.014) and family income (Pvalue 0.000) were proven to be associated with the incidence of stunting in toddlers in the Banyuputih Community Health Center Work Area. From the OR value of anemia, it is obtained 3.504, meaning that mothers who have anemia during pregnancy have a chance to have children with stunting by 3.504 times compared to mothers who do not experience anemia during pregnancy. Likewise, from the OR value of family income, it was obtained 361,999, meaning that toddlers who were in families with an income less than the regional minimum wage had a chance of stunting of 361,999 compared to toddlers from families with income above the regional minimum wage.

Keywords: *Risk Factors, Stunting, Toddlers.*

Introduction

Stunting is the impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation. Children are defined as stunted if their height-for-age is more than two standard deviations below the WHO Child Growth Standards median[1].

In 2025, Stunting is estimated that around 171 million to 314 million toddlers are stunted and 90% of them are in Africa and Asia. The Global Nutrition Report shows Indonesia is included in 17 countries out of 117 countries, which have three nutritional problems (stunting, wasting and overweight) in toddlers[2].

Stunting not only affects suboptimal growth, but also has difficulty achieving optimal physical and cognitive development, has a low level of intelligence,

be more susceptible to disease and decrease productivity as adults[3][4].

There are many factors of stunting, the effect of lack of energy and nutrition intake and infection. Household and family factors, complementary feeding, and breastfeeding are also direct factors causing stunting[5].

The incidence of stunting in Indonesia is still high and decreased in 2018 with a prevalence of 30.8% compared to 2013 (37.2%) and 2010 (35.6%). Where the prevalence of stunting was 30.8% in 2018 consisting of 11.5% very short and 19.3% short. With this number, Indonesia ranks 5th most stunting in the world (this condition is only better than India, China, Nigeria, and Pakistan). Meanwhile, East Java is a province that has a high prevalence, namely 26.7%.[6]

Situbondo District has a high and increasing prevalence of stunting. Situbondo is also the district with the third rank of stunting cases in East Java. Based on Monitoring Data on Nutritional Status of East Java Province in 2016, Situbondo Regency has a prevalence of toddlers with stunting of 23.0%, in 2017 it was 30.5% and as of February 2018, of 44,386 toddlers, 30.3% were recorded as having stunting.

Based on the results of interviews with the data and information section of the Situbondo District Health Office, it was stated that so far there was no special recording of stunting. Until 2018, only sufficient data on the Nutrition Status Monitoring Survey which is carried out by the Province every year. And only in 2019, the number of it is recorded for stunting detection, even then only in the weighing month (February and August). So that there has been no specific analysis per Community Health Center/Subdistrict related to the stunting case in Situbondo until 2019.

Based on the report for the weighing month of February 2019, the Banyuputih Community Health Center has the highest stunting rate of toddlers in Situbondo Regency, which is 42.7%, with details of 25.21 very short children and 17.49% short[7]. Therefore, it is necessary to conduct research on the analysis of risk factors for stunting in toddlers in the Banyuputih Health Center, Situbondo Regency.

The purpose of this study was to determine the risk factors for stunting in toddlers so that the risk factors for stunting in the Banyuputih Community Health Center can be addressed appropriately.

Material and Method

The research was a quantitative study with a cross-sectional design. The research's location was conducted in the Banyuputih Community Health Center, Situbondo Regency, East Java, Indonesia. The research was conducted for 10 months in 2020. The population in this study were all toddlers who were measured Height/age in the Banyuputih Community Health Center Work Area. The sample in the study was 274 Toddlers in the Banyuputih Community Health Center with inclusion and exclusion criteria. The sample was calculated using a formula[8]:

$$ n = \frac{Z^2_{1-\frac{\alpha}{2}} P(1-P)N}{d^2(N-1) + Z^2_{1-\frac{\alpha}{2}} P(1-P)} $$

Inclusion Criteria:

1. Toddlers aged 0-59 months

2. Toddlers are included in the data where Height/Ages measurements were taken in the last weighing month

3. Toddlers have complete supporting data

Exclusion Criteria:

1. Incomplete supporting data

The sampling technique used was proportional random sampling. With the following proportions:

1. Banyuputih Village = (113/949) x 100 = 12% x 274 = 33 Ballita

2. Sumberejo Village = (310/949) x 100 = 33% x 274 = 90 toddlers

3. Sumberanyar Village = (328/949) x 100 = 34% x 274 = 93 toddlers

4. Sumberwaru Village = (199/949) x 100 = 21% x 274 = 58 toddlers

The instruments used in this study were observation sheets, supporting documents in the form of a cohort of toddlers, the Mother and Child Health's Handbook, Mother and Child Health and Nutrition reports.

Data was analyzedwuth univariate, bivariate and multivariate analyzes. Univariate analysis was performed on each variable from the research results by describing each variable by making a frequency distribution table. Bivariate analysis was carried out to see the relationship between each independent and dependent variable using the chi square test. And Multivariate with multiple logistics analysis.

Result and Discussion

The research results are as follows:

Univariate Analysis:

Table 1. General description of stunting in the Banyuputih Community Health Center

No.	Inf	F	%
1	Normal	203	74
2	Stunting	71	26
	Total	**274**	**100**

Based on Table 1, it showed that some of the toddlers with stunting in the Banyuputih Health Center work area were 26%.

Table 2. Overview of Risk Factors for Toddler Stunting in the Banyuputih Health Center Work Area

No.	Inf	F	%
Children's Characteristic			
Age			
1	0-12 m	130	58
2	>12-24 m	33	12
3	>24-36 m	39	14
4	>36-48 m	29	11
5	>48 m	13	5
Total		274	100
Sex			
1	Male	124	45
2	Female	150	55
Total		274	100
Birth Weight			
1	≥2500gr	256	93
2	<2500gr	18	7
	Total	274	100
Birth Body Length			
1	≥48cm	221	81
2	<48cm	53	19
Total		274	100
Breastfeeding			
Early Initiation of Breadfeeding			
1	Yes	274	100
2	No	0	0
Total		274	100
Exlusive Breatfeeding			
1	Yes	239	87
2	No	35	13
Total		274	100
Infection Desease			
	Diarrhea		
1	No	264	96
2	Yes	10	4
Total		274	100

No.	Inf	F	%
Upper Respiratory Tract Infection			
1	No	0	0
2	Yes	274	100
Total		274	100
Maternal and Family's Factor			
Anemia (Mother's Nutrition Status)			
1	No	205	75
2	Yes	69	25
Total		274	100
Upper Arm Circumference (Mother's Nutrition Status)			
1	Normal	245	89
2	Less	29	11
Total		274	100
Mother's Height			
1	≥150cm	208	76
2	<150cm	66	24
Total		274	100
Family's Income			
1	≥Regional Minimum Wage	221	81
2	< Regional Minimum Wage	53	19
Total		274	100
Mother's Education			
1	University	8	3
2	Senior High School	13	5
3	Junior High School	118	43
4	Elemntary High School	135	49
5	Not go to school	0	0
Total		274	100
Numbers of Family Member			
1	2-4 members	151	55
2	5-7 members	112	41
3	>7 members	11	4
Total		274	100
Environment			
Vitamin A			
1	Yes	274	100
2	No	0	0
Total		274	100

Based on Table 2, it showed that the characteristic factors of children aged 0-12 months are 58%, female gender is 55%, underweight was 7%, and birth length was 19%. In the aspect of breastfeeding, 100% did early initiation of breastfeeding and 13% did not exclusive breastfeeding. In fact, a history of infectious disease had a history of diarrhea by 4%, and a history of ARI by 100%. Maternal and family factors of anemia during pregnancy were 25%, had a lower arm circumference of less than 11%, short height of mother (<150cm) was 24%, family income was less than the minimum wage rate of 19%, mother's education was mostly graduated from elementary school by 49%, the number of family members was mostly 2-4 people and 100% of environmental factors consume vitamin A.

So based on the results of the univariate test at the bivariate test stage for breastfeeding factors (early initiative breastfeeding variable), infectious disease factors (upper respiratory tract infection variable) and environmental factors (Vitamin A variable) analysis cannot be carried out because the data is homogeneous.

Bivariate AnalysisL From bivariate analysis, it showed that the statistical test results of birth weight obtained the value of Pvalue = 0.009 (P ≤ 0.05), with a degree of significance α (5%), it could be concluded that the alternative hypothesis (Ha) was accepted or the null hypothesis (Ho) was rejected which showeda relationship between birth weight and the incidence of stunting. On the other hand, age (Pvalue 0.095), gender (Pvalue 0.512), and body length (Pvalue 0.334) had no relationship with the incidence of stunting.

The results of this study were according to Paudel, et al (2012) which showed that birth weight less than 2500gr had a higher risk of becoming stunting.

The results of the exclusive breastfeeding statistical had Pvalue = 0.025 (P ≤ 0.05), with a degree of significance α (5%), it could be concluded that the alternative hypothesis (Ha) was accepted or the null hypothesis (Ho) was rejected which showed a relationship between exclusive breastfeeding and the incidence of stunting. The results of this study were in accordance with Ni'mah & Siti (2015) and Fikadu, et al (2014), namely toddlers who did not receive exclusive breastfeeding were at high risk of stunting.

The results of the diarrhea statistical test had Pvalue = 0.021 (P ≤ 0.05), with a degree of significance α (5%), it could be concluded that the alternative hypothesis (Ha)

was accepted or the null hypothesis (Ho) was rejected which indicates there was a relationship between diarrhea and the incidence of stunting.

The results of this study were as according to Bhutta, et al (2013), Stewart et al (2013), namely diarrhea could interfere with the absorption of nutrients. Diarrhea occurring five or more times before the age of two is estimated to contribute 25% to the incidence of stunting.

The statistical test results for anemia, upper arm circumference, mother's height, family income obtained the value of Pvalue = 0.000 (P ≤ 0.05), with a degree of significance α (5%), it could be concluded that the alternative hypothesis (Ha) was accepted. or the null hypothesis (Ho) was rejected, which indicates a relationship among anemia, upper arm circumference, mother's height, family income and the incidence of stunting. On the other hand, for mother's education (Pvalue 0.510), the number of family members (Pvalue 0.238) had no relationship with the incidence of stunting.

The results of this study were consistent with Lestari et al (2014), Nadiyah et al (2014), Oktariana and Sudiarti (2014) that there was a relationship among anemia, upper arm circumference, and mother's height with the incidence of stunting. Likewise, this study was in accordance with Bishwakarma (2011) that family income will make it easier for toddlers to fulfill their nutrition and easily get access to health services so as to reduce the risk of stunting.

Multivariate Analysis:

Table 3. Multivariate Model Candidate Selection

Variable	P value
Age	0,95*
Sex	0,512*
Birth Weight	0,009
Birth body length	0,334*
Exclusive Breastfeeding	0,025
Diarrhea	0,021
Anemia	0,000
Upper Arm Circumference	0,000
Mother's Height	0,000
Family Income	0,000
Mother's Education	0,510*
Number of Family Member	0,228

Based on Table 3, it showed that there were 8 out of 12 variables that can proceed to the next stage, namely those with a value <0.25, including birth weight, exclusive breastfeeding, diarrhea, anemia, upper arm circumference, mother's height, family income and number of family members.

Table 4. Summary of Modeling Results

Variable	Model 1	Model 2
Birth Weight	0,198	-
Exclusive Breasfeeding	0,795	-
Diarrhea	0,093	-
Anemia	0,033	0,014
Upper Arm Circumference	0,07	-
Mother's Height	0,456	-
Family Income	0,000	0,000
Number of Family Members	0,727	-

Based on Table 4 it showed from modeling 1 that can pass to modeling stage 2, namely 2 of the 8 variables with the P value < 0.05, namely anemia and family income.

Table 5. Analysis of Risk Factors for Toddlers with Stunting Incidence in the Banyuputih Health Center Work Area

Variable	B	Wald	Pwald	OR 95%CI
Anemia	1,254	5,980	0,014	3,504 (1,283-9,572)
Family Income	5,892	31,857	0,000	361,999 (46,794-2,800E3)

Based on Table 5, it showed that anemia and family income were proven to be related to the incidence of stunting in toddlers in the Banyuputih Health Center Work Area. From the OR value of anemia, it was obtained 3.504, meaning that mothers who had anemia during pregnancy had a chance to have children with stunting by 3.504 times compared to mothers who did not experience anemia during pregnancy. Likewise, from the OR value of family income, it was obtained 361,999, meaning that under-fives who were in families with an income less than the Regional Minimum Wage had a chance of stunting of 361,999 compared to toddlers from families with income above the Regional Minimum Wage.

Conclusion

The results showed that anemia (Pvalue 0.014) and family income (Pvalue 0.000) were proven to be associated with the incidence of stunting in toddlers in the Banyuputih Community Health Center. From the OR value of anemia, it was obtained 3.504, meaning that mothers who had anemia during pregnancy had a chance to have children with stunting by 3.504 times compared to mothers who did not experience anemia during pregnancy. Likewise, from the OR value of family income, it was obtained 361,999, meaning that toddlers who were in families with an income less than the regional minimum wage had a chance of stunting of 361,999 compared to toddlers from families with income above the regional minimum wage.

Conflict of Interest: None

Ethical Clearance: Ethical approval obtained from the institutional Ethical Commite of Banyuwangi Institute of Health Science.

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Oral Health Knowledge and Attitude of Students In UAE

Aysha Rashed Al-Suwaidi[1], Shatha Al-Sharbatti[2], Sura Ali Al-Bayati[3]

[1]Researcher, Gulf Medical University, [2]Professor, Community Medicine Department, College of Medicine, Gulf Medical University, [3]Associate Professor, Diagnostic and Surgical Dental Science Department, College of Dentistry, Gulf Medical University

Abstract

Objectives: To assess the oral health knowledge and attitude in school students grade 7-12, in Ajman, UAE and to identify predictors of poor oral knowledge and attitudes and to determine common barriers to oral health care.

Method: A Cross sectional study among students, grade 7 -12, whose parents signed informed consent for their participation. Random selection of schools and participants was done. Validated self-administered questionnaire was employed. Knowledge and attitudes were assessed by scoring system. Official ethical approval was obtained. Data analyzed by SPSS software. Chi- square test, Fishers' Exact test, logistic regression analysis and Mann-Whitney test were used.

Results: The study included 395 participants,mostly $\leq$ 13- year-old, females, UAE national, having family size <5, with higher levels of education parents. Poor knowledge was identified in 37.2% of respondents. Significant associations were noticed between poor knowledge and gender, family size, and dental insurance (<0.05 for previous variables). Being females compared to males, having large family size, lower education level father, and no dental insurance increase the risk of poor knowledge (OR=4.92, CI:. 2.08-11.63, P<0.0001; OR=11.82, 95%CI:5.48-25.52, P=<0.0001;

OR=2.39, 95%CI: 1.38-4.12, P=0.002; OR=5.04, 95%CI:2.11-11.99, P=<0.0001 respectively). Adequate attitude score was identified in 93.7% of respondents. The risk for poor attitude was significantly increased with poor knowledge (OR=3.02,.95% CI:1.24-7.32, P=0.01). Discouraging parent opinion on dentist visits was the most common barrier for oral healthcare

Conclusions: Poor knowledge is identified in about one third of respondents, and adequate attitude in most of respondents. Gender, family size and lack of dental insurance were significant predictors of poor oral health knowledge. Poor attitudes are determined by poor knowledge. Discouraging parent opinion is the most common barrier

Keywords: *Knowledge, Attitude, Oral health, Students.*

Introduction

The WHO describes adolescents as "young people between the ages of 10 and 19 years" that are frequently considered as a healthy group.[1] Traditionally,

Correspondence Author:
Dr. Sura Ali Ahmed Fuoad Al Bayati
Associate professor, Diagnostic and Surgical Dental Science Department, College of Dentistry, Gulf Medical University

numerous dental experts have regarded adolescence as a period with few dental needs.[2] Previous studies showed the importance of knowledge to prevent oral health problem and to maintain oral hygiene.[3-6] A survey from England, Wales and Northern Ireland, showed a strong positive association between better perceptions about oral health and regular dental checkups.[7] A study in China showed that oral health knowledge among 12-15 year- old was poor.[3] A study in Spain to assess the relationships between oral health knowledge, attitudes and behavior in 12-year-old schoolchildren showed that

97.5% of children had limited oral health knowledge and reported inadequate oral healthcare habit.[4] In India, a cross- sectional study to assess the oral health awareness of children and adolescents showed that more than half of the study subjects were aware of the significance of maintaining optimum oral hygiene, regular dental visits and damaging effects of tobacco.[5] A study in Tanzania, showed that 72.7% of participants reported to be aware about dental examination and its importance, attitude towards dental health problems was found to be more positive among girls than boys.[8]

Few studies are available from the GCC countries in relation to the oral health knowledge and attitudes of adolescents. In Qatar, a study among 2200 students aged 12-14 years, found that the percentage of low knowledge was about 11%, and about 35% of children thought wrongly that one should visit the dentist only in case of pain.[9] In the UAE, a cross-sectional study was performed among school children in Ajman. The results demonstrated significant association between knowledge and good oral health practice.[10]

Factors that determine the oral health knowledge are numerous. Inconsistent findings was reported in relation to gender. A study from Malaysia, showed that males had significantly higher average knowledge score compared to females.[11] While in a study from Saudi Arabia, a significant higher knowledge was observed among females compared to males.[12] Other factor is the parents' educational level. A study in Portugal showed that parents' educational level was associated with tooth brushing frequency, tooth brushing duration, parental help during tooth brushing and the frequency of dental visit arrangement.[13] Socioeconomic status and home environment have been found to influence perceived oral health. Paula et al found strong negative relation between children's opinion of oral health status and monthly family income, parent education, and household overcrowding.[14]

Barriers to oral health among school student are related to the availability of oral health programs, oral health care, dental appointments during school hours, socio-cultural factor, and availability of coordination between school, clinics and parents.[15]

There are few researches regarding student knowledge and attitude towards oral health from the UAE. The present study aimed to assess oral health knowledge and attitude in school students grade 7-12, in Ajman, UAE and to identify predictors of poor knowledge and attitudes and common barriers to oral health care.

Materials and Method

A Cross sectional study that included both male and female students in Ajman public and private schools from grade 7- 12. Four schools were selected randomly from a list of all private and governmental schools in Ajman, (2 public and 2 private)to be the site of data collection Sample size was calculated using the equation, $n=Z^2pq/d^2$, the estimated population proportion was based on a study done in Qatar.[16] Sampled participants were selected randomly from list of students in these 4 schools. The study included both gender students who are in grade 7 -12, willing to participate and their parents accept their participation and signed informed consent and living in Ajman. The study excluded students who were not willing to participate/or their parent refuse to sign informed consent. A validated self-administered questionnaire was used as a tool. The questionnaire was validated by 3 experts in the field of dentistry. The questionnaire included 26 knowledge and 6 attitude questions. A scoring system was used to assess knowledge, and attitude by which a +1 score was given for correct knowledge or positive attitude response, while zero was assigned for incorrect knowledge or negative attitude response. Poor knowledge or attitude was identified if the total knowledge or attitude score was less than 50% of the total corresponding scores. Research protocol was approved by the Gulf Medical University (GMU) Institution Research Board (IRB)on 04.06.2017. Approval from Ministry of Education was obtained (June 22nd 2017) before the data collection started. Data collection was done between November 1st 2017- May 1st 2018. Informed consent was obtained from the participants' parents before enrolling them in the study. Confidentiality of the information is respected and only the research team (and IRB member if requested) can have access to the data. The study is not a funded research and there is no Conflict of Interest. Official approval from the principles in the four schools was obtained. After completing data collection, the data was fed into Excel spreadsheet. SPSS version 24 was used for analysis. Results are displayed in descriptive and inferential statistics. Chi square test and Fishers' Exact test were used, as appropriate, to find the association between variables. Simple and multiple logistic regression analysis were used to find predictors of oral health knowledge and attitudes. Mann Whitney

test was used to assess to the significance of difference between median values.

Results

In this study, 395 participants were included. Most of the participants were aged 13 year or less (n=283,71.6%), the majority were females(n=254, 64.3%), UAE national(n=249, 63.0%), having family size equal or less than 5 members (n=290,73.4%), their father and mother levels of education were college and above (n=223, 56.5% and n=215, 54.4% respectively). Crowding index was used in this study as indicator of socioeconomic status of respondents. The results showed that the median crowding index was 3 with a minimum and maximum values of 1 and 5 respectively.

The percentage of respondents who had no health or dental insurance were 48.9% and 91.1% respectively. Among participants who had dental insurance (35 participants) the coverage of expenses was less than 50% in 14 participants (40% of the dental insured respondents).

Knowledge: Distribution of participates by knowledge score level showed that 147(37.2%) and 248(62.8%) participants had poor and adequate knowledge score respectively.

On asking the students about the perceived importance of keeping teeth\mouth clean, the most frequent response (90.1%) was "to keep oral cavity healthy", followed by "To prevent tooth decay" (67.6%), "To prevent bad breath" (62.3%) and "To keep teeth beautiful" (60.8%)respectively.

Table 1 shows the percentage of correct responses in knowledge questions regarding general oral health, gum health and teeth alignment. Only 8.6% and 24.8% of the students knew the correct frequencies of cleaning teeth and of visiting the dentist respectively. Around 40% of students lack the knowledge regarding signs/symptoms of tooth decay. Less than 60% of students were aware that smoking has adverse effect on the gum (57.7%) and about the symptoms of gum diseases (59.5%). Profound lack of knowledge was noticed in relation to teeth alignment effect on cleaning of the teeth and speech and only 2.5% of the student had aforementioned knowledge. About one third of the participants (31.4%) knew that teeth alignment problems should be corrected early.

Table 1. The Percentage of correct responses regarding oral health, gum health, and teeth alignment

Questions regarding teeth	No. of correct responses	%
General knowledge questions regarding oral health		
The importance of keeping teeth/mouth clean	395	100
The importance of cleaning teeth to keep oral cavity healthy	356	90.1
Whether smoking can adversely affect teeth	285	72.2
The importance of cleaning teeth to prevent bad breath	267	67.6
How to avoid tooth decay	251	63.5
The importance of cleaning teeth to prevent tooth decay	246	62.3
The importance of cleaning teeth to keep teeth beautiful	240	60.8
The signs/symptoms of tooth decay	235	59.5
The frequency of visiting the dentist	98	24.8
The frequency of cleaning teeth	34	8.6
Knowledge questions regarding gum health		
Signs of gum disease	318	80.5
Symptoms of gum diseases	235	59.5
The best way to keep the gums healthy	343	86.8
Whether smoking can adversely affect gum	228	57.7

Questions regarding teeth	No. of correct responses	%
Knowledge questions regarding teeth alignment		
Teeth alignment problem affect the cleaning of the teeth	10	2.5
Teeth alignment problem affect the speech	10	2.5
Teeth alignment problems should be corrected early	271	68.6

Figure 1. Shows the percentage of correct responses in knowledge questions regarding teeth cleaning aids. While most of the participants knew that tooth- brush is among the best cleaning aid (94.9%), however, much less percentage of respondents knew that floss and mouth wash are also important aids (30.6% and 49.1% respectively). Less than quarter of the students (23.8%) knew about the type of tooth- brush preferably used by them to clean their teeth. Although 78.2% of the respondents reported knowing the right technique of brushing, however, only 43.5% correctly knew the right technique of brushing.
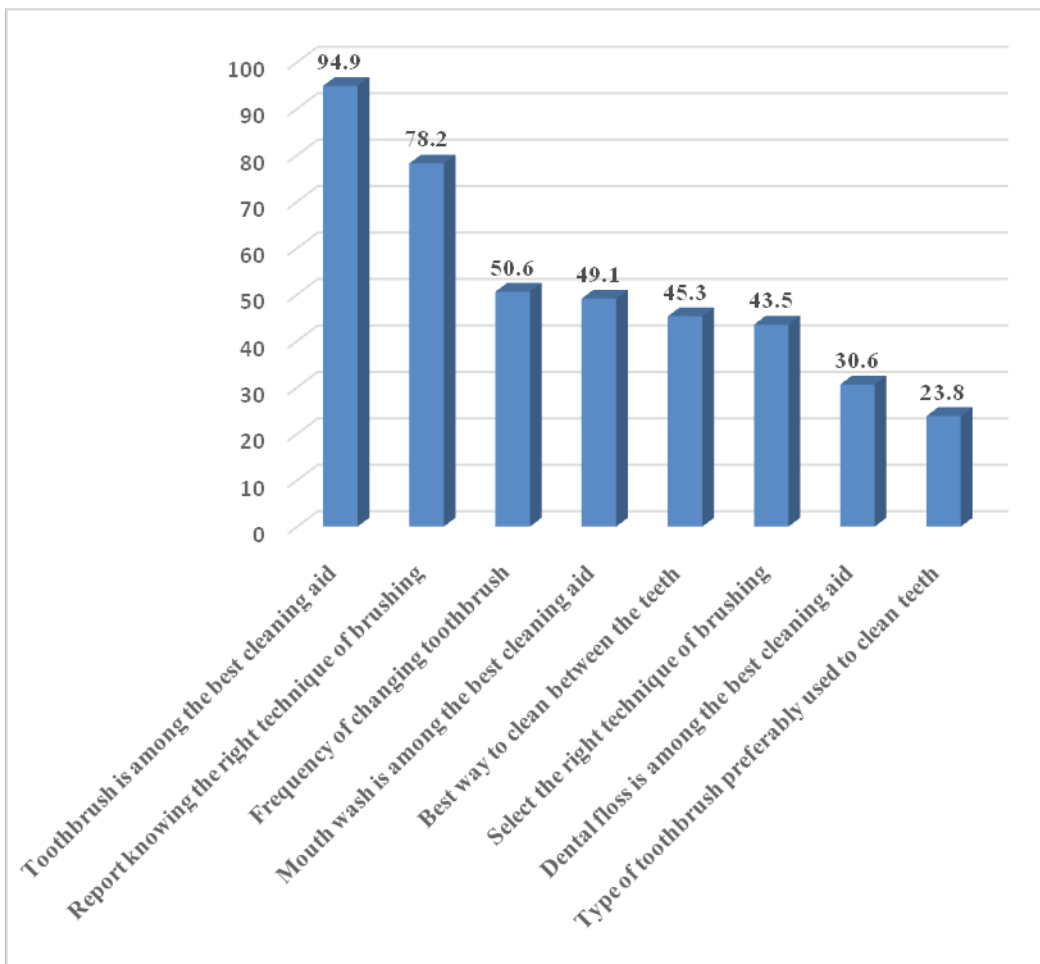
Figure 1. The percentage of correct responses in knowledge questions regarding teeth cleaning aids(n=395).

Table 2 showed the association between knowledge scores and socio-demographic characteristic of participants. Poor knowledge score was significantly association with gender, family size and dental insurance. The median crowding index in the group of students who had poor and adequate knowledge scores were 1.0 and 1.3 respectively to assess the difference between the median crowding index in the poor Vs. adequate knowledge score groups, Mann Whitney test was used, and it was significant P<0.0001.

Table 2. Association between knowledge scores and socio-demographic characteristic of participants

Variable	Groups	Poor		Adequate		Total No. (100%)	P value
Age (Years)	<=13	113	39.9	170	60.1	283	0.076
	>13	34	30.4	78	69.6	112	
Gender	Male	40	28.4	101	71.6	141	0.007
	Female	107	42.1	147	57.9	254	
Nationality	UAE	101	40.6	148	59.4	249	0.072
	Others	46	31.5	100	68.5	146	
Grades	7	23	51.1	22	48.9	45	0.218
	8	93	35.6	168	64.4	261	
	9	15	37.5	25	62.5	40	
	10	16	32.7	33	67.3	49	
Family size	Not large (≤5)	137	45.4	165	54.6	302	<0.0001
	Large (>5)	10	10.8	83	89.2	93	
Father Education Level	≤ Secondary education	72	41.9	100	58.1	172	0.093
	≥ College	75	33.6	148	66.4	223	
Mother Education Level	≤ Secondary education	73	40.6	107	59.4	180	0.209
	≥ College	74	34.4	141	65.6	215	
Dental insurance	Yes	14	40.0	21	60	35	0.721
	No	133	36.9	227	63.1	360	

Attitude: Favorable attitude score was identified in 93.7% of respondents and only 6.3% of the respondents reported unfavorable attitude. The percentage of favorable attitude responses to various attitude questions items was found as follow: the majority (95.4%)had favorable attitude when they had been asked about the importance of keeping good oral health;84.6% toward acceptance to participate in future camps to increase the awareness about oral health, while 80% agreed that oral health is integral to general health. Furthermore, about three- fourths of the participant (72.5%) were not afraid to go to dentist,and 64.8%of them reported their readiness to encourage friend/relative to have healthy oral habits. The lowest percentage of positive attitudes(57.2%) was reported for the perceived importance of regular dentist visit.

Table 3 Shows the association between attitude scores and socio-demographic characteristic of participants. Significant associations were found between family size and attitude scores. The median crowding index in the group of students who had positive and negative attitude scores were 1.2 and 1.0 respectively, and to assess the difference between the median crowding index for positive Vs. negative attitude score groups, Mann Whitney test was used, and it was not significant P=0.937.

Table 3. Association between attitude scores and socio-demographic characteristic of participants

Variable	Group	Attitude scores				Total No. (100%)	P value
		Unfavorable		Favorable			
		No.	%	No.	%		
Age (Years)	≤13	20	7.1	263	92.9	283	0.338
	>13	5	4.5	107	95.5	112	
Gender	Male	8	5.7	133	94.3	141	0.690
	Female	17	6.7	237	93.3	254	

Variable	Group	Attitude scores				Total No. (100%)	P value
		Unfavorable		Favorable			
		No.	%	No.	%		
Nationality	UAE	17	6.8	232	93.2	249	0.595
	Others	8	5.5	138	94.5	146	
Grade	7	1	2.2	44	97.8	45	0.615
	8	19	7.3	242	92.7	261	
	9	2	5.0	38	95.0	40	
	10	3	6.1	46	93.9	49	
Family size	Not large (≤5)	24	7.9	278	92.1	290	0.017
	Large (>5)	1	1.1	92	98.9	93	
Father education level	≤Secondary education	13	7.6	159	92.4	172	0.378
	≥ College	12	5.4	211	94.6	223	
Mother education level	≤Secondary education	13	7.2	167	92.8	180	0.505
	≥ College	12	5.6	203	94.4	215	
Dental insurance	Yes	1	2.9	34	100.0	35	0.713*
	No	25	6.9	335	93.1	360	

Barriers to Dental Care from Students Perspectives: The most common barrier for visiting the dentist regularly was explored. Parent discouragement regarding regular visit to dentist was found to be the most common barrier (37%), followed by high expenses of the dental procedure (27.6%). In less than one fourth (23.8%) of the participants, the dental phobia was the barrier, while both fear from pain associated with dental procedure and absence of advice from health care provider were reported as barriers by 22.8% and 22% of the participants respectively. The least frequent barriers were the availability of time and the availability of nearby dental service which was reported by 21.3% of the participants for both barriers.

Table 4. Shows Logistic regression analysis for identification of predictors of poor oral health knowledge. It can be seen that gender(being females compared to males), large family size, having lower education level father, and not having dental insurance are significant determinants of poor oral health knowledge.

Logistic regression analysis was done to find predictors of poor attitudes towards oral health. In Binary logistic regression, the only variables that showed significant relation with poor attitude scores were family size and knowledge level. Regarding family size, the study showed that the OR for poor attitude among students whose Family size >5 compared to students whose family size ≤5 was 7.942 (95% CI:1.060-59.528, p=0.044). Concerning knowledge level, the OR for poor attitude among students who had poor knowledge compared to students whose knowledge levels were adequate was 3.923 (95% CI:1.649-9.336, p=0.002). On analyzing the previous two variables in multiple logistic model, the only variable that showed significant result was the knowledge level, which showed that the OR for poor attitude among students who had poor knowledge compared to students whose knowledge level were adequate was 3.022 (95% CI: 1.247-7.322; p=0.014) on adjusting for the effect of family size

Table 4. Logistic regression analysis: Predictors of poor oral health knowledge
(Multiple logistic regression model prediction = 28.4%)

		N	COR	95% CI	P	AOR	95% CI	P
Age (Years)	≤13	283	1.525	0.95-2.43	0.77	-	-	-
	>13	112	1					

		N	COR	95% CI	P	AOR	95% CI	P
Gender	Male	141	1	1.18-2.86	0.007	1	2.082-11.639	<0.0001
	Female	254	1.838			4.923		
Nationality	UAE	249	1.48	0.96-2.28	0.73	-	-	-
	Others	146	1					
Grades	7	45	1.88	0.99-3.571	0.05	0.779	0.274-2.216	0.639
	8	261	1.74	0.73-4.14	0.20	2.363	0.840-6.646	0.103
	9	40	2.15	0.93-4.97	0.71	0.986	0.372-2.618	0.978
	10	49	1			1		
Family size	Not large (≤5)	302	1	3.44-13.79	<0.001	1	5.481-25.522	<0.0001
	Large (>5)	93	6.89			11.828		
Father Education level	≤ Secondary	172	1.42	0.94-2.14	0.09	2.392	1.387-4.123	0.002
	≥ College	223	1			1		
Mother Education level	≤ Secondary	180	1.30	0.86-1.95	0.20	-	-	-
	≥ College	215	1					
Dental insurance	Yes	35	1	0.560-2.313	0.721			
	No	360	1.138					
Crowding Index		395	1.80	1.36-2.37	<0.001			

Discussion

During childhood and adolescence, oral health habits, beliefs and attitudes, are usually developed and correct knowledge regarding oral health is better to be provided during this period since children and adolescents are receptive to new information. Evidence showed that good oral habits could effectively be established during this period if the correct messages and approaches are used[1]. This requires identification of gap in knowledge and factors that affect oral health attitudes of children and adolescents.

Knowledge: In this study the prevalence of poor knowledge was 37.2 %, this is higher than prevalence of low knowledge reported in a study from Qatar[9] (11.2%) among students age 12-14 years and a study from Manipur, North India[17](9%) among 810 healthy adolescents. Also, a study in China[3] showed that in oral health knowledge among 12-15 year- old was poor and only 5.3% had correct knowledge about dental plaque

Higher prevalence of poor knowledge than our data was reported in a study from Mangalore, India[18] with a prevalence of poor knowledge of 54.5% among 11-13 years old children and a study in Spain[4] which showed that 97.5% of children had limited knowledge of oral health issues.

In this study only 72.2 % and 57.7% had knowledge that smoking can adversely affect the teeth and gum respectively, 24.8% had knowledge on frequency of visiting the dentist and 8.6% had the correct knowledge on frequency of cleaning teeth. Our results regarding knowledge about the frequency of cleaning teeth is lower than that in a study from India[5], in which, 69% knew the necessity to brush teeth after every meal. Our data can be compared with a study from Tanzania[8], with a reported knowledge about dental checkup among 72.7% of the participants. Lack of knowledge regarding the adverse effect of smoking on oral health was also studied by Sood et al. 2014, who found that among dental patients only 54% and 65% knew that smoking can cause tooth decay and gum disease respectively.[19]

In this study 63.5% of participants have the correct knowledge on how to avoid tooth decay and this is lower than what is shown in study from Chandigarh, India[6],in which 92.7% were aware that sweets have negative impact on dental health.

In the present study, 80.5% and 59.5% of the students knew about gum diseases signs and symptoms respectively, while in Al-Subaita et al[20]study that included 287 students in Saudi Arabia, 56% of participants were aware that dental bleeding is a primary sign of poor oral health. Profound lack of knowledge

regarding the impact of malalignment of teeth on oral health cleaning where only 2.5% of the students had this knowledge. This is in agreement with Blaggana et al study that showed 49.8% knew that malalignment affect oral health.[6]

In this study higher percentage of poor knowledge was found among female (42.1%) compared to male (28.4). This is in agreement with study from Malaysia[5]which showed that males school students had significantly higher average knowledge score compared to females. Our study also agreed with data from Nigeria[21] which revealed that male respondents, aged 11-13 years and those attending private schools, had higher average dental health knowledge than their counterparts' females. Our data disagree with another study from Saudi Arabia[20] which showed that girls were more aware than boys about "bleeding gums, oral health effects on general health and the importance of dental check-up".

With regard to age, the present data showed no significant association between oral health knowledge scores and age, and this is consistent with Carneiro et al study from Tanzania[22] with a reported no significant difference between knowledge score of student 14-17 years and 18+ years. The present data also did not show significant difference between junior and senior students which is consistent with Lian et al study from Malaysia.[11]

In this study family size, parent education and crowding index were used as socioeconomic determinants of oral health oral health knowledge and attitudes. The studied students whose father education was lower had significantly higher risk of poor knowledge. This finding support Wahengbam et al[17] study who had reported significant association between parent education and inadequate oral health knowledge among adolescents. The importance of parent education observed in this study is also supported by a study from Brazil.[14]Our finding is also supported by earlier study which showed that parents is the most prevalent source of oral health information for children.[9] We found that the risk of poor oral health knowledge was significantly higher among students who had larger family size and there was significant association between knowledge score and family size. This finding agrees with Al-Darwish study which showed that larger household size can act as a barrier to oral health knowledge, because of the need to focus on larger number of children. [9]

Worrying finding is the very high proportion of participants who were not having dental insurance (90.1%).This is important because earlier study identified dental insurance as one of the predictors for oral health utilization among school children.[23] The CDC estimated that about one fourth of U.S. children do not have dental insurance[24], which is less than our finding. In UAE, although all citizen is covered by health insurance (private or public), however,dental insurance is not yet a mandatory requirement for all health insurance agreement. Including dental care as part of basic health insurance is recommended. The present results have not revealed significant association between dental insurance and oral health knowledge and attitude. This could be explained by the small number of students who are covered by dental insurance. More research are suggested to explore this relationship

Attitude: In this study favorable attitude score was identified in 93.7% of respondents. This is higher than a study from Manipur, North Eastern India[17], in which 79.8% of the studied adolescents had favorable attitude towards oral health. Reddy et al found that 52% of the students had an unfavorable attitude. [25] The authors in the previous study attributed the high unfavorable attitudes among the study participants to the possible fear of dental care. Regarding going to the dentist, 72.4% of our participants admitted that they were not afraid to go to dentist visit this disagree with Hans et al study[5] which showed that 53% of the students avoid dental visit because of fear of pain.

Regular visit to the dentist was thought to be important by about half of the studied students (57.2%). Higher percentage of students was reported by de Palma et al[26] (79.9%) and Blagganaet al6 (77.6%) on the belief that "regular dentist visits is necessary".Higher percentage was also reported in a study from Jodhpur, India[5], where 88% of the children felt the need to visit a dentist. A study from Qatar9 found that 32.5% of the students thought wrongly that one must consult the dentist merely in case of pain.

The studied females have less favorable attitude (93.3%) compared to males (94.3%) the opposite can be seen in a study from Tanzania[8], which showed that girls had significantly more positive attitude towards dental health compared to boys (Mean attitude scores for girls vs. boys= 19.87 vs. 19.14, P=0.025). Also, we found that the percentage of favorableattitude of older student was more among older compared to younger student (95.5%

vs. 92.9%) this is in agreement with Wahengbam et al[17] study. Also, we observed higher percentage of favorable attitude among student with higher compared to lower father's education (94.4% vs. 92.4%) and higher compared to lower mother education (94.4% vs. 92.8%). Similar findings were also in Wahengbam et al[17]study. The current results showed that poor oral health knowledge was the only variable significantly associated with unfavorable attitudes which suggests that improvement in attitudes can be achieved upon increasing the awareness of participants. This is in line with aforementioned study which documents significant correlation between knowledge - attitude scores. [17] Similar finding was also reported by Kumar et al who had documented positive linear relationship between knowledge and practice scores.[27]

Barriers: In our study the student most perceived barrier to dental care was parent opinion (37%) followed by the cost of dental procedure (27.6%) while the lowest perceived barrier were the availability of time (21.3%) and availability of dental services near living area (21.3%). In Blasi, et al[28] study, the most commonly barrier to dental care included was cost (83.7%) and no dental insurance (78.1%).Financial factor was also identified as a barrier to care seeking for children oral health by Kelly et al.[29] Fear of pain associated with dental procedure and fear from dental procedure was perceived by 22.8% and 23.8% of our respondents respectively, this is lower than what was seen in Dodd et al study [30], where 60% of respondents offered at least one fear statement when describing why people do not go to the dentist. A qualitative study on dental care barriers of Swedish adolescents showed that fear of pain and feeling of discomfort were among the reported barriers.[31] Interestingly, lack of advice from health provided is reported as barrier by 22% of participants this is supported by other researchers.[15] Semi-structured interview of adolescents on perceived factors that affect utilization of oral health services reported parental perception of oral health need as one of the factors.[30]

Limitation of this study is that we can't be generalized finding to all UAE students because the present study had included only limited number of schools only in one State (Ajman) in UAE.

We declare that this manuscript is an original study and has not been sent to other journal and we have no Conflict of Interest and have not received a fund for conducting this study. Research protocol was approved by the Gulf Medical University (GMU) Institution Research Board (IRB). Approval from Ministry of Education was obtained before the data collection started. Informed consent was obtained from the participants parents before data collection.

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Effectiveness of Back Massage vs Breathing Exercises on Labour Pain and Anxiety among Primigravida Mothers During First Stage of Labour in Pravara Rural Hospital, Loni (Bk)

Bharti Satish Weljale

Associate Professor, Pravara Institute of Medical Sciences (Deemed to be University), College of Nursing, Loni (Bk). Maharashtra

Abstract

Background: Pregnancy is a special event. The labour & birth process is an exciting, anxiety provoking situation for the woman & her family. Each woman comes into labour room with her own set of expectation, fear, preparation, pain threshold, personality & behavioural make up & ways of experiencing what is happening to her, which has to be managed effectively. The pain involved in labour & birth can sometimes dominate a pregnant woman or a couple throughout child, particularly as the baby's due date approaches. The time of labour & birth, though short, in comparison with the length of pregnancy, is the most dramatic & significant period of pregnancy for the expectant woman.

Method: Quasi experimental study, pre and post-test design with quantitative approach was used. Setting of the study was in Pravara rural hospital, Loni (Bk).Those primigravida women who are above 19 years of age and fulfilling the inclusion criteria and were available during study period were the samples for this present study. Sample size was total 60 (30 of them to study group I and 30 of them to study group II).Purposive sampling technique was used for the study. Structured questionnaire was used to assess demographic and obstetrical variables, labor pain of mother was assessed by visual analogue scale and anxiety of the mother was assessed by the state –Trait Anxiety inventory scale.

Results: Analysis showed that comparison of mean and SD of pretest level and posttest level of labour pain in study group I & II was very highly significant at P=0.001 level and comparison of mean and SD of pretest level and posttest level of anxietyin study group I & II was very highly significant at P=0.001 level. The result depicted that, there was statistical significance found in labour pain of primigravida mothers in study group I & II at P=0.01 level. Regarding anxiety of primigravida mothers in study group I & II, there was significant difference found at P=0.01 level.

Conclusion: Labour is very sensitive phase of a women, fear and anxiety may be high in primi mothers during process of labour. Pharmacological and non-pharmacological method of pain relief are complementary procedures which help a woman suffer less anxiety and pain during childbirth. Thus this study conclude that back massage and breathing exercises provided more persistent pain relief and reduce anxiety. It is effective, non-pharmacologic, accessible, cost effective and non-invasive technique to help reduce the intensity of labour pain and anxiety.

Keywords: *Assess, effectiveness, back massage, breathing exercises, labor Pain,anxiety, primigravida, first stage of labor.*

Corresponding Author:
Bharti Satish Weljale
Associate Professor, Pravara Institute of Medical Sciences (Deemed to be University), College of Nursing, Loni (Bk). Maharashtra
Mobile No.: 9890860969
e-mail: bhartiweljale@gmail.com

Introduction

"The aim of the wise is not to secure pleasure, But to avoid pain".

Labour pain is a universal and unique experience for childbearing women but threshold of this pain varies between individuals. For some it resembles menstrual cramps. Pain intensity varies widely and generally increases as labour progresses. Pain experienced during labour is probably the most painful event in the lives of the women.[1]

Labour pain is often described as the worst pain in a women's life, but the experience is highly variable. Although many factors have linked to the labour pain, it is difficult to assess the individual effects of these factors because labour is a dynamic process and pain intensity changes over the course of labour.[2]

Lamaze method is also termed as psycho prophylactic method that means preventing labour pain (prophylaxis) by the use of mind (psyche). The primigravida mother will learn activities and breathing pattern that can be applied to control pain sensation during uterine contractions. Lamaze method helps the pregnant woman to keep her calm during labour and save her energy for the delivery time.[3] Method like conditioned reflexes, imagery, conscious relaxations, visualization, hydrotherapy, and massage, hot and cold applications, breathing exercises, effleurage, body movements and position changes are taught to the mother. The goal of the Lamaze method is to cut short the labour stages wisely, by making the mother to understand what is happening, the physiological changes and thereby reducing the intensity and the perception of pain.[4]

Statement of Problem: Effectiveness of back massage vs breathing exercises on labour pain and anxiety among primigravida mothers during first stage of labour in Pravara rural hospital, Loni (Bk)

Objectives:

1. To assess and compare the effectiveness of back massage vs breathing exercises on labour pain and anxiety among primigravida mothers during first stage of labour

2. To correlate the labour pain and anxiety of primigravida mothers with back massage vs breathing exercises during first stage of labor in the both groups

Materials and Method

Research design and approach: Quasi experimental study, pre and post-test design with quantitative approach was used.

Setting of the study: Maternity Ward and labor room situated at ground floor at Pravara Rural Hospital Loni Bk. Labor waiting 10 beds are available as well as 6 tables for birthing process.

Population: All Primigravid women admitted in labor room was the population for this study.

Samples: Those primigravida women who are above 19 years of age and fulfilling the inclusion criteria and were available during study period were the samples for this present study.

Sample size: Sample size was total 60(30 in study group I and 30 in study group II) (calculated through Open episoft ware, version 3,open source calculator).

Sampling technique: Purposive sampling technique was used for the study.

Inclusion criteria: The primigravida women who were:

- Ready to participate in the study

- Having single vertex fetus in anterior position

- With gestational age 38-42 weeks, above 19 years of age

- Having cervical dilatation 4cm and above & who are in first stage of labour.

Exclusion Criteria: The primigravida women who were:

- Having high risk pregnancy such as PIH,APH, Habitual abortion, ectopic pregnancy

- Having medical complications like haematological diseases, thyroid diseases, DM, HTN also obstetrical complications like CPD, obstructed labor, meconium aspiration, fetal distress etc.

- Primigravida mothers getting analgesics for pain relief in 1st stage of labour or any other non-pharmacological pain relief measures.

Data Collection Procedure: Ethical approval from the Institutional ethics committee of PIMS-DU, Loni (BK) was obtained (Reg. No: PIMS/DR/CON/2020/326).Permission was obtained from medical

superintendent, head of department of obstetrics and gynecology Pravara rural hospital, LoniAll participants was made comfortable and relaxed. Introduction of the investigator was given to participants. Explanations regarding study and its objectives was given to them. Before data collection informed consent was obtained from study subjects. The investigator established good rapport with participants before giving nursing interventions and assured confidentiality and pretest was conducted by interview method. For study group I, back message was given and study group II, breathing exercises was given every two hourly. Meanwhile, the progress of the labour was assessed by doing vaginal examination in every four hourly. Labor Pain was marked with the help of visual analogue pain scale and anxiety was assessed by State-Trait Anxiety Inventory scale. Posttest was taken by investigator and after data collection all the participants were thanked for their participation and cooperation for the study.

Results

Demographic variables of primigravida mothers in the study group I: The major findings of demographic of primigravida mothers age, 12(40%) were between 19-23yrs, the educational qualification of primigravida mothers 13(43.33%) were higher secondary, occupation 10(33.33%) was agriculture,family income 13(43.44%) were earning less than Rs.10,357 to 15,535. Majority were belongs to joint family 15(50%), and 17(56.67%) were residing in rural areas.

Demographic variables of primigravida mothers in the study group II: The major findings of demographic of primigravida mothers age, 13(43.33%) were between 19-23yrs, the educational qualification of primigravida mothers 14(46.67%) were higher secondary, occupation 10(33.33%) was agriculture,family income 12(40%) were earning less than Rs.10,357 to 15,535. Majority were belongs to joint family 16(53.33%), and 19(63.33%) were residing in rural areas.

Regarding the obstetrical variables of primigravida mothers in the study group I: The major findings of obstetrical variables of primigravida mothers in study group I, the gestational age of primigravida mothers 12(43.33%) of them were in 38-40 weeks, the cervical dilatation of primigravida mothers 24(80%) of them were between 4-5cm of cervical dilatation.

Regarding the obstetrical variables of primigravida mothers in the study group II: The major findings of obstetrical variables of primigravida mothers in study group II, the gestational age of primigravida mothers 13(40%) of them were in 38- 40 weeks, the cervical dilatation of primigravida mothers 23(76.66%) of them were between 4-5cm of cervical dilatation.

Table 1: Comparison of mean and SD of pretest level and posttest level of labour pain and anxiety among primigravida mothers with back massage in study group I

Variables	Pre-test		Post-test		Paired 't' test
	Mean	SD	Mean	SD	
Labour pain	7.1566	1.644	3.07	2.99	22.20
Anxiety	130.6	6.41	136	9.08	6.933

Analysis showed that comparison of mean and SD of pretest level and posttest level of labour painin study group I was very highly significant at P=0.001 level and comparison of mean and SD of pretest level and posttest level of anxietyin study group I was very highly significant at P=0.001 level.

Table 2: Comparison of mean and SD of pretest level and posttest level of labour pain and anxiety among primigravida mothers with breathing exercises in study group II

Variables	Pre-test		Post-test		Paired 't' test
	Mean	SD	Mean	SD	
Labour pain	7.28	2.08	4.06	2.99	7.933
Anxiety	131.6	6.47	146.17	10.52	24.42

Analysis showed that comparison of mean and SD of pretest level and posttest level of labour pain in study group II was very highly significant at P=0.001 level and comparison of mean and SD of pretest level and posttest level of anxietyin study group II was very highly significant at P=0.001 level.

Table 3: Comparison of posttest level of mean and SD of labour pain and anxiety of among primigravida mothers with back massage and breathing exercises between study group I & II (n=60)

Variables	Study group I		Study group II		Paired 't' test
	Mean	SD	Mean	SD	
Labour pain	3.07	2.88	4.96	2.65	2.63
Anxiety	136	9.08	149.17	10.52	10.54

The result depicted that, there was statistical significance found in labour pain of primigravida mothers in study group I & II at P=0.01 level. Regarding anxiety of primigravida mothers in study group I & II, there was significant difference found at P=0.01 level.

Table 4: Correlation of labour pain and anxiety score of primigravida mothers with back massage and breathing exercises between study group I & II (n=60)

	Correlation	Mean ± SD	Correlation coefficient	Interpretation
Study group I	Labour pain vs anxiety	136±3.07	r=0.54 p=0.01**	Moderate correlation
Study group II	Labour pain vs anxiety	149.17±4.96	r=0.43 p=0.01**	Moderate correlation

**Highly significant at ≤0.01

The above table suggested that, mean and SD value was 136±3.07 and correlation was r =0.54 which was statistically significant at 0.01 levels. There was a moderate positive correlation found between the labour pain and anxiety of primigravida mothers in study group I. The correlation of posttest of labour pain and anxiety among primigravida mothers in study group II revealed that, mean and SD value was 149.17±4.96 and the correlation was r = 0.43 which was statically significant at 0.01 level. There was a moderate positive correlation found between the labour pain and anxiety of primigravida mothers in study group II.

Discussion

Massage therapy helping in pain relief, provides direct physical contact with the parturient, potentiating the effect of relaxation and greatly reducing emotional stress. Several theories explain the mechanism by which massage might relieve pain, such as reduction in cortisol and norepinephrine levels, increasing serotonin levels, stimulation of endorphin release in addition to enhancing circulation with a consequent increase in oxygen transmission to the tissues, and the facilitation of toxin excretion through the lymphatic system.[5]

Chang et al.,conducted a study on massage throughout the active phase of labor and detected a gradual increase in pain and anxiety in the control and experimental groups, but in experimental group there were lower pain scores during the three phases, and a lower anxiety score only in the first phase.[6]

This study is supported by Simkin and Bolding, who stated that relaxation and breathing may contribute more to a woman's ability to cope with labor pain than to actually reduce that pain.[7]

Conclusion

Labour is very sensitive phase of a women, fear and anxiety may be high in primi mothers during process of labour. Pharmacological and non-pharmacological method of pain relief are complementary procedures which help a woman suffer less anxiety and pain during childbirth. Thus this study conclude that back massage and breathing exercises provided more persistent pain relief and reduce anxiety. It is effective, non-pharmacologic, accessible, cost effective and non-invasive technique to help reduce the intensity of labour pain and anxiety.

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Effect of Bimanual Activities on Hand and Proprioception in Autism Spectrum Disorder

Chinmoyee Nanda Panigrahy[1], Rituja Vilas Dandekar[2]

[1]Masters of Physiotherapy in Musculoskeletal Conditions Assistant Professor and Lecturer at Tilak Maharashtra Vidhypeeth, Pune, [2]Intern at Tilak Maharashtra Vidhyapeeth, Pune

Abstract

Background: Autism spectrum disorder (ASD) is defined as neurological and developmental disorder with characteristic features that include delayed gross motor milestones. It can be recognized at the initial stage during infancy or childhood with major affection see in communication and behavioral response of the child. Every 1 child amongst 100 children suffers from autism in India. The aim of our study was to see the effects of bimanual exercises on the hand function and kinesthetic awareness in the child with autism spectrum disorder and the objective of the study was to measure kinesthetic awareness, to measure pegboard reaction time and to measure grip strength.

Method: 20 children were selected on the basis of inclusion and exclusion criteria and were divided into 2 groups, interventional group (group A) and control group (group B), each group consisted of 10 children each. Group A has 6 boys and 4 girls and group B has 7 boys and 3 girls. A written consent was taken from the parent (guide) of autistic child and study was explained to them and data was collected and analyzed using SPSS within the confidence interval of 95%. **Result: -** On the basis of data analysis table no. 1 shows the prevalence of both the genders. And table no. 8 shows the comparison between interventional group and control group within the confidence interval of 95% (with significant p value- 0.02)

Conclusion: Bimanual exercises has been shown to be effective in improving hand function and kinesthetic awareness in children suffering from Autism spectrum disorder.

Keywords: *Autism Spectrum Disorder, Bimanual Activities, Hand Function, Pegboard Reaction Time, Grip Strength, Joint Position.*

Introduction

Autism spectrum disorder is a neurodevelopment disorder that can be predicted at the initial stage during infancy or childhood and majorly affects behavior and communication of the child. It can be recognized at any age; signs and symptoms are generally observed during the first 2-3 years of life.[1] It is characterized by affection in social communication, social interaction, constrained repetitive pattern of behavior and restricted interest in activities and motor problems are a frequent problem and involve motor planning deficits, motor coordination abnormalities, fine and gross motor skills, clumsiness and postural instability. These characteristic clinical signs of the children with autism disorders are the most explored areas in most of the studies and paid much less attention to their motor involvement, body composition

and nutritional conditions.[2,3] ASD is a set of disorders including Rett syndrome, autistic disorder, pervasive development disorder and childhood disintegrative disorder and Asperger syndrome[4] with a prevalence of male to female ratio for ASD being 4.3:1.[5,6,7,8]

Children with autism spectrum order generally demonstrate poor motor skills, consequently, rehabilitation programs should emphasize on fundamental motor skills and patterns of movement, individual games and sports and developmental activities that increase physical skill.[9] Children with autism spectrum disorder also suffer from abnormality in perception to touch, proprioception and painful stimuli.[10] In a study by Bhat et al, it showed that muscle weakness and abnormal muscle tone in autism spectrum disorder may play a role in the limitations in daily activities, such as locomotion

and reaching and grasping activities. Kern et al. in their study found that handgrip strength in participants diagnosed with an autism spectrum disorder was related to the severity of the disorder.

However, children with autism do differ from other groups having a slow reaction time, lesser perception, low sensitivity and kinaesthetic awareness in comparison with age matched normal controls and the study is of importance so as to rehabilitate these children to have a better living condition.

Materials and Method

Materials required for the study were, data collection sheet, consent form pegboard, sphygmomanometer, and a goniometer. Outcome Measures for the study were Pegboard reaction time,Range of motion of wrist for kinaesthetic awareness and Grip strength using sphygmomanometer.

Procedure: Study design was experimental and study type was interventional, 20 children from the target population (children with autism spectrum disorder) were selected randomly from special autistic schools in and around Pune based on the inclusion and exclusion criteria (refer table 1) and divided into two groups, interventional group (group A) and control group (group B), Group A had 6 boys and 4 girls and group B had 7 boys and 3 girls. The duration of study was of 6 months.

The interventional group (group A) was given bimanual activities for a month for thrice a week including, vestibular ball pressing with both hands, clay moulding, ball catch and throw with both hands, peg board activities for 30 minutesand group B was intervened with the regular ongoing therapy. Each group comprised of 10 children each

Table 1: Table showing inclusion and exclusion criteria, n= 20

Inclusion Criteria	Exclusion Criteria
• Children above 10 years • Both genders • Type 2 • Children with consent from their parents	• Type 3 • Children with hand deformities • Parents who did not consent • Sensory problems affecting speech, eyesight, and hearing.

Statistical analysis for data was done using SPSS and tables were made using Microsoft word. Test of normality was applied for all the outcome measures and parametric and non-parametric tests were applied accordingly. For

among the group comparison Wilcoxon signed rank test was used and for within the group Man Whitney- U test was used. Central tendency was observed in terms of mean, median and standard deviation.

Results

On the basis of data analysis, within the group comparison between group A (interventional group) and group B, significant difference of pegboard reaction time (PBRT), grip strength (G.S.) and no significant difference was observed in both the groups for joint position sense (JPS), at p=0.05. (Refer table 2 and 3)

Table 2: Table showing baseline data of both the groups comparable at p= 0.05

Variable	Group A	Group B
Male	7	8
Female	3	2
Total	10	10
Age	13.2 ± 2.7	14.1 ± 2.9
Height	146.1 ± 6.2	145.5 ± 5.7
Weight	38.9 ± 5.3	44.2 ± 7.6
BMI	18.26 ± 2.5	20.73 ± 2.0

Table 3 Table showing pre- and post-interventional comparison of Peg board reaction time (PBRT), grip strength(GS) and Joint position sense/kinesthetic awareness (JPS) for group A and B, and within the group comparison of group A and group B, at p=0.05

Variables	Group A	Group B	P Values
PBRT-PRE (seconds)	5.7±2	6.1±2	
PBRT-POST (seconds)	3.8±1.9	7±2.3	
P Value	0.02	0	<0.05
G.S. PRE (gm)	21.2±2.7	23.6±1.7	
G.S. POST (gm)	22.3±3.6	23.1±4.3	
P Value	5	5	>0.05
JPS-PRE (FLEXION) (in deg)	3.4±1.2	4.2±1.8	
JPS-POST (FLEXION) (in deg)	2.9±1.5	2±1	
P Value	1	0	<0.23
JPS-PRE (EXTENSION) (in deg)	3.4±1.7	3.7±1.7	
JPS-POST (EXTENSION) (in deg)	3.7±3.5	3.7±1.7	
P Value	5	3	>0.05

Discussion

Autistic children have their individual personality with perception deficits affecting their motor abilities of daily living and make it difficult for them to cope up with a normal routine like their normal counterparts, in our study we wanted to see if activities that include use of bimanual manipulation will be effective in improving their hand function as grasping and reaching is one of the most basic requirements to improve the quality of living for these kids.

Our study showed significant changes in the outcome measures in both within and among the group, this is supported by a study by Russell Lang et.al, in 2010 who in their study concluded that the effects of exercise on physical fitness of individuals with intellectual disability had a huge effect on improving progress in muscular endurance and strength.[11] Michele L. Alaniz, et.al; in (2016)studied that hand strength is the developmental trend in children with autism and that grip and pinch strength are important components in the development of fine motor tasks.[12]

Even though ASD has been diagnose little is known about the physiotherapy aspect of intervention in these children and the lack of awareness about ASD and treatment in the communities also makes it worse as it may impede the efforts of early identification and intervention. Health education and promotion are needed to improve people's knowledge about ASD and available mental health services as well as more extensive treatment approaches are needed to treat the children.

Conclusion

Bimanual exercises showed improved hand function leading to our conclusion that bimanual exercises should be a part of intervention plan and exercise focusing on only one hand should be lessened.

Ethical Clearance: Taken from institutional ethical committee

Source of Funding: Self

Conflict of Interest: None

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A Cross Sectional Study to Assess the Socio Demographic Profile and the Challenges Faced by the Disabled Patients Attending Kims OPD

Dattatreya Dinna Bant[1], Sunil Gokhale[2], A. Akshay Subramanian[3]

[1]*Professor And Hod, Dept. of Community Medicine, Kims Hubli,* [2]*Tutor, Dept. of Community Medicine, Kims Hubli,* [3]*Second Year Post Graduate, Dept. of Community Medicine, Kims Hubli*

Abstract

Background: In our everyday life we come across people with various disabilities. There are times when we have felt pity for them but havent really thought about the facilities and concern that we could provide for them to make their life a liveable one in everyday society. But we have talked more and done little on this. They continue to be stigmatised in the society with fewer employment options, unmet needs in the health care delivery system and the ever present social segregation. It is high time we look into this and beyond. Hence the need for the study.

Methodology: A cross sectional study was conduted to assess the socio demographic profile and the challenges faced by the disability patients attending KIMS opd. The study was done for a period of one month from 4-6-2019 to 3-7-2019. 100 patients with disability were randomly selected and a pretested structured questionnaire was given to them. The responses were entered in Excel sheet and tabulated using SPSS version 20. Percentages and proportions were obtained. Statistical association were interpreted among various parameters and represented as tables and figures.

Conclusion: Disability was more prevalent in the younger working male population,thus hindering the productivity of the nation. There was significant association between education of the patient and awareness about the facilities for the disabled and also between disability at birth and history of consanguinous marriage among parents. Social stigma, lack of decent employment,difficulties in obtaining disability certificate and financial dependency were some of the major challenges faced by the patients.

Keywords: *Socio Demographic, Profile, Challenges, Disabled, Kims OPD.*

Introduction

An umbrella terminology for impairments and restriction of activity making it difficult for an individual to live and do the duty of a normal being is called a disability[1].

Improving the standard of lifetime of folks with disabilities could be troublesome and a difficult task.

Corresponding Author:
Dr. A Akshay Subramanian
Second Yr Post Graduate, Dept. of Community Medicine, Kims Hubli
e-mail: aakshayqm@gmail.com

World Health Organisation estimates that 100 percent of the world's population has some reasonable disability, and around 80% of the disabled population resides in rural areas. In developing countries, it was calculated that no more than 2%-3% of the disabled may benefit from rehabilitation services[2].

Disabled folks are at a disadvantage of being educated less, used or restored. Social segregation of disabled persons is extraordinarily widespread. What is more baffling is that welfare services doesn't still offer too many special privileges for disabled. As a result, most disabled folks typically face unfitness and cruelty.[3]

The Right to Work and Employment is one amongst the basic human rights which might facilitate to equalise

opportunities for persons with disabilities and guarantee full and effective social integration[4]. Unmet need for disability related health care has been related to lower employment. For a few folks it's going to mean that disability interferes directly with the ability to secure and maintain competitive employment for earning livelihood. It might conjointly mean that staying healthy requires all of one's time and energy, treatment, help with activities of daily living, or helpful technology[5].

Most authorities believe that disability in community could be a minor downside and doesn't require abundant of intervention. However, in reality, it's a social downside where the disabled population becomes a liability to society. Alma Ata declaration in 1978 explicit that a comprehensive primary health care ought to embody encouraging, preventive, curative and rehabilitative care[2].

There's scarceness of facilities and services for the disabled in each governmental and non-governmental sectors. Moreover, such services are targeted in urban areas[2]. Though some changes in approach have taken place, there's still a necessity for major changes if disabled folks are to be integrated well inside our society[3]. The Govt of India has taken many measures, together with the 'Disability Act of 1995 ' for rehabilitation, and non-governmental Organizations too play a serious role for the same. In spite of those measures, disabled folks still lack access to opportunities like education, health, and employment apart from their emotional and psychosocial wants being neglected[2].

Disability affects the various aspects of lifetime of someone, and this life is usually sophisticated by negative forces, like mental object, prejudice, negativism, and unfitness[3]. The study tried to explore and perceive disability, significantly within the light-weight of its psychological and social impacts. On top of context, the study tries to analyse activities of daily living (ADL) and perceive intimately the impact of disabilty on the standard of living of disabled folks attending KIMS OPD.

Aims and Objectives

- To study the socio demographic profile of the disabled patients.

- To know the challenges faced by them at home, school/workplace and society.

Methodology

Study Design: Cross Sectional Study

Study Period: 4-6-2019 TO 3-7-2019

Sampling Size: 100

Inclusion Criteria: Disabled attending KIMS OPD in the age group of 4-80 yrs.

A Cross sectional study was conducted from 4/6/2019- 3/7/2019 to assess the socio demographic profile of the disabled patients attending KIMS OPD and to identify the problems faced by them. A pretested, structured questionnaire was given to 100 randomly chosen disabled patients attending KIMS OPD. Subjects who had an issue with English as the medium of instruction in the questionnaire were verbally asked and their responses documented. All the data were entered in Microsoft Excel sheet and tabulated using SPSS version 20. Percentages and proportions were obtained. Statistical association between eduacation of the disabled and the awareness about Government facilities were obtained among other associations like disability at birth and consanguinity,social stigma and type of disability,abuse faced and type of disability, financial dependency and type of disability among others. Results were represented in the form of tables and diagrams.

Results

Majority of the disabled were aged between 16-30 years. 28% of the disabled were illiterate whereas 23% of them completed primary education,20% of them secondary education,12% completed PUC when compared to only 17% who could hold a degree. 26 subjects were ignored by the family. It is very interesting to observe that parents of about 43% of the disabled patients were involved in consanguinous marriage. Furthermore 30% of the disabled found it difficult to obtain required certificate of disability as opposed to the 70% who got them easily. Although 22% of them were financially independent, a whopping 78% of the disabled patients were financially dependent on their family or others. Among the financially independent patients most of them retorted to earn their livelihood through acquiring meagre jobs such as being a coolie worker, petty show owners or in an organisation doing menial jobs. Apart from all these disturbing statistics, the solace that could be taken out is that 63% of the disabled people involved in community activities that helps in fostering the other disabled. The society needs

to be more empathetic to them as the study observed that 40% of the study population still experienced social stigma. Even though 72% of the diasbled were aware of the special Govt facilities available for them,only 28% felt they were adequate with an astounding 98% unaware of the PWD act.

When relation between education and awareness of Govt. facilities were considered,it showed an association with a significant CHI Square value of 10.927.(Figure 1)

63% of disabled with a history of consanguinous marriage among parents had disability from birth. There existed a significant association between consanguinous marriage and disability since birth.(chi square value-7.551) (Table 1).

Social stigma was more prevalent among the mentally disabled when compared to deaf,blind and other locomotor disabilities. Chi Square value being 2.662 there didn't exist a significant association between type of disability and social stigma. (Figure 2).

Abuse faced was more among the deaf. Chi sqaure value of 0.567 indicates no association between type of disabilty and abuse. (Table 2).

Even the financial dependence was not significantly associated with the type of disabilty (Chi Square value-3.581).Blind people were marginally more financially dependent. (Figure 3)

People with locomotor disability received more help when compare to visually challenged,hearing loss and mental disability. Chi square value being 0.224 didnt show an association between the type of disability and the help received. (Table 3).

When relation between type of disability and history of consanguinous marriage among parents were considered, more prevalence was seen in visually disabled and disabilty due to hearing defects. There didnt exist any association between the type of disability and consanguinous marriage (chi square value- 1.184)

Figure 1

Figure 1 shows the relation between Educational status and awareness about Government facilities
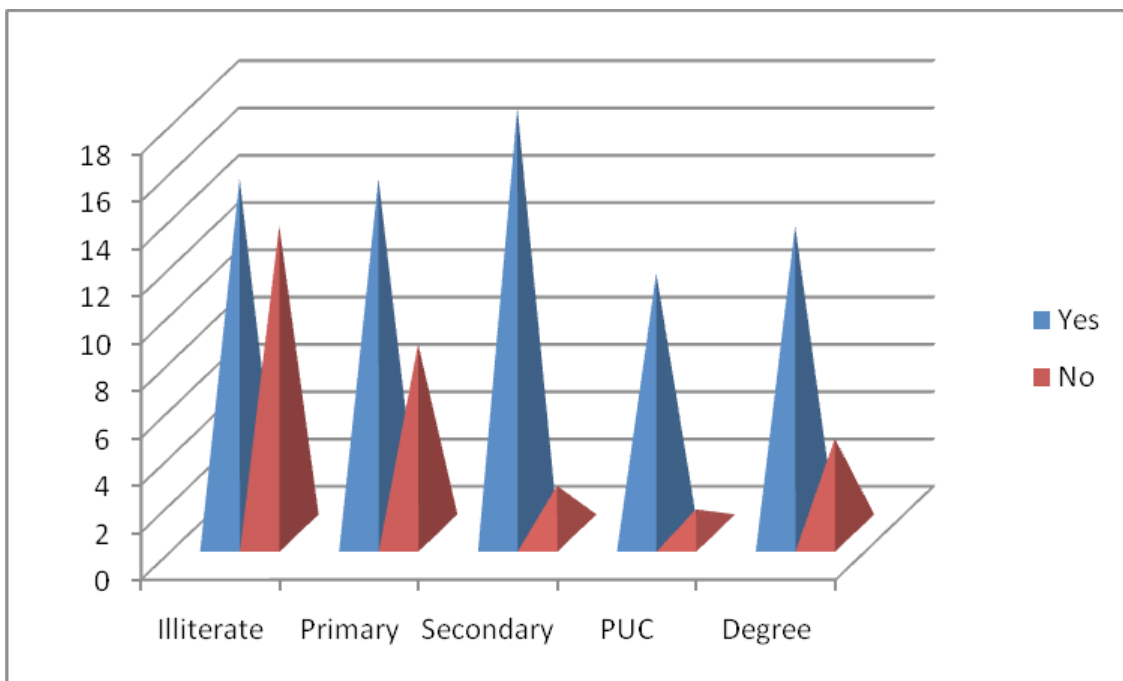
Figure 2 shows the relation between the type of disablity and social stigma

Figure 2

Figure 3 Shows the relation between type of disability and financial dependency
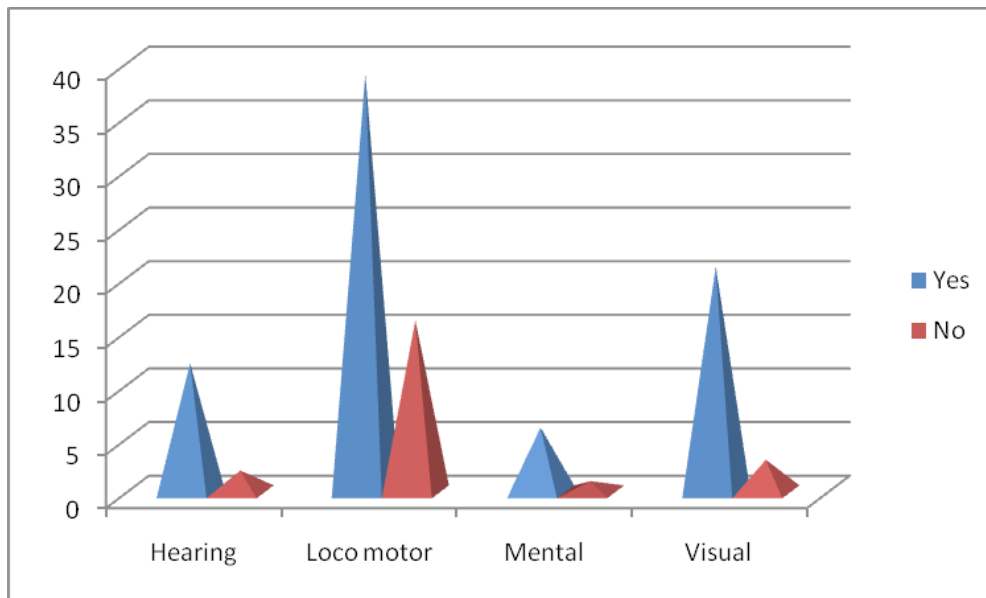
Figure 3

Table 1 shows the relation between consanguinous marriage among parents and disability at birth.

Table 1

History of Consanguineous marriage among parents	Disability since birth		Total
	Yes	**No**	**Total**
Yes	27	16	43
No	20	37	57
Total	47	53	100

Table 2 shows relation between type of disabiltiy and abuse faced.

Table 2

Type of disability	Facing Abuse		Total
	Yes	No	
Hearing	3	11	14
Loco motor	9	46	55
Mental	0	7	7
Visual	2	22	24
Total	**14**	**86**	**100**

Table 3 shows the relation between type of disability and the help received

Table 3

Type of disability	Help received				Total
	Many times	Sometimes	Rarely	Never	
Hearing	9	3	1	1	14
Loco motor	22	21	9	3	55
Mental	1	2	2	2	7
Visual	6	13	4	1	24
Total	**38**	**39**	**16**	**7**	**100**

Conclusion

Disability is more prevalent in the age group of 16-30 years and more among the males-unfortunately forming a major chunk in the productive group of the nation hindering the progress of the country. A significant association was found between the level of education and the awareness about Govt. facilities for the disabled and also between disability at birth and consanguinity in marriage among parents. Social stigma,financial dependency, lack of decent employment and difficulties in obtaining disability certificate were found as the major challenges experienced by them.

Source of Funding: Self

Conflict of Interest: Nil

Ethical Clearance: Taken from Institute Ethics Committee, KIMS Hubli

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The Study to Assess the Effectiveness of Structured Teaching Programme on Menstrual Blood Stem Cells Banking among Nursing Student at Selected College of Nursing, Uttrakhand

Ekta Lohani[1], Neha Bhatt[2], Mamta Rana[3]

[1]*Assistant Professor Graphic Era Hill University College of Nursing, Bhimtal,* [2]*Assistant Professor Graphic Era Hill University College of Nursing, Bhimtal,* [3]*Nursing Tutor Graphic Era Deemed University, Dehradun*

Abstract

Background: Menstrual blood banking is a process of banking of menstrual blood for the purpose of cell therapy. The storage of menstruation blood stem cell as a biological insurance for the future Stem. They potential fight diseases, grow replacement of body parts. Menstrual blood stem cell has a great potential for reducing mortality rate in women. Meaning Menstruation blood stem cell therapy can be beneficial for donors as well as clients. The main objective of the study is to assess the effectiveness of structure of teaching programme on menstrual blood stem cell banking among nursing students. Comprehensively, our result suggest menstrual blood stem cell may be desired source for clinical application of cell therapy.

Objectives: To assess the effectives of structured teaching programme on knowledge regarding menstrual blood stem cell among under graduate students.

Design: Quasi experimental one group pre test and post test design adopted regarding this study.

Setting: College of Nursing, Jeolikote Nainital. Participants: 60 Graduate students fulfilling the inclusion criteria were selected by simple random sampling.

Method: A pre test was conducted by using self administered questionnaire after pre test,structure teaching programme was given again post test was conducted to assess the effectiveness of programme. Collected data was analysed by using descriptive and inferential statistics.

Results: On analysis, the study revealed that pre test, (20 %) having poor knowledge, (80%) having adequate knowledge. And in post test Students (7%) having moderate knowledge, 56 Students (93%) having good knowledge . The improvements was statistically tested by paired "t" test value and result found to be significant at 2.00 value.

Conclusion: The finding of the study revealed that Assess the Effectiveness Of Structured Teaching Programme On Menstrual Blood Stem Cells Banking .

Keyword: *Menstrual blood stem cells banking, knowledge, structured teaching programme, human factor, stem cell, Menstruation.*

Corresponding Author:
Ms. Ekta Lohani
Assistant Professor, Graphicera Hilluniversity, (College Ofnursing) Bhimtal, Uttrakhand
e-mail: lohaniekta466@gmail.com

Introduction

"Stem cells are located throughout bodies, like a reserve army offering regenerating and repair."

"Menstrual blood banking offers hope of new cure."

The Menstrual stem cells are unique. The opportunity for women to bank their menstrual blood. The menstrual

cycle is a normal process that happens to nearly all women during their childbearing years from puberty till menopause[1]. Menstrual blood is not just blood it's also made up of tissue from the uterine lining. Menstrual blood released by female every month till Menopause. Menstrual blood contains millions of stem cells that may have properties and characteristics similar to those of stem cells found in bone marrow and embryos[2].

A new research has found stem cell technology is the future of medicine because the researchers have shown that when it comes to growing heart muscles. The connective tissue cells in menstrual blood have a success rate 100 times higher than the 0.2–0.3 % for stem cells taken from human bone marrow[3].

Stem cells that have ability to continuously divide and differentiate into various other kinds of cells and tissues. The discovery of stem cells in the menstrual blood has given with new meaning to menstruation for women who earlier considered menstruation as nothing but a painful and necessary evil[4]. Researcher found that menstrual blood is rich sources of stem cells like oesteoblast, smooth muscle cells, cardiomyocytes, neurons, dendrite cells and hepatocytes.stem cells.[5]

. These stem cells are unique because they have many properties and characteristics similar to both bone marrow and embryonic stem cells. They multiply and can differentiate into many other types of stem cells such as neural, cardiac,bone, fat, cartilage and others demonstrating great promise for future use in clinical regenerative medical therapies.[6]

Now a day, Menstruation blood stem cells can be induced as respiratory epithelial pancreatic, cardiomyocytic and neurocytic using felicitous differentiation technique. The clinical trials of menstruation blood stem cells is better to establish the pathological treatments of variety of disease. Because menstruation blood stem cells are good immunoprotective properties. This is painless and harmless procedure,it is a very simple and convenient method of collection.[7] Menstruation blood stem cell have been proved to play

multifunctional roles in treating a variety of disease through diversely therapeutic strategies in preclinical research.[8]

Statement of the Problem: A study to assess the effectiveness of structured teaching programme on knowledge regarding menstrual blood stem cells banking among nursing students at selected institute Naincy college of nursing.

Objectives:

- To assess the knowledge regarding menstrual blood stem cell banking.

- To assess the effectiveness of structured teaching programme on knowledge regarding menstrual blood stem cell banking.

Hypothesis: H_1 The mean post test score regarding menstrual blood stem cell banking will be significantly higher than the pre test score of adolescent girls who had structured teaching programme.

Material and Method

The quantitative approach and pre – experimental design with pre –post test design was used. Non – probability purposing sampling technique was used to collect the 60 adolescent girls. The study was carried out in nursing college of nursing, jeolikote. before collection of data, official permission from principal. The participates were informed about the purpose of study and written consent was obtained from the participates. 60 adolescent's girls were selected randomly. Pre test was done by out of 60 using demographic Performa and knowledge questionnaire .structured teaching programme was implemented after pre-test. post test was conducted seven days after pre test.

Research Variables:

Independent Variable: Structured Teaching Programme.

Dependents Variable: Knowledge

Results

Section 1:

Table 1: Frequency and percentage distribution of students according to their demographic characteristics. (n=60)

S.No.	Variables	Category	Frequency	Percentage
		Demographic Characteristics of Respondents		
1	Gender	Female	60	100%
2	Age	17 – 20 years	54	90%
		24 – 25 years	0	0
		21 – 23 years	6	10%
		>25 years	0	0
3	Education	B.Sc. nursing 1st and 2nd yr	60	100%
4	Previous Knowledge of menstrual stem cell banking	Yes	33	55%
		No	27	45%
5	Sources of knowledge	Lecture	10	16.6%
		Books	44	73.33%
		Mass media	3	5%
		Friends	3	5%
6	Utilization	Yes	26	43.33%
		No	34	56.66%
7	Habitat	Urban	30	50%
		Rural	30	50%

Pre Test Knowledge Scores:

Table 2: Pre test distribution of level of knowledge of nursing students on menstrual blood stem cell banking.

S.No.	Level Of Knowledge	Frequency	Percentage
1.	Good	0	0
2.	Average	48	80%
3.	Poor	12	20%

Table 3: Post test distribution of level of knowledge of nursing students on menstrual blood stem cell banking

S.No.	Level Of Knowledge	Frequency	Percentage
1.	Good	56	94%
2.	Average	4	6%
3.	Poor	0	0

Comparison of Pre Test and Post Test Knowledge Score:

Table 4: Comparison between the knowledge score of pre test and post test score of nursing students regarding menstrual blood stem cell banking.

Level of Knowledge	Pre Test		Post Test		T Test
	Mean	SD.	Mean	SD.	
	0.41	12.14	0.80	24.14	42.83

Result

The study revealed that level of knowledge in pre test,12 students (20 %) having poor knowledge, 48 students (80%) having adequate knowledge. 4 students (7%) having moderate knowledge, 56 students (93%) having good knowledge in post test. the indicate the study was assess the effectiveness on menstrual blood stem cells among undergraduate students. the improvements was statistically tested by paired "t" test value and result found to be significant at 2.00 value. there was a statistically no significant association found between the post test score of the sample with their demographic variables.

Nursing Implication: Health response is the primary response of the nurse who is called to be a caregiver with knowledge expertise. The nursing personnel's are challenged to provide standard and quality nursing care. There is the need for the nurse to take active part to restore the life. The findings of this study has implication in various area of nursing practice, nursing education, nursing administration, nursing research.

Nursing Service: Nurse should be equipped with update knowledge on recent practice and carried out in menstrual blood stem cell banking.

Nursing Education: The study emphasizes on the need for developing good teaching skills among nursing students on menstrual blood stem cell banking.

Nursing Administration: Nurse administer should guide and monitor the nursing students regarding practices involved in menstrual blood stem cell banking. Cost effectives production of material used for teaching by nurses should be Encouraged. Necessary administrative support like proper procedure counselling should be providing to conduct such activity .

Nursing Research: The essence of research to build a body of knowledge in nursing. Nursing researches the main source by which the nursing profession is growing.

The findings of the study service as the basis for the professional and the student to conduct the further study. The study also brings about the fact that more studies need to be done at different setting which are culturally acceptable, better teaching strategies of education.

Recommendation:

- The study can be replicated in large samples for better generalization.

- This study can also be replicated on other health personnel like doctors and nurses and other community members.

- The study can be done in the Hospital, School and Industrial settings.

Conclusion

Based on the finding of the study, it is concluded that the null hypothesis is rejected and the research hypothesis is accepted. It is concluded that means the Structured Teaching Programme is effective for increase knowledge of nursing students regarding Menstrual blood stem cell banking.

Ethical Clearance: No Ethical issue.

Conflict of Interest: There is no Conflict of Interest exit.

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Recognizing Wellness Outcomes: Anxiety, Spirituality and Locus of Control as a Function of Ageing

Elizabeth Maria Mathai

Research Scholar, DIPR/University of Delhi

Abstract

Wellness is a functioning procedure of getting mindful of and settling on decisions toward a consistent, healthy and satisfying life. Health and Wellbeing are more than being liberated from sickness, it is a unique procedure of progress and development. The research examined the profile of State Anxiety, Trait Anxiety, Spirituality and Locus of Control recognizing psychological transits of wellness outcomes as a function of aging. The investigation uncovers that as people, transit from youth to more established stage they become increasingly spiritual, despite what might be expected in a similar excursion old age is by all accounts observed to be the least anxious (both state and trait anxiety). The explanation for elevated levels of uneasiness among the more youthful age could be because of the sense, that this age generation is increasingly stressed and fearful over their future and arriving at their objectives in this focused world. This exploration is charmed and enlivened by the developing accentuation on wellbeing in the compelling administration of psychological wellness issues and as a guide to improve emotional well-being status. The ever - the unique world has become a significant test for us all. With time the obstructions are likewise developing. The present paper is a push to comprehend the most reasonable approach to manage the difficulties of human lives. This study connects adopting a more qualitative approach, such as a well-designed interview method, in gathering knowledge about participant experience after engaging in mind-body-spiritual practices.

Keywords: *Wellness, state anxiety, trait anxiety, spirituality, mental health, locus of control, health psychology.*

Introduction

Wellness:

"A state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity."   –The World Health Organization

"A conscious, self-directed and evolving process of achieving full potential."   –The National Wellness Institute

Anxiety: Referred as an emotion characterized by an unpleasant state of inner turmoil, often accompanied by nervous behavior such as pacing back and forth, somatic complaints, and rumination.[1] Davison (2008) described it as the subjective unpleasant feelings of dread over anticipated events, such as the feeling of imminent death.[2] It is characterized by the feeling of uneasiness and worry, usually generalized and unfocused as an overreaction to a situation that is only subjectively seen as menacing. It is often accompanied by muscular tension restlessness, fatigue and problems in concentration. Further it can be appropriate, but when experienced regularly the individual may suffer from an anxiety disorder.[3] Humans generally require social acceptance and thus sometimes dread the disapproval of others. Apprehension of being judged by others may cause anxiety in social environments. Anxiety during social interactions, particularly between strangers, is common among young people. It may persist into adulthood and become social anxiety or social phobia.[4] Anxiety is not the same as fear, which is a response to a real or perceived immediate threat, whereas anxiety involves the expectation of future threat.[5] Anxiety can be either a short-term 'state' or a long-term personality "trait".

State Anxiety: Spielberger (1979) described state anxiety as a transitory emotional state consisting of feelings of apprehension, nervousness and physiological sequelae such as an increased heart rate of respiration.[6]

Trait Anxiety: Is described as the individual's capability to perceive different situations from the environment like danger and threat.[7] This is part of the personality dimension of neuroticism versus emotional stability. Trait anxiety is characterized by a stable perception of environmental stimuli (events, others, statements) as threatening.

Spirituality: It is a very unclear concept that has no concrete definition. By its very nature, the concept of spirituality is deeply rooted in religion, yet in contemporary spirituality, there is an incremental divide emerging between religion and spirituality. Therefore, in present-day society, the formation of a dichotomy with spirituality representing the personal, subjective, inner-directed, unsystematic, liberating expression, and religion signifying a formal, authoritarian, institutionalized inhibiting expression is being witnessed. For instance, to some people it may be about a non-religious experience that varies from person to person some people get in touch with their spiritual side through private prayer, yoga, meditation, quiet reflection, a belief in the supernatural, or long walks.

Locus of Control: It is described as the degree to which people believe that they have control over the outcome of events in their lives, as opposed to external forces beyond their control. A person's "locus" is conceptualized as internal - a belief that one can control one's own life or external - a belief that life is controlled by outside factors which the person cannot influence, or that chance or fate controls their lives (Rotter, Julian B 1966).[8] The extent to which one attributes valued outcomes or reinforcement to either internal or external circumstances reflects their dimension of locus of control. Individuals with an internal locus of control believe in the power of their own decisions and behaviors to impact life events and determine their own future. Those with an external locus of control, on the other hand, view life events as dictated by environmental factors outside of one's control, such as luck, fate, or powerful others.

Materials and Method

Participants and Sample Size: This study examined the profile of State Anxiety, Trait Anxiety, Spirituality and Locus of Control recognizing psychological transits of wellness outcomes as function of ageing. The respondents are individuals from versatile realm residing in Delhi and National Capital Region of India. The data was obtained form 90 individuals, 30 participants in each group classification vis. Youth (18yr to 33yr), Adult (34yr to 49yr), Old (50+ year), further comprising of 30 %Males and 70% Females.

The mean and standard deviation age of the relevant groups noticed to be Youth (M=20.93, SD=2.61), Adult (M=42.60, SD=4.89) and Old (M=57.60, SD=4.96). Individuals are represented by various regional, religious, cultural, environmental differences, in general it was ensured that participation depends on the availability of the respondent and the sole interest of him/her to participate. All the participants were informed about the purpose of the study and were enrolled after obtaining informed consent. The experimental study eventually consists of 90 respondents, that were taken in the various age category classification as mentioned above, defining the research design and population under study. To ensure unbiased collection of observations and efficient outcomes a prior ism sample calculation showed n = 30 for each experiment group (Youth, Adult and Old) is quite good enough to determine large (Cohen's f) effect in the population with the power associated is > 80%, so that the observed sample reflects true effect in the population.

Measures: The State-Trait Anxiety Inventory (1983) - To measure the anxiety levels the self -report tool was utilized to examine the presence and severity of current symptoms of anxiety and its generalised propensity. There were 2 subscales within this measure. Firstly, the State Anxiety Scale (S- anxiety) evaluates the current state of anxiety, asking how respondents feel "right now". The Trait Anxiety Scale (T-anxiety evaluates relatively stable aspects of "anxiety proneness including general state of calmness, confidence etc. There are 40 items, 20 items allocated to each subscale.

Internal consistency coefficients for the scale have ranged from .86 to .95; test-retest reliability coefficients have ranged from .65 to .75 over a 2-month interval (Spielberger et al., 1983). Test-retest coefficients for this measure in the present study ranged from .69 to .89. Considerable evidence attests to the construct and concurrent validity of the scale (Spielberger, 1989).

Rotter's Locus of Control Scale (Rotter, 1996)–The scale was used to measure an individual's internal – external orientation. The scale is referred to as I-E scale and provides a measure of individual differences in a generalised belief control of reinforcement.

In a 2- point scale and participants are supposed to select choice (a) or (b) in each part. The scale consists of 29 items, 23 related to I-E expectancies and 6 are filler items intended to disguise the purpose of the test.

Individual answers range from 1-23 and scores obtained from this scale were divided into 2 groups: scores from 1-10 indicate I- LOC and above 10 indicate E- LOC.

Statistics: Assessment for the psychological transits of wellness outcomes are evaluated using Between Group Analysis of Variance [ANOVA]. Systematic improvements in the studied parameters are noticed with the corresponding magnitude of such effect in the population of interest. It was ensured that all assumptions such as normality and homogeneity made tenable before applying appropriate statistics and its validity.

Results

The profile of State Anxiety, Trait Anxiety, Spirituality and Locus of Control recognizing psychological transits of wellness outcomes are studied experimentally as function of ageing vis. Youth, Adult and Old. Noticeably transit from youth to more established stage they become increasingly spiritual, despite what might be expected in a similar excursion old age is by all accounts observed to be the least anxious (both state and trait anxiety). Locus of control, examination for the observed population reveled that distress observed, watched and experienced among the youth is for the most part outer (external) than the more established age bunch which is inside (internally) controlled.

Table 1: One Way Analysis of Variance of various age groups on State Anxiety, Trait Anxiety, Spirituality and LOC

State Anxiety					
	Df	**SS**	**MS**	**F**	**P**
Between groups	2	7834.42	3917.21	67.73	.000
Within groups	87	5031.23	57.83		
Total	**89**	**12865.65**			
Trait Anxiety					
	Df	**SS**	**MS**	**F**	**P**
Between groups	2	12228.68	6114.34	123.42	.000
Within groups	87	4309.80	49.53		
Total	**89**	**16538.48**			
Spirituality					
	Df	**SS**	**MS**	**F**	**P**
Between groups	2	7618.42	3809.21	31.34	.000
Within groups	87	10573.90	121.53		
Total	**89**	**18192.32**			
Locus of Control					
	Df	**SS**	**MS**	**F**	**P**
Between groups	2	1947.80	973.90	83.14	.000
Within groups	87	1019.10	11.71		
Total	**89**	**2966.90**			

A one-way between-subjects ANOVA was conducted to examine State Anxiety amongst the individuals to assess the effect of ageing on wellness outcomes. There was a significant effect of ageing

manipulation on emotional state at the p<.05 level for the three conditions [F (2, 87) = 67.73, p = 0.000]. Post hoc comparisons using the Bonferroni correction test indicated that the state anxiety score decreases

significantly as age increases (all comparisons Youth vs. Adult vs. Old; p<.01), for instance mean and standard deviations of the respective groups reported to be Youth (M=61.37, SD=8.18), Adult (M=45.47, SD=6.73) and Old (M=39.2, SD=7.81). Experimental manipulation is highly successful. The effect size for such a good fit model reported being 60.9%.

Figure 1 Illustrating State Anxiety Mean Response as a function of Age

A one-way between-subjects ANOVA was conducted to examine Trait Anxiety amongst the individuals to assess the effect of ageing on wellness outcomes. There was a significant effect of ageing manipulation on emotional state (negative) at the p<.05 level for the three conditions [F (2, 87) = 123.42, p = 0.000]. Post hoc comparisons using the Bonferroni correction test indicated that the trait anxiety score decreases significantly as age increases (all comparisons Youth vs. Adult vs. Old; p<.01), for instance mean and standard deviations of the respective groups reported to be Youth (M=64.93, SD=6.61), Adult (M=45.97, SD=6.68) and Old (M=36.97, SD=7.76). Experimental manipulation is highly successful. The effect size for such a good fit model reported being 73.9%.
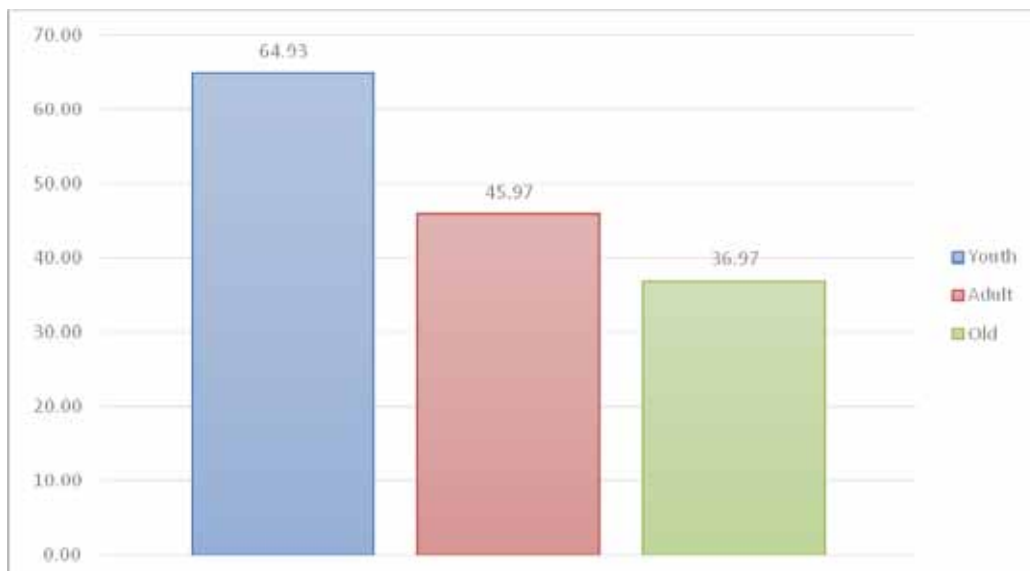
Figure 2 Illustrating Trait Anxiety Mean Response as a function of Age

A one-way between-subjects ANOVA was conducted to examine Spirituality amongst the individuals to assess the effect of ageing on wellness outcomes. There was a significant effect of ageing manipulation on spirituality state at the p<.05 level for the three conditions [F (2, 87) = 83.14, p = 0.000]. Post hoc comparisons using the Bonferroni correction test indicated that the spirituality levels increase significantly as age increases (comparisons Youth vs. Adult and Youth vs. Old; p<.01), however no significant difference was observed while comparing Adult vs. Old population, for instance mean and standard deviations of the respective groups reported to be Youth (M=11.47, SD=3.72), Adult (M=20.97, SD=3.02) and Old (M=21.67, SD=3.48). Experimental manipulation is highly successful. The effect size for such a good fit model reported being 41.9%.
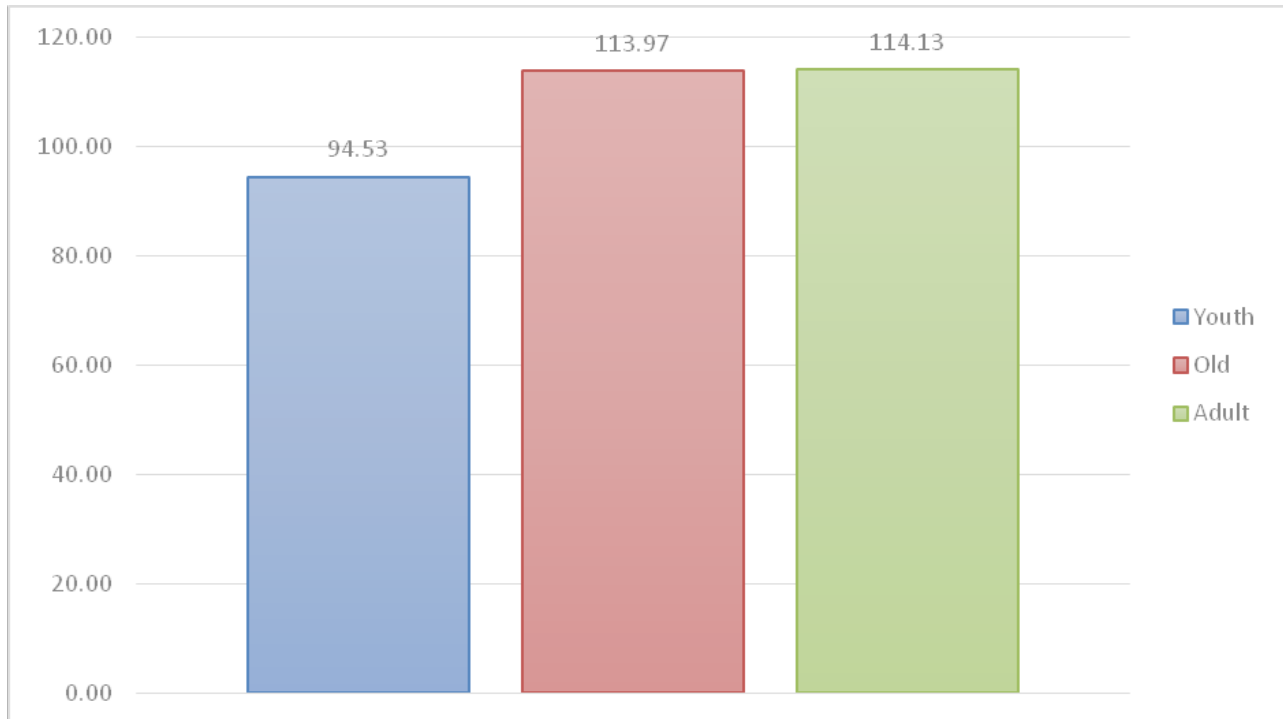
Figure 3: Illustrating Spirituality Mean Response as a function of Age

A one-way between-subjects ANOVA was conducted to examine Locus of Control amongst the individuals to assess the effect of ageing on wellness outcomes. There was a significant effect of ageing manipulation on locus of control state at the p<.05 level for the three conditions [F (2, 87) = 31.34, p = 0.000]. Post hoc comparisons using the Bonferroni correction test indicated that the locus of control levels increase significantly as age increases (comparisons Youth vs. Adult and Youth vs. Old; p<.01), however no significant difference was observed while comparing Adult vs. Old population, for instance mean and standard deviations of the respective groups reported to be Youth (M=94.53, SD=10.72), Adult (M=114.13, SD=11.08) and Old (M=113.97, SD=11.25).Experimental manipulation is highly successful. The effect size for such a good fit model reported being 65.7%.
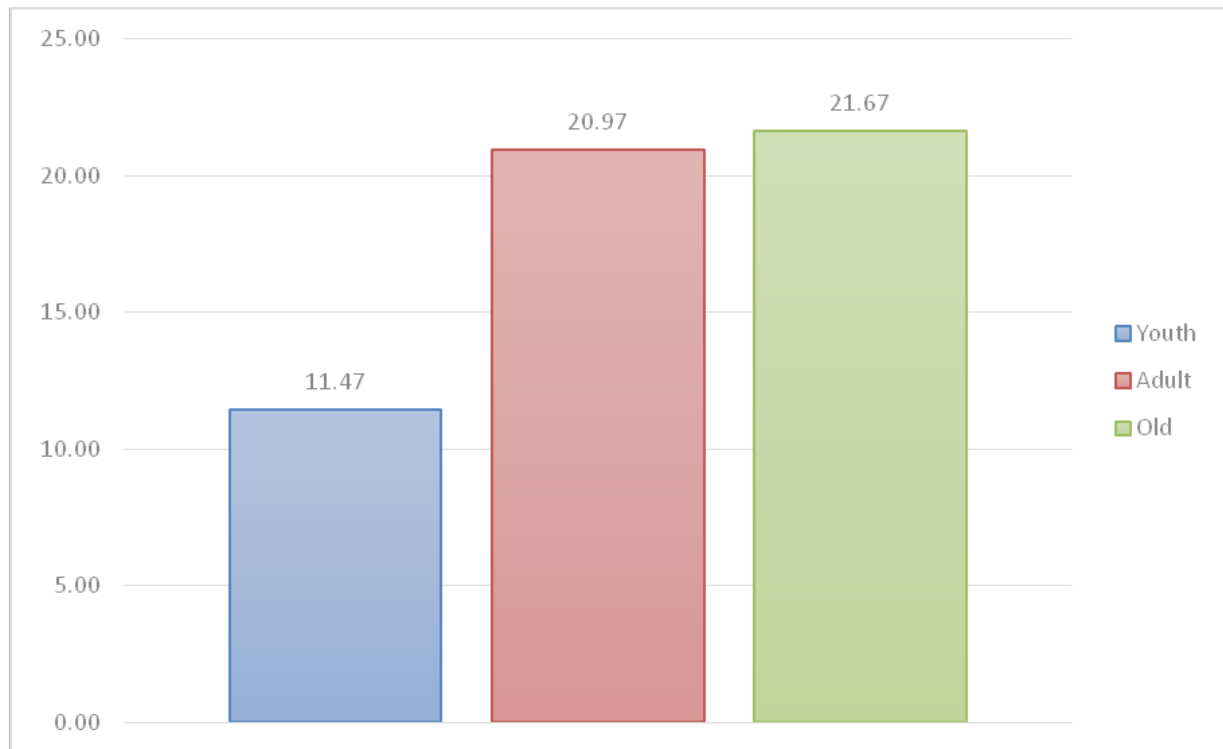
Figure 4: Illustrating Locus of Control Mean Response as a function of Age

Discussion

Confronting difficulties and impediments in life venture are normal and basic overall human presence however how we deal with the perspective in those desperate conditions decides the psychological well-being of a person. Murray & Segal (1994) has expressed that by rehearsing relaxations techniques like, yoga, meditation and so forth, last however not the least by releasing those upsetting feelings and by not considering upon them over and over and it is recommended that one shall strive for healthy means of expressing feelings.[9] The investigation uncovers that as people, transit from youth to more established stage they become increasingly spiritual, despite what might be expected in a similar excursion old age is by all accounts observed to be the least anxious (both state and trait anxiety). The explanation for elevated levels of uneasiness among the more youthful age could be because of the sense, that this age generation is increasingly stressed and fearful over their future and arriving at their objectives in this focused world. To state youth bunch have more to accomplish than the more established ones who are nearly settled and have moderately less mental trouble, intermittent contemplations about the future. Locus of control, examination for the observed population reveled that distress observed, watched and experienced among the youth is for the most part outer (external) than the more established age bunch which is inside (internally) controlled.

Web based life, innovation, and technology are among the most perilous factors conversely raising caution. Inordinate utilization of each will, in general, induce impeded social associations and an expanded feeling of disconnection. Unreasonable internet-based life use likewise cultivates a specific challenge between one's reality and one's virtual life. Adams and Kisler (2013) found that practically 50 % of students showed they woke up at nighttime to answer texts. A similar report found that the more individuals use technology during their resting hours, the less fortunate the nature of their rest and the higher their paces of unsettling disturbance, sadness, nervousness and generally stress.[10] Studies have exhibited that spirituality has been seen higher among adults and older age bunch when contrasted with youth. People who had lower levels of spiritual prosperity additionally had lower levels of mental prosperity including expanded uneasiness and more side effect distress.[11] McClain, Rosenfeld, & Breitbart (2003) indicated that spiritual prosperity was firmly connected with less sadness, hopelessness, and suicidal ideation.[12]

Chibnall, Videen, Duckro, & Miller (2002)uncovered that higher levels of death distress were associated with more depressive symptoms, less spiritual well-being, and living alone. Further higher levels of death anxiety and death depression were correlated with lower levels of spiritual well-being.[13] Altogether spirituality is associated with higher levels of life satisfaction. Much mindfulness and admiration have been seen among the clinically healthy population to embrace yoga as a medium for advancing health standards, preventing health-related issues, and as a divine pursuit. Numerous exposures pertinent to psychological wellness are truly social in nature or accepted to have social subcomponents, even those identified with increasingly complex cultural or region level impacts. The idea of how these social encounters are embedded in the environment/earth might be significant.

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Overview of 8-hydroxy-2′-deoxyguanosine (8-ohdg) as DNA Damage Biomarker in Infants Who Live Near Gold Mines, Yogyakarta, Indonesia

Ernawati[1], Adi Heru Sutomo[2], Indwiani Astuti A.[3]

[1]*Students of Doctoral Study Program Faculty of Medicine, Public Health and Nursing Gadjah Mada University (UGM), Yogyakarta, Indonesia,* [2]*Faculty of Medicine, Public Health and Nursing UGM, Yogjakarta, Indonesia,* [3]*Faculty of Medicine, Public Health and Nursing UGM, Yogyakarta*

Abstract

Background: People living near gold mines have risks of Hg exposure. Hg as free radical will react to body biomolecules. Susceptible biomolecules are nucleic acid or DNA. With DNA damage biomarker using 8-hydroxy-2′-deoxyguanosine(8-OhdG).

Purpose: This research will give an overview of 8-OHdG in mother and infants living near gold mines.

Research Method: This Observational Longitudinal research measures Hg level in mothers' hair and urine, breast milk, cord blood, also infants' hair and urine. Level of 8-hydroxy-2′-deoxyguanosine (8-OHdG) in urine is measured with Elisa Kit. Mercury Analyzerwas used to measure Hg.

Results: Average of Hg in maternal hair and urine, cord blood, breast milk also infants' hair and urine were high above Threshold Limit Value (TLV) by WHO. Showing occurrence of Hg accumulation in mothers. Infant Hg exposure has occurred during prenatal transferred through cord blood and postnatal through breast milk. Average of 8-OHdG in maternal and infant urine were high above normal average level of people unexposed to Hg, i.e 2.28 nm/ml which shows occurrence of DNA damage.

Conclusion: Maternal and infant Hg were high above TLV. Level of 8-OHdG in maternal and infant urine were high above 8-OHdG level of people unexposed to Hg, indicating DNA damage inducted by mercury.

Keywords: *Mercury, pregnant mothers, infant and 8-hydroxy-2'-deoxyguanosine (8-OHdG).*

Introduction

Pregnant Mothers and their infants who live near gold mines have risks of Hg exposure. During pre-conception, pregnancy, and postnatal are the most critical phases and it can make foetus and infant susceptible to mercury exposure. This is because of brain and other body organs development and growth in those phases[1].

Continuous Hg exposure can cause free radical formation in the body. Mercury can induced ROS (Reactive Oxygen Species)[2], the source of free radical playing most role in causing oxidative stress. This is where instability occurs between pro oxidant and antioxidant in the body (Powers and Jackson, 2008). Excess production of free radical is caused by low activities of antioxidant. Oxidative stress from Hg interaction can cause neurotoxicity[3].

Hg as reactive species will interact with macromolecules such as DNA, Protein and Lipid. This chemical reaction can cause DNA adduct, which is part

Corresponding Author:
Ernawati
Students of Doctoral Study Program Faculty of Medicine, Public Health and Nursing Gadjah Mada University (UGM), Yogyakarta, Indonesia
Tel. +628277982274
e-mail: ernawati@mail.ugm.ac.id

of genotoxicity. 8-OHdG is one of DNA adduct which can be used to identify this DNA damage. Excreted through urine, 8-OHdG is one of the dominant form of oxidative lesions induced by free radicals, and has been widely used as oxidative stress and carcinogenicity biomarker[4].

Research Method

This research is an Observasional Longitudinal study to find out 8-hydroxy-2′-deoxyguanosine(8-OHdG) as biomarker of DNA damage in mothers and infants. There were 16 pairs of mothers and infants appointed as respondent. With minimal length of stay for three years and throughout their lives as maximum of stay near gold mines in Kalirejo Village, Kokap Sub-district, Kulon Progo District, Yogyakarta. Ethical clearance is obtained from Ethical Committee of Medical Health Research, Faculty of Medicine University of Gadjah Mada (Ref: KE/FK/1036/EC/2017). Statement of willingness to become respondent is by signing this informed consent letterafter getting explanation about this study and understanding about aim and research method, also knowing potential risks during research.

Mercury was measured using maternal venous blood, cord blood and breast milk as much as 2 ml. The first urine after waking up in the morning of maternal and infants' samples were collected as much as 5 ml. Then 2 ml of it was used for mercury measurement. The rest of 3 ml was used for 8 OHdG measurement which was stored in -80 ^{0}C temperature until measurement was done. As much as 0,5-2 gram of hairs were taken, cut near the scalp. Blood, hair, and urine samples were taken during pregnancy and in the range of infants' age from 15 days to 3.15 months and 3.16 to 6.15 months.

Mercury is measured by Mercury Analyzer Lab Analyzer with sensitivity of 5 ng/L or 0,05 ng absolute. Samples were weighed and put into 100 ml Erlenmeyer flask, then 10 ml HNO3 . HCLO$_4$ (1 : 1) were added. It was then heated on top of a hotplate until it became clear and released white smokes. After that the solution was filtered and put as much as 50 ml into volumetric flask. Blank solution was made with the same treatment but without the samples. Samples were taken with 10 ml volumetric flask, then put into test tubes. KMnO$_4$ 0,1 % ml were added and shaken,then 0,1 ml of Hydroxylamine hydrochloride were added and continuously shaken, while also putting 0,5 ml of SnCl$_2$.2H2O. The solutions were then read by Mecury Analyzer. 8-OhdG measurement and all of materials in ELISA kit were according to Wuhan Fine Biotech Co., Ltd factory instruction(Fine Test, 2017). Data were analysed descriptively using SPSS.

Results

Table 1. Descriptive Data Analysis on Pregnant Mothers and Their Infants who live near Gold Mines in Kalirejo Village Kokap Sub-district Kulon Progo District

Variable	Mean	Median	SD	Min-Max
Mothers' age (year)	30.19	30.50	6.65	18.00-44.00
Gestational age (days)	169.44	189.00	85.48	43.00-274.00
Length of stay (year)	21.81	26.00	14.15	3.00-44.00
Infant birth weight (Kg)	4.98	3.33	6.81	2.76-3.80
Infant birth height (Cm)	4.98	48.50	1.31	45.00-50.00
Maternal hair Hg (µg/Kg)	785.63	140.64	2023.79	7.26-8275.86
Maternal urinary Hg (µg/L)	150.36	19.22	435.12	4.60-1753.96
Cord blood Hg (µg/L)	589.21	17.30	1973.79	0.04-7958.73
Maternal hair Hg I (µg/Kg)	10585.63	215.30	33381.66	15.63-133394.78
Maternal urinary Hg I (µg/L)	696.78	21.24	2491.28	0.04-10006.08
Breast milk Hg I (µg/L)	37.22	11.06	76.69	1.01-303.33
Infants' hair Hg I (µg/Kg)	129900.49	976.72	363198.84	0.04-1371440.48
Infants' urinary Hg I (µg/L)	560.33	422.11	1688.45	0.04-594.05
Maternal hair Hg II (µg/Kg)	186.02	148.55	117.28	6.78-429.12

Variable	Mean	Median	SD	Min-Max
Maternal urinary Hg II (µg/L)	21.35	14.36	28.57	0.00-117.70
Breast milk Hg II (µg/L)	81.42	13.84	260.50	3.42-1057.38
Infants' hair Hg II (µg/Kg)	17328.77	203.93	63679.34	44.90-255719.70
Infants' urinary Hg II (µg/L)	14.78	7.06	21.86	0.50-90.13
Maternal 8-OHdG I (ng/ml)	56.0932	62.2605	22.88223	3.15-86.62
Maternal 8-OHdG II (ng/ml)	71.9091	73.0510	11.65622	40.09-87.
Infants' 8-OHdG I (ng/ml)	48.9248	47.7195	27.44305	3.15-5.91
Infants' 8-OHdG II (ng/ml)	61.4708	65.0155	20.11631	0.67-87.13

Table 1 shows the average of mothers' age was 30,19 years. The youngest was 18 years old and the oldest was 44 years old. The median±SD was 30.50±6.65 years old. Gestational ages range from 43 – 274 days, with average age of 169.44 days and median±SD of 189.00±85.48 days. The average length of stay for mothers was 21.81 years, ranging from 3.00 – 44.00 years.

The average of infant birth weight and height were 4.98 Kg and 48.38 cm, respectively. The lowest birth weight was 2.76 Kg and the highest one was 3.80 Kg. The lowest birth height was 45.00 cm and the highest one was 50 cm. The median±SD of birth weight and height were 3.33±6.81 and 48.50±1.31, respectively.

The average amount of Hg in pregnant mothers' hair was 785.63 µg/Kg, the median±SD was 140.64±2023.79, with the lowest of 7.26 µg/Kg and the highest of 8275.86 µg/Kg. While the urinary Hg was 150.36 µg/L with Median±SD of 19.22±435.12, minimum and maximum amount of Hg were 4.60 µg/L -753.96 µg/L. The average of cord blood Hg was 589.21 µg/L, Median±SD of 17.30+1973.79, minimum of 0.04 µg/L and maximum of 7958.73 µg/L.

The average of postpartum hair maternal Hg (stage I) was 10585.63 µg/Kg, Median±SD of 215.30+33381.66 with minimum-maximum level of 15.63 - 133394.78 µg/Kg. Urinary Hg was 696.78 µg/L, Median±SD of 21.24+2491.28, with the lowest and highest was 0.04 - 10006.08 µg/L. The average of maternal hair and urinary Hg at stage II were 186.02 µg/Kg dan 21.35 µg/L, respectively, Median±SD of 148.55±117.28 and 14.36±28.57, respectively, with the minimum and maximum was 6,78 - 429,12 and 0,05 -117,70 µg/L, respectively.

Hg content in breast milk, at stage I and II had the average of 37.22 µg/L and 81.42 µg/L, respectively. The Median±SD were11.06±76.69 µg/L and13.84±260.50 µg/L, respectively. While minimum and maximum level were 1.01 – 303.33 µg/L and 3.42 – 1057.38 µg/L, respectively.

Infants' average hair and urinary Hg at stage I were 129900.49 µg/Kg and 560.33 µg/L, respectively. Hair Median±SD was 203.93+63679.34 µg/Kg and urinary Median±SD was 42.11+1688.45 µg/L. Minimum and maximum level in hair were 0.04 – 1371440.48 µg/Kg and 0.04 – 594.05 µg/L in urine. At stage II, infants' average hair and urinary Hg level were 17328.77 µg/Kg and 14.78 µg/L, respectively. Where hair and urinary Median±SD were 203.93±63679.34 and 7.06±21.86, respectively. The minimum and maximum level in hair and urine were 44.90 – 255719.70 µg/Kg and 0.50 – 90.13 µg/L, respectively.

The average of maternal 8-OHdG at stage I and II were 56.09 ng/ml and 71.91 ng/ml, respectively, Median±SD were 62.26±22.88 ng/ml and 73.05±11.66 ng/ml, respectively, and the lowest and highest level were 3.15 – 86.62 ng/ml in stage I and 40.09- 87.49 ng/ml in stage II. In infants, average 8-OHdG level at stage I was 48.93 ng/ml and at stage II was 61.47 ng/ml, Median±SD for stage I was 47.72±27.44 and stage II was 65.02±20.12, with the lowest and highest level at each stage were 3.15 - 5.91 ng/ml and 0.67 - 87.13 ng/ml, respectively.

Discussion

Pregnant women who live near gold mines in Kalirejo Village, Kokap Sub-district, Kulon Progo District had high Hg above TLVby WHO (Table 1), i.e. maximum of mercury allowed in hair and urine were≥ 2 ug/kg and ≥ 4 µg/L, respectively. Those level reflected Hg exposure during pregnancy[5]. Hg in mothers' body could easily enter the placenta[6], causing problems

in foetus or infants. Hg in maternal blood and urine correlated with Hg in cord blood[7].

As entrance of Hg in foetus, placenta or cord blood in this study had Hg above TLV of ≥ 10 µg/L (Table 1.) The high Hg in cord blood was the indicator of mercury exposure in foetus during post-conception phase[8].

Postpartum maternal Hg in hair and urine, including in breast milk, at stage I and II were also above TLV (Table 1). Hg from mother transferred to breast milk. TLV of Hg in breast milk by Regulations of the Head of Food and Drug Administration Republic of Indonesia, about Maximum Threshold for Processed Food Heavy Metal Contamination in Infant Formula and Advanced Formula, was 0,01 mg/kg or ≥ 10 ug/kg. Contamination of mercury in breast milk could be harmful to infants. Mercury can be transferred to infant during lactation period which shows exposure in the womb[9].

The high Hg in hair, urine, breast milk, and cord blood in this study probably caused by the length of stay near gold mines area. The average length of stay of pregnant women was 21.81 years ranging from minimum of 3 years to maximum of 44 years. The longer they do activities near gold mines location, the higher the risks of mercury exposure, especially through inhalation[10]. Therefore, the longer length of stay near gold mines area, the higher Hg accumulation in hair. People with length of stay ≥ 15 years have risks of accumulating mercury in hair and 7 times greater chance of having hair mercury above limit compared to the ones who have shorter length of stay[11].

Maternal Hg, either during pregnancy or postpartum, contributed to infant Hg. Infant hair and urinary Hg were above TLV (table 1). This shows prenatal mercury exposure, through cord blood. High infant Hg could be caused by high absorption of digestive system, low physiological brain ability to prevent heavy metal aggregation, also lack of haemostasis and detoxification mechanism[12]. Infants have greater susceptibility to Hg compared to adult due to differences in metabolism rate and organ development such as central nervous system[1]. Children with high prenatal exposure could affect their development, including reduced brain size; cortical blindness; motoric skill deficiency; hearing, language development and memory function disorders; low IQ level; visual-spatial disorder; and mental retardation. Infants could adversely affected if maternal mercury was greater than 1 ppm or 1.000 µg/L (µg/Kg), such as neurological disorders, IQ lost,kidney and cardiovascular system damage[13].

DNA damage could happen through Hg mechanism. One of DNA damage markers was 8-hydroxy-2-deoxyguanosine (8-OHdG)[14][15]. 8-OhdG is used as biomarker to determine oxidative stress in population exposed to Hg[2][16][17][18][19][20]. Maternal and infant urinary Hg had significant correlation with increasing urinary 8-OhdG level[21]. 8-OhdG was excreted directly through urine. Excretion of 8-OHdG through urine has been identified as sensitive biomarker for DNA oxidative damage[22]. Infant and maternal urinary Hg significantly correlated to the increasing level of urinary 8-hydroxy-2-deoxyguanosine (8-OHdG)[21].

The average of all maternal urinary 8-OhdG level, in stage I and II were above person unexposed to mercury (Table 4.1), which is 2.28 nm/ml[2]. The average of infant urinary 8-OhdG was above person unexposed to mercury (Table 4.1.). All infant at stage I have 8-OHdG above person unexposed to mercury, and only one infant at stage II had 8-OhdG under person unexposed to mercury. This damage detection was really important because of its abundant amount in urine and its mutagenic potential in the body could be a good indicator of reactive oxygen species (ROS) and potential biomarker for in vivo carcinogenesis.

Therefore the high level of 8-OHdG showed existence of oxidative lesions induced by Hg. In the other word, the high level of urinary 8-OHdG indicated DNA damage in mothers and their infants. But it needs further study about this matter.

Conclusion

Maternal and infant mercury were above TLV, indicating of mercury accumulation in mothers and infants and there was prenatal exposure via placenta and postnatal exposure via breast milk. Urinary 8-OHdG indicated DNA damage induced by mercury. Exposure to mercury has induced oxidative DNA damage in infants who live near gold mines area.

Ethical Clearance: This study was approved by Medical and Health Research Ethics Committee

(MHREC) Faculty of Medicine, Gadjah Mada University-DR. Sardjito General Hospital (Ref: KE/FK/1036/EC/2017)

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Factors Affected Unprotected Anal Intercourse among Men Who Have Sex with Men in Solok Indonesia

Faiz Nur Hanum[1], Rosfita Rasyid[2], Nur Afrainin Syah[3], Tika Afriani[4]

[1]Assistant Professor, Department of Nutrition, Mohammad Natsir University, Bukittinggi, West Sumatera, Indonesia, [2]Associate Professor, Department of Public Health and Community Medicine, Andalas University, Padang, Indonesia, [3]Associate Professor, Faculty of Medicine, Andalas University, Padang, Indonesia, [4]Assistant Professor, Department of Pharmacy, Mohammad Natsir University, Bukittinggi, Indonesia

Abstract

Unprotected Anal Intercourse (UAI) was the primary factor in transmission HIV among MSM. The aim of this study was to examine factors that affected UAI among MSM in Solok, Indonesia. This study using a design mix method approach, a study combination between quantitative among 70 MSM and qualitative among 19 informants. The result of this study shows that 77.1% reported engagement in UAI during sex in the previous six months. Multivariate analysis shows that UAI was associated with partner status (p=0.017, OR: 3.958; 95% CI:1.230 to 12.736), and knowledge about HIV/AIDS (p= 0.01, OR: 9.8; 95% CI: 2.555 to 37.587). The qualitative study shows that preference and lack of MSM identification were the other factors that affected UAI among MSM.

Keywords: *HIV/AIDS · MSM · UAI.*

Introduction

Men who have sex with Men (MSM) are currently at marked risk for HIV infection in Low- and Middle-Income Countries (LMICs) in Asia, Africa, Latin America and the Caribbean, and in Eastern Europe and Central Asia, and countries with a lower-middle economy state that MSM is 19 times more at risk of developing HIV than the general population.[1,2] In the United States, HIV/AIDS cases among MSM have been increasing for over half (53%) of all reported HIV infection in 2006, and the case increase from 28,077 cases in 2007 to 30,573 cases in 2010.[3] In Asia, the HIV/AIDS epidemic is generally concentrated on Injecting Drug Users (IDU), men who have sex with men (MSM), and sex workers. HIV/AIDS cases among homosexuals in China increased from 14.7% in 2009 to 17.4% in 2011, and about 2-4 % of men population in China identified as MSM.[4] In Indonesia, the number of new cases of HIV among MSM in 2015 about 4.241 cases with AIDS about 449 cases. [5]

The primary risk factors transmission HIV/AIDS in MSM was Unprotected Anal Intercourse (UAI). UAI is unsafety sex behavior among insertive or receptive MSM whose doing anal intercourse without using condoms for both insertive and receptive in anal intercourse.[6] Unprotected Anal Intercourse (UAI) is deviant sexual behavior, where MSM does not think about the effects that can occur due to unsafe sexual behavior without using condoms. Broadly speaking, human behavior is a reflection of various psychiatric symptoms, such as knowledge, desires, interests, motivations, perceptions, and attitudes.[7] The more often men who perform sex do not use condoms, the higher the risk of infected HIV/AIDS. In the United States, 43% of MSM who carry out UAI are infected with HIV.[8] In Denmark, 66% of MSM who carry out UAI are infected with HIV.[6] In Kazakhstan 69% of HIV positive MSM have unprotected anal sex (OR: 2.00; 95% CI: 1.04-3.84).[1] Research conducted at MSM in Nanjing, China also showed that 62.3% of MSM samples performed UAI.[9]

The reason for non-use condoms among MSM can be caused by internal and external factors. Internal factors are determinants that are unique to each individual, such as demographic characteristics, mental health factors, and personal beliefs about sexual pleasure. External factors came from outside of individuals that can support MSM not using condoms while doing intercourse.[10] High rated of UAI has been found among immigrants

citizen, have physical conditions like homophobia, have a large number of partner, alcohol and drug consumption, have a low level of education, being in the heterosexual marriage, HIV status, HIV perception, internet usage for finding sex partners were the factors that affected UAI among MSM.[11,12]

In this study, we reported the results of factors that affected for non-use of condoms among MSM in Solok - West Sumatera. In 2015 it is known that the number of MSM in Solok increased sharply from 2014 to 2015. In the preliminary study with HIV/AIDS Prevention Commission in Solok, it is known that around 50% of MSM in Solok still practice sex with not using condoms. An understanding of the factors that influence the behavior of UAI in MSM can help in designing programs that are effective in preventing the transmission of the HIV/AIDS virus to MSM and their partners. Therefore, researchers intend to examine the factors associated with Unprotected Anal Intercourse (UAI) on MSM in Solok.

Method

This study using a mix method approach or a combination of quantitative and qualitative approaches. This method using quantitative method at the first stage and qualitative method at the second stage to strengthen the results of quantitative research conducted at the first stage. The qualitative method used to obtain more in-depth information about other factors that influence MSM having sex without using a condom to informants who feel relevant to the problem in this study. This research was conducted from December 2016 to May 2017 and took place in Solok, West Sumatera, Indonesia.

The number of samples in quantitative research was determined using the Lemeshow formula and obtained about 70 samples and selected using consecutive techniques. To be eligible for participation, individuals needed to identify themselves as male, 16 years or older and having engaged sex with another man for the past 6 months. Data collected by using a self-administered questionnaire containing questions about demographic conditions of samples such as names, age, education, occupation, partner, sexual orientation, HIV status, knowledge about HIV/AIDS, alcohol, and drug consumption. Data were analyzed using univariate, bivariate, and multivariate analysis.

Two-sample chi-square tests were performed using statistical software to assess proportional differences in data study. Logistic regression was used to identify dominant factors that affected UAI among variables derived from self-administered questionnaire items.

The sample for qualitative research is determined by using purposive sampling and selected from informants who are considered knowing the problem more broadly and deeply and can be trusted as a source of data. Informants in this study were selected about 19 informants. Background of the 19 informants that participated in qualitative method is from Public Health Office Kota Solok, HIV/AIDS Prevention Commission, part of a No-Governmental Organization that focused on MSM and the groups that risk for HIV/AIDS, and from MSM itself. MSM that eligible to be as informants is an individual that part of the quantitative technique and divided into two age groups namely 16-30 years old and higher than 30 years old. Data collected with in-depth interview technique and Focus Group Discussion among informants and analyzed using triangular method.

Results

Quantitative Method:

Univariate Analysis:

Table 1 Main Characteristic of Participants

Variable	f	%
Age		
16-30 years	49	70
>30 years	21	30
Education		
Elementary school	4	5.7
Junior high school	4	5.7
Senior high school	49	70
College	13	18.6
Occupation		
Non-workers	21	30
Workers	49	70
Marital Status		
Single	56	80
Married	9	12.9
Widowed	**5**	**7.1**
Sexual orientation		
Homosexual	10	14.3
Bisexual	60	85.7

Variable	f	%
Partner Status		
Regular	44	62.9
Irregular	26	37.1
Number of partner		
1	44	62.9
2	9	12.9
3	9	12.9
4	2	2.9
5	2	2.9
6	2	2.9
7	1	1.4
9	1	1.4
Level of Education		
Low	38	54.3
Middle	19	27.1
Good	13	18.6
HIV Test		
Yes	45	64.3
Positive	1	2.2
Negative	44	97.8
No	25	35.7
Alcohol Consumption		
Yes	18	25.7
No	52	74.3
Drugs		
Yes	4	5.7
No	66	94.3
UAI		
Yes	54	77.1
No	16	22.9

All of the participants in this study reported having anal intercourse with 1 or more partners during the previous 6 months. The characteristic of 70 participants are described in Table 1. 49 MSM (70%) aged between 16-30 years old, 70% of participants graduated from senior high school. 70% of participants have a job like an entrepreneur, beauty stylist, parking attendants, and artist. Non-jobs participants generally are students. The majority of participants (80%) were single. For sexual orientation, 85.7% of participants self-identified as bisexual and 14.3% as a homosexual.

Over half of the participants (62.9%) have regular partners for the past 6 months, while other participants (37.1%) having 2-9 sex partners. Half of the participants (54.3%) have low-level knowledge about HIV/AIDS. Over half of the participants (64.3) had HIV tests and 1 of the participants reported having HIV status. 25.7% of participants consume alcohol and the majority of participants were non-drugs person.

A total of 54 participants (77.1%) reported doing UAI with male partners in 6 past months. Result of the relationship between variables shown in Table 2.

Table 2 Relationship between variables

Variables	UAI				Total	
	UAI		Safe sex			
	f	%	f		F	%
Age						
16-30	39	79.6	10		49	100
>30	15	71.4	6	-	21	100
Total	**54**	**77.1**	**16**		**70**	**100**
Level education						
Primary-secondary	6	75	2		8	100
Higher than secondary	48	77.4	14	-	62	100
Total	**54**	**77.1**	**16**		**70**	**100**
Partner Status						
Regular	38	86.4	6		44	100
Irregular	16	61.5	10	3.958	26	100
Total	**54**	**77.1**	**16**		**70**	**100**
Sexual orientation						
Bisexual	46	76.7	14		60	100
Homosexual	8	80	2	-	10	100
Total	**54**	**77.1**	**16**		**70**	**100**
Knowledge about HIV/AIDS						
Not Good	49	86	8		57	100
Good	5	38,5	8	9,8	13	100
Total	**54**	**77.1**	**16**		**70**	**100**
HIV Test						
Yes	35	77.8	10		45	110
No	19	76	6	-	25	100
Total	**54**	**77.1**	**16**		**70**	**100**
Alcohol Consumption						
Yes	14	77.8	4		18	100
No	40	76.9	12	1.050	52	100
Total	**54**	**77.1**	**16**		**70**	**100**
Drugs						
Yes	2	50	2		4	100
No	52	78,8	14	-	66	100
Total	**54**	**77.1**	**16**		**70**	**100**

From Table 2. Variables indicating significance with UAI among participants is partner status (having a regular or irregular partner) p= 0.017 and knowledge about HIV/AIDS p= 0.001.

Factors That Affected UAI among Participants: In univariate analysis (Table 1 and Table 2), reporting that UAI significantly associated multivariate analysis with Status Partner and knowledge about HIV/AIDS (p<0.05). Logistic regression was used to identify dominant factors that affected UAI among participants. Significant factors affecting UAI included in the model were as follows: partner status (OR: 3.958; 95% CI:1.230 to 12.736), and knowledge about HIV/AIDS (OR: 9.8; 95% CI: 2.555 to 37.587).

Table 3 Multivariate Analysis

Variable	P Value	OR	95% CI for EXP (B)	
			Upper	Lower
Partner Status	0,017	3.958	1.230	12.736
Knowledge Level	0,001	9.8	2.555	37.387

From logistic regression, knowledge about HIV/AIDS is a dominant factor that affected UAI.

Qualitative Method

Background of the 19 informants that participated in qualitative method is from Public Health Office Kota Solok, HIV/AIDS Prevention Commission, part of a Non-Governmental Organization that focused on MSM and the groups that risk for HIV/AIDS, and from MSM itself. The topic that discussed with the informants is the reason for MSM practicing UAI when doing anal intercourse from another perspective. In the qualitative method, data collected using Focus Group Discussion method among MSM group and in-depth interview with staff of the Public Health Office in Solok, HIV/AIDS Prevention Commission, and part of a Non-Governmental Organization that focused on MSM.

The result shows that other factors that affected MSM practicing UAI while doing anal intercourse is preference factor, Lack of identification of MSM so that it affects the distribution of condoms, and lack of government programs that providing knowledge about HIV/AIDS that affected the low level of knowledge about HIV/AIDS among MSM.

Discussion

Unprotected Anal Intercourse among Participants: Our study is the first to investigate the issue of unprotected sex between MSM in Solok. The result shows that over half of the participants (77.1%) reported doing UAI at least one period during 6 previous months. Unprotected sex-related with condom use among MSM. This result parallels with the other study where about over half of MSM doing UAI.[9,13] This study identifies the factors that affected UAI doing intercourse among MSM was status partner and level knowledge about HIV (p<0.05). Other factors like age, level of education, sexual orientation, alcohol, and drugs were not affected UAI among participants.

In this study, the researcher did not find an association between age with UAI. As in other studies, older MSM has greater risk than younger MSM.[14] It because older MSM generally become less aware of the importance of using contraception compared to younger age, making older MSM less obedient when using condoms.[14] In contrast, in this study younger MSM mostly doing UAI than older ages. It is because from an interview with MSM, mostly MSM state that they are uncomfortable using condom while doing sex. FGD of MSM reported that the older age of MSM has high awareness of using condoms. It reported that the older age of MSM always bringing condoms when they have intention doing intercourse with their partners.

The decision of using condoms relate with education level.[15] In this study, level of education not associated with UAI. MSM who have low level of education more often involved in sexual risk behavior than MSM that has higher education.[16]

Sexual orientation is a term used to describe the pattern of emotional, romantic, or sexual attraction. As in other studies, sexual orientation associated with UAI. Bisexual more often didn't use condoms while doing intercourse.[17] In contrast, from this study sexual orientation not related with UAI. From the interview in the qualitative study, the result shows that bisexuals have more worries about sex especially because bisexuals are generally also bound by a female partner and have a wife. This concern makes bisexuals prefer to have safer sex compared to homosexuals.

Getting a HIV test is the most important thing to knowing about HIV status. By getting HIV status,

an MSM can know about their HIV status and their partner`s status so they will aware and communication between MSM will increase when doing intercourse and it will preventing HIV transmission.[17] Communication MSM and their partners about HIV status is a key point to improving HIV protective behavior in preventing HIV transmission.[13] Our study stated that having HIV status is not significant factor that related with UAI. From the qualitative study, this is caused by low awareness from MSM that having HIV test to using condoms when doing intercourse and their mindset that it is still safe doing UAI if the result when getting HIV test among them is negative.

Alcohol and drugs can cause risky sexual behavior such as not using a condom during sex on MSM. Marijuana, ecstasy, ketamine, cocaine, opiate, and stimulant drugs are reported can increasing risky sexual behavior among MSM and reported the risk is increasing 2 multiple higher among MSM.[18,19] Alcohol and drugs can cause loss of consciousness, irrational mind, and increasing sexual desire among MSM. Irrational mind can cause MSM losing self-control and increasing irrational sex behavior like not using condoms.[20] From this study, alcohol and drugs are not significant factors that related with UAI. The number of participants that using alcohol and drugs when doing intercourse still small, so it's cause lacking variation of sample.

Partner of sex is two or more different parties who work together because they need or complement each other in sexual relationships. In this study, it was found that as many as 44 MSM (62.9%) had regular sex partners and 26 MSM (37.1%) had irregular sex partners. The results of this study related with research conducted in Hong Kong that stated over half (75.1%) of MSM had permanent partners.[21] Relationship between status partner with UAI support with statements from participants in the qualitative study. In the qualitative study, MSM stated that they feel safe doing intercourse with a regular partner than irregular partner. It's because communication about each other especially about their HIV status and the risk of HIV will communicate so well with regular partners. In contradiction, communication about sensitive issues like HIV and the risk will feel not communicating so well if their partners are different about time to time.[13] In other cases, MSM that knowing about each other status about HIV makes MSM and their partners more comfortable and confident not to use condoms during sex.

Awareness of using condoms consistently based on willingness, motivation, and sufficient knowledge especially about benefit of using condoms when doing intercourse. It is because the action with knowledge will be lasting forever than without knowledge.[10] Surprisingly, the result of this study shows that there is a positive association between knowledge about HIV/AIDS with UAI among MSM (p<0.05). The risk MSM that has low level knowledge about HIV doing UAI is 10 times greater than MSM that has knowledge about HIV/ADS sufficiently.

Counseling, promotion, information, and education programs are significant factors that affected UAI among MSM in Liaoning.[22] Related with quantitative method, in qualitative method knowledge about HIV and sexual risk behavior were also the factors that affected UAI.

Low level of knowledge about HIV/AIDS among participants caused by lacking socialization about HIV/AIDS especially for the risk groups like MSM. Based on interviews with staff of Public Health Office Solok, the programs have been created but still not right on the target. The target of the programs still focused on to general public but not for the risky groups. The programs still not covering all of MSM population in Solok, so that there are still MSM who does not participate in socialization programs. Effectiveness of socialization program has so many limitations such as lack of coordination among staff, lack of MSM identification, and difficulty to gather all of MSM to participate in programs because sometimes MSM socializes in a group-group, and sometimes the groups didn't get along with other groups.

Preference is another factor that affected UAI among participants. Based on data in qualitative interviews, personal preferenced caused by desires of MSM itself, discomfort when using condoms, and that factor of partner desire. This result is relatable with other studies where discomfort when using condoms while doing intercourse is an inhibitor for condom-use among MSM in Uganda.[20] From the qualitative data, inconveniences of using condoms among participants caused by the condom have non-proportional size so that associated with increased odds for condom breakage or slippage. Because of this non-proportional size, MSM did not use the condoms consistently or regularly.[23] Request of a partner is the factor that affected the preference of MSM using condoms while doing intercourse. Request of a partner to use or not using condoms while doing

intercourse can be affected by the decision of MSM, because partner is an important person especially for MSM that worked as commercial sex workers.

Lacking identification of MSM reportedly related with condoms distribution among MSM in Solok. MSM that didn't get condoms distribution reportedly having risk doing UAI 2.2 multiple greater than MSM whose getting condoms.[22] MSM who receive condoms is more likely to use condoms during sex than those who do not receive condoms. Therefore the lack of identification of MSM is one of the factors that influence MSM behavior in using condoms.

Our study has some limitations, first because this study bringing the sensitive and taboo topic in east culture, so participants are afraid and worries to participate in this study especially negative stigma in the community about deviant behavior. Several participants explained that they were afraid to disclose their sexual orientation and to speak freely about their sexual practice and sometimes covering the truth. Interviewed explained that if they had agreed to participate in this study because they considered that confidentiality and safety were guaranteed by recruitment method. Second, the study may be limited by the fact that it was a sensitive topic, the study still not cover all of MSM in this area, and not all of MSM can be interviewed by researchers, so Focus Group Discussion was performed to obtain the information because MSM is openly and confident when asking questions if they're in groups than individually.

Despite this limitation, as the first study to explore HIV transmission risk behaviors among MSM in Solok and West Sumatera, our work could open the way to future studies on MSM and HIV in this country. Further investigation could concern about MSM and various sexual identities exist about their sexual behavior and its relationship with socio-culture, norms, and religion. Our study suggests improving the role of peer prevention activities to increasing and suggest that prevention interventions should be systematically implemented within the high-risk groups of MSM in the Indonesian context.

Communication and coordination in the prevention interventions of programs must be improving among government and non-government parties to increasing the effectiveness of programs. Beyond social, norms, erroneous representation of HIV risk and taboos, prevention strategy should consider all forms of sexuality and social status.

Conclusion

The study reveals that partners status, knowledge about HIV/AIDS, preference of using condoms, and lacking identification of MSM reportedly related with UAI.

Conflict of Interest: The authors declare that there is no Conflict of Interest in this study.

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A Cross-Sectional Study on Perspective of People towards the Covid-19 Induced Nationwide Lockdown in the State of Himachal Pradesh, India

Farah Niazi[1], Aanchal Anant Awasthi[2], Neha Taneja[3], Rajiv Janardhanan[1,2,3]

[1]*Analytical Bio-Surveillance & Infectious Disease Epidemiology Laboratory, Amity Institute of Public Health, Amity University Uttar Pradesh, Noida, India,* [2]*Health Data Analytics & Visualization Environment Laboratory, Amity Institute of Public Health, Amity University Uttar Pradesh, Noida, India,* [3]*Laboratory of Disease Dynamics & Molecular Epidemiology, Amity Institute of Public Health, Amity University Uttar Pradesh, Noida, India*

Abstract

Background: Almost one-third to half of the global population is now under some form of COVID-19 induced lockdown. The objective of this study was to assess the perspective of people in the state of Himachal Pradesh, India towards the COVID-19 induced nation-wide lockdown.

Methodology: This cross-sectional study was conducted among 159 residents of the state of Himachal Pradesh using snowball technique. The questionnaire was prepared through Google Forms and contained 21 perspective based questions.

Results: Majority of the participants (96.2%) were found to be fully aware and satisfied (66.7%) with the implication of the nation-wide lockdown. It was also revealed that only few of the participants were working from home or taking online classes (18%). The percentage of participants facing mental and physical health issues were 55.3% and 49.7% respectively.

Conclusion: The overall findings of the study revealed that even though most of the participants were fully aware and were satisfied with the implication of the nation-wide lockdown, there were some problems being faced by them. However, most of the participants agreed with the necessity of nationwide lockdown for the control of COVID-19.

Keywords: *COVID-19, Lockdown, Himachal Pradesh, Mental health issues, Physical health issues.*

Introduction

In the month of December 2019, a cluster of pneumonia cases were reported in the city of Wuhan, China, which was found to be caused by a previously unknown virus, now known as 2019 Novel CORONA VIRUS or COVID-19. The corona viruses generally circulate in a wide range of animals, including bats, pangolin, camel, civet cat, etc. and some of the times these viruses make a jump from animals to humans, known as a spillover.[1] A spillover may occur due to a number of factors, including mutations in the viruses and increased contact between animals and humans.[2] The virus which causes COVID-19 most probably has its ecological reservoir in bats, and transmission of the virus to humans has likely occurred through an intermediate animal host.[3] The exact dynamics of the transmission of the COVID-19 is yet to be determined. As of now, researchers agree that the new corona virus is spread through droplets released into the air when an infected person coughs or sneezes. The droplets generally do not travel more than a few feet, and in a few seconds they fall to the ground. This is the reason why social and physical distancing is very effective in prevention of the spread of this disease.[4] The disease now has not only spread in China, but to many other countries in the world, including India. The WHO Director-General, Dr Tedros Adhanom Ghebreyesus, declared the novel coronavirus (2019-nCoV) outbreak a public health emergency of international concern (PHEIC) on 30 January 2020 and emphasized on minimizing the threat

in affected countries and to reduce the risk of further international spread.[5]

As of now i.e. on 12/05/2020, 188 Countries and Territories around the world have reported a total of 7,360,239 confirmed cases of the COVID-19 that originated from Wuhan, China, and a death toll of **416,201.**[6] China implemented what was then the largest quarantine in human history to try to contain the corona virus, locking down at least 16 cities towards the end of January 2020.[7] After the virus started to spread to other countries, many other countries were forced to impose nation-wide lockdown or some other kind of restrictions. Almost one-third to half of the global population is now under some form of lockdown.[8] The state of lock-down in many parts of the world, which contribute largely to the global economy, has led to the halting of services and products. This has in turn led to a break in the global supply chains and has thus, affected the global economy brutally.[9]

India confirmed its first COVID-19 case on 30/01/2020, in the state of Kerala.[10] However the number of cases started to spike in the early week of March 2020. This led to the announcement of the first phase of the nation-wide lockdown, followed by three more phases till now. The first phase of lockdown, which consisted of a period of 21 days, was implemented from 25/03/2020 to 14/04/2020.[11]The second phase of lockdown consisted of a period of 19 days and was implemented from 15/04/2020 to 03/05/2020. [12] The third phase of lockdown was of 14 days and was implemented from 04/05/2020 to 17/05/2020. [13]The fourth phase of lockdown was implemented from 18/05/2020 to 31/05/2020.[14]At present, i.e. on 11/06/2020, there are 287,155 confirmed COVID-19 cases, out of which 140,979 have recovered and 8,107 deaths have been recorded.[15]

As India is a country which is home to about 1.3 billion people.[16] it was inevitable for everyone to have the varying perspective towards the lockdown and its implementation. Keeping that in view, this study was designed to assess the perspective of people in the state of Himachal Pradesh, India towards the COVID-19 induced nation-wide lockdown.

Method

Participants: We conducted a cross-sectional survey among 159 residents of the state of Himachal Pradesh, India. As it was not feasible for us or the participants to engage in a community based survey, the data was collected online. The participants with known contacts were approached and recruited. The questionnaire was prepared through the Google Forms and was distributed among the participants via e-mail and WhatsApp. The participants were then encouraged to give out the questionnaire to their acquaintance. The questionnaire included an Informed Consent at the beginning, which consisted of the objective of the study and confidentiality of the participants. Institutional ethical approval was taken. Participants had the option to agree or disagree for their willing participation in the study. Only after agreeing to the participation, they were directed to the main sections of the questionnaire.

Measures: The survey was conducted using a self-structured questionnaire which consisted of two parts: socio-demographics and perspective based questions. Socio-demographic variables included age, gender, marital status, religion, education, occupation and place of current residence. The perspective based questions were 21 in number pertaining to the perspective of the participants towards the COVID-19 induced lockdown in India.

Statistical Analysis: The data was then retrieved into the Microsoft Excel. Statistical analyses were conducted using IBM SPSS Statistics Version 24.0. Descriptive statistics were done for the socio-demographic variables and the perspective based questions. It was then followed by the Chi-square test which was used to find the association between different relevant socio-demographic variables and perspective based questions. The level of significance was set at $p < 0.05$.

Results

Socio-demographic Data: A total of 159 residents of Himachal Pradesh were included in the study. All of the participants had agreed to take part in the study.

The mean age of the participants was found to be 42.22 years with a standard deviation of 11.71 years and the majority of the participants were Male (65.4%). While the larger part of the participants was married (78.6%), only 4.4% of the participants' education was below graduation level. The participants were mostly involved in private jobs (41.5%) and predominantly belonged to the urban area of Himachal Pradesh (71.1%). [Table 1].

Table 1: Socio-demographic characteristics of the participants

Socio-Demographic Variables	Frequencies (%)
Age	
[Mean ± SD*]	42.22±11.71
Gender	
Male	104(65.4%)
Female	55(34.6%)
Marital Status	
Married	125(78.6%)
Unmarried	32(20.1%)
Others	2(1.3%)
Religion	
Hindu	137(86.2%)
Muslim	19(11.9%)
Others	3(1.9%)
Education	
$5^{th} - 8^{th}$	1(0.6%)
$9^{th} - 12^{th}$	6(3.8%)
Graduate	55(34.6%)
Post-graduate	94(59.1%)
M.Phil/P.H.D	3(1.9%)
Occupation	
Student	17(10.6%)
Home-maker	15(9.5%)
Private job	66(41.5%)
Government job	58(36.5%)
Others	3(1.9%)
Place of Current Residence	
Rural	46(28.9%)
Urban	113(71.1%)

*Stands for Standard Deviation

Data related to perspective based questions: The majority of our respondents (96.2%) were found to be aware about the on-going COVID-19 induced nation-wide lockdown, thought that it's a severe disease (99.4%) and agreed that a nation-wide lockdown was necessary to control COVID-19 (73.0%). Most of the respondents were satisfied with the implication of the lockdown (66.7%).

Only 30.2% of the participants were not feeling good about being home for 24 hours during the lockdown and only 22.6% and 18.9% of the participants often missed going out for a walk and socializing with others, respectively. Most of the participants had domestic help before the announcement of the lockdown, however only 17.6% of the participants agreed missing their domestic help often.

At most 24.5% of the participants admitted facing any kind of difficulties during the lockdown, while majority of the participants revealed that it was easy for them to have access to essential commodities and medical supplies (89.3% and 90.5% respectively). However, 37.1% of the participants found it difficult to have access to non-essential services. Most of the participants (82%) were not engaged in working from home or taking online classes. Also, majority of them (74.9%) admitted that they feel unsafe about home-delivery services. Almost equal percentage of the participants (56.7%) relied on internet and news channels to gain information about COVID-19.

Majority of the participants (55.3%) stated that they have been facing issues related to mental health, the major issue being stress (42.1%), however only 49.5% of the participants agreed that they have been facing any issue related to physical health.

Barely, 3.1% of the participants agreed that they often worry about their future being drastically affected due to the pandemic. Most of the participants (67.3%) were aware about the helpline numbers for mental health issues, launched by the Govt. of Himachal Pradesh, although only 4.4% of them admitted to use those numbers. [Table 2 and Figures 1,2,3 & 4].

Table 2: Respondents' perspectives towards the COVID-19 induced Lockdown

Perspectives	Frequencies (%)
1. Awareness of the on-going COVID-19 induced nationwide lockdown.	
Yes	153 (96.2%)
No	2 (1.3%)
Cannot say	4 (2.5%)
2. Severity of the disease COVID-19.	
Severe	158 (99.4%)
Minor	1 (0.6%)
Negligible	0 (0.0%)

Perspectives	Frequencies (%)
3. Agreeing with the sentence "Nationwide lockdown was necessary to control COVID-19".	
Agree	116 (73.0%)
Neutral	43 (27.0%)
Disagree	0 (0.0%)
4. Level of satisfaction with the nationwide lockdown.	
Satisfied	106 (66.7%)
Neutral	52 (32.7%)
Dissatisfied	1 (0.6%)
5. Feeling about being inside home for almost 24 hours every day.	
Not good	48 (30.2%)
Cannot say	76 (47.8%)
Fine	35 (22.0%)
6. Missing going out for a walk.	
Rarely	33 (20.8%)
Sometimes	90 (56.6%)
Often	36 (22.6%)
7. Missing socializing with others.	
Rarely	34 (21.4%)
Sometimes	95 (59.7%)
Often	30 (18.9%)
8. Having a domestic help for house-hold work before the announcement of the lockdown.	
Yes	103 (64.8%)
No	56 (35.2%)
9. Missing domestic help during this lockdown.	
Rarely	27 (17.0%)
Sometimes	48 (30.2%)
Often	28 (17.6%)
10. Experiencing any difficulties during this lockdown.	
Yes	39 (24.5%)
No	48 (30.2%)
Cannot say	72 (45.3%)

Perspectives	Frequencies (%)
11. Access to essential commodities (milk, vegetables, groceries, etc.).	
Easy	142 (89.3%)
Difficult	3 (1.9%)
Cannot say	14 (8.8%)
12. Access to medical supplies.	
Easy	144 (90.5%)
Difficult	2 (1.3%)
Cannot say	13 (8.2%)
13. Access to non-essential services (electrical, mechanical, plumbing, internet, etc.).	
Easy	44 (27.7%)
Difficult	59 (37.1%)
Cannot say	56 (35.2%)
14. Feeling about the safety of home delivery services.	
Safe	32 (20.1%)
Unsafe	119 (74.9%)
Cannot say	8 (5.0%)
15. Facing any of the following issues related to mental health.	
Anxiety	15 (9.5%)
Depression	1 (0.6%)
Stress	67 (42.1%)
Insomnia	5 (3.1%)
None	71 (44.7%)
Others	0 (0.0%)
16. Worrying about the future being drastically affected due to the lockdown/pandemic.	
Rarely	50 (31.5%)
Sometimes	104 (65.4%)
Often	5 (3.1%)
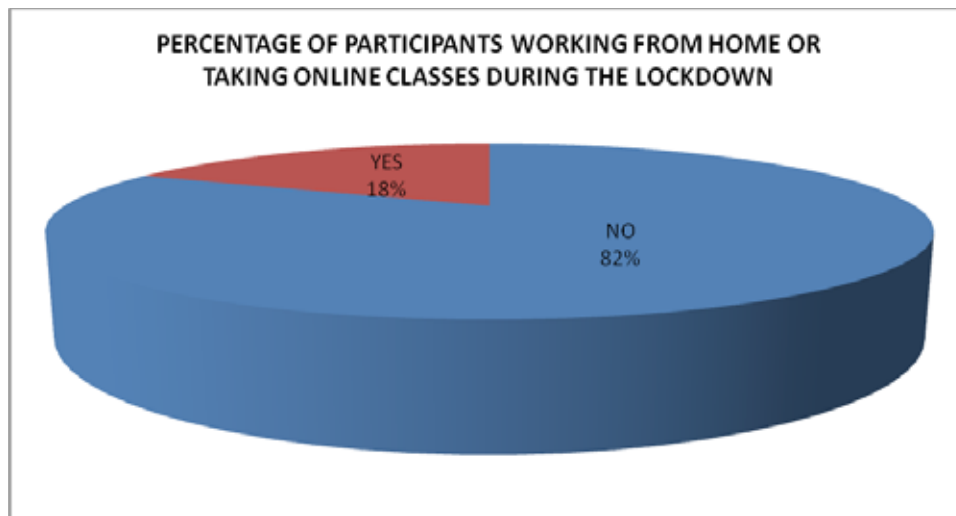
Figure 1: Pie chart depicting whether participants have been working from home or taking online classes during the lockdown.
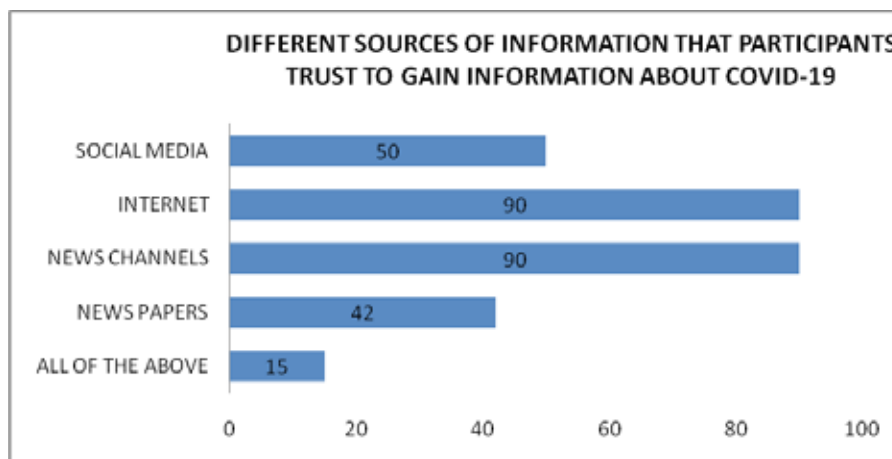
Figure 2: Bar chart depicting different sources participants trust to gain information about COVID-19.
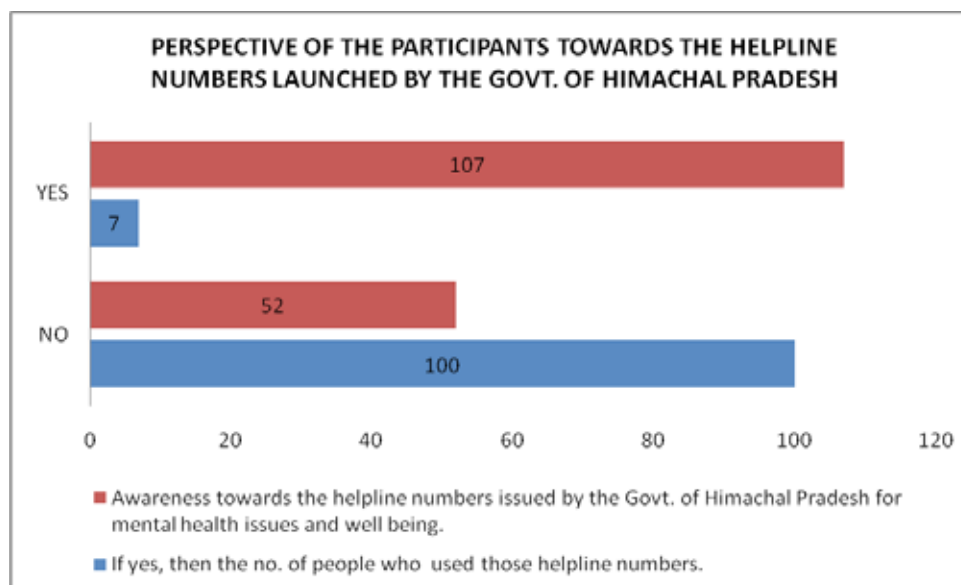
Figure 3: Bar chart depicting the perspective of the participants towards the helpline numbers launched by the Govt. of Himachal Pradesh.
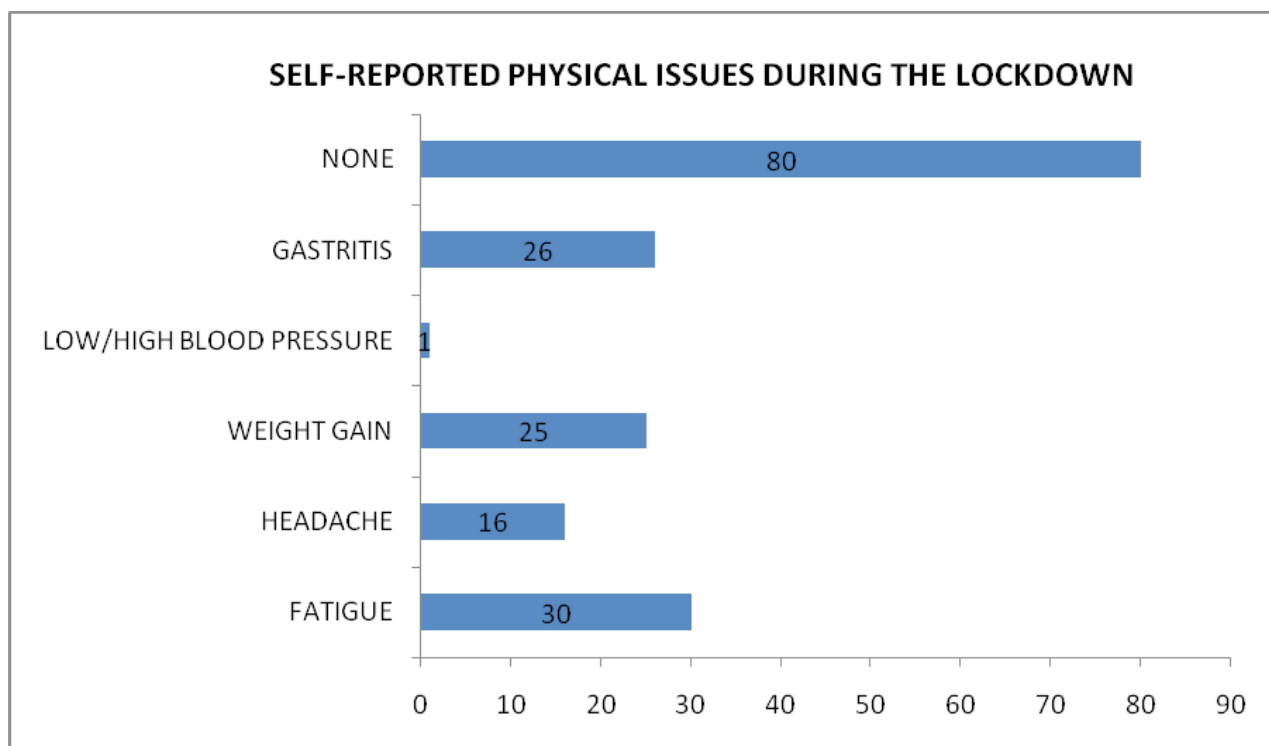
Figure 4: Bar chart depicting the number of participants facing physical issues during the lockdown.

Bi-variate relationship between socio-demographic variables and the perspective based questions: As shown in Table 3, we also analysed the association between different relevant socio-demographic variables and the perspective based questions, to find out whether there is any significance between the two or not. The level of significance was set at **p < 0.05**.

The result has been summarised as follows:

Table 3: Bi-variate relationship between socio-demographic variables and perspective based questions

Socio-Demographic Variables	Age		Gender		Education			Occupation		
	≤40	>40	M	F	5th–12th	Grad.	Post-grad.	Pvt.	Gov	Others
1. Nationwide lockdown was necessary to control COVID-19.										
Agree	43(70.5)	73(74.5)	77(74.0)	39(70.9)	2(28.6)	45(81.8)	69(71.1)	22(62.9)	44(66.7)	50(86.2)
Disagree	18(29.5)	25(25.5)	27(26.0)	16(29.1)	5(71.4)	10(18.2)	28(28.9)	13(37.1)	22(33.3)	8(13.8)
P-Value	0.581		0.673		0.009*			0.016*		
2. Satisfaction with the nation-wide lockdown.										
Satisfied	35(57.4)	71(72.4)	70(67.3)	36(65.5)	2(28.6)	42(76.4)	62(63.9)	22(62.9)	42(63.6)	42(72.4)
Neutral	26(42.6)	27(27.6)	34(32.7)	19(34.5)	5(71.4)	13(23.6)	35(36.1)	13(37.1)	24(36.4)	16(27.6)
P-Value	0.050*		0.814		0.027*			0.506		
3. Feeling about being at home for 24 hours.										
Not Good	45(73.8)	79(80.6)	83(79.8)	41(74.5)	5(71.4)	40(72.7)	79(81.4)	26(74.3)	51(77.3)	47(81.0)
Fine	16(26.2)	19(19.4)	21(20.2)	14(25.5)	2(28.6)	15(27.3)	18(18.6)	9(25.7)	15(22.7)	11(19.0)
P-Value	0.311		0.446		0.420			0.736		

Socio-Demographic Variables	Age		Gender		Education			Occupation		
	≤40	>40	M	F	5th–12th	Grad.	Post-grad.	Pvt.	Gov	Others
4. Missing going out for a walk.										
Rarely	43(70.5)	80(81.6)	78(75.0)	45(81.8)	6(85.7)	42(76.4)	75(77.3)	24(68.6)	51(77.3)	48(82.8)
Often	18(29.5)	18(18.4)	26(25.0)	10(18.2)	1(14.3)	13(23.6)	22(22.7)	11(31.4)	15(22.7)	10(17.2)
P-Value	0.103		0.328		0.856			0.285		
5. Missing socializing with others.										
Rarely	49(80.3)	80(81.6)	84(80.8)	45(81.8)	6(85.7)	43(78.2)	80(82.5)	27(77.1)	54(81.8)	48(82.8)
Often	12(19.7)	18(18.4)	20(19.2)	10(18.2)	1(14.3)	12(21.8)	17(17.5)	8(22.9)	12(18.2)	10(17.2)
P-Value	0.838		0.872		0.770			0.785		
6. Experiencing any difficulties during the lockdown.										
Yes	23(37.7)	16(16.3)	21(20.2)	18(32.7)	2(28.6)	14(25.5)	23(23.7)	15(42.9)	17(25.8)	7(12.1)
No	38(62.3)	82(83.7)	83(79.8)	37(67.3)	5(71.4)	41(74.5)	74(76.3)	20(57.1)	49(74.2)	51(87.9)
P-Value	0.002*		0.081		0.941			0.004*		
7. Opinion about home delivery services.										
Yes	11(18.0)	21(21.4)	22(21.2)	10(18.2)	1(14.3)	9(16.4)	22(22.7)	2(5.7)	17(25.8)	13(22.4)
No	50(82.0)	77(78.6)	82(78.8)	45(81.8)	6(85.7)	46(83.6)	75(77.3)	33(94.3)	49(74.2)	45(77.6)
P-Value	0.604		0.657		0.599			0.049*		
8. Facing any mental issues during the lockdown.										
Yes	40(65.6)	48(49.0)	56(53.8)	32(58.2)	5(71.4)	31(56.4)	52(53.6)	25(71.4)	37(56.1)	26(44.8)
No	21(34.4)	50(51.0)	48(46.2)	23(41.8)	2(28.6)	24(43.6)	45(46.4)	10(28.6)	29(43.9)	32(55.2)
P-Value	0.041*		0.601		0.646			0.043*		

Discussion

Epidemics and pandemics are an inevitable recurring phenomenon and usually lead to many challenges which are faced by the people in general.[17]Hence, keeping that in view, the primary objective of our study was to assess the perspective of the people of the state of Himachal Pradesh, India, towards the COVID-19 induced nation-wide lockdown. The majority of the participants were found to be well-educated as most of the respondents were post-graduates (59.1%). On assessing the perspective based questions, it was revealed that nearly all of the participants (96.2%) were aware about the on-going COVID-19 induced nation-wide lockdown and thought that it's a severe disease (99.4%). This could be attributed to the reason that there has been an easy access of internet in most part of the country and it has become comparatively easier to get knowledge about day-to-day news and other happenings.[18] This is supported by the fact that 56.6% of the participants relied on internet to gain information about the COVID-19. The vast majority of the study participants (73%) agreed that a nation-wide lockdown

was necessary to control the disease and 66.7% of them were satisfied with the implementation of the lockdown. This finding was expected as the disease has spiked in the country during the on-going days.[15] Only 18.2% of the participants revealed that they have been either working from home or have been taking online classes. This finding was positive as it excludes the chances of isolation and burnout that comes with working from home situation, which might cause, even if relatively mild, the deterioration of mental health, reduced social contact, and lack of self esteem and motivation.[19]24.5% of the participants agreed facing some or the other kind of difficulties during the lockdown. Though, most of the participants (89.3% and 90.6%) also revealed that it was easy for them to have access to essential commodities and medical supplies as compared to having access to non-essential commodities. However, with the recent increase of cases in Himachal Pradesh (421 cases in total, out of which 222 have recovered and 5 deaths have been reported as on 11/06/2020), there is a high possibility of lockdown related restrictions to further increase in the near future.[20]

42.1% of the participants agreed that they have been dealing with stress due to the lockdown and 8.8% of them revealed that they are dealing with fatigue and headache. While, 44.7% of the participants reported that they have not been facing any kind of issues related to mental health. It was also worth observing that about 65.4% of them agreed that they sometimes worry about their future as well as their family's. This finding was crucial owing to the fact that,problems like panic buying, exhaustion of resources might occur, when a large population is affected by stress and anxiety. It also can lead to several other issues like limitations in daily activities, avoidance behavior which in turn may lead to limited socialization and self-medication. Because of anxiety, people tend to adopt various unwanted and unhealthy lifestyle and dietary modifications under the influence of rumors and false news. These may affect mental health adversely.[21]

Another important finding was the percentage of participants who did not have any issues related to their physical health (50.3%). It was inevitable that people may have become less physically active, but also possibly there might have been some positive health behavior changes. Perhaps people have been more motivated to quit habits like smoking and drinking or have been encouraged to access online exercise and healthy lifestyle classes.[22] Though, considerably most of them (19.4%) reported about dealing with fatigue.

Majority of the participants were also aware of the fact that the Govt. of Himachal Pradesh has launched a series of helpline numbers for mental health issue and well being, but only 4.4% of them revealed that they have used the numbers even once [Figure 3]. This finding can be attributed to the stigma, both social and self-perceived, built around the mental health issues, despite being aware of it.[23]

Strength: To the best of our knowledge, this is the first study to be conducted in the state of Himachal Pradesh, assessing the perspective of the people towards the COVID-19 induced nationwide lockdown in India. The timely conduction of this study during the period of lockdown makes this study more rational.

Limitations: One of the shortcomings of this study was that it was only limited to the people who were educated, knew English language, had smart phones, e-mail IDs and easy access to internet services. This does not represent the generalized population but only the educated population of the state. The perspective of the uneducated people towards the COVID-19 induced lockdown, however, might vary significantly from the findings of our study. The other limitation of this study was the small sample size.

Conclusion

Based on the limited sample size, we concluded that while majority of the participants were fully aware and were satisfied with the implication of the nation-wide lockdown, there were some problems being faced by them to run their day to day lives. It was also revealed that only few of the participants were working from home or taking online classes. Some of the participants were facing mental and physical health issues. However, almost all of them agreed that a nation-wide lockdown was necessary for the control of COVID-19.

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Impact of Applying Evidence-Based Guidelines for Epileptic Patient on their Knowledge, Self Efficacy, Drug Adherence and Quality of Life

Fathia Ahmed Mersal[1], Shereen Ahmed Ahmed Qalawa[2], Amany Gamal Algharib[3]

[1]Professor, Community Health Nursing, Faculty of Nursing, Ain Shams University, Egypt, [2]Associate Professor, Medical-Surgical Nursing, Nursing College, Qassim University, KSA, [2]Professor, Medical-Surgical Nursing, Faculty of Nursing, Port-said University, Egypt, [3]Lecturer, Medical–Surgical Nursing, Faculty of Nursing, Port-said University, Egypt

Abstract

Background: Epilepsy is considered as a chronic brain disorder characterized by recurrent derangement of the nervous system caused by sudden extreme discharge of the cerebral neurons.

Aim: To evaluate the impact of applying evidence-based guidelines for epileptic patient on their knowledge, self efficacy, drug adherence and quality of life.

Design: A Quasi-experimental design conducted on 54 epileptic patients underlying three phases; assessment, planning, implementing, and evaluating phase which emphasized on estimating the effect of the evidence based guidelines implementation before (Pre-test) and re-interviewed after one month and four months (follow-up) of implementation for the guidelines.

Results: Reflected that there are a significant positive correlation were found between epileptic patient's self efficacy and their family history, level of education and between total epileptic patients knowledge and their marital status in the posttest phase (Ps = .040, .013, .049) respectively.

Conclusion: The majority of epileptic patients had low self efficacy and quality of life levels in the pre implementation of guidelines phase comparing to Post and follow-up guideline implementation phases. Also, the majority of them had high knowledge and perception level in the item related to disease crisis, perception of anticonvulsant drugs and adherence at post and follow-up guidelines implementation phases.

Relevance to Clinical Practice: There are obvious needs to activate implementation of epileptic guidelines manual in the hospitals.

Keywords: *Impact, applying, evidence-based, guidelines, epileptic patient, knowledge, self efficacy, drug adherence, quality of life.*

Introduction

Epilepsy is considered as a chronic brain disorder characterized by recurrent derangement of the nervous

Corresponding Author:
Fathia Ahmed Mersal
Designations: Shereen Ahmed Ahmed Qalawa
Faculty of Nursing, Ain Shams University, Egypt
e-mail: s.qalawa@qu.edu.sa

system caused by sudden excessive discharge of the cerebral neurons. It is a neurological condition that knows as no geographic, social, or ethnicboundaries, occurring in men and women and affecting people of all ages. However, the word Epilepsy is derived from the Greek word "epilepsia" which can be broken into epi (upon) and lepsis (to take hold of or seizure) [1].

An estimated 4.7 million people with epilepsy live in the WHO Eastern Mediterranean Region. The existence prevalence of epilepsy at Al Kharga in Egypt district was

6.76/1,000 with the highest peak during early childhood. The annual incidence rate was 43.14/100,000, and age-specific incidence rate with two peaks of incidence at early infancy and elderly[2].

Antiepileptic drugs are a frequently efficient treatment used for epilepsy. So, failure of drug adherence is interrupt the outcome, increased risk of seizures incident and other associated problems including increased health care costs.[3]

Furthermore, Epilepsy treatment remain central to managing psychosocial dimension and improving patient's quality of life through efforts to improving the magnitude of self-management and efficacy[4,5]. Thus, epilepsy has a major impact on quality of life for both epileptic patients and their family members[1].

On the other hands, the quality of life (QOL) of people with epilepsy is estimated lower than that of people with other chronic diseases which this disease has an enormous influence on three main dimensions of the QOL (physical, mental and social health), which is directly and indirectly decreasing opportunities for participation in routine daily living activities[6].

Furthermore, appropriate management of neurological disorders is directly associated with professional supports,right outpatient management. Perceived self-efficacy has become a significant and valuable impact because it is reflected the people ability to cope and manage various behavioral challenges. Thus, epileptic patients who endow with social support suffered less depression, heightened self-esteem and self-efficacy, and improved quality of life, even after adjusting for baseline health and socioeconomic status[7].

Aim of the Study: To evaluate the impact of applying evidence-based guidelines for epileptic patient on their knowledge, self efficacy, drug adherence and quality of life in Port-Said City

Hypothesis of the study: Implementation of evidence-based guidelines program would improve epileptic patient's knowledge, self efficacy, drug adherence and quality of life.

Subjects and Method

Research Design; the present study is a quasi-experimental study design.

Setting: This study was carried out at outpatient clinic in Mental and psychological health hospital at Port-said city which is located in Suez-Canal district which this hospital is considered as a main governmental hospital in Port said city centered to treat epileptic patients .

Sample: A purposive sampling used in this study, 54 adult epileptic patients were directly involved in evidence based program according to **inclusion Criteria** and willing to fill in a questionnaire and/or be interviewed, were included in the study. Whereas patient's having cognitive impairment, cerebral infections or tumors and pregnant women were excluded from the study.

Tools of data collection: *data was collected through used 3 main tools; the first tool* was structured interview questionnaire used to collect data related to this study; it was written in a simple Arabic language developed by researchers. **The first part** was concerned with demographic characteristics of studied it was contains information related to sociodemographic characteristics of the studied patients as their age, gender, educational class level, marital status, occupation, duration of epileptic disease, family history . **The second part** included 32 items adapted from *Kinderen etal., 2014*[8]to assess the epileptic patient's knowledge and perception towards the epilepsy as: effects of epilepsy, clinical manifestations for each phase of seizures, investigations, perceptions of some investigations as EKG, perceptions of some anticonvulsant drugs ….etc. **The third part** consisted of 8 items adopted from *Kakacek.,2014*[9] *& Culig and Leppée., 2014*[10] Based on *Morisky et al., 1986*[11] to assess the epileptic patient's self adherence with their drugs as : missed dose, repeated dose, drugs during seizures, and barriers of anticonvulsant drug adherence . **The second tool** It includes 15 questions adopted from *Kakacek, 2014*[9] to assess the epileptic patient's self efficacy state of their locus of control with their disease as : epilepsy crisis, relationship with family, friends and heath careworkers, emotional upset, and seizures. **The third tool** includes 30 questions adopted from *Mohammadi et al., 2013* [12] *and Mollaoglu et al., 2015*[13] based on SF36 to assess the epileptic patient's quality of life state with their disease as : overall quality of life as patient's perceived ranged from very poor to very good and assess memory condition, concentration which ranged from all the time to rarely, and assess work activities, recreational activities, emotional upset which ranged from all the time to rarely, and assess anxiety, social relation, sexual relation which ranged from no anxiety to a lot of anxiety, and effects of

anticonvulsant drugs on patient's activities. Which each item takes scores from 1to 5 of all items which arranged as very annoying, annoying, sometimes, usually and no annoying. It is adapted from the provincial *guidelines for the management of epilepsy in adults and children,.,2015* which is the result of a collaborative effort between **CCSO, the Epilepsy Implementation Task Force (EITF),** and Provincial **Neurosurgery Ontario (PNO). The EITF was established in June., 2013** to develops and implements a simple framework of guidelines for ideal epilepsy care and practices in Ontario. **The fourth tool** includes 4 main items related to adherence and monitoring as Initiation of epileptic treatment, Drug monitoring,appointment and follow-up,etc……

Scoring System: The knowledge and perception scores one were given for each correct answer and zero for incorrect answer. For each area of knowledge and perception, the scores of the questions were summed-up and the total score divided by the number of the items. These scores were converted into a percent score. The total patient' knowledge and perception were considered satisfactory if the percent score was 60% or more and unsatisfactory if less than 60%. The drug adherence and self efficacy scores ranged as each item takes scores from 0 to 4 of all items which arranged as rarely, sometimes, usually, often and always .While quality of life scores ranged as each item takes scores from 1to 5 of all items which arranged as very annoying, annoying,sometimes, usually and no annoying .

Validity and Reliability: The tools were tested for their content validity by a jury of five experts in the Medical surgical nursing, neurological medical specialists. The required modifications were carried out accordingly. Testing reliability of the study tools was done by Cronbach alpha, the result was .720 for knowledge questionnaire, .972 for drug adherence, .983 for self efficacy and .984 for quality of life.

Pilot Study: A pilot study was conducted on 10% of epileptic patients to test the clarity of questions and to estimate the time required for using the tools and to determine the time needed to fill the tool. Patients included in the pilot study excluded from the study sample.

Field Work: Study participants were individually interviewed after obtained oral consent and informed them that their participation was voluntary and they could withdraw at any time without consequences.. Data were collected and program was implemented over a period of 7 months, 2 days/week and 4 hours/day starting from March 2018 to August 2018 . The educational guidelines booklet and simple media as pamphlets was implemented for each group one session per week for a total of eight sessions for each group. The duration of the session was about one hour, and it carried at the pre-mentioned setting after posted announcement in the clinic with the date and time for session conduction. The booklet was distributed to all participants in the first day of starting implementation phase after explaining the aim of the educational guidelines booklet to all participants (participants divided into small groups each one contained about 10 patients). Suitable teaching aids as videos, power point and posters was provided.

I. **Assessment Phase:** The tools of data collection were developed into Arabic language by the researchers after thorough detailed review of literature. The researchers started with a pilot test, and then validated the tool.

II. **Planning Phase:** Based on the assessment phase, the program content and media after reviewing the relevant literature in Arabic language were prepared. The content of the health instructions selected and developed includes general concepts about epilepsy (definition, clinical manifestations, types and treatment), use of drugs, side effects, safety precaution,warning signs of drug interactions, seizures .

III. **Implementation Phase:** The evidence based guidelines was implemented through eight sessions, and was given in small groups; each group consisted of five to seven participants. Patients were given a handout containing all information's for future reference. The length of each session ranged about 35-45 minutes.

IV. **Evaluation Phase:** The evaluation phase emphasized on estimating the effect of the evidence based guidelines implementation on epileptic patients' knowledge, self - efficacy and proper action and handling regarding drug adherence and quality of life,the patients were individually interviewed before (Pre-test) and re-interviewed after one month and four months of implementation for the guidelines to evaluate their knowledge, self efficacy, drug adherence and quality of life (posttest, follow-up).

Data Analysis: Data collected were entered, edited and coded in SPSS (Statistical Package for the Social Sciences), Version 16. All comparisons were two tailed and p-values <0.05 were considered significant. To compare variables between the pre, post and follow-up guidelines implementation, chi-squared test (for qualitative variables) were used. Repeated ANOVA test for comparing the phases of tests.

Results

Table 1. Shows that (61.1%) of epileptic patients were in age group 25-45 years with mean age 36.72±1.2 while (55.6%) of them were male and (59.3%) of them had Literal works. (53.7%) of them had ≤ 5days absenteeism rate from work. (64.8%) of them had family history of epilepsy and (50%) of epileptic patients had primary level of education.

Figure 1. Shows that mean scores of epileptic patient's knowledge pre-implementing guidelines phase was 17.28 which improved post implementing guidelines phase to 21.54 while it slightly decreased in flow up phase to 19.79

Table 2. Shows that there are a significant positive correlation were found among epileptic patients 'knowledge, self efficacy, drug adherence and Quality of life with their sociodemographic characteristics in pre implementation of guidelines phase (P<0.001)

Table 3. shows there are a significant positive correlation were found between total epileptic patient's knowledge scores and their level of education and between total quality of life and their occupation while there are a highly statistical correlation were found between total epileptic patients quality of life and their family history in the pre - test phase (Ps = .017, .040, .000) respectively

Table 4. shows there are a significant positive correlation were found between epileptic patient's self efficacy and their family history, level of education and between total epileptic patients knowledge and their marital status in the posttest phase (Ps = .040, .013, .049) respectively.

Table 1: Number and percent distribution of participants according to their demographic characteristics

Parameter	N=	%
Age:		
>25	10	18.5
25-	33	61.1
45-	9	16.7
<65	2	3.7
Mean of age:	36.72±1.2	
Gender		
Male	30	55.6
Female	24	44.4
Mean of Disease duration	23.4630±12.31	
Occupation		
No Job	12	22.2
Governmental Job	10	18.5
Literal works	32	59.3
Absenteeism days last month		
≥5 days	25	46.3
≤ 5days	29	53.7
Family history of Epilepsy		
Yes	35	64.8
No	19	35.2
Level of education		
Illiterate	16	29.6
Primary	27	50
Secondary	9	16.7
Higher	2	3.7
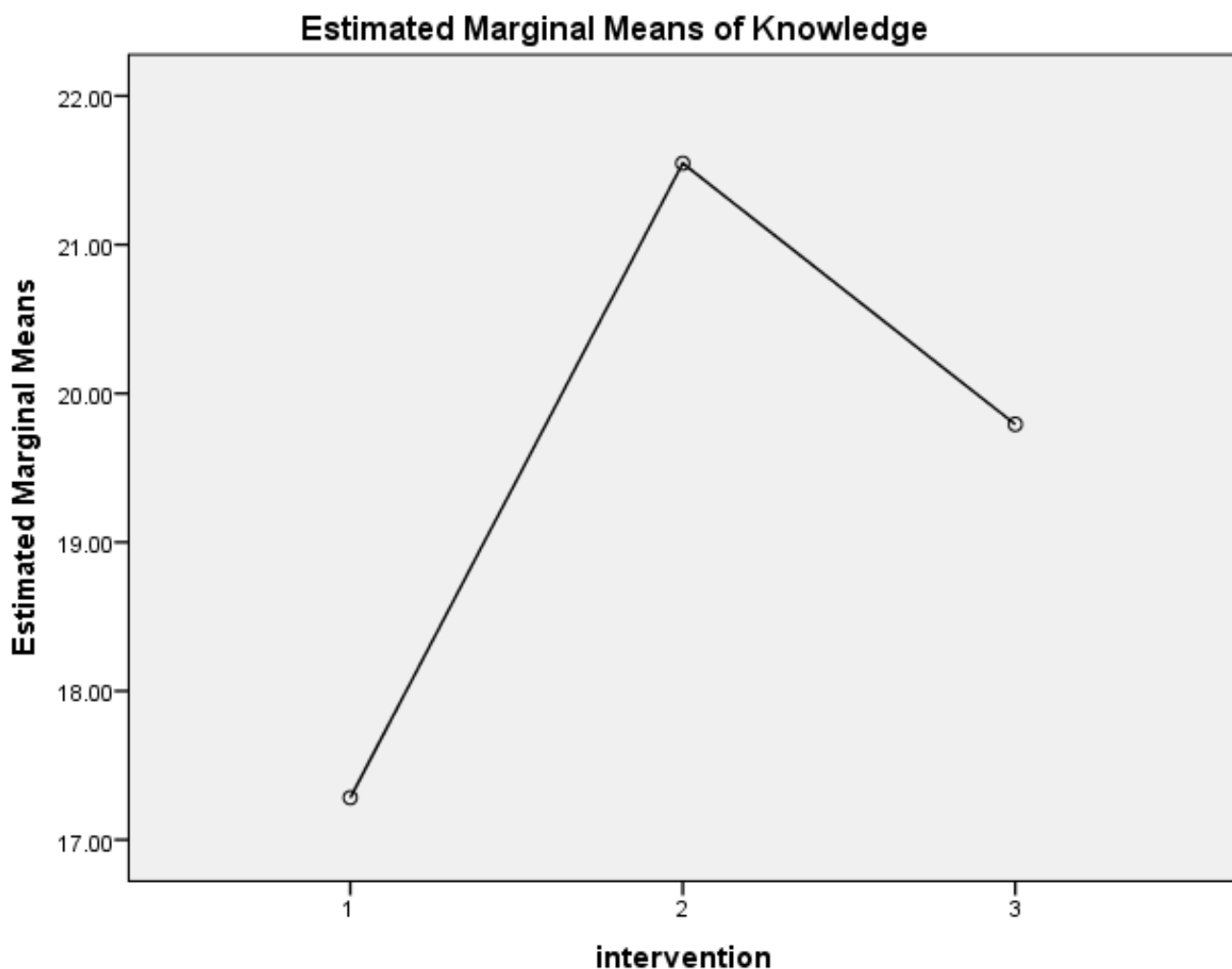
Figure (1): Mean epilepsy knowledge scores difference pre, post and follow up implementation of guidelines phase among epileptic patients.

Table (2): Correlation between knowledge, self efficacy, drug adherence, Quality of life and sociodemographic characteristics of epileptic patients in pretest phase

		Age	Gender	Duration	Occupation	Family history	Level of education	Marital
Tot.pre.SE	R	-.103	-.007	-.080	.037	.081	-.076	.039
	P value	.459	.961	.564	.793	.560	.586	.779
Tot.K.pre	R	.121	.081	.120	-.005	.171	.325*	.135
	P value	.382	.558	.387	.973	.217	.017	.330
Tot.comp.pre	R	-.138	-.099	-.120	-.033	.204	.108	.069
	P value	.321	.475	.388	.813	.139	.437	.618
QLpre	R	-.163	-.091	-.090	.280*	.502**	.043	.045
	P value	.238	.514	.516	.040	.000	.759	.749

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

Table (3): Correlation between epileptic patients knowledge, self efficacy, Quality of life and sociodemographic characteristics in posttest phase

		Age	Gender	Duration	Occupation	Family history	Level of education	Marital
Tot.comp.post	R	.184	-.192	.100	-.162	-.055	-.035	.235
	P value	.183	.165	.474	.242	.695	.800	.088
Tot.post.SE	R	.181	-.042	.173	.065	.281*	.337*	-.028
	P value	.190	.763	.212	.638	.040	.013	.842
QLpost	R	.121	-.044	.072	.186	.012	-.131	.023
	P value	.382	.753	.603	.177	.933	.345	.866
K.total.post	R	-.039	-.009	-.075	.114	-.196	-.117	.269*
	P value	.778	.950	.591	.414	.156	.398	.049

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

Table (4): Correlation between total epileptic patient's knowledge, self efficacy, drug adherence, Quality of life scores and their sociodemographic characteristics

		Age	Gender	Duration	Occupation	Family history	Level of education	Marital
K.tot.F	R	-.127	.184	-.123	.016	.069	-.169	-.101
	P value	.361	.183	.375	.911	.620	.223	.467
tot.F.SE	R	.071	-.079	.073	.058	.231	.065	-.014
	P value	.611	.570	.600	.679	.092	.640	.922
QLF	R	-.112	-.030	.044	-.046	-.008	-.250	.042
	P value	.421	.831	.754	.743	.951	.069	.763
Tot. Drug Adherence	R	.359**	.022	-.222	-.121	.274*	-.192	-.169
	P value	.008	.875	.107	.382	.045	.164	.222

Discussion

Health-related self-management for patients with epilepsy is chiefly embedded patient education, awareness, and engagement. However, a lack of patient education about their state is a widespread problem which one of the most common reasons for 'breakthrough' seizures is medication non-adherence. Thus, first and foremost supports of epileptic patients are concerned with patient education for increasing their knowledge towards disease cycle, coping and improving decision-making. (**Hixson., 2016**).[14]

According to sociodemographic characteristics of epileptic patients the current study found that more than half of epileptic patients were in age group 25-45 years with mean age 36.72±1.2 and male also, more than half of them had Literal works and had≤ 5 days absenteeism rate from works and had family history of epilepsy .

Regarding epileptic patient's knowledge, the present study revealed that there are a significant difference were found between pre and post implementation of guidelines phase in all items and total scores of patient's knowledge and perception while the statistically significant difference were found between post and follow-up implementation of guidelines phase regarding only items namely knowledge of antiepileptic treatment. These finding goes in the same line with **Oskouei., 2016**[15] In Iran who reported from WHO that there are a significance of conducting a research for developing countries to improve understanding and awareness of epileptic patients . Nevertheless, **Jacob., 2011**[16] added that the developing countries are prone for lack of services for convulsions, lack of knowledge regarding epilepsy and its first aid management, simplicity of access care and diagnostic evaluation of the convulsive disorders.

In Ethiopia, ***Fantaet al., 2015***[17]emphasized on that lack of awareness and education often make people with epilepsy be stigmatized, depressive, and withdrawal from society because problems their faced at work and economic difficulties .On the other hands, ***Mahrer-Imhof et al., 2013***[1] In Switzerland necessitated on the importance of attention toboth patients and family members 'knowledge which the main reason for disease deterioration and hospitalization .

Concerning drug adherence the current study revealed that there are a significant difference were found between pre, post and follow up implementation of guidelines phase regarding epileptic patient's medication adherence scores . These findings goes in the same line with ***Numanb., 2016***[18] In Pakistan who painted on treatment duration (more than 6 months) and elderly age (above 55 years) were the major reasons of drug non-compliance.

On the other hand, In Netherland ***deKinderen et al., 2014***[10] estimate the annual health care costs forepileptic patient and their family resulting from side-effects of antiepileptic drugs and discovered that about 88% of epileptic patient experience side-effects of antiepileptic drugs which burden to their costs.

Likewise, ***Nixonaand Angalakuditib., 2011***[19] highlighted on that epilepsy can influence patient's cognitive, concept, and physical abilities and other concepts such as future hopes, burden, self-esteem and recommended that education and teaching through using conceptual model enhanced patients' adherence with epileptic treatment .Whereas, ***Hosseini et al., 2016***[4] In Iran reported that lack of support has critical adverse effect on reducing patients' motivation and impede them from accepting personal responsibility for their adherence to treatment regimen.

Concerning the relationship between 'knowledge, self efficacy, drug adherence and Quality of life with their sociodemographic characteristics, the present study revealed that there are a significant correlation were found between epileptic patients 'knowledge, self efficacy, drug adherence and Quality of life with their sociodemographic characteristics in pre implementation of guidelines phase these findings goes in the same way with ***Mohamed et al., 2015***[20] in Brazil who reported that there are a greater occurrence of divorce among epileptic patients than in the healthy Brazilian population. In this interim,, ***Lee et al., 2014***[21] In Korea

concluded that sociodemographic characteristics are a main factors which indirect effects on Quality of life by aggravating adverse effects of antiepileptic drugs. Meanwhile, in china ***Gao et al., 2015***[22] stated that epilepsy is recognized as a major cause of economic burden which indirectly affect quality of life for epileptic patients.

Moreover, in florida, USA*Saada et al.,2015*[23] recommended that there are an obvious needs for conducting educational training programs regarding how to improve their quality of life and daily living activities plus a positive family support are important issues that can help epileptic patients to best deal and live with their disease .In this concern, *Cianchetti et al., 2015*[24] in Italy, highlighted on that the degree of family ' concerns and the severity of the disease correlated with a deterioration of quality of life in both the patient and family and impairs all quality of life dimensions. In addition to, *Hosseini et al., 2016*[4] In Iran who mentioned that proper coping strategies regarding all phases of seizures and lifestyle modifications has a chief impact on preventing the occurrence of seizures and overcome fears, anger and tension, sleep trouble for both patients and their family .

Surprisly, ***Karakis et al.,2014***[25] in Rhodes at Europe revealed that there are a challenges associated with epileptic patient and their caregiver characteristics which has a negative consequence on caregiver quality of life.

According to ***Viteva., 2014***[6] concluded that continue using multidisciplinary approach with proper guidance and comprehensive monitoring of a neurologist, a specialist in epilepsy, psychologist and a social worker greatly help in reducing the negative control of seizure frequency and severity among epileptic patients. In distinguish ***Chauhan et al., 2016***[5] in India discovered that the practices of managing epilepsy were good amongst majority of the caregivers.

Regarding total scores of epileptic patient's knowledge, drug adherence, self efficacy and quality of life, the current study revealed that there are a significant positive correlation were found between total epileptic patient's drug adherence scores and their only age, and family history . These findings contradicting with ***Numanb., 2016***[18] In Pakistan who highlighted on that male epileptic patients more compliance of epileptic drugs comparing to female patients.

In Taiwan ***Chen et al., 2016***[26] highlighted on adverse effect of antiepileptic drugs and social support as important factors that can affect quality of life and daily living activities. Also, ***Viteri et al., 2010***[27] In Spanish discovered that patients treated with lamotrigine more satisfied and higher improvement on their Quality of life than those on the valproic acid drug.

Whereas, in Bangalore, India, ***George et al., 2015***[28] highlighted on the importance of choice for safer antiepileptic treatment options, and monitoring for adverse effects are a critical role in preventing seizure occurrence and maintain getting best quality of life among epileptic patients .In distinguish, ***saadi et al., 2016***[29], recommended that factors most significantly prognostic of improved quality of life for epileptic patients are patient's age, level of education, and decreased self-perceived stigma.

Regarding self efficacy, ***Akbarbegloo et al., 2015***[30] in East Azerbaijan concluded from their study that epileptic patients have strong needs for information and knowledge regarding preventing and managing seizures and to communicate about updated strategies for dealing with seizures and enhancing self-efficacy.

Finally, In India, ***saadi et al., 2016***[29] recommended that educational attainment may result better awareness of seizure prevention, management and education of medication adherence, reduced self-perceived stigma with effective improvement and utilization of coping strategies that positively influence QOL . Furthermore, *Mahrer-Imhof et al., 2013*[1]In Switzerland emphasizedon that there are an importance needs to include both epileptic patients and their relatives in education and concentrate on family support to alleviate patients and relatives stress. As well, ***Mohamed et al., 2015***[20] highlighted on the role of educational programs for epileptic patients which play a significance role in patient's awareness and their quality of life.

Conclusion & Recommendations: The majority of epileptic patients had low self efficacy and quality of life levels in the pre implementation of guidelines phase comparing to Post and follow-up guideline implementation phases. As well, the majority of them had high knowledge and perception level in the item related to disease crisis,and adherence to anticonvulsant drugs at post and follow-up guidelines implementation phases. There are obvious needs to activate implementation of epileptic manual guidelines in the hospitals, further

study for impact of implementing designed guidelines on epileptic patients' awareness and quality of life and self efficacy should be emphasized.

Ethical Clearance: Permission was obtained from the Dean of the Faculty of Nursing, Port Said University to hospital director before starting the research and after filled approval to conduct scientific research and follow scientific research ethics protocol in the Hospitals of Mental Health and Addiction treatment protocol as a part of policy and rules of hospital.

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Prickly Pear Cactus (*Opuntia Ficus-Indica*) the Beles in Ethiopia: A Review on Nutritional Aspects and Health Benefits

Gargi Dhar

Assistant Professor, Department of Reproductive Health and Nutrition, School of Public Health, Wolaita Sodo University, Ethiopia

Abstract

Background: Prickly Pear Cactus (*Opuntiaficus-indica*) is the cactus species of greatest agronomic importance, due to its delicious fruits, stems (cladodes), which are used as fodder for livestock as well as a fruit and vegetable for human consumption. This cactus was introduced in Ethiopia 150 yrs before, locally known as Beles. The chemical, nutritional composition, and health benefits of cactus pears have been extensively studied. But the documented research evidence related to the nutrient content of the Ethiopian variety is very less and the study on health benefits is almost nil. Climate changes, drought, high temperatures, and changes in soil productivity are threatening human civilization in terms of food scarcity in Ethiopia. In this context, there is an urgent need to re-explore and promote Ethiopian Prickly Pear, an indigenous cactus as a supportive food for drought-prone areas in Ethiopia with enlightening the potential health benefits of cactus fruit and stem.

Method: This work is based on the reports of the United Nations, local Government, and Non-Government organizations, research articles, conference proceedings, books, and unpublished theses.

Conclusion: The review identified the gap between the knowledge and the practice in the use of this cactus in Ethiopia. It is recommended that along with administrative and social support; production and utilization can be enhanced to address human and livestock needs.

Keywords: *Beles, Ethiopia, Health Benefits, Nutritional Aspects, Prickly Pear Cactus.*

Introduction

Cactus pear, *Opuntiaficus-indica* (L.) is a CAM (Crassulacean Acid Metabolism) plant cultivated in a wide range of environments and most agro-economically important cactus crop species, out of about 150 species in the genus *Opuntia.* The ecological success of *O. ficus-indica*, like other CAM plants, is due to their peculiar daily pattern of carbon uptake and water loss mostly at night. The crop originates in Mexico and still the largest producing and consuming country in the world. Now, it is cultivated in America, Africa, Asia, Europe, and Oceania[1]. In addition to its resilience as a crop to restore degraded land, the cactus pear is also increasingly consumed by human (fruit and young cladodes part); as fodder in sub-Saharan Africa and South Asia. Other non-food uses like biofunctional, medicinal, nutraceutical, and cosmetic properties are already promoted and some are yet to be explored[2]. "Green gold", "fruit for the poor", "treasure under its spines", "world vegetable dromedary", "future plant", "sacred plant" and "monster tree" are just some of the names used for the plant and the fruit [3], which convey the importance of opuntias to poor people for their survival.

Tigray is a region of Ethiopia bordering on Eritrea; where more than 80% live in rural areas and agriculture is the mainstay of the people. But production is very less due to infertile soil and erratic rainfall. The cactus pear or "beles" (as it is known here), plays an important economic and cultural role, which is reflected in traditional songs and sayings, as in the following translation by Abay (1997) [4]: *"Oh my beles you spare me this summer till barley has cheerfully come to rescue me".* Increasing humans and livestock growth, combined with a decline in soil productivity and recurrent episodes of drought and famine, there is increasing reliance on cactus pear to minimize risk, ensure crop and food security in this part

of Ethiopia. Along with that, both spiny and spineless cactus is used as a source of livestock feeding in Tigray region[5]. Despite the great extent and importance of cactus pear in Ethiopia, there is a lack of awareness of mass and interest of scholars on cactus pear.

Based on the current birth rate, countries having arid and semi-arid areas are mostly under the category of the fastest-growing populations; are going to face difficulty in food production by 2050 [6]. In this context, Cactus Pear (Beles) can be promoted as an alternative crop with improved drought tolerance and water-use efficiency in the arid and semiarid part of Ethiopia with special emphasis on its medicinal properties. Same time, the attention required in research and development sectors of nutritional aspects and health benefits of crop and its productivity management.

Materials and Method

This work is based on the reports of the United Nations, local Government, and Non-Government organizations, research articles, conference proceedings, books, and unpublished theses. The search words include Prickly Pear Cactus, Beles, Nutritional aspects, Health benefits, Ethiopia, etc. The review covers all the documented information available in the above-mentioned sources up to November 2020.

Discussion

History of Cactus Pear in Ethiopia: Long before the Spaniards arrived in America, the Opuntias were in use and cultivated. The Indian chroniclers were the first to record these plants and their fruits, which were carried to Spain and initially used as ornamental plants [1]. There is evidence for the use of *Opuntia* in the human diet at least 9000 years ago[7] or even as early as 12,000 years ago[8,9].

It has been given many names in its native range and in the regions where it has been introduced. The name "tuna" is of Caribbean origin and "Nopal" is a Mexican name derived from the Nahuatl Nopalli[10]. In other languages, it is called figo da India (Portuguese); Indian fig (English); figuierd'Inde (French); Indianische Feige (German); fico d'India (Italian)[11].

Beles was introduced between 1848 and 1870 by Catholic Missionaries in Tigray region, Ethiopia. One priest brought three spineless cladodes from Mexico and planted one cladode in Alitena (Erob), the second one planted in Golea (Gantaafeshum), and the third one planted in Lehe (Eritrea). After that, the plant was distributed throughout the region and beyond. This information was supported by Kibra (1992) [12] and Neumann (1997) [13]. However, Habtu (2005)[14] reported that Muslim pilgrimages to Mecca (Saudi Arabia) introduced cactus pear to the lowlands of the southern Tigray in 1920.

About Structure, Component and Nutritional Aspects of Fruit, Cladodes & Seed:

Cladodes: They are modified flattened stems with a characteristic ovoid or elongated shape. Young tender cladodes, called nopalitos [Fig 1, 3], are consumed as fresh vegetables; they are used as an ingredient in a wide range of dishes, including sauces, salads, soups, snacks, pickles, beverages, confectionery, and desserts. Besides the direct consumption of tender shoots, mature cladodes are ground to make flour and other products. Nopal flour is a rich source of dietary fibre reaching up to 43% (dry basis)[15]. The major components of cladodes are carbohydrate-containing polymers, comprising a mixture of mucilage and pectin. In addition,

Fig1 : Plant with flat stem(cladodes)   Fig2 : Inside out of ripen Fruits   Fig 3 : Plant with fruits

100g of cladodes contain 11mg vitamin C and 30μg of carotenoids. The dried mucilage comprises on average: 5.6% moisture; 7.3% protein; 37.3% ash; 1.14% nitrogen; 9.86% calcium; 1.55% potassium [16]. The presence of five major flavonoids (isoquercitrin, nicotiflorin, rutin, isorhamnetin-3-O-glucoside, and narcissin) was observed by Guevara Figueroa et al,(2010)[17]. Cactus cladodes contain phytochemicals with no apparent detrimental effects on livestock. Negesse et al. (2009)[18] determined the content of some anti-nutritive factors in mature and young cladodes of spineless cactus (*O. ficus-indica*) growing in Ethiopia and reported their total tannin content as 21 and 42g equivalent tannic acid/kg(dry matter) respectively.

Fruit: It is an oval, elongated shape, and is technically a fleshy berry form. *O. ficus-indica* fruit grows vigorously in terms of length, width, weight, and volume in the first 20-30 days after anthesis and grows approximately up to 59-90 days. Generally, cactus pear fruits may be divided into three components: seeds (some varieties with few or no seeds), peel, and pulp [Fig 2, 3]. The presence of a high number of normal seeds in the fruit is considered an obstacle to its commercialization. Other than consumed as fresh fruit, it can be used to prepare a large number of products like jams, liqueurs, vinegar, sauces, juice concentrates, and canned products. This fruit constitute sugars, fibre, mucilage, and pectins as major; and proteins (specially amino acids like alanine, arginine, and asparagine), vitamins and minerals as the minor components[19]. Cactus pear fruits present high antioxidant activity, due to the presence of vitamin C, carotenoids, flavonoids and betalains[20,21]. Betalains are the main pigments responsible for the ripe fruit (peeled and unpeeled) colours like green, yellow, orange, red, purple and, therefore, they are a major factor in consumer acceptance. Kuti (1992)[22] reported an antioxidative effect due to the major flavonoids found in cactus fruits (e.g. quercetin, kaempferol, and isorhamnetin derivatives). The nutrient concentrations remain in the fruit without significant changes throughout storage; although some changes in vitamin C content have been reported, depending on the storage conditions[23]. Irrespective of the origin or variety, the fruits are a good natural reservoir of micronutrients like magnesium, calcium, potassium, phosphorus, and vitamin C, so they can be used as food supplements. Based on the low acidity, high sweetness, and attractive stable color, Opuntia fruits could be very suitable as a natural additive or substituted material in the production of many foodstuffs. The fleshy prickly pear fruits have a short shelf life, varying from 2-3 and up to 4weeks [24], which making marketing and long-term storage and worldwide distribution of fruits difficult [25]. The absence of toxic elements like lead and cadmium is indicating that the fruit is safe as food[26].

Table 1 showing the nutrients present in 100gm of fruit from two sources: one from Ethiopian Food Composition Table[27] and another from USDA Database(2019)[28]; both sources are only providing fruit nutrient content with some variations. Differences may be due to many factors: species; variety; environmental factors, such as the climatic and edaphic conditions; crop management, including fertilization and post-harvest treatment; and maturity status.

Table 1: Nutrient Content of *O. ficus-indica* fruit (raw), per 100gm of edible portion

Nutrients Type	Energy (kcal)	Protein (gm).	Fat (g)	CHO (gm)	Fiber (gm)	Calcium (mg)	Iron (mg)	Zinc (mg)	Ascorbic Acid (mg)
Ethiopian Beles(EHNRI,1998)[27]	55	1.10	0.8	15.4 (including fiber)	4.6	122.8	1.0	1.2	14.20
Prickly Pears, Raw, (USDA Database, 2019)[28]	41	0.73	0.51	9.57	3.6	56	0.3	0.12	14

Seed: According to Tewelde and Mulubrhan(2019)[29], the seed of Ethiopian Beles contains 392.84kcal/100g energy on a dry weight basis. The dietary Ca, K, P, Fe, and Zn contents of the sample accounted for 390.14mg, 446.46mg, 206.18mg, 4.37mg, and 2.01mg per 100g, respectively. Despite the high phytate content (259.20mg/100g), the seed had an appreciable amount of antioxidant capacity (43 to 95% of inhibition).

The nutritional and chemical properties of the prickly pear may not provide the required balanced diet for human nutrition, like rice, wheat, legumes, but, the

prickly pear fruit and derivative properties can act as a supplement towards human nutritional requirements due to having some promising nutraceuticals.

About Health Benefits of Cactus Pear

Health Benefits of Fruits: Cancer protective effects *O. ficus-indica* fruits aqueous extracts have been documented by Zou et al.,(2005) [30] for ovarian, cervical, and bladder cancer. Siriwardhana et al., (2006)[31] studied human peripheral lymphocytes and stated that *O. ficus-indica* fruit extract can reduce DNA damage. Tesoriere et al. (2003, 2004, 2005b)[32, 33, 34] reported that cactus pear fruit ingestion produced a decrease in oxidative stress markers, inhibited low-density-lipoprotein (LDL) oxidation, and increased resistance to oxidative hemolysis red blood cells in ex vivo experiments. The anti-ulcerogenic and anti-gastritis effects of *O. ficus-indica* fruits were studied in rats by Lee et al. (2001)[35]. Hepatoprotection of *O. ficus-indica* fruit juice and the extract was demonstrated in rats [36,37]. Kim et al.(2006) [38] demonstrated the neuroprotective action of *O. ficus-indica* fruit extracts against neuronal oxidative injuries induced by excitotoxins in mice cortical cells. Hypoglycemic action and antidiabetic effects of cactus fruit were observed in rats [39].

Health Benefits of Cladodes: Diuretic effect has been reported by feeding of *O. ficus-indica* cladodes in rats[40]. The anti-ulcerogenic and anti-gastritis effects of *O. ficus-indica* cladodes were studied in rats[40,41]. Opuntiaficus-indica plant extract can alleviate alcohol hangover symptoms in humans[42]. The protective effect of *Opuntiaficus-indica* cladode juice against oxidative damage reported by Ncibi*et al.* (2008)[43] and Zourgui*et al.* (2008)[44]. Healing properties of *O. ficus-indica* cladodes in human has been identified by Hegwood(1990)[45]. Frati Munari et al.(2004)[46] studied in human that Opuntia sp. cladode can act as an anti-obesity factor. An anti-hyperlipidemic effect was observed in rats by feeding of *O. ficus-indica* cladodes [47]. Antiviral action of Opuntia sp. cladodes reported in guinea pigs[48]. A study on Mexican adult women revealed that the intake of dehydrated nopal at a high stage of maturity in the premenopausal stage could improve bone mineral density and calciuria and thus prevent osteoporosis[49].

Health Benefits of Seed: According to Tewelde and Mulubrhan (2019)[29], the seed of Ethiopian Beles

had an appreciable amount of antioxidant capacity (43 to 95% of inhibition).

Although the medicinal properties of cactus have been known since ancient times, recently some of them have been scientifically proven. But the study explicitly on Ethiopian variety is scanty.

Development & Uses of Belesin Ethiopia: Tigray region covers about 80,000 km2 and is estimated to have about 360,000 hectares of cactus pear, about two-thirds of which are spiny plants. Approximately half the existing area of opuntias was planted; the rest has been invaded by naturalized cactus. Here, it is used as food, livestock feed, cash income, environmental protection, fence, firewood, cochineal production, and bee forage[50]. Two Ethiopian organizations that play an important role in the expansion of cactus acreage are the Relief Society of Tigray (REST) and the Tigray Regional Natural Resource Conservation and Development Bureau. The Cactus Fruit Development Project (CFDP) has promoted the selection, production, and distribution of cactus varieties, identification of diseases, and design of erosion control measures as part of its strategies [51]. Various projects have been developed to raise awareness of the uses of cactus by local communities. Cactus pear is mainly used for fruit production, with still limited knowledge of nutritional aspects and human health benefits.

Food and Agriculture Organization of the United Nation (FAO) cooperation projects in the area, carried out by International Cactus Pear Network (Cactus Net) members, have introduced nopalitos (Cladodes) in regional diets and the NGO "Mums for Mums" in Tigray region, Ethiopia promotes the use of nopalitos at the community level. This project used to have a public awareness nutritional program through which they spread about the nutritional value of cactus fruit. They also provided facilities for program participants to experiment with different cactus recipes. They published a beautiful little cactus recipe book, which is available to the public. Along with that, this NGO promoted small-scale enterprise development based on cactus pear. But, their adoption has been limited due to the presence of thorns, the abundance of mucilage, and the lack of organoleptic appeal of cooked nopalitos. In this area, "Himbasha" (traditional bread) prepared with Beles seed and wheat flour(ratio of 85:15%) is another form of consumption of this cactus.

Conclusion

In Ethiopia, this "Beles" is considered as the 'Bridge of life' by storing large quantities of water in the stems, like fruit, and providing both feeds for cattle and farmers during prolonged drought due to global warming[51]. Again, this fruit and stem can be considered as a promising future crop for commercial food applications. But the production challenges of this environmentally friendly crop are there due to a lack of research related to reproductive biology, plant productivity, and orchard management. One of the biggest challenges is the structural improvement of fruit, specifically the creation of large, tasty, seedless fruits of higher quality. In addition to that, Beles is confined only into local markets due to ineffective marketing strategies. Large-scale commercial production and export for Tigrean cactus pears have to be promoted by establishing enterprises, or co-operatives. Consequently, pharmacological potential in human nutrition and health issues are being under exploited due to research challenges in terms of low political, social attention on Cactus. Public policies and credit are essential in order to increase the cultivation of this important plant in the arid and semi-arid regions. Scientists must identify the traits for use in intensive breeding programs helpful for coping with drought, diseases, and improving nutritional content. Collaboration between interdisciplinary teams from all cactus-pear-producing countries is advisable.

Despite the efforts of the last 20 years, current knowledge remains scarce and only limited scientific information is available to producers and users. Tigray Region is among the most drought-prone areas of Ethiopia, and households in these areas mostly depend on food and cash assistance for their survival. If edible cactus grows abundantly in these parts of the country, they can be used to address human and livestock needs. Along with administrative and social support; International collaboration needs to be encouraged, with sharing expertise, genetic resources, and facilities for new varieties of cactus, which will benefit cactus pear cultivation for a country like Ethiopia. Lastly, the commercial production and use of spineless cactus for forage and almost seedless fruit for humans need to be encouraged at the community level.

Conflict of Interest: The author declared that there is no conflict of interest in the publication of this manuscript.

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Accuracy of Linear Measurements of Ultra-Low Dose Cone Beam Computed Tomography and Digital Panoramic Radiography Performed on Mandibular Anaesthetic Landmarks Versus Real Mandibular Measurements: A Diagnostic Accuracy Study

Hala Wafik El Fayoumy[1], Hoda Abd El Kader Saleh[2], Mohamed Khalifa Zayet[2], Iman Dakhli[3]

[1]Student, [2]Professor, [3]Associate Professor, Oral and Maxillofacial Radiology Department, Faculty of Dentistry, Cairo University

Abstract

Aim: This study was conducted to evaluate the accuracy of linear measurements performed on mandibular anaesthetic landmarks obtained by ultra-low-dose cone beam computed tomography and digital panoramic radiography in comparison with real measurement on dry mandible.

Method: A total number of nine dry human mandibles were selected and mandibular anaesthetic landmarks were marked using gutta-percha. The dry mandibles were submitted for digital panoramic radiography and cone beam computed tomography with mini-dose parameters using the SOREDEX CRANEX™ 3Dx unit, linear measurements were performed on SCANORA Lite image viewer and on Demand 3D viewer. The real linear measurements were measured using digital caliper.

Results: There was a statistically significant difference in all measurements performed on digital panoramic radiographs,reformatted panoramic images underestimate real linear vertical measurements without significant difference, the absolute error for the cross-sectional views of CBCT ranged from 0.0001 to 1.44mm for mandibular foramen linear measurements, using mini-dose parameters did not affect image quality nor measurements accuracy.

Conclusions: Linear measurements driven from CBCT cross-sectional images using On Demand software are accurate and have the lowest error value; therefore it is considered one of the most important imaging modality for preoperative surgical site assessment.

Keywords: *Cone Beam Computed Tomography, Ultra-Low Dose, Reformatted Panoramic Images, Digital Panoramic Radiography.*

Introduction

One of the most important mandibular anatomical landmarks in the mandible is the inferior alveolar nerve

Corresponding Author:
Hala Wafik El Fayoumy
Student, Oral & Maxillofacial Radiology Department,
Faculty of Dentistry, Cairo University
Address: 8/2 5th Sector Maadi Nerco/Cairo-Egypt
e-mail: hala.wafik@dentistry.cu.edu.eg
Mobile: 002-01007000267

and its' branches which can be damaged during surgical procedures. Also, the success of any surgical procedures depends on the proper localization of mandibular foramen to achieve excellent anaesthesia with minimum patient discomfort. Therefore the dentist must be able to localize it prior to any dental procedure.[1]

Panoramic radiography is one of the most commonly used extraoral techniques which provides a view of the maxillo-mandibular area. It provides a view of the surgical site and the adjacent anatomical structures such as the mandibular canal and the mental foramen. Other

advantages of this technique include a lower radiation dose to the patient and a relatively shorter acquisition time.[2]

However, panoramic radiography has its limitations such as magnification, low image resolution when compared to periapical radiography, it also gives two-dimensional images without any sectional information. Because of a relatively thin focal trough especially in the anterior region, this technique is sensitive to head positions. Mistakes due to the patient's position could increase errors in measurements questioning the accuracy of this technique.[3, 4]

Several authors found that there was no significant difference between real distance measurements and panoramic measurements for different mandibular posterior locations using dry human mandibles. Also, the distances measured by panoramic radiography were closely correlated with those measured by cone beam computed tomography (CBCT). A strong correlations between panoramic radiography and CBCT in measurements of alveolar bone height in the regions of the maxillary sinus, nasal fossa, mandibular canal, and mental foramen was reported. [5]

Cone beam computed tomography is an imaging modality that uses a cone-shaped X-ray beam and allows the acquisition of volumetric data in a single rotation around the object to produce a series of two and three-dimensional images using the cone-beam algorithm. It allows three-dimensional visualization, eliminates the drawbacks of two-dimensional imaging, and produces images of higher resolution. Ultra-low-dose cone beam computed tomography is a recommended option for clinicians due to the decrease in radiation exposure to patients, imaging doses must be kept as low as reasonably achievable.[6,7, 8]

Despite the extended application of both digital panoramic radiography and ultra-low-dose cone beam computed tomography in the various dental fields, little work has been done to assess and compare the role of these imaging modalities in mandibular landmark localization and also to evaluate their diagnostic accuracy in relation to real measurement.

Materials and Method:

Inclusion and Exclusion Criteria: A total number of nine dry human mandibles obtained from the Anatomy Department, Faculty of Medicine, Cairo University, were included in the study. The Selection of the human dry mandibles was independent of age, gender and race. They were intact, free from any bony defects, fractures, pathology. Either dentulous or edentulous mandibles. Any fractured mandible or mandibles with pathological lesions were excluded. All the selected eligible mandibles will be included in the study forming Consecutive series. This research was approved by the Research Ethics Committee and Medical Biostatistics Unit, Faculty of Dentistry, Cairo University.

Setting and Location: Procedures of the study including mandibles preparations regarding the anatomical landmarks and measurements of the gold standard were done at Oral and Maxillofacial Radiology department, Faculty of Dentistry, Cairo University. Procedures of imaging process, data acquisition, and software manipulation were performed at Ekram Radio-Diagnostic Centre (El Sheikh Zayed, Giza, Egypt).

Technical Information:

A. **The pre-analytical phase:** Mandibular anaesthetic landmarks were identified on each dry mandible and were marked using gutta-percha.

B. **The analytical phase:** The nine human dry mandibles were submitted for:

1. **Digital Panoramic Radiography:** Panoramic radiographs were obtained using the **SOREDEX CRANEX™ 3Dx unit** (Tuusula, Finland). The exposure parameters were 8mA, 63kV, and 16.4 sec exposure time. Panoramic images were imported to **SCANORA Lite, image viewer** (SCANORA software, Soredex Corp, Helsinki, Finland). (Figure 1, 2).

2. **Cone Beam Computed Tomography (CBCT):** **SOREDEX CRANEX™ 3Dx unit** was used in this study. Images were acquired at a single rotation. SOREDEX® MiniDose parameters were used. The exposure parameters were 3.2mA, 90kV and 2.3 sec exposure time to take the advantage of 3D data in dose sensitive cases like children, or reduce the radiation dose for the patient. Cone beam computed tomography images were imported to **OnDemand 3D viewer** (OnDemand 3D Software, Cyberimed, Korea). (Figure 3, 4, 5).

C. **The post analytical phase:** The direct measurements with digital caliper have been used widely as a reference standard based on its frequent usage in similar studies assessing the accuracy of

linear measurements obtained by different imaging modalities[9]. The real linear measurements were measured in millimeter on dry mandibles using **digital caliper** (Mitutoyo Corp., Kawasaki, Japan) and were compared with measurements obtained from both techniques. All measurements were taken twice with one week interval and the mean of each measurement was calculated.

Sample Size Calculation: A paired T-test power calculation was used to detect the proper sample size. Mean differences and standard deviations were estimated according to **Patil et al. 2015**[1] based on the difference in distances measured on dry mandibles between different radiographic techniques. The results showed that a total sample size of 9 mandibles was adequate to detect a mean difference (Effect size) between study groups (radiographic techniques) of 1.66 mm (SD=1.56) with a power of 80% and a two-sided significance level of 5%.

Descriptive Analysis: Linear measurements were described in terms of mean, median, standard deviation (SD), and range according to each group.

Comparative Analysis:

Absolute Error was calculated based on the following equation:

$$Technique\ reading - Real\ reading$$

Relative (Percentage) Error in linear measurements was calculated based on:

$$\frac{Absolute\ Error}{Real\ reading} \times 100$$

Correlation Analysis: To assess the correlation between real measurements with linear measurements that are normally distributed, Pearson's Correlation Coefficient was applied. To assess the correlation between real measurements with linear measurements that are not normally distributed, Spearman's Correlation Coefficient was applied.

The significance level: It was verified at $P \leq 0.05$. The results are considered to be statistically significant if the p-value was less than 0.05.

The statistical package used for this study: R statistical package[10], version 3.3.1 (20-12-2018). Copyright (C) 2018. The R Foundation for Statistical Computing (Statistical analysis was performed with R statistical package, version 3.3.1 (20-12-2018) Vienna, Austria).

Results and Discussion

Regarding mandibular foramen linear measurements from the middle of superior border of mandibular foramen till sigmoid notch (line ab):Digital panorama mean measurement showed a statistically significant difference compared to that of real measurement on the left side, while on the right side both digital and reformatted panorama mean measurement showed a statistically significant difference compared to that of real measurement. (Table 1).

The results of the present study showed no statistically significant difference between real linear measurements derived from the digital caliper and linear measurements obtained from reformatted panoramic images except for measurement from the middle of the superior border of the mandibular foramen till sigmoid notch (line ab) on the right side (p-value 0.0234). However, this difference is minimal and generally the reformatted panoramic images underestimate real linear measurements. This comes in accordance with **Lascala et al., 2004** [11], who performed linear measurements on dry human skulls, they concluded that the real distances measured on dry skulls were always larger. However, **Beshtawi et al., 2020**[12], found statistically significant differences in all measurements derived from reformatted panoramic radiographs.

Regarding mandibular foramen linear measurements from middle of anterior border of mandibular foramen till middle of posterior border of mandibular foramen (horizontal diameter): CBCT mean measurement showed a statistically significant difference compared to that of real measurement on the left side, while on the right side, digital panorama mean measurement showed a statistically significant difference compared to that of real measurement.

Linear measurements performed on cross-sectional views showed no statistically significant difference when compared to real linear measurements except for horizontal diameter measurement of the mandibular foramen on the left side (p-value 0.0415). Cross-sectional views showed sometimes overestimation and sometimes underestimation when compared to real linear measurements. **Baumgaertel et al., 2009** [13], **Alamri et al., 2012,**[14] **and Tarazona-Álvarez et al., 2014**[15] have explained the reasons for over and underestimation in

CBCT measurements which might be referred to the software used or the partial volume effect which occurs when a voxel is occupied by two structures with different densities and the voxel reflects an average density.

Regarding linear measurements from middle of midline till middle of anterior border of mental foramen: Left side, digital panorama mean measurement showed a statistically significant difference compared to that of real measurement. Right side, Digital panorama and CBCT mean measurements showed a statistically significant difference compared to that of real measurement. (Table 2).

Measurements that were taken from the midline till mental foramen were severely underestimated on digital panoramic images(with 1:1 magnification), these differences may be attributed to positioning errors, finding in agreement with **Rondon et al 2014**[16]. On the other hand **Langlois et al., 2011**[17], stated that digital panoramic radiographs are reliable for performing linear measurements, as there was no difference among the measurements obtained with the dry specimens.

The current study showed that the absolute and relative error for the cross-sectional views of CBCT ranged from 0.0001 to 1.44mm (0.38% to 1.91%). This comes in agreement with **Lagravère et al., 2008**[18] who evaluated the accuracy of linear measurements in CBCT images and found a mean measurement error less than 1 mm. Reformatted panoramic images showed an absolute error ranging from 0.01 to 0.87 mm. **Lupi et al., 2018,**[19] stated that geometric distortion in reformatted panoramic images can entail a relative error of up to 10%.In contrast, the digital panoramic images showed the highest mean measurement error ranging from 0.08 to 2.11 mm.

In the current study; using ultra-low-dose CBCT (by reducing the milliamperage setting 3.2 mA) did not lower the image quality nor the accuracy of linear measurements. **El Sahili et al., 2018,**[20] found high degrees of concordance between low and high dose images, and images taken at lower milliamperage settings showed good diagnostic quality.

Assessment of intra and inter-observer reliability for linear measurements of mandibular and mental foramina (showed very strong agreement range from 0.91–0.100 by using Intra-class Correlation Coefficient, statistical significance (p-value ≤ 0.05).

Figure (1): Scanora lite viewer.
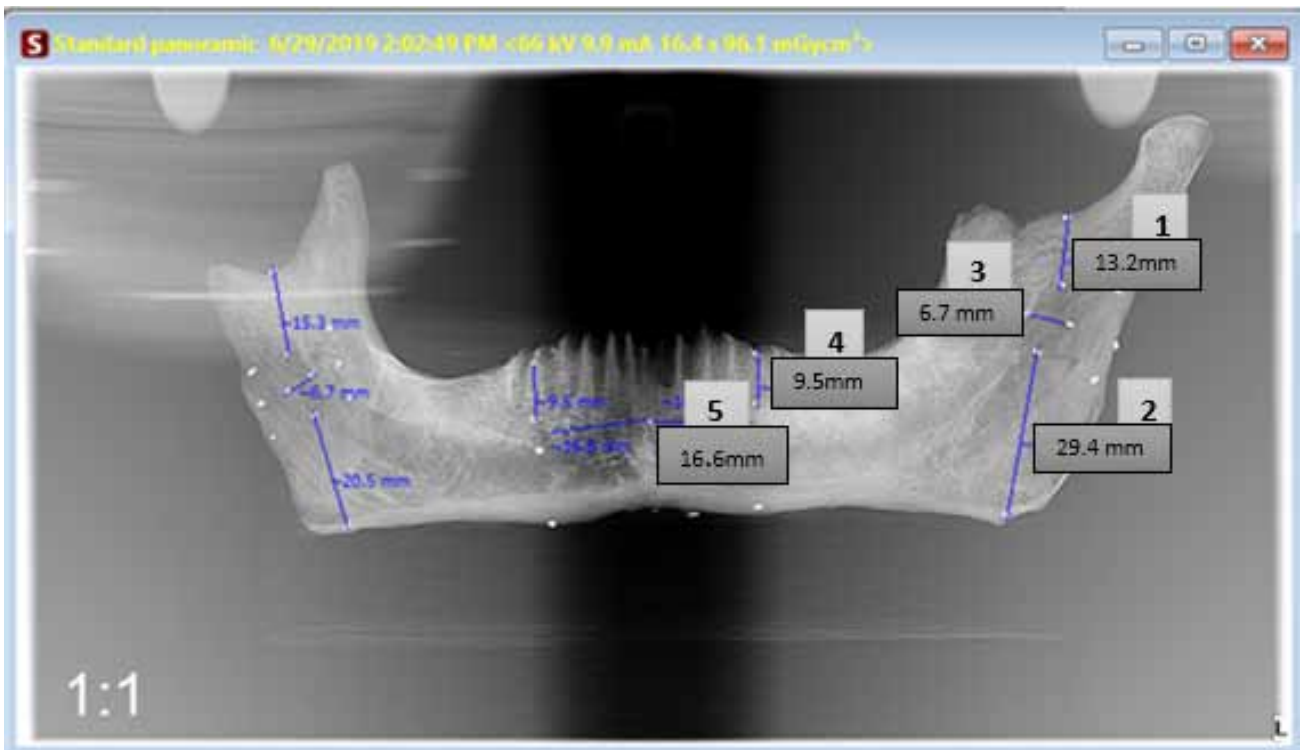
Figure (2): Digital panoramic radiograph with 1:1 magnification showing linear measurements performed on mandibular and mental foramina bilaterally, (1) line ab, (2) line ef, (3) mandibular foramen horizontal diameter, (4) linear measurement from crest of ridge till superior border of mental foramen, (5) measurement from midline till anterior border of mental foramen.
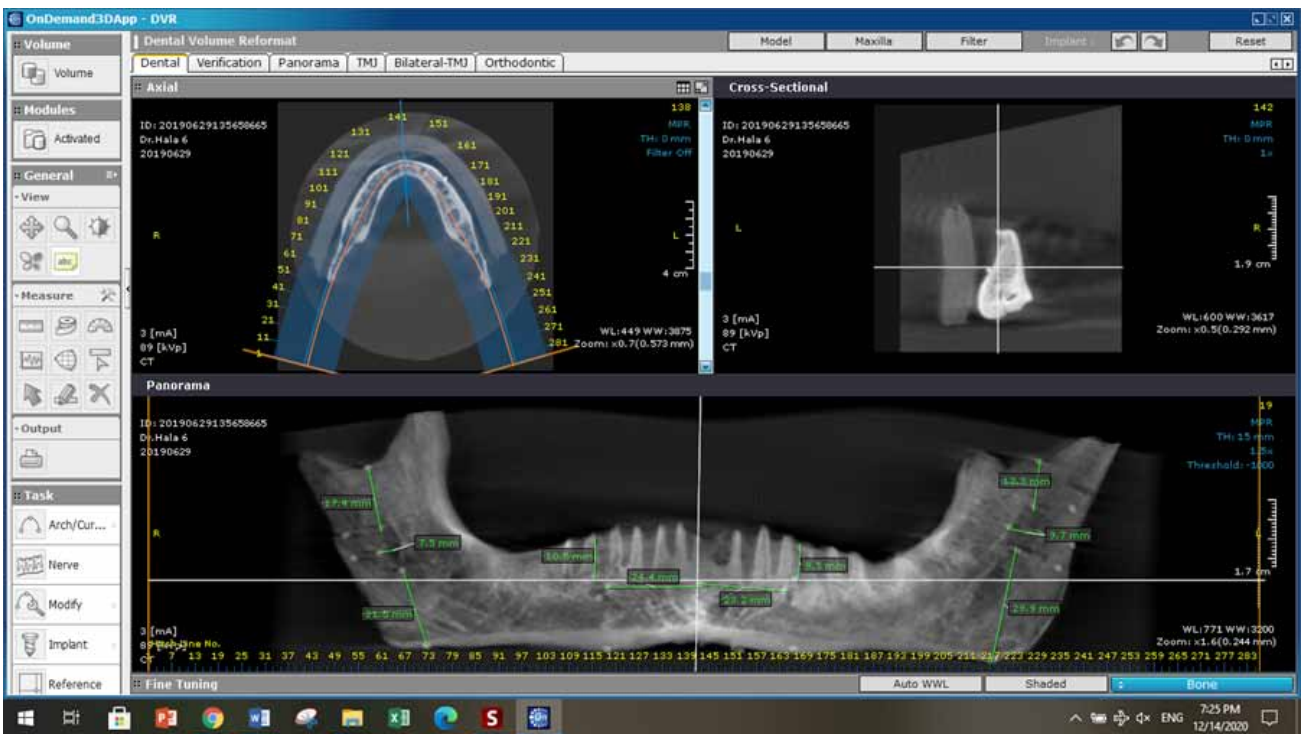
Figure (3): OnDemand 3D viewer.
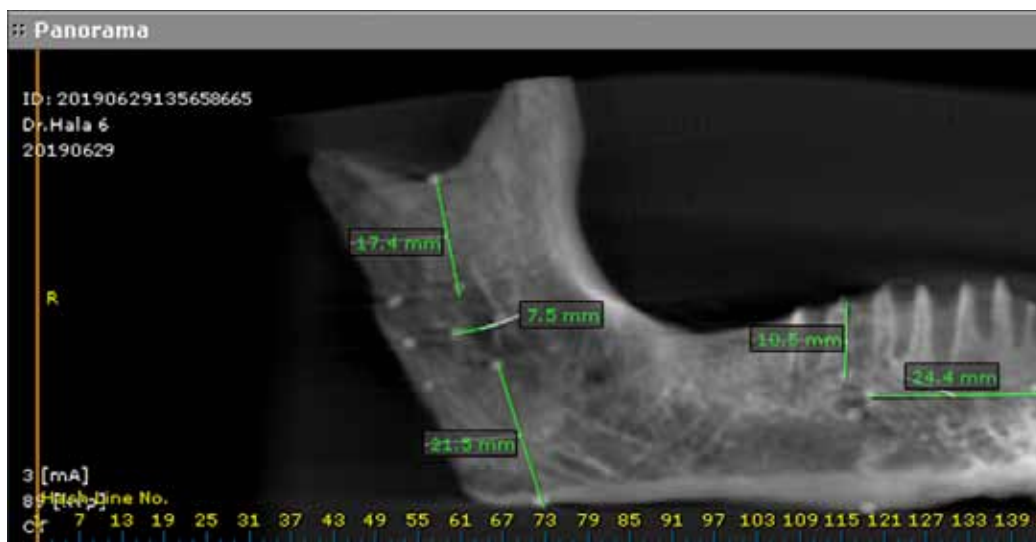
Figure (4): Cropped reformatted panoramic radiograph showing linear measurements performed on mandibular and mental foramina.
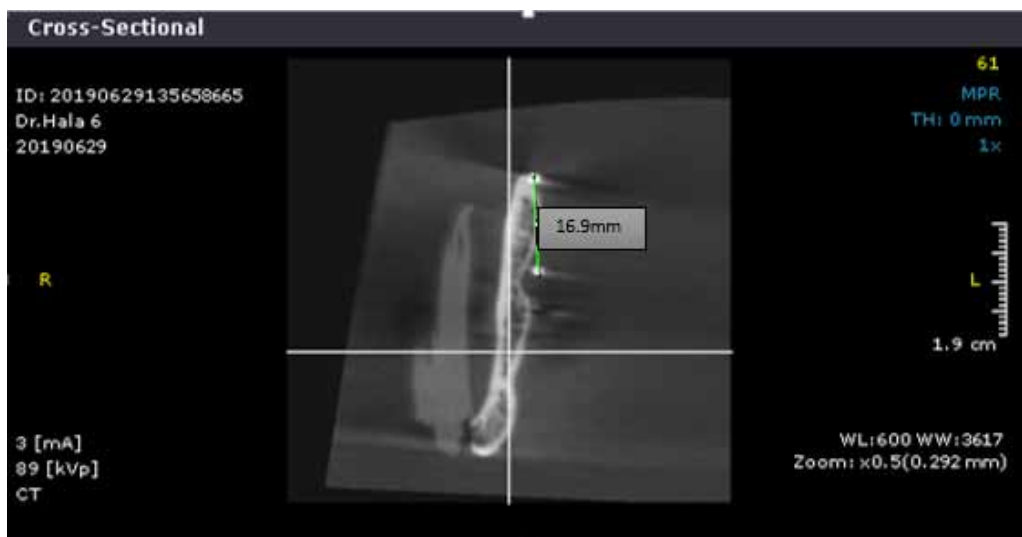
Figure (5): ab linear measurement performed on cross sectional image of cone beam computed tomography.

Table (1): Descriptive analysis of ab linear measurements in mm regarding each group and between-group comparisons

			Mean	SD	Median	Min	Max	Absolute Error		Relative (Percentage) Error		Comparison with Real measurements Paired t test	
								Mean	SD	Mean	SD	p-value*	Interpretation
ab	Left	Real	15.02	1.61	15.17	12.2	18.01	-	-	-	-	-	-
		DP	14.13	1.24	14.02	12.65	16.55	-0.88	0.84	-5.56	5.58	0.0132	Significant difference
		RP	14.74	1.41	14.7	12.65	17.55	-0.27	0.70	-1.59	4.71	0.2759	Insignificant difference
		CBCT	15.27	1.33	15.55	12.95	17.4	0.26	0.69	1.98	4.69	0.296	Insignificant difference
	Right	Real	15.98	1.54	15.85	13.75	18.83	-	-	-	-	-	-
		DP	14.12	1.54	14.4	11.4	16.45	-1.86	0.66	-11.66	4.14	<0.0001	Significant difference
		RP	15.42	1.62	15.45	12.95	17.5	-0.56	0.60	-3.55	3.90	0.0234	Significant difference
		CBCT	15.92	1.34	16	13.35	17.5	-0.06	0.55	-0.23	3.15	0.7619	Insignificant difference

*Significance level at p-value ≤0.05. N.B.: DP-Digital Panorama, RP-Reformatted Panorama, CBCT-Cone Beam Computed Tomography/Cross-sectional,MD-Mean Difference, SD-Standard Deviation.

Table (2): Descriptive analysis of linear measurements from middle of midline till middle of anterior border of mental foramen in mm regarding each group and between-group comparisons

			Mean	SD	Median	Min	Max	Absolute Error		Relative (Percentage) Error		Comparison with Real measurements Paired t test	
								Mean	SD	Mean	SD	p-value*	Interpretation
Midline till Mental foramen	Left	Real	25.26	2.83	26.17	20.28	28.23	-	-	-	-	-	-
		DP	15	3.06	15.40	8.80	18.35	-10.26	1.88	-40.92	8.39	<0.0001	Significant difference
		RP	25.05	2.88	26	20.10	28.10	-0.21	0.53	-0.85	2.25	0.2638	Insignificant difference
		CBCT	25.49	2.97	26.75	20.55	28.70	0.23	0.63	0.86	2.55	0.3177	Insignificant difference
	Right	Real	25.42	1.98	25.77	22.45	27.64	-	-	-	-	-	-
		DP	15.01	3.13	16.05	8.25	18.35	-10.41	1.81	-41.40	9.46	<0.0001	Significant difference
		RP	25.12	2.27	25.25	21.25	27.80	- 0.3	0.48	-1.26	2.00	0.096	Insignificant difference
		CBCT	25.04	1.91	25.25	21.75	27.65	-0.38	0.47	-1.48	1.88	0.0416	Significant difference

*Significance level at p-value ≤0.05. N.B.: DP-Digital Panorama, RP-Reformatted Panorama, CBCT-Cone Beam Computed Tomography/Axial, MD-Mean Difference, SD-Standard Deviation

Conclusion

From the present work, the following conclusions could be reached:

- Linear measurements obtained from CBCT reformatted panoramic images are more reliable than digital panoramic radiographic measurements.

- Linear measurements driven from CBCT cross-sectional images using On Demand software are accurate and have the lowest error value.

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Efficacy of Bhramari Pranayama on Dyspnoea among the Patients with Chronic Obstructive Pulmonary Disease

Heera Jayasheela

*Professor and Vice Principal, Pravara Institute of Medical Sciences (Deemed to be University),
College of Nursing, Loni (Bk), Maharashtra*

Abstract

Background: Pranayama is composed of two Sanskrit terms, "Prana" is breath or vital energy in the body and "yama" means control. Pranayama is the practice of breath control in yoga. WHO has estimated by 2020 COPD is predicted to rank as the third leading cause of death worldwide. Dyspnoea is the common symptoms which has an impact on quality of life in COPD patients. Complementary therapy of pranayama is the non pharmacological management of dyspnoea among the COPD patients. The aim of the study was to explore the impact of Bhramari pranayama on dyspnoea among COPD patients admitted in Pravara Rural Hospital, Loni (Bk).

Method: A quasi experimental study, pre test post test with control group and evaluative approach was accomplished for the present study. The present study was conducted in Pravara Rural Hospital, Loni (Bk). Total 60 (study group: 30 and control group: 30) COPD patients were enrolled patients using convenient sampling technique. The self prepared validated questionnaire and Modified Borg's Dyspnoea score was used for data collection. Baseline assessment was performed for both groups. During thefirst week of admission the researcher assessed dyspnoea by Modified Borg's Dyspnoea scale and implemented intervention of Bhramari Pranayama sessions every four hourly twice in day till discharge. Follow up home visit was conducted by researcher for every 15 days till 12 weeks. After intervention post test assessment was performed after 12 weeks. The control group patients continued their routine care. Inferential statistics 't'-test was used to evaluate the effectives of Bhramari pranayama on dyspnoea score among the COPD patients. Chi-square test was used to associate the level of dyspnoea score with the demographic variables of COPD patients.

Results: The study findings revealed that in study group, there is statistically significant difference of Modified dyspnoea scores after implementation of Bhramari pranayama training as compared to control group. Chi-square test shows there is statistical association between demographic profile namely; gender and duration of illness ($p<0.05$) level in study group.

Conclusion: The present study demonstrated that Bhramari pranayama minimized dyspnoea among the COPD patients. Bhramari Pranayama was effective to improve the pulmonary function of COPD patients.

Keywords: *Efficacy, Bhramari Pranayama, dyspnoea, chronic obstructive pulmonary disease.*

Corresponding Author:
Heera Jayasheela
Professor and Vice Principal, Pravara Institute of
Medical Sciences (Deemed to be University),
College of Nursing, Loni (Bk),Maharashtra-413736
e-mail: heera.jayasheela00@gmail.com
Mobile No.: +919423364472

Introduction

Chronic obstructive pulmonary disease is a disease condition characterised by airflow limitation which not reversible, it is preventable and treatable disease.[1] COPD is an incurable illness and associated with a significant symptom burden and poor quality of life. The common symptoms includes breathlessness, fatigue, sleep disturbance, sputum production, cough, wheezing,

a high psychological burden and impairment in activities of daily living and poor social, economic and physical function.[2]

According to WHO there were 251 million cases of COPD in the world and it is estimated that COPD causes 3.15 million death per year.[3] The prevalence of COPD in Maharashtra including urban and rural area was (8%), (33%) of deaths was attributed to COPD, where COPD is the second leading cause of death.[4] Studies related to effect of Bhramari Pranayama demonstrated that pranayama increases respiratory stamina, expands lungs, raises energy and calm the body. Yoga is a science that teaches method of joining individual soul and supreme soul. The breath being of pranayama, the system is based on three stages: inhalation (pooraka), retention (kumbhaka) and exhalation (rechaka). Bhramari pranayama (humming bee breath) is yogic practice in which includes unique breathing technique with constant humming sound of female bees during the expiration placing the body in relaxation phase. Studies done had noticed regular practice of Bhramari pranayama improves the respiratory status of chronic obstructive pulmonary disease patients.[5] The present study was conducted to explore the effect of Bhramari Pranayama on dyspnoea among the patients with chronic obstructive pulmonary disease.

Statement of Problem: Efficacy of Bhramari Pranayama on dyspnoea among the patients with chronic obstructive pulmonary disease.

Objectives:

1. Assess the existing level of dyspnoea of COPD patients in study and control group.

2. Evaluate the impact of Bhramari Pranayama on dyspnoea of COPD patients on study group.

3. Associate the level of dyspnoea scores with selected socio-demographic variables of the study group.

Materials and Method

Research Design: Quasiexperimental study with control group design with evaluative approach.

Variables: Independent variable: Bhramari Pranayama

Dependent variable: Dyspnoea scores

Setting: Pravara Rural Hospital, Loni (Bk), Maharashtra

Sample: Chronic Obstructive Pulmonary Disease patients.

Sample Size: 60 (Study group: 30 and control group: 30).

Sampling technique: Non probability convenient sampling technique.

Inclusion Criteria:

1. COPD patients who are admitted at Pravara Rural Hospital,Loni (Bk)

2. Age above 35 years

3. Willing to participate and provides written informed consent.

Exclusion Criteria: Critically ill patients

Tools:

1. Socio- Demographic profile of COPD patients

2. Clinical Characteristics of COPD patients

3. Modified Borg's Dyspnoea scale

Data Collection Procedure: The study proposal approval was obtained from Ethical Committee of PIMS-DU (Ref No : PMT/PIMS/RC/2017/240). Prior permission was obtained from Medical Superintendent, Head of Department of Medicine and Chest Physician and of Pravara Rural Hospital, Loni (Bk), Maharashtra. The researcher had undergone the training of Bhramari Pranayama from Dr Rajendra Waman, Yoga Professor from Sangamner College. The purpose of study was explained to the patients, and written informed consent was taken from COPD patients to undergo Bhramari Pranayama training in the study group. Semi structured interview was to collect the data. In study group every four hourly Bhramari pranayama training session were by the conducted by the investigator till discharge. Exercise diary was provided by the researcher to record the exercise performed after discharge. Study group COPD patients practiced Bhramari Pranayama for 25 minutes thrice in a day for a period of 12 weeks. Follow up visit was conducted by the researcher every 15 days till 12 weeks. The control group received the routine care.

Results

Table No. 1: Distribution of Socio Demographic variables of COPD patients

Variables	Study group (n=30)		Control group (n=30)	
	Frequency	Percentage	Frequency	Percentage
Age (Years)				
35-44 year	5	17	2	7
45-54 year	3	10	4	13
55-64 year	2	7	11	37
Above 65 year	20	66	13	43
Gender				
Male	27	90	19	63
Female	3	10	11	37
Educational status				
Illiterate	19	63	14	47
Primary	8	27	6	20
Higher Secondary	2	7	8	27
Graduate and above	1	3	2	6
Occupation				
Agriculture	18	60	11	37
Laborer	6	20	7	23
Factory worker	2	7	3	10
House maker	4	13	09	30
Monthly Income				
Lower Class < 938	16	53	11	37
Lower Middle Class 938-1875	5	17	9	30
Middle Class 1876-3186	6	20	3	10
Upper Middle Class 3127- 6253	2	7	5	16
Upper Class ≥6254	1	3	2	7
Place of residence				
Rural	29	97	26	87
Urban	1	3	4	13

Table No. 1 revealed highest percent (66%) and (43%) in study and control group were in age group above 65 years. Majority (90%) and (63%) were males in study and control group. Highest percent (63%) in study group and (47%) in control group were illiterate. Most of the subjects (60%) and (37%) in study and control group were farmers. Regarding income most (53%) in study group and (37%) in control group had income below < 938/- month. Both the groups (97%) and (87%) COPD patients resided in rural area.

Table No. 2: Distribution of clinical characteristics of COPD patients

Characteristics	Study group (n=30)		Control group (n=30)	
	Frequency	Percentage	Frequency	Percentage
History of exposure to smoke				
Active smoking	23	77	19	63
Passive smoking	1	3	3	10
Biomass fuel	6	20	8	27
If active smoker, cigarette/bid is packet				
Less than 1 packet/day	26	87	17	57
More than 1 packet/day	4	13	13	43
History of Allergy				
Yes	19	63	18	60
No	11	37	12	40
If Yes Allergens				
Pollens	14	47	17	57
Dust	4	13	5	17
Pesticide spray	12	40	8	26
Duration of illness				
Less than 5 years	11	37	8	27
More than 5 years	19	63	22	73

Table No. 2 depicts more than half (77%) and (63%) were active smokers in study and control group. In study and control groups (20%) and (27%). females had exposure to biomass fuel .Highest percent (87%) and (57%) in study and control group smoke less than one packet per day. In study group (63%) and (60%) in control group had history of allergy. Maximum (47%) and (57%) in study and control group had allergy due to pollens. Most of the subjects (63%) in study group and (73%) in control group had duration of illness above 5 years.

Table No. 3: Distribution of level of dyspnoea in study and control group COPD patients

Modified Dyspnoea Score	Study group (n=30)				Control group (n=30)			
	Pre Test		Post Test		Pre Test		Post Test	
	f	%	f	%	f	%	f	%
No breathlessness at all	--	--	--	--	--	--	--	--
Very very slight	--	---	--	--	--	--	--	--
Very slight	--	---	11	37	--	---	--	--
Slight	--	---	9	30	--	---	--	--
Moderate	10	33	4	20	11	37	--	--
Somewhat severe	6	20	6	13	3	10	6	20
Severe Breathlessness	9	30	--	--	7	23	15	50
Very severe	5	17	---	---	9	30	4	13
Very very severe	---	--	---	--	---	--	5	17
Maximum	--	--	--	--	--	--	--	--
Almost Maximum	--	---	--	---	--	---	--	---
Total	30	100	30	100	30	100	30	100

Table No. 3 shows in study group over all pre test Modified Borg's dyspnoea score was (33%) and (37%) in control group, indicates moderate dyspnoea among the COPD patients. In study group over all post test level of Modified dyspnoea score of COPD patients revealed that after implementation of Bhramari pranayama majority (37%) had very slight dyspnoea whereas in control group (50%) had severe breathlessness.

Table No. 4 Assessment of pre test level of dyspnoea score among the COPD patients

Group	Pre test Modified Borg Dyspnoea Score	
	Baseline (After 3 Days of hospitalization)	After 12 weeks
	Mean	SD
Study group (n=30)	8.47	1.81
Control group (n=30)	7.01	1.41

Table No. 4 depicts the mean pre test score of Modified dyspnoea score was 8.47 with the standard deviation 1.81 whereas the mean pre test score in control group was 7.01 with standard deviation 1.41. Both the group had symptoms of moderate dyspnoea.

Table 5: Comparison of pre test, post test Modified Borg's Dyspnoea score of COPD patients

Group	Modified Borg Dyspnoea Score				't' test	Level of significance at 0.05 level
	Pre test		Post test			
	Baseline	After 12 weeks	Baseline	After 12 weeks		
	Mean	SD	Mean	SD		
Study group (n=30)	8.47	1.81	2.40	1.61	2.63	Significant
Control group (n=30)	7.01	1.41	5.4	1.40	2.04	Not Significant

Table No. 5 shows in study group the calculated 't' value in the study group was 2.63 shows significant difference of Modified dyspnoea score after implementation of Bhramari pranayama training sessions at (p<0.05) level as compared to control group was 2.04 which was not significant.

Table No. 6: Association between the post test dyspnoea score and demographic variables of COPD patients

SN.	Variables	X^2 value	Level of significance
1	Age	0.21	Not significant
2	Gender	3.90*	Significant
3	Occupation	0.51	Not significant
4	History of active smoking	2.73	Not significant
5	Duration of illness	3.88*	Significant

(df=1, Table value=3.84, *p<0.05)

The above Table No. 6 represents in study group, Chi-square test shows there is statistical association between demographic profile namely;gender and duration of illness at (p<0.05) level.

Discussion

The result findings are supported by Katiyar SK who also observed that the pranayama improves the lung status and there is statistically significant improvement of dyspnoea at (p<0.05 level) after the

practice of pranayama.[6] This finding is consistent with studies conducted by Saxena T on effect of pranayama on dyspnoea among COPD patients.[7] A study on effect of yoga on COPD patients showed that lung parameters improved after the practice of yoga and useful adjunct form of therapy for COPD. This finding is consistent with the studies conducted by Judith AP on breathing exercises for COPD patients.[8]

Conclusion

The present study demonstrated that in study group COPD patientswho practiced Bhramari Pranayama for (12 weeks) had reduceddyspnoea. The study findings concluded that Bhramari pranayama was effective to minimize dyspnoea among the patients with chronic obstructive lung disease.

Ethical Clearance : Taken from Ethical Committee of PIMS-DU, Loni (Bk)

Source of Funding: Self

Conflict of Interest: Nil

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Disruption of Stunting Social Capital in South Sulawesi, Indonesia (Case Study on 1000FDL Families in Bone and Enrekang Districts)

Moh. Husni Thamrin[1], Andi Agustang[2], Arlin Adam[3], Andi Alim[4]

[1]Postgraduate, Department Sociology, University of State Makassar, [2]Professor, Postgraduate, Department Sociology, University of State Makassar, [3]Professor, [4]Assistant Professor, Department of Public Health, University of Pejuang Republic Indonesia

Abstract

Background: Ideally, the social capital of the village community becomes the strength to accelerate the village development process, experiencing disruption, resulting in the incidence of stunting in children.

Aims: This study aims to explore the root causes of the fragility of stunting social capital and find the right social strategy in dealing with stunting through the use of social capital of rural communities.

Method: This research uses qualitative research method with case study techniques.

Results: The determinants of social capital disruption for the 1000FDL family are family disorientation in fostering family members, the widespread use of technology that has resulted in more social distancing among family members, belief in the myths of maintaining pregnancy and children, and the development of family pragmatic behaviour in fulfilling life's needs.

Conclusion: Based on the findings of this study, it is recommended that a program for handling stunting through community empowerment is focused on extracting the social capital of rural communities. Another recommendation is that there is a need for verification research to test the significance of the deterministic factors of social capital disruption that cause stunting.

Keywords: *Children, Social Capital; Stunting; 1000FDL.*

Introduction

Indonesia is facing nutritional problems that have a serious impact on the quality of Human Resources (HR). One of the nutritional problems that are of major concern is the high stunting. Stunting is a chronic malnutrition problem caused by insufficient nutritional intake for a long time as a result of feeding that is not by the required nutritional needs. The basic cause of stunting is due to a lack of attention during the 1000 First Days of Life (FDL).

The period of the first 1,000 days of life is 270 days during the mother's pregnancy, up to 730 days in the first life of the baby born. This period is sensitive and very important, so it is called the golden period. This is because the impact that can arise when children's needs are not met will be permanent and cannot be corrected. The impact is not only on physical growth but also on cognitive and mental development[1].

The long-term impact of stunting is the shortness of children in a generation. In girls, the impact will be seen when adults or pregnant. Women who are stunted

Corresponding Author:
Arlin Adam
Professor, Department of Public Health, University of Pejuang Republic Indonesia Jl. G. Bawakaraeng No.72, Lariang Bangi, Kec. Makassar, Kota Makassar, Sulawesi Selatan 90151
e-mail: arlin.adam73@gmail.com

are at a higher risk of experiencing retardation or growth retardation in their fetus (IntraUterine Growth Retardation/IUGR) and giving birth to babies with low birth weight (LBW)[2]. The psychologically short body also affects a child's self-esteem in their social life, especially during adolescence. The result of stunting is not only short but also affects the development of brain cells so that cognitive abilities and intelligence decrease[3];[4].

The definition of stunting in this study is nutritional status based on the index of body length or height according to age[5]. Physically, toddlers look shorter than toddlers their age. In another definition, stunting is a linear growth that fails to reach its genetic potential, as a result of a poor diet and disease[6]. So, stunting can be seen when toddlers are measured for length or height, then compared with the standard, the results are below normal.

The prevalence of stunting in children in Indonesia is still far from the WHO standard at the 20% level as the limit for non-public health problems. Nationally, the stunting rate for children in Indonesia is 30.8%[7]. As many as 20 provinces have prevalence rates above the national rate. South Sulawesi province is one of the three provinces with the highest stunting prevalence rate, namely 35.7%, above Southeast Sulawesi (28.7%), North Sulawesi (25%) and Southeast Sulawesi (32.3%).

From field fact-finding and analysis of secondary data reported by the District/City Health Office in South Sulawesi, it was found that stunting is determined by sociological problems such as lack of maternal knowledge, changes in family relationship patterns in caring for children, belief in myths, loss of attention from the neighbourhood environment. Pregnant women, lack community participation, and low access to health services. These causes arise as a result of social changes in society that have contributed to changing the order and the way people behave. The aggregate determinant concept in sociology is categorized as the concept of social capital.

The correlation between social capital and the incidence of stunting can be seen from the act of stealing age as an act of circumventing the regulation regarding the age of marriage that must be over 20 years for women and 25 years for men. Thus, the incidence of early marriage in South Sulawesi is quite high which has the potential to result in early pregnancy which is more

at risk of death for mothers and children[8]. Maternal childbirth under 20 years of age contributes to high rates of neonatal, infant and under-five mortality[9].

The incidence of early marriage is influenced by several factors, including the socio-cultural norms that apply in society, economic status, and education level. Cultural and social norms, including those related to beliefs, influence the age of marriage for women[10], [11]. Economic status also affects the incidence of early marriage, especially in rural areas. Poor families choose to marry off their children at an early age to improve economic stability[12]. Another factor that can influence early marriage is the level of education. Children born to mothers who marry early have a lower chance of life and are more likely to have nutritional problems for their children such as stunting, wasting, and malnutrition[13].

Another aspect of social capital that has implications for the incidence of stunting is the maintenance of an understanding of the myths about food and parenting patterns. The practice of choosing food for consumption for children depends on the dominant public belief that is influenced by perceptions based on cultural-spirituality, as well as parenting patterns are often coloured by metaphysical thinking by placing nature as the best field for children to train themselves from the start.

The lack of parental attention to children has been accelerated by the modernization of family life which has resulted in disorientation in the family which is more concerned with economic functions compared to other family functions. Modernization of family life also has an impact on the growth of practicality of individuals in the family which leads to instant decision-making patterns.

Decision-making is a form of social action that is guided by society's interpretation of the value or meaning contained in the food. This understanding is the same as Max Weber's thinking about social action which is facilitated by certain meanings.

The Weberian view influences people's awareness in choosing food. There are quite a lot of foods that contain nutrition but are interpreted contrary to the value of life by the community so that it has implications for rejection, such as eating taboo crab and squid for pregnant women because it means that the child is conceived can be black and scaly.

The social capital disruption above affects the ability of the 1000FDL family to maintain pregnancy and child care so that it has the potential to give birth to a stunting child.

Method

This research uses qualitative method with case study techniques. This method was chosen as a consequence of the paradigmatic view of research that uses the constructivism paradigm.

Sources of data in this study consist of primary data and secondary data. Data collection techniques used observation, in-depth interviews, FGD in which the researcher was the main research instrument. Qualitative data analysis used in the field analysis method by exploring in-depth the contents of the questions given by the informants. The stages of data analysis are divided into three processes; 1) data reduction, 2) data categorization, and 3) data interpretation. Presentation of data by exploring in-depth the patterns of relationships between data.

Result

Determinants of Disruption of Family Social Capital

From the study of research, cases found facts that disrupt social capital, including:

- The family of 1000FDL generally consists of parents who work actively in economic sectors, so that attention to pregnancy and child care is relatively lacking.

- There is a tendency for 1000FDL families to hand over care for babies under two years old and babies under five years old to domestic helpers.

- 1000FDL families are more concerned with economic aspects than coaching other aspects of life.

- For some 1000FDL families, the physical growth of two-year-old babies is considered healthier, so they are stuck with industrial food consumption behaviour.

- Knowledge and understanding of mothers in pregnancy care, safe delivery, and exclusive breastfeeding have relatively little implications for the mother's response, which in many cases results in the birth of a child with a stunted status.

- Generally, 1000FDL families still use prenatal care and child care practices that reflect traditional or cultural understandings such as allowing children to interact freely with nature so that the child's physical structure becomes stronger, eating certain foods during pregnancy, drinking water that has been spelt out before undergoing a spell. the process of birth, smoked toddlers accompanied by growth spells, and prohibitions or taboos for children that smelled supernatural.

- Family members are so busy using cellphones that direct social interaction is almost no longer done

- 1000FDL family life shows that there is a change in lifestyle to a more hedonistic direction due to the indoctrination of lifestyle from technology media.

- For most families, family resilience is defined as the extent to which the family can immediately meet practical needs without having to think about a future which it considers a mystery.

Disruption of Family Social Capital as Social Mediation for Stunting

The findings of the relationship between social disruption and stunting are as follows:

- The role of the neighbourhood environment in the care of pregnant women has disappeared, so that family experiencing pregnancy struggle independently. In many cases, the independent struggle of mothers results in giving birth to children with LBW conditions as a risk factor for stunting.

- Husbands consider pregnancy, childbirth and child care as the responsibility of housewives.

- The participation of the village government in preparing convenience facilities for 1000FDL families is still relatively low. Generally, village governments prioritize physical development programs over stunting reduction programs.

- The family kinship that used to be a source of strength in overcoming common problems has deteriorated so that families in one clan no longer care for and help each other.

- Local values that contain common good are no longer an inspiration for families in carrying out daily life practices as a result of the very fast absorption of modernity values.

- Trust as the main value of the family building in the process of social interaction is degraded following the development of individualistic attitudes among the 1000FDL family members.

Affirmative Social Capital Exploration

The research findings that describe the use of affirmative social capital are as follows:

- Affirmative social capital is categorized in the form of networks, beliefs, and norms

- The use of social networks in potential villages is carried out in the form of stakeholder involvement in dealing with stunting. The form of stakeholder involvement is carried out in an organized manner by forming a stakeholder forum.

- Fostering a sense of trust among citizens aimed at dealing with stunting is done through efforts to raise awareness together about the importance of stunting for the future of children and the future of the development of a nation's Human Resources. This effort must be driven by community leaders in the village through role models that can be emulated socially by all villagers.

- The institutionalization of preventing stunting for children has become the new norm through mutual consensus between the social organizations of the village community and the village government legitimized by the district/city government.

- The movement of this affirmative social capital category is internalized through a community empowerment program that aims to enable every 1000FDL family to practice according to health principles.

Discussion

Disruption of social capital such as networks, beliefs, and norms has resulted in the incidence of stunting in children. Ideally, this social capital is the main source of strength in conducting family development so that the family structure experiences family resilience that can carry out its functions completely. Disruptive social capital has turned into a source of threat of stunting and malnutrition for children.

Disruption in the sense of disturbance to social values and order has the risk of degrading civilization. Civil society as a civilized society cannot exist without close social ties and the existence of values (cultural, social,

moral) as social capital. In the context and conditions of technological development and fast-paced socio-economic changes, it seems that the great disruption is inevitable. As long as science and technology are still developing, so long as disruption will occur.

There are four determinants of social capital disruption in 1000FDL families that lead to stunting for children, namely family disorientation, exposure to technology, belief in myths, and family pragmatic behaviour in fulfilling life's needs.

The posture of the family is currently experiencing changes in both structure and function. These changes are preceded by changes in family orientation, from an orientation that is complex to fulfil needs to simplification of needs only on economic needs.

This orientation causes family members to position themselves as economic beings so that all their potential is directed at work as a priority by ignoring other orientations such as education, religion, socio-cultural, health, and recreation. The family is considered successful and established when the family can accumulate symbols of welfare such as ownership of luxury items and a hedonistic lifestyle.

The influence of technology on family life is significant in the context of the incidence of stunting in children. This symptom is very visible in the process of social interaction between family members. A direct typology of social interaction in which expressions, feelings, and emotions are exchanged and contain cultural meanings are replaced by technology-mediated interactions.

As a result, the individualistic attitude of the members gradually thrives on replacing the collectivity attitude as a basic characteristic of family institutions. Technological determinism uproots people from their human roots to become mechanical and instrumental humans in which practical goals are the only actions that are considered rational. Humans have lost their nature.

According to Fukuyama, to restructure society socially, attention needs to be directed to two human capacities, namely awareness of human nature and human tendencies to organize themselves. The first factor is the source of values, while the second is the operational area for social capital[14].So, no matter how sophisticated the technology and the innovations that appear, human nature must remain the foundation for the organization of social life.

The desire to restore human nature as a compass in organizing social life can be intervened through the internalization of locality values, considering that the family in this study strongly believes in myths as the basis of truth. This means that an irrational typology of the family can be extracted positively through the integration of mythological beliefs with the truth of science.

Positive (affirmative) social capital extraction towards a stunting-free family through effective management of the three basic components of social capital, namely networks, trust, and norms. The network is formed because they come from the same area, the same political or religious beliefs, genealogical relationships, and others[15]. Community networks are strongest and thickest at the goal level and continue to be weak when looking at the regional, national and international levels[16].

This theoretical view means that the grouping of 1000FDL mothers in the village has two similarities that have the potential to create cooperation, namely the same goal, namely preventing stunting in children and geographic similarity at the village level.

Apart from networking, public trust as social capital has a very important role in dealing with child stunting. Weakened social ties due to social interaction habits mediated by information communication technology result in low trust among residents or family members.

Fostering trust as a basic value of living together can be built and preserved through socio-cultural activities in the form of social and religious and cultural rituals. The integration of the issue of stunting in the socio-cultural activities of the village community is considered very appropriate to instil strong belief values for individuals to place stunting as the gateway to human development or in other words the starting point of the life of the golden generation.

Trust is an attitude of mutual trust in the community to unite with one another and to contribute to increasing social capital[17], [18]. Trust can facilitate the community to work together and help in avoiding the incidence of stunting for children. The integration of the issue of stunting with socio-cultural activities will affect the process of institutionalizing or forming community norms.

The norms that are formed then become collective rules which are usually unwritten but understood by each member of society and determine the expected behaviour patterns in the context of social relations[19]. When stunting is transformed into a new norm for rural communities, efforts to prevent and handle stunting for children can be carried out accelerated and convincingly.

Conclusion

The determinants of social capital disruption for the 1000FDL family are family disorientation in fostering family members, the widespread use of technology which results in more social distancing among family members, belief in the myths of maintaining pregnancy and children, and the development of family pragmatic behaviour in fulfilling life's needs. The social capital disruption of the 1000FDL family has health-social implications for children born in a stunted state. Empowerment of 1000FDL families through family assistance and tiered advocacy of public services in the village can affirm social capital as a means of preventing and overcoming stunting for children.

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An Analysis of Omenn Syndrome–
A Rare Combined Immunodeficiency Syndrome

Jibin M.[1], Rohisha I.K.[2]

[1]Nursing Officer, All India Institute of Medical Sciences Raipur Chhattisgarh,
[2]Tutor, College of Nursing, All India Institute of Medical Sciences Raipur Chhattisgarh

Abstract

Omenn Syndrome is a rare combined immunodeficiency syndrome manifested mainly by generalised erythroderma, alopecia, loss of eyebrow and eye lashes, generalised oedema and metabolic disturbances. Poor prognosis is reported as it mimics the appearance of severe eczema and immunodeficiency and is under noticed as there is presence of circulating lymphocytes. Understanding the guidelines of prompt diagnosis will facilitate early treatment and improve prognosis.

Keywords: *Omenn syndrome, treatment, guidelines, prognosis.*

Introduction

Omennsyndrome is a rare combined immunodeficiency syndrome classified under 4A01.10 severe combined immunodeficiency in ICD Classification. This rare syndrome was first described by Gilbert Omenn in 1965[1]. The statistics of this disease is not clear, but 1in 58000 babies born with Severe Combined Immunodeficiency (SCID) in US each year and according to Orphanet report series of rare diseases, there are 25 cases of omen syndrome reported through publication in January 2020[2].

Clinical presentation: The babies with Omenn syndrome frequently present with : chronic diarrhoea, pneumonitis, enlarged lymph nodes, failure to thrive, hepatosplenomegaly, pustular rash on extremities, generalised erythroderma, alopecia, loss of eyebrow and eye lashes, generalised oedema and metabolic disturbances due to protein loss through the skin and gut[3].

Figure 1: Characteristic clinical features of Omenn syndrome which shows generalised erythroderma and alopecia.

Atypical Omenn syndrome: Few of case reports have described on atypical Omenn syndrome which is manifested as RAG -2 gene mutations where all the

Corresponding Author:
Mrs. Rohisha IK
Tutor, College of Nursing AIIMS Raipur, GE Road, Tatibandh
e-mail: rohisharohu@gmail.com
Phone No: 9605624370

clinical manifestations of omen syndrome appear except rash, eosinophilia, and elevated IgE. One report was presenting atypical omen syndrome with Adenosine Deaminase (ADA) Deficiency[4].

Associated Syndromes: There will be associated syndromes in babies suffering from Omenn syndrome which makes the prognosis poor. The associated syndromes reported through various case reports are:

1. Cartilage hair hypoplasia: This is an associated autosomal recessive inherited disorder manifested as short limb dwarfism, fine sparse hair and abnormal immune system[5].

2. Adenosine Deaminase Deficiency: A metabolic disorder with mutations in the ADA gene causes immunodeficiency

3. Digeorge syndrome: Digeorge syndrome involves deformity of heart, parathyroid and is a congenital anomaly characterized by defects mainly from 3rd and 4th pharyngeal pouches.

4. Colomboma of eye: Colomboma means defect is manifested by a hole in any one of structures of the eye like iris, retina, choroid, or optic disc.

5. Cardiovascular abnormalities: An infant with Omenn syndrome usually found to have biventricular hypertrophy, impaired left ventricular systolic function, and severe sinus bradycardia, possibly secondary to endomyocardial disease caused by eosinophilia[6]

6. Growth retardation

7. Sensory problems

8. CHARGE syndrome: Coloboma, Heart Defect, Choanal Atresia, Growth Or Development Retardation, Genital Hypoplasia, Ear Anomaly Or Deafness

9. Ligase 4 deficiency: A mutation in LIG 4 Gene affects the major mechanism of DNA double strand break repair.

Diagnostic Measures:

Type of evaluation	Major findings
Laboratory evaluation	Normal or high lymphocyte count
	Eosnophilia is invariably present[7,8]
	Flow cytometry shows presence of an oligoclonal set of activated antigen-stimulated Th2 cells, B cells are absent and natural killer cells are present. Normal distribution of CD4/CD8 or predominant CD8.
	Elevated IgE and IgG levels

Type of evaluation	Major findings
Imaging studies	Thymus is absent
Other findings	Mutational analysis for RAG-1 and RAG-2 to permit genetic counseling and prenatal diagnosis in subsequent pregnancies[9]
	Serum interleukin 4 (IL-4) and interleukin 5 (IL-5) levels are typically increased. In vitro cells produce decreased levels of IL-2 and interferon-gamma (IFN-γ) compared with the elevated IL-4 and IL-5 production by Th2 cells.

Skin biopsy, lymph node biopsy, fluorocytometric analysis of peripheral blood lymphocytes, lymphocyte mitogen assays and Bronchoscopy can be done further for diagnosis[10].

Treatment: Symptomatic treatment can be done but the prognosis is reported as poor in many of the case reports. The only treatment modalities which can be adopted arebone marrow transplantation and stem cell transplantation[11].

Why poor prognosis is reported: Many times the symptoms of Omenn syndrome mimic the appearance of severe eczema and immunodeficiency are under noticed as there is presence of circulating lymphocytes. These children will be treated with steroids and referral services are assured properly due to the wrong diagnosis. A case report of a 5 year old boy with symptoms of diffuse erythrodema and pustular rash on extremities reports that the rash was incorrectly diagnosed as erthyema toxicum versus transient neonatal pustular melanosis. This case

was later identified as Omenn syndrome through the diagnosis of T-B-NK1 SCID and Chimerism testing[12,13].

Guidelines to be followed for better prognosis:

• If a newborn baby manifests signs associated with Omenn syndrome, evaluate T cells, B cells and natural killer cells (NK).

• Determine the origin of T cells using Chimerism studies

• Prompt immunosuppressive therapy

• Define the genetic aetiology

These guidelines will help the health professionals for prompt diagnosis and facilitate early treatment[14].

Conclusion

Early newborn screening, prenatal counselling and genetic counselling play an important role in preventing and early identification of SCID's. It is important to understand regarding Omenn syndrome by the health care professionals and able to diagnose them accurately at the earliest. It will enhance the initiation of treatment at the earliest and improve the prognosis.

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The Experience of a Developing Country in Using Misoprostol for Induction of Labor

Jwan Dakheel Saeed[1], Srwa Ismael Khalid[2]

[1]Lecturer, Obstetrics and Gynecology Department, Maternity Teaching Hospital, Erbil, Iraq,
[2]Consultant, Obstetrics and Gynecology Department, Maternity Teaching Hospital, Erbil, Iraq

Abstract

Objective: Assess the maternal and neonatal outcomes after use of vaginal misoprostol for induction of labor in resource limited situations

Materials and Method: A prospective case control study, it included 200 pregnant women (100 of whom required Induction of labor for different indications and the other 100 pregnant women were in spontaneous labor. The route of misoprostol tablet administration was vaginal, starting with 25mcg every 6 hours with maximum 4 doses.

Results: Median time from misoprostol administration to vaginal delivery was 16.0 hours, the most common indications of misoprostol were prelabor ruptured membrane 34%, post-date 27%, and oligohydramnios with fetal growth restriction 19%.

The Apgar score of the neonates in 1 minute was < 7 in 45%, however it was down to 6% at 5 minutes of delivery in induced women. Admission to the neonatal care unit (NCU) in induced women was 40%, whereas 21% in women with spontaneous labor, the rate of admission to NCU in induced women was significantly higher in nulliparous women 73.8% compared to multiparous women 15.5% p<0.001, and also higher in women received more than 2 doses of misoprostol.

Conclusion: Misoprostol is effective and safe for induction of labor when clinically indicated, however women should be counseled carefully regarding the maternal and fetal complications prior to induction with misoprostol.

Keywords: *Misoprostol, labor, neonatal outcome, maternal outcomes, maternal outcomes.*

Introduction

Induction of labor is described as the method of stimulating the uterus artificially to begin labor [1], it is carried out when the pregnancy related maternal/fetal risks are greater than the early delivery associated with maternal/fetal risks[2], the whole process of labor induction is to imitate as closely as possible the physiological process[3], labor induction aim to stimulate uterine contractions before labor begins spontaneously, resulting in vaginal delivery[4]. The incidence of induction of labor varies widely between countries and even between regions of the same country, however it is greater among developed countries than developing countries[5,6].

The success of labor induction relies on the extent of replication of parturition-related physiological events like cervical ripening and uterine contractions, the condition of the cervix (whether favorable or unfavorable) determines the technique used for labor induction[7], the modified form of the Bishop[8] criteria remains valid in the cervix evaluation to predict the probability of effective induction[7], prostaglandin E2 (PGE2) formulations are

Corresponding Author:
Jwan Dakheel Saeed
Lecturer, Obstetrics and Gynecology Department,
Maternity Teaching Hospital, Erbil, Iraq
Phone No.: + 964 (0) 750 861 5865
e-mail: aaa.hemato.2018@gmail.com

recognized as the gold standard for induction of labor[5], cost and conservation factors, however, were significant limitations restricting their use in developing countries, these obstacles are apparently overcome by the latest synthetic prostaglandin E1, misoprostol[7].

Misoprostol, an analogous synthetic prostaglandin E1, has low cost, room temperature storage and wide accessibility[9], has long been acknowledged as a cervical maturing agent[10,11]. Consequently, misoprostol tablets have been used off-label by clinicians since the 1990s for labor induction[11], It is also noted that misoprostol reduces the need oxytocin augmentation of labor[12,13], and the need of caesarian section[14], misoprostol is administered conveniently via the oral, sublingual and vaginal path[15], however vaginal misoprostol is the prostaglandin of choice for induction of labor as recommended by the Swiss Society of Gynecology and Obstetrics[16].

Moreover, misoprostol use was correlated with adverse side effects of the mother and fetus, such as uterine hyper stimulation[17, 18], changes in fetal heart rate, rupture of the uterus, maternal death[19], physicians are also worried about litigation for off-label indications following adverse effects of misoprostol[20], there is no certainty about the optimal dosing regimen, thus, the need for further inquiries into the smallest efficient dose of misoprostol was stressed in order to minimize side effects and maximize maternal and perinatal safety[18], uunfortunately, misoprostol use in developing countries is relatively limited, Moreover, there are significant differences in the regimes used[21]. This study was intended to assess the perception and practice of obstetricians in Erbil-Iraq region concerning their use of misoprostol in induction of labor.

Method

Study design and settings: This is a prospective control study which was performed between 1st of July 2018 and 1st of July 2019 in the Maternity Teaching Hospital, Erbil-Iraq.

Patients Selection: The data of 100 pregnant women aged ranging from 16-41 years old in whom labor was induced with misoprostol compared to other 100 pregnant women in whom labor was not induced with the same age, parity, and gestational age.

Inclusion Criteria: Women with either maternal or fetal indications were received misoprostol when the following criteria are fulfilled: Singleton, ($\geq$326) weeks of gestation, cephalic presentation, no history of uterine surgery, and reactive non stress test (NST).

Indications for labor induction were prolonged gestations, premature rupture of membrane, maternal health problems (hypertension, pre-eclampsia, diabetes), oligohydramnios with fetal growth restrictions.

Indication Protocol: The pregnant women received misoprostol placed in posterior vaginal fornix in a dose of 25 micrograms, the dose repeated every 6 hours for maximum 4 doses (100 micrograms) no more, the dose of 25 Mcg achieve by eighth of the (200 Mcg tablet), vaginal examination done every 2 hours to assess the cervix and labor progress, whenever active labor started no more additional dose of misoprostol was given, Each woman underwent 20 minutes of cardiotocography (CTG) assessment of fetal condition and uterine contractions before misoprostol insertion, and then fetal heart rates were assessed by fetoscope a hand-held device every 30 minutes, there were not on continuous CTG as recommended by almost all the guidelines in the view of the shortage of CTG in the hospital.

Results

There was no significant difference in maternal age, gestational age, and parity between group I and II, see table 1.

Table 1: Basic characteristics of the study groups

	Group I		Group II		P-value
	No.	(%)	No.	(%)	
Age (Years)					
< 20	14	(14.0)	14	(14.0)	
20-24	31	(31.0)	31	(31.0)	
25-29	25	(25.0)	25	(25.0)	>0.999
30-34	22	(22.0)	22	(22.0)	
$\geq$ 35	8	(8.0)	8	(8.0)	

	Group I		Group II		P-value
	No.	(%)	No.	(%)	
Gestational Age (Weeks)					
< 37	17	(17.0)	17	(17.0)	0.635
37-41	71	(71.0)	75	(75.0)	
> 41	12	(12.0)	8	(8.0)	
Parity					
Nulliparous	42	(42.0)	42	(41.0)	
Multiparous	58	(58.0)	58	(58.0)	0.886

The Bishop score was 4 or less in 66% of the women. Less than two thirds (62%) of the women received two or less doses of misoprostol.

The rate of success among women with a Bishop Score of ≤ 4 was 75.8% compared with 70.6% among women with a score of more than 4, but the difference was not significant), see table 2.

Table 2: Association between Bishop Score and the outcome

Bishop score	Succeed		Failed		p-value
	No.	(%)	No.	(%)	
≤ 4	50	(75.8)	16	(24.2)	0.577
> 4	24	(70.6)	10	(29.4)	

After giving misoprostol, there was a success in its effect in the majority (74%) of the women. The APGAR score of the neonates after 1 minute was < 7 in the less than half (45%) of the women, but this proportion decreased after 5 minutes of delivery to 6%. Half of the women didn't develop any complications after receiving the misoprostol, 26% ended with emergency Cesarean section, and 19% developed fever and rigor. The other complications are presented in Table 3.

Table 3: Outcomes after using misoprostol

	No.	%
Result of induction		
Success	74	(74.0)
Failure	26	(26.0)

APGAR score at 1st minute		
< 7	45	(45.0)
≥ 7	55	(55.0)
APGAR score at 5th minute		
< 7	6	(6.0)
≥ 7	94	(94.0)
Perinatal death	0	(0.0)
Complications of using misoprostol		
No complication	50	(50.0)
Fever and rigor	19	(19.0)
Retained placenta	2	(2.0)
Uterine tachysystole + precipitate labor	3	(3.0)
Ends with emergency CS	26	(26.0)

Table 4: Rate of admission to the NICU in the misoprostol group

	Admission		No admission		P-value
	No.	(%)	No.	(%)	
GA (weeks)					
< 37	13	(76.5)	4	(23.5)	0.003
37-41	23	(32.4)	48	(67.6)	
> 41	4	(33.3)	8	(66.7)	

	Admission		No admission		P-value
	No.	**(%)**	**No.**	**(%)**	
Parity					
Nulliparous	31	(73.8)	11	(26.2)	< 0.001
Multiparous	9	(15.5)	49	(84.5)	
No. of misoprostol doses					
≤ 2	10	(16.1)	52	(83.9)	< 0.001
> 2	30	(78.9)	8	(21.1)	

Around half (40%) of the Group I women had been admitted to the NICU, compared with 21% of the Group II women. (p = 0.004) as presented in Table 5.

Table 5: Admission to the neonatal care unit in each of the two study groups

Admission to NICU	Group I (Misoprostol)		Group II (No misoprostol)		p-value
	No.	**(%)**	**No.**	**(%)**	
Yes	40	(40.0)	21	(21.0)	0.004
No	60	(60.0)	79	(79.0)	

Discussion

In this study we found that using vaginal misoprostol for the induction of labor in both nulliparous and parous women to be effective, leading to a successful and uneventful vaginal delivery in 74% of women (32% primip & 42% multips). The indication for induction was prelabor ruptured membrane, preterm prelabor ruptured membrane, post-term pregnancy and pre-eclampsia.

The median time from administration of vaginal misoprostol to vaginal delivery was 16 hours regardless of the parity status. This result is similar to what was found in a few recent published articles for example Mayer et al.[22] and Jagielska et al[23]. About 62% of induced women received 2 or less doses of misoprostol and the bishop score was less or equal 4 in 66% of induced women, among whom the vaginal delivery rate was 75.8%, while 34% of induced women had bishop score of more than 4 (considering the of possibility of individual variability in the assessment of bishop score), the success rate for vaginal delivery in this group was 70.6%.

The two most common indications for cesarean delivery in the induced group were a pathological CTG in 38.5% and arrested labor in 34.6%. Out of all women who underwent induction of labor 74% delivered vaginally and 26% ended with emergency cesarean

section. It had been noticed that the most adverse effect of prostaglandins used for induction of labor is uterine tachysystole and uterine hyper stimulation syndrome[18,24] and in our study, the uterine tachysystole was reported in 3% and this is because we used lower doses (25 Mcg with 6 hours' interval). And among those who has been induced 19% had fever and rigor as a side effects of misoprostol induction, with no incidence of uterine rupture or postpartum hemorrhage. Furthermore, half of the patients who underwent induction of labor either ended with vaginal delivery or emergency cesarean section had no maternal complications reported.

It's important to evaluate neonatal outcome to assess the benefits of IOL, despite the occurrence of maternal complications during induction of labor with misoprostol and vaginal delivery, the overall fetal outcome of neonates was good. 55% of neonates had 1st minute APGAR score of ≥ 7 and this increased to 94% in 5th minute. Furthermore, none of the neonate in our study had APGAR score between (0-3) in 5-min which has significant association with neonatal mortality [25]. Remarkably, the rate of perinatal mortality in women underwent IOL by vaginal misoprostol in the study was zero.

The neonatal admission to NICU were more with those gestational age less than 37 weeks in both groups, and more admission in nulliparous women underwent

induction of labor, this is likely to be due to nulliparous women having a longer average duration of labor, as the duration of first and second stage of labor is an important factor affecting NICU admission[26]and we did find an increase in the neonatal admission among those who received more than 2 doses of misoprostol as its shown in, and there was no significant difference between parity and admission to NICU in women with spontaneous labor.

Despite of significant deference between group I and group II, that 40% of induced women had been admitted to the NICU, and 21% of women with spontaneous labor admitted to neonatal care unit P value 0.004, the induction of labor using the regimen described in the present study is suggested to be safe, effective, reduces adverse outcomes and can be easily administered in resource-limited settings, but further studies consuming a randomized control design will be required to approve these findings[27] and in certain health settings the benefits of access to misoprostol can well outweigh the risks[28, 29].

Conclusions

The achievement of vaginal delivery in women underwent induction of labor is high as 74%, with no significant maternal and neonatal complications when reasonable regime and monitoring in properly selected women for IOL has been provided .

Conflict of Interest: None

Ethical Clearance: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by the Kurdistan Board of Medical Specialties.

Source of Funding: Self

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Effect of Modified Ankle Foot Orthoses (AFO) along with Goal-Oriented Physiotherapy in a Child with Spastic Diplegic Cerebral Palsy–An Interesting Case Report

Kovela Rakesh Krishna[1], Pamidigantam Raghava Priya[2], Archana Rupanagudi[3], Shilpa Sankeesa[4]

[1]Program Director R & D, Second Heart Physio Foundation, Nizampet Cross Roads, Hyderabad, [2]Joint Program Director R & D, Second Heart Physio Foundation, Nizampet Cross Roads, Hyderabad, [3]Managing Director, Second Heart Physio Foundation, Nizampet Cross Roads, Hyderabad, [4]Chief Research Coordinator, Second Heart Physio Foundation, Nizampet Cross Roads, Hyderabad

Abstract

Cerebral Palsy (CP) is considered as a neurological condition caused by a non-progressive damage or malformation of the brain that occurs during the developmental process. Body movement and muscle synchronization are mainly impaired in children with Cerebral Palsy. Each cerebral palsy case is unique to the person. One person may have complete paralysis and need continuous treatment, while another may have mild movement tremors with partial paralysis but require little assistance. The form and the timing of the injury to the developing brain are the main reasons for such impairments. Orthoses are primarily used to treat the secondary musculoskeletal problems of muscle contracture and bony deformity. In the Present Case report a modified Ankle Foot Orthoses (AFO) is used bilaterally by using an extra malleolar orthosis, medial block to prevent forefoot adduction and an extra strap to prevent navicular drop for a 7-year-old Spastic Diplegic girl child who was in Gross Motor Functional Classification System (GMFCS) grade III. After a 3-month goal-oriented physiotherapy treatment program primarily focusing on gait, we observed decreased Navicular drop, increased ankle stability (Twisting was not seen), improvement in Gait Parameters such as Increased stride length, Cadence and improved gait velocity.

***Keywords:** Cerebral Palsy, Spasticity, Diplegia, Physiotherapy, Goal Based Therapy, GMFCS, Gait Parameters, Orthoses, AFO.*

Introduction

A heterogeneous group of non-progressive motor disorders in the developing brain is cerebral palsy. The definition of CP involves, by convention, brain injuries arising antenatally and postnatally at any point up to the age of 2 years[1]. Premature delivery (less than 32 weeks), Intrauterine growth retardation, Intracranial hemorrhage, Birth asphyxia are the most important causes[2]. Spastic CP is the most common form of CP in which Spastic diplegia is the usually seen type. Spastic diplegia involves lower limbs more than upper limbs caused by thinning of periventricular white matter[3].

There are a wide number of studies carried out on implementation and use of orthosis in Spastic CP children, and they show that If it is used properly to solve the pathomechanical problems in gait, any orthosis is beneficial[4]. There are no studies in the literature that clarify any modifications in conventional AFO that can accelerate the recovery. In the present case report we aimed at modifying the conventional AFO to give better results in terms of stability and gait parameters.

Patient Information: Around 3 months back a seven years old girl child visited the department along

Corresponding Author:
Kovela Rakesh Krishna
Program Director R & D, Second heart Physio foundation, Nizampet cross roads, Hyderabad
e-mail: programdirector@secondheartphysiofoundation.org

with the mother. She was the first child born at term with normal birth weight through C section. It was done because the meconium aspiration was seen. Soon after delivery child suffered with asphyxia and there was a delay in giving supplemental Oxygen to the newborn. This lead to neonatal seizures, she was in NICU for around 15 days after which she was discharged. Mother noticed tonal changes at around 6 months as baby was not even having any head control. Her all milestones were delayed. She was under Physiotherapy management since past 5.5 years.

Clinical Findings: On examination child did not have any increased tone in upper limbs perhaps they were weak. Lower limbs had increased tone in bilateral adductors (1+), Bilateral plantar flexors (1+). She was in GMFCS level III, her speech was delayed, No obvious behavioral abnormalities, highest functional positions achieved independently was sitting without support and walking with walker. She was able to do bilateral upper limb activities and also mild fine motor activities. No contractures were seen in bilateral upper and lower limbs. Bilateral Feet were in plantar flexed posture without contracture and there was forefoot adduction with collapsed arch and navicular drop. There was twisting in ankle noted bilaterally.

Diagnostic Assessment: Previously child was under treatment in a special school where Physiotherapy, speech therapy and remedial therapy were given. There was no focused physiotherapy treatment with measurable outcomes but the therapy prevented contractures in lower limbs. Parents main concern was gait. On evaluating gait parameters, we focused primarily on Stride length, Cadence and Gait velocity were reduced considerably. Based on findings we diagnosed the child as spastic diplegic. Retrieved literature on improving gait parameters suggests that Goal oriented physiotherapy treatment has significant contribution in improving lower extremity function in children and adolescents with cerebral palsy[5]

Therapeutic Intervention: Prior to the beginning of intervention, we made a note of exaggerated tone of lower limb musculature, Gait parameters such as Stride length, Cadence and Gait velocity. We primarily focused on improving the gait parameters for which we thought we have to improve stability of ankle joint first in order to improve weight bearing and controlled weight shifting. As twisting was noticed in bilateral ankle joints, we have done modifications in AFO. We used extra malleolar

orthoses with medial block to prevent forefoot adduction and also, we have planned to put an extra strap to support the navicular bone and prevent it from drop (Figures 1 & 2). We have followed goal-oriented physiotherapy treatment protocol to improve bilateral gluteal maximus, hip abductors and ankle dorsiflexor strength by using Proprioceptive Neuromuscular Facilitation strategies mainly Dynamic reversals, Rhythmic stabilization and rhythmic initiation[6].

Figure 1: Shows Medial Block

Figure 2: Fitting AFO to the child

Navicular support with external shoe support: Treatment was given one hour a day, 5 days a week for 3 months. AFO was on throughout the treatment session every day. Along with the treatment protocol, home program was taught to the mother by using Mother as a Rehabilitative Aid format[7]. We included Adductor stretching of lower limbs, Single limb stance, Knee thrusting exercises and sit to stand training. All the exercises are done wit AFO on and asked her to show us once before performing at home.

During the study time there were no adverse events. After completion of three months again the readings were taken, there were significant improvements in all the gait parameters(Graph I), we have even found in change of muscle tone. (Table I). There was no change in GMFCS scale.
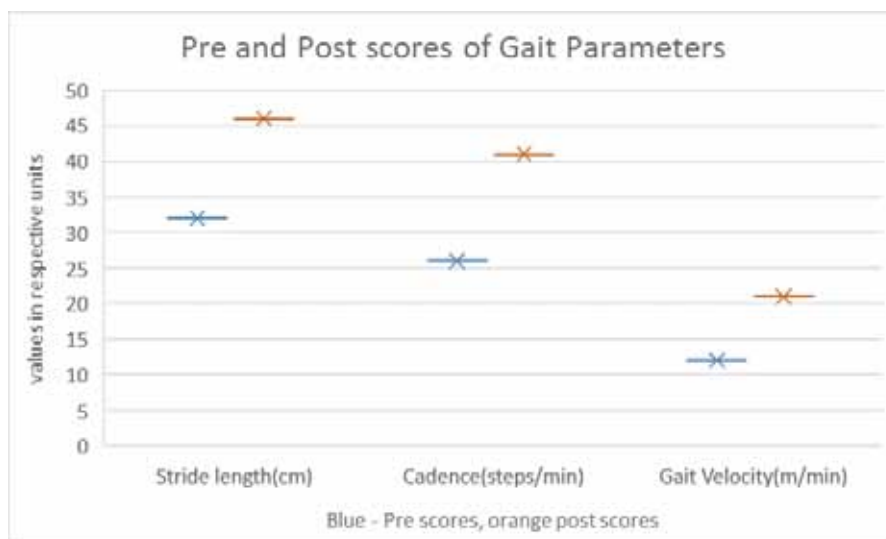
Graph 1: Shows pre and post scores of gait parameters

Table I. Shows Spasticity measured through Modified Ashworth scale (MAS) on day 1 and after 3 months

Tone (MAS)	Day 1	After 3 months
Bilateral hip Flexors	1+	No hypertonicity
Bilateral hip adductors	1+	1
Bilateral Plantar Flexors	1+	No hypertonicity

Discussion

The goal of the study was to see the effect of modified AFO on the improvement of ankle joint stability and also on gait parameters. This is the first research to record the results of updated AFO after use. An external orthosis should not be used until and unless it is compulsory, as it can be an extra burden for a child. Our previous studies were also focusing on the same[4]. In the way we like, we used AFO for the child and thus avoided an unequal load on the child. We found substantial decreases in forefoot adduction, decreases in muscle tone of plantar flexors, enhanced parameters of gait. Therefore, the results of the study show that stability plays a critical role in achieving regulated mobility. We can boost the prognosis of patients if orthoses are successfully used along with goal-oriented physiotherapy. The rise in gait parameter scores is primarily due to improved stability. To see the success of this regimen on the GMFCS scale, we are maintaining the same protocol for a long-term duration. In the future, we will publish results on GMFCS and Balance. The medial block and additional strap helped in weight transmission and increased efficient toe off phase. The extra-malleolar orthosis gave an additional stability to ankle joint.

Conclusion

If Orthoses are used cleverly and with proper rationale along with goal-oriented physiotherapy it can give tremendous results and fasten the recovery process of the child.

CARE Guidelines were followed while preparing the manuscript[8].

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Study on Changes of the Concentration of Some Indicators of the Serum Iron Test in Patients with Nephrotic Syndromein Vietnam

Le Van An[1], Le Chuyen[1], Duong Thi Ngoc Lan[2],
Pham Thi Thuy Vu[2], Nguyen Thi Thu Thao[2], Vo Hoang Lam[3]

[1]Associate Professor in Internal Medicine, [2]Master of Internal Medicine Medical Student,
[3]Medical Student, University of Medicine & Pharmacy, Hue University, Vietnam

Abstract

Background: In nephrotic syndrome (NS), the excessive and prolonged loss of protein in the urine reduces albumin blood and leads to many other changes such as dyslipidemia, blood clotting disorders, and disorders of hematopoietic components. In NS, the more persistent and persistent decrease in albumin in the blood, the more apparent these disorders, including disorders of iron, transferrin and ferritin in serum. The objectives of the study were to: Determine serum iron, transferrin and ferritin concentrations and Investigate the relationship between iron, transferrin and ferritin concentrations and serum albumin in NS patients.

Methodology: Cross-sectional descriptive research method. Convenient and controlled sample selection of 68 NS patients without kidney failure, aged 16 years and over, hospitalized for treatment at Internal Department of Hue University of Medicine and Pharmacy Hospital, Vietnam.

Results: The average serum iron concentration is 8.9 μmol/L, of which at low level, the rate is 30.9%; In 100% of cases, the serum transferrin concentration is lower than normal, the average concentration is 0.68 mmol/L; the average elevation of ferritin in serum was 610.3 pmol/L, of which at high level accounted for 67.6% (46 patients). Serum albumin concentrations are positively correlated with iron and transferrin, but negatively with serum ferritin.

Conclusion: In NS, the serum ferritin concentration is elevated and inversely correlated with the serum iron, transferrin, and albumin concentration.

Keywords: *Concentration, serum iron, nephrotic syndrome.*

Introduction

Nephrotic syndrome (NS) is a common problem in glomerular diseases. The disease often recurs many times and can lead to kidney failure if not treated and taken care well. Currently, the diagnosis and

Corresponding Author:
Le Van An
Associate Professor in Internal medicine, University of Medicine and Pharmacy, Hue University, 06 Ngo Quyen Street, Hue City, Thua Thien Hue 530000, Vietnam
e-mail: lvandd@hueuni.edu.vn

determination of NS are no longer difficult, however, the pathogenesis mechanism and the disorders caused by nephrotic disease still have many problems that need attention. In NS, the loss of protein in urine is much and prolonged, it reduces blood protein and leads to many other changes such as dyslipidemia, clotting disorders, disorders of blood-forming components,….In NS, the greater the decrease in blood albumin, the more pronounced these disorders are, including disorders of iron, serum transferrin and ferritin[1],[2][3],[4]. In normal people, the daily requirement of iron is about 0.5-1mg, the main source of iron is from foods of animal and plant origin. All iron in the body is about 4g, of which 65% is in Hb, 15-30% is stored in the endothelial inter-retinal system and liver parenchymal cells in the

form of ferritin. Iron is an important component in the synthesis of hemoglobine and myoglobine; Iron plays an important role in oxidative energy production, oxygen transport, mitochondrial respiration and inactivating harmful oxygen radicals. Ferritin has been identified as a predictor of the development and progression of atherosclerosis.

In NS, iron deficiency and ferritin stagnation in the body will cause iron deficiency anemia, affecting the metabolic activity of cells, causing glomerular fibrosis leading to impaired kidney function, making the process of Treatment and prognosis of patients with NS become more complicated[4],[5],[6].

Quantification of serum ferritin levels provides an indication of the body's total iron stores, thereby assessing the prognosis of anemia in patients with NS; however, research on the changes in iron components in NS has not been given adequate attention, while this disorder may contribute to worsening kidney disease and worse prognosis. To find out this problem, we study the topic "*Study on changes of the concentration of some indicators of the serum iron test in patients with nephrotic syndrome*". Objectives of the study:

Determine of serum iron, transferrin and ferritin in adults with NS patients.

Investigate the relationship between iron, transferrin and ferritin levels and serum albumin in patients with NS patients.

Subjects and Methodology

Research Subjects: We selected a convenient sample of 68 NS patients without kidney failure from May 2019 to May 2020, aged 16 years and over, hospitalized for treatment at Internal Department of Hue University of Medicine and Pharmacy Hospital, Vietnam. Criteria for diagnosis of NS include: proteinuria ≥ 3.5 grams/24 hours; blood protein <60 grams/L and blood albumin <30 g/L, increased blood cholesterol and total edema [7].

- Criteria for the exclusion of NS patients not included in the study are patients with one of the following diseases:

+ Endocrine disorders, hypertension, hepatitis, liver failure, kidney failure, rheumatoid arthritis.

+ Blood diseases.

+ Acute and chronic infections.

+ Pregnant women.

+ Cases of alcoholism.

+ The cases are being treated for NS.

Patient has been transfusion or lipid-rich products. Patients are taking vitamin B12, taking iron-containing drugs, oral contraceptives and some drugs that alter serum iron levels.

Research Method: Research method according to cross-sectional descriptive method.

Patients are carried out clinical examination and tests to diagnose NS, eligible for inclusion in the research group.

Tests are conducted on Cobas analyzers, at Labo of Hue University of Medicine and Pharmacy Hospital, a reputable and reliable hospital. Before the test, instruct patients to eat normally, not to eat or drink foods containing high amounts of iron. All tests are done when the patient first arrives in the hospital, has blood drawn in the morning and has not eaten.

Quantification of serum iron, ferritin and transferrin concentrations by immunoturbidity measurement.

Normal values of serum iron, transferrin and ferritin concentrations

Type	Normal Value
Serum iron	5,83-34,5 µmol/l
Serum transferrin	2-3,6 mmol/l
Serum ferritin in men	30-400 pmol/l
Serum ferritin in women	15-150 pmol/l

Test for serum protein, serum albumin and proteinuria at the same time as serum iron, ferritin and transferrin.

- Processing data according to the method of medical statistics, Excel 2007.

Research Results

General characteristics of the subject of the study group:

Table 1. General characteristics of the subject of the study group

General characteristics	Rate	Male		Female		Total	
		n	**%**	**n**	**%**	**n**	**%**
Age	<30	32	47.0	6	8.8	38	55.8
	30-50	8	11.8	7	10.3	15	22.1
	>50	11	16.2	4	5.9	15	22.1
	$\overline{X}$CI 95%	24 (27.7-37.6)		42 (28.5-46.1)		33.4 (29.1-37.6)	
Occupation	Officer	21	30.9	5	7.3	26	38.2
	Farmer	19	27.9	8	11.7	27	39.7
	Homemaker	11	16.2	4	5.9	15	22.1
Area	Urban	24	35.3	9	13.2	33	48.5
	Rural	27	39.7	8	11.8	35	51.5
Total		**51**	**75**	**17**	**25**	**68**	**100**

Male accounted for 51 patients (75%), female 17 patients (25%), the difference is statistically significant with $p<0.05$. The average age of the study team is 33.4. Occupation in agriculture accounts for 39.7% and in rural areas 51.5%.

Test results of the study group:

Table 2. Results of biochemical tests of the study group

Test results		Rate		Overall average
		n	**%**	
Serum protein (*gram/L*)	<40	7	10.3	**44.4** *CI 95%: 43.2-45.6*
	40-60	61	89.7	
Serum albumin (*gram/L*)	<20	62	91.2	**16.4** CI 95%: 15.7-17.1
	20-40	6	8.8	
Proteinuria (*gram/24 hours*)	3.5-5	12	17.6	**9.7** *CI 95%: 8.4-11.5*
	5-10	30	44.1	
	>10	26	38.2	
Serum iron (*μmol/L*)	Low	21	30.9	**8.9** *CI 95%: 8.1-9.7*
	Normal	47	69.1	
	High	0	0.0	
Serum transferrin (*mmol/L*)	Low	68	100	**0.68** *CI 95%: 0,64-0.72*
	Normal	0	0.0	
	High	0	0.0	
Serum ferritin (*pmol/L*)	Low	0	0.0	**610.3** *CI 95%: 521.9-699.2*
	Normal	22	32.4	
	High	46	67.6	

The Serum albumin<20 grams/L accounts for 91.2% (62 cases), the average concentration was 16.4 grams/L. Proteinuria concentration was mainly over 5 grams/day, accounting for 82.3% (56 cases), the average concentration was 9.7 grams/day.

The serum iron concentration at a low level <5.83 µmol/l, accounting for 30.9%, the average concentration was 8.9 µmol/L. In 100% of cases, the serum transferrin concentration was lower than normal, the average concentration was 0.68 mmol/L. Serum ferritin at high levels accounted for 67.6% (46 patients), average concentrations were 610.3 pmol/L.
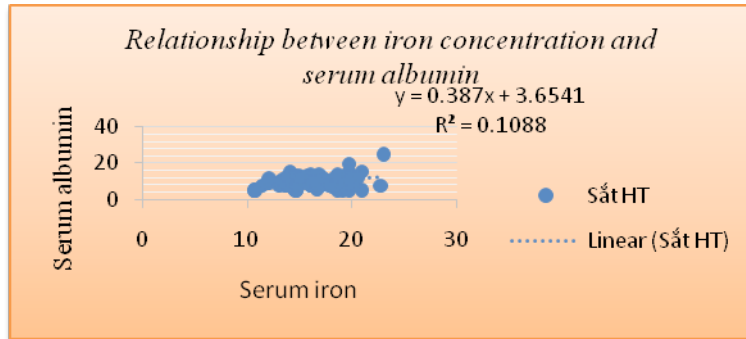
Figure 1. Relationship between iron concentration and serum albumin

There is a moderatepositive correlation between the iron concentration and serum albumin, through the linearregression equation y = 0.387x+3.6541 and the correlation coefficient r = 0.34, with a difference of p <0.05
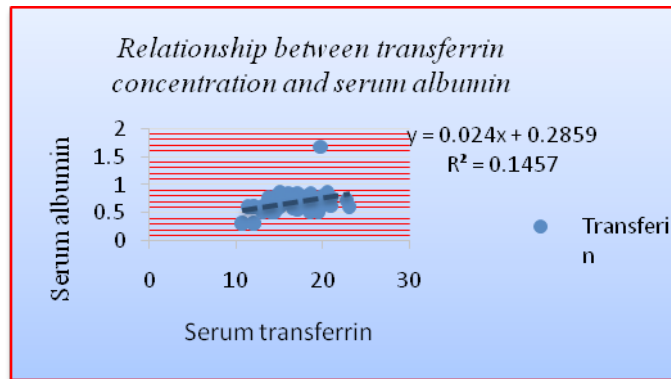
Figure 2. Relationship between transferrin concentration and serum albumin

There is a moderate positive correlation between the concentration of transferrin with serum albumin, using a linear regression equation of y = 0.024x+0.2859 and correlation coefficient r = 0.38, with difference p <0.05.
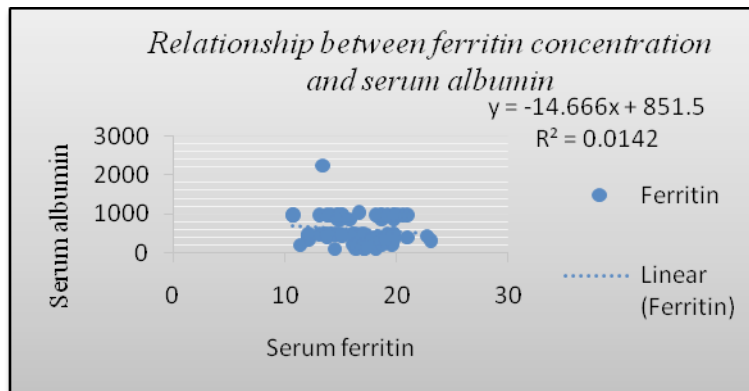
Figure 3. Relationship between ferritin concentration and serum albumin

There is a moderate negative correlation between the average ferritin concentrations with serum albumin, through linear regression equation y = -14.666x+851.5 and the correlation coefficient r = 0:38, with the difference p <0.05.

Discussion

Iron is an important component in the synthesis of hemoglobine and myoglobine, in addition iron also participates in some redox enzymes such as catalase, peroxydase and cytochrome.In NS the loss of transferrin in the urine is sufficient to reduce the serum transferrin concentration, the decrease in transferrin concentration can lead to iron deficiency and iron deficiency anemia. For ferritin has been identified as a predictor of the development and progression of atherosclerosis and is often elevated in NS[3],[4],[5], iron deficiency will cause iron deficiency anemia and affect the metabolism of cells due to a deficiency of iron-containing enzymes, but iron overload in the body also causes iron stagnation in the tissuessuch as heart, liver, endocrine glands, atherosclerosis, ...In NS the greater the decrease in serum albumin, the more pronounced these disturbances. Therefore, in NS, prolonged disturbance of iron, transferrin and ferritin factors will make treatment more difficult and the prognosis of NS becomes worse [2],[8].

The changes in serum iron, transferrin and ferritin concentration through data in Table 3.2 showed that up to 21 patients had lower than normal iron serum concentration (<5.83 µmol/l), accounting for 30.9%; The average serum iron concentration was 8.9 µmol/L. Iron deficiency in NS is a risk factor for kidney damage. In the body of macrophages that release iron periodically during the day with the highest iron release in the morning and lowest in the afternoon, it is important to consider the timing of the test, however the iron test in our study was to draw blood in the morning so this is a reflection of the highest iron concentration of the patient[1].

The correlation between transferrin synthesis and hepatic albumin synthesis suggests that transferrin synthesis is a component of the overall response to protein synthesis in patients with NS. This suggests that the therapeutic approach to maximize the serum transferrin concentration in nephrotic patients is primarily based on a reduction in proteinuria[1],[2]. Data in Figure 3.2 show that, in 100% of cases, NS had a lower than normal serum transferrin concentration, the highest serum transferrin concentration was 1.68 mmol/L, the lowest was 0.32 mmol/L and the average concentration was 0.68 mmol/L. This shows that in NS, the more proteinuria is lost, the lower the serum transferrin, and the higher the risk of iron deficiency anemia.

Ferritin is a high molecular weight protein that reflects the level of iron reserves in the body, but can also increase responsiveness in some acute illnesses. Increased serum ferritin in NS patients has been associated with loss of proteinuria[1]. The results of the study data in Table 3.2 also showed that the serum ferritin concentration increased 67.6% (46 patients), there was no case at low level and the average concentration was 610.3 pmol/L. This is also consistent with the result of excessive proteinuria loss in our patient group. Increased serum ferritin indicates the degree of cardiovascular risk in NS, especially in cases of dyslipidemia. Compared with the study of Nguyen Tran Kien[9], the rate of ferritin increase in NS is 58%, which is lower than our study, which may be explained by our patient group has blood albumin is too low.

Regarding the relationship between the iron concentration and serum albumin, the results in Figure 3.1 show that there is a moderate positive correlation between the iron concentration and serum albumin, with a linear regression equation of y = 0.387x+3.6541 and the correlation coefficient r = 0.34, the difference is statistically significant with p <0.05. Regarding the concentration of transferrin with serum albumin, the results in Figure 3.2 show that, there is a moderate positive correlation between the transferrin concentration and serum albumin concentration with a linear regression equation of y = 0.024x+0.2859 and the correlation coefficient r = 0.38, the difference is statistically significant with p <0.05. Regarding the concentration of ferritin and serum albumin, the results in Figure 3.3 show that, there is a moderate negative correlation between the concentration of ferritin and serum albumin and the linear regression equation is y = -14.666x+851.5 and the correlation coefficient r = 0.38, the difference is statistically significant with p <0.05. Thus in NS serum albumin concentration positively correlated with iron concentration and transferrin, but negatively correlated with serum ferritin concentration.

Conclusion

Through the study of serum iron, transferrin and ferritin concentrations of 68 NS adult patients without

renal impairment, aged 16 years and over, we reach the following conclusions:

The average concentration of serum iron and transferrin is lower than normal, especially transferrin concentrations, while serum ferritin concentrations are often elevated in NS patients.

The serum albumin concentration positively correlated with iron concentration and transferrin, but negatively correlated with serum ferritin concentration.

Ethical approval statement: The study proposal was approved by the Ethics Committee for Biomedical Research of University of Medicine & Pharmacy, Hue University. In addi- tion, approval for data collection at the sites was obtained from Hue Medical University Hospital. The interview of study subjects was performed with their verbal permission after they were given adequate infor- mation about the study.

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Instruments for Screening Obstructive Sleep Apnea in Drivers of Commercial Vehicles: A Systematic Literature Review

Lelitasari[1], L. Meily Kurniawidjaja[2], Robiana Modjo[3]

[1]Doctoral Student of Public Health, [2]Profesor of Public Health, [3]Lecturer of Public Health, Faculty of Public Health, Universitas Indonesia

Abstract

Background: Undiagnosed Obstructive sleep apnea in commercial vehicle drivers has the potential to cause traffic accidents. Polysomnography is the gold standard for diagnosing obstructive sleep apnea, but it is expensive, impractical, and not available in primary health services in the workplace.

Objective: This systematic literature review aimed to identify and evaluate the Obstructive Sleep Apnea screening instruments that have been used on commercial vehicle drivers in the past 10 years.

Method: A review was conducted to analyze the latest research related to the use of instruments for screening Obstructive Sleep Apnea in commercial vehicle drivers. Publications from December 2009 through December 2019 were identified using EBSCO, Science Direct, ProQuest, SpringerLink, and SAGE Publications. The research included was published in English and concerns the use of Obstructive Sleep Apnea screening tools among commercial vehicle drivers (i.e., truck, taxi, commercial vehicle, and public transportation drivers). The screening employed various questionnaires, the measurement of biological parameters (body mass index [BMI], neck circumference, blood pressure, Mallampati score), and polysomnography. Each article was analyzed according to these criteria, and its relevance was assessed.

Result: The initial screening inclusion criteria produced 10 relevant studies. All the studies used instruments to screen Obstructive Sleep Apnea in commercial vehicle drivers, and they all indicate that using obstructive sleep apnea screening instruments is useful for identifying Obstructive Sleep Apnea cases in commercial vehicle drivers.

Conclusion: The Obstructive Sleep Apnea screening instruments provided information through the use of a questionnaire and the examination of biological parameters. The Berlin and STOP-Bang questionnaires have good sensitivity and specificity, making them suitable tools for Obstructive Sleep Apnea screening in commercial vehicle drivers.

Keywords: *OSA, sleep disorder, snoring, professional drivers, accident, screening tools.*

Introduction

Obstructive sleep apnea (OSA) is a commonly undiagnosed condition, there being an 80%–90%

Corresponding Author:
Lelitasari
Department of Occupational Health and Safety, Faculty of Public Health Universitas Indonesia
e-mail: lelita4life@gmail.com

possibility that those who have it are unaware of their condition. Drivers with OSA who are not being treated are at greater risk of having a traffic accident related to sleep problems[1], and an estimated 7% of traffic accident injuries in the male driver population are linked to OSA[2].

OSA is a respiratory disorder in sleep caused by the relaxation of the pharyngeal muscles and characterized by a decrease or total stoppage of airflow despite continuing attempts to breathe. Most people with OSA

snore loudly, and they repeatedly stop breathing when the airflow is reduced or blocked during sleep. Apnea is characterized by a reduction in airflow of up to 90% for at least 10 seconds (30% for hypopnea) followed by a decrease in blood oxygen level of up to 3%–4%[3]. OSA prevalence varies greatly around the world, ranging from 9% to 38%, and is higher in the male population[4].

The severity of OSA is determined by the total amount of apnea or hypopnea that occurs during sleep. The average hourly number of incidents that occur during sleep is called the Respiratory Disturbance Index or Apnea/Hypopnea Index (AHI). An AHI of fewer than five episodes/hour is considered normal while 5–15 episodes/hour is categorized as mild sleep apnea, 15–30 episodes/hour as moderate sleep apnea, and 30 or more episodes/hour as severe sleep apnea[5].

OSA has two main pathophysiological consequences: the disruption of sleep and the desaturation of oxygen. Sleep disruption can cause excessive sleepiness[6], which reduces quality of life[7] and increases the risk of traffic accidents[8].

The gold standard for OSA diagnosis is the polysomnographic examination (PSG), but its use is limited because it is costly and time consuming[9][10], so there is an urgent need for a reliable OSA screening tool to help doctors decide which patients should be referred to a sleep clinic. Self-reported questionnaires constitute a good first step in clinical research [11], and instruments that are practical and easy to use are also needed in the workplace.

This research reviews the OSA screening instruments that have been used on commercial vehicle drivers in the past 10 years.

Material and Method

The scope of this study included a review with a five-stage methodological framework consisting of (1) identifying research questions, (2) identifying relevant studies, (3) selecting studies, (4) graphing the data, and (5) compiling, summarizing, and reporting the research results[12]. In addition, the Preferred Reporting Items for Systematic Reviews and Meta-Analysis[13] was implemented although the protocol had not been previously registered. The review's research question was: Which method have been used to track the OSA of commercial vehicle drivers over the past 10 years?

The literature was searched through online databases, and articles were deemed suitable for consideration if they were written in English and provided relevant information on sleep apnea diagnostic procedures for commercial vehicle drivers. Bibliographies were searched manually to discover other research related to the topic.

Search Strategy: The search strategy employed a combination of relevant keywords: (obstructive sleep apnea OR sleep apnea) AND fatigue AND (driver OR drivers OR commercial drivers OR truck drivers OR taxi drivers) AND (accident OR accidents) AND (measurement OR method OR instrument).

An identified article was included in the study if it met the following criteria: (a) it was published in a public health academic journal and was freely available; (b) the study identified at least two to three of the following: sleep apnea, obstructive sleep apnea, driver, drivers, commercial drivers, accident, accidents; (c) the research was conducted anywhere in the world; (d) it used either quantitative or qualitative method. Only articles published in English from December 2009 through December 2019 were included.

To reduce the potential for observer bias, the title and abstract were identified by two authors (LS and LMK), and their relevance was reviewed. The full text of the potentially relevant article was then reviewed and analyzed separately based on the eligibility criteria and discussed with the third author (RM) for final approval to be included in the review. The information taken from the study included: (1) author, (2) title, (3) year of publication, (4) location/country, (5) language, (6) population, (7) instrument, (8) obstructive sleep apnea, (9) drivers, and (10) accidents.

Results

Study Search and Selection: When searching the literature, we identified 44 studies in the identification step. After duplicates were removed, 20 studies remained. Of these, 10 articles were excluded during the next analysis because they did not provide information on the topic of interest. Finally, 10 studies qualified with the inclusion criteria and were selected for extraction of the data (Fig. 1).

General Study Characteristics: The selected studies were conducted in both developed and developing countries: two in Italy[14,15], one in South

Korea[16], one in the US[17], one in China[18], one in Turkey[19], two in Iran[20][21], and two in Serbia[22,23]. The target populations included truck drivers[14,15], commercial vehicle drivers[17,19–23], taxi drivers[18], and public transport drivers[16].

Quality Assessment: All of the studies had good reporting quality, and they all addressed questions and problems that were clear and focused, with research method suitable for answering the research questions. Several studies did not determine statistical significance or confidence intervals in the outcomes of their tests.

Use of OSA Screening Instruments: Among the 10 studies on commercial vehicle drivers, all used a combination of instruments in the form of questionnaires and examinations of biological parameters to screen for OSA with the exception of a study that used only one instrument, the Berlin questionnaire [16]. One to four distinct instruments were used in each study. Two studies used two instruments [17,20], five studies used three instruments [14,15,19,21,23], and two studies used four instruments [18,22].

The Epworth Sleepiness Scale (ESS) was the most commonly employed instrument, with nine studies using it [14,15,17–22]. The ESS is a basic test used to assess daytime sleepiness. The ESS consists of eight-item questions with scores ranging from 0 to 24, and a scores of >10 suggests excessive sleepiness[23] and indicates that OSA is the significant cause of excessive daytime sleepiness [24].

The self-completed Berlin questionnaire, which was developed to identify OSA in practitioners in primary health care, was used in five studies [14,16,19,20,23]. It comprises three parts: one on snoring, the second on drowsiness and fatigue during the day, and the third addressing medical history, anthropometric measurements, hypertension, and BMI. If two or more categories are recognized as positive, patients are considered to be highly prone to OSA [25].

The STOP-Bang questionnaire, used in four studies[15,18,21,22], consists of eight questions (yes/no) on the clinical symptoms of sleep apnea and produces a total score of 0–8. This questionnaire (which stands for **s**noring, **t**iredness, **o**bserved apnea, high blood **p**ressure, **B**MI, **a**ge, **n**eck circumference, and male **g**ender) was specifically developed to meet the need for a screening tool that is reliable, concise, and easy to use[26].

The Pittsburgh Sleep Quality Index (PSQI), a self-completed questionnaire assessing sleep quality and sleep disturbances over a one-month interval, was used in two studies [15,21]. Nineteen individual items produce seven "component" scores for subjective sleep quality, sleep latency, sleep duration, sleep efficiency habits, sleep disturbance, use of sleeping pills, and daytime dysfunction [27].

PSG, the gold standard for diagnosing OSA, was used in two studies [22,23]. Nocturnal PSG is the standard procedure for making an objective diagnosis of OSA, but it is expensive, not easily accessible, and unsuitable for screening at work [28].

One study used the Mallampati scores [14], and two studies measured biology parameters (body mass index (BMI), neck circumference, and blood pressure) [17,22].

Discussion

The results of various studies indicate that drivers with symptoms of OSA are 2–12 times more likely to experience traffic accidents than drivers without such symptoms [29]. Individuals with OSA show intermittent hypoxia [30] that reduces frontoparietal activation and leads to a failure in top-down prefrontal control and attention [31]. This condition tends to inhibit executive functioning, alertness, ongoing attention, and cognitive performance [32].

This study found that the combination of self-completed questionnaire instruments with the examination of biological parameters produced results that could be used to predict OSA's risk of causing accidents and psychological distress. The study by [15], which used the STOP-Bang, ESS, and PSQI method, found that half of the participants (51.1%) had OSA and that 19.8% reported psychological distress. A study conducted by [14], using the Berlin questionnaire, the ESS, and Mallampati ratings, found that OSA in patients substantially predicted the outcomes of motor vehicle accidents and near collisions. The results of the Berlin questionnaire in research conducted by [20] showed a high risk of a rise in accident rates for people with OSA. In the study of [22], the STOP-Bang questionnaire (Serbian version) demonstrated an adequate specification validity and standard, which merit its continued use as a screening tool to diagnose OSA in commercial drivers. With the STOP-Bang achieving 100% sensitivity at AHI>15, having the highest specificity at 53.3% (AHI ≥5), it can be used as a reliable screening tool.

Sunwoo, et all used the Berlin questionnaire to determine the prevalence of OSA and found that, in high-risk groups,the prevalence of OSA in men was 19.8% while in women it was only 11.9% [16]. Olszewski and Wolf used the ESS, and its biological parameters identified 36% of commercial drivers as being at risk of OSA[17]. Zhang, et al combined the STOP-Bang, the ESS, the Driver Behavior Questionnaire, and the Driver Skill Inventory on taxi drivers [18]. The results showed that the driving ability of those at highrisk of OSA was worse than that of drivers at low risk because OSA causes memory lapses and affects risk perception. In their research using the Berlin questionnaire, the ESS, and the Psycho Technical Assessment System. Demirdogen, et al found that cognitive-psychomotor functioning could be impaired in persons with obesity and a high risk of OSA [19]. Popevic,et al used the Berlin questionnaire and found that 35% of the subjects potentially had OSA. This was confirmed using PSG, which diagnosed 58% of the subjects with OSA. The Berlin Questionnaire has a sensitivity from 50.9% (AHI $\geq$5) up to 75% (AHI $\geq$ 30) and a specificity of 70.5% to 86% [23].

The present research found that the STOP-Bang has a higher sensitivity (100%) than the Berlin questionnaire (50.9%–75%) while the specificity of the Berlin questionnaire was higher (70.5%–86%) than that of the STOP-Bang (whose highest was 53.5%). Questionnaires and the measurement of simple biological parameters have the potential to screen commercial vehicle drivers who are at high risk of suffering from OSA. This will increase the attention and alertness of occupational health physicians, occupational safety and health teams, and related parties in the workplace to the possibility of commercial vehicle drivers suffering from OSA. It is expected that identifying drivers of commercial vehicles suffering from OSA will reduce the risk of accidents.

Conclusion

This study provides information on a variety of self-completed questionnaire instruments and measurements of biological parameters that can be used to screen OSA in commercial vehicle drivers. The commonly used questionnaire is the ESS in combination with other questionnaires, namely the Berlin questionnaire, the STOP-Bang, and the PSQI. The measurement of biological parameters consists of the Mallampati score, BMI, neck circumference, and blood pressure. The Berlin and STOP-Bang questionnaires have good

sensitivity and specificity, making them suitable tools for OSA screening in commercial vehicle drivers.

This research also shows that subjects with the potential of having OSA have a higher risk of having traffic accidents, near collisions, psychological distress, worse driving ability, memory lapses, reduced risk perception, and disturbed cognitive-psychomotor functioning.

Conflicts of Interest: The authors declare that they have no conflicts of interest in this study.

Ethical Clearance: Submit to The Ethic Review Board of The Faculty of Public Health, University of Indonesia

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Prediction Analysis of
Cancer Cells Using ML Classification Algorithms

M. Parvathi[1], Ch. Manaswini[2]

[1]Professor, [2]Student, Department of Electronics and Communication Engineering,
BVRIT Hyderabad College of Engineering for Women, Telangana, India

Abstract

Background: Breast Cancer is one of the most occurring cancers among all the diseases in medical science. About 1 in 8 women are suffering from breast cancer in their lifetime. In 2020, an estimated 276,480 new cases of invasive breast cancer are expected to be diagnosed in women along with 48,530 new cases of non-invasive breast cancer. Apart from women, men are also suffering from breast cancer, but the rate of occurrence is low in men.

Aim: To classify the breast cancer cells from original mammographic images using processing steps of Gaussian smoothing, Threshold segmentation, Feature Extraction.

Methodology: Breast cancer datasets are collected and preprocessed using attributes-like Menopause, Node-Capes, INV Nodes, Irradiate and Class. Three Machine Learning classifiers such as Bagging, Naive Bayes, and Naive Bayes Multinomial are applied for the classification analysis.

Results: Bagging classifier gives efficiency in the range of 77-86% when we consider Menopause, Node-Capes and Irradiate attributes and Naive Bayes classifier gives efficiency in the range of 71-78% for INV-Nodes and Class attributes.

Conclusion: It is observed that the bagging classifier gives best efficiency when we consider Menopause, Node-Capes and Irradiate attributes and Naive Bayes is best suits for INV-Nodes and Class attributes.

Keywords: *Weka explorer, dataset, Threshold segmentation, ML Classifiers.*

Introduction

The basic cancer cells are either from forming solid tumors or flood of blood from the abnormal cells. In general cell division is required for body growth and repair. In the cell division, the parent cell divides into sub cells called daughter cells. These daughter cells play a key role further to be used in generating new tissue or to replace the dead cells due to aging or by damage. A healthy cell stops itself by dividing into daughter cell when there is no longer a need for more daughter cells. In contrast, a cancer cell continues to produce copies.

Corresponding Author:
Dr. M. Parvathi
Professor, Department of ECE, BVRIT Hyderabad
College of Engineering for Women, Telangana-500049
e-mail: pbmuddapu@gmail.com

Breast Cancer is one of the most exquisite and internecine diseases among all of the diseases in medical science. It is one of the crucial reasons of death among females all over the world. About 1 in 8 women (about 12%) are suffering from invasive breast cancer over the course of their lifetime. In 2020, an estimated 276,480 new cases of invasive breast cancer are expected to be diagnosed in women along with 48,530 new cases of non-invasive breast cancer.

In the year 1994, a research on WEKA Explorer has been done by Geoffrey Holmes, Andrew Donkin and Ian H and a paper named WEKA[1], a Machine Learning Workbench has been published. In this paper there is a detailed explanation given about what is WEKA Explorer.

They have tried enabling the machine learning schemes to be applied directly to the data in the database

in much the same way as systems that perform knowledge discovery in databases. This makes the users to use data from WEKA instantly into their projects comfortably.

In the year 1994, experts from the Department of Information and Computer Science Aalto University School of Science, Espoo, Finland have researched on the Classification with Learning Naive Bayes.In the year 1998, a publishing on Naïve Bayes Multinomial text has been done by Andrew McCallum and Kamal Nigam[2].This publishing concludes that to clarify the confusion by describing the differences and details of these two models, and by empirically comparing their classification performance on five text corpora. From the research they have given a conclusion of what is Naive Bayes algorithm and what is its implementation. Their experimental results on two abstract image datasets demonstrate the advantage of the multiple kernel learning frameworks for image affect detection in terms of feature selection, classification performance, and interpretation.

In the year 2003, there has been a research done on Image Processing techniques preceded by Artificial Neural Network by Zhi-Hua Zhou, & Yuan Jiang[3]. From this publication they have given a conclusion about the comprehensibility being very important for any machine learning technique to be used in computer-aided medical diagnosis.

In the year 2011, research on another Machine Learning classifier, Bagging. Breast Cancer classification using Bagging was done by authors namely M. A. Pradhan et.al[4]. Through this publication, they have concluded that breast cancer detection is very important in the field of medical science as well as Bioinformatics. The biomedical process like as image processing, the electrical processes like sensing from patient are erroneous because the accuracy of these processes is not stable all the time because of the limited lifetime of instrument.

In the year 2013, there has been a publishing on Digital Image Processing by Tina R. Patil and S.S. Shereker[5].This publication revealed that the digital image processing is far from being a simple transpose of audio signal principles to a two dimensions space.

From the recent publishing of Gaussian Smoothing by Lundin M, Lundin J, Burke HB and ToikkanenS[6], there has been a conclusion about Gaussian Smoothing that denoising method that introduce better smoothness

that is much required for lowering SNRs. Summarizing all of these results, wavelet denoising method that introduce relatively little smoothness are generally preferable over Gaussian smoothing for denoising.

Thresholding is a step needed after Gaussian smoothing, in which each pixel in an image has its own threshold, which is estimated by calculating the statistical information of its neighbourhood pixels. Experimental results show that it is apparent to obtain better results by the proposed algorithm than by cannyoperator [7, 8].

Recent publications[9, 10, & 11]reported are on Deep Learning Method for automated breast cancer diagnosis using different classifiers like CNN, KNN, Inception V3, SVM and ANN concludes that better accuracy for detection of Breast cancer and analysis using WEKA explorer.

With the reference to all the papers above it is observed that detection and classification of cancer cells includes many steps to be performed in the present scenario. This paper presents an idea of detection and classification of cancer cells into benign and malignant using few machine learning algorithms by taking few attributes based on which cells are classified. The mammographic images are collected from the specialists; from that the breast cancer cells are identified and further they are classified into Benign and Malignant cells using machine learning classifiers namely Bagging, Naive Bayes and Naive Bayes Multinomial Text. The major attributes considered in our work are Menopause, Node-Capes, INV-Nodes, Irradiated and Class. We have performed the required Image Processing techniques like Gaussian-Smoothing Threshold Segmentation for the preprocessing the mammographic images and then ML algorithms are applied on the extracted features using WEKA Explorer for the classification of cells. Finally the performance of all the three classifiers is analyzed and observed for higher efficiency of a particular classifier pertains to a chosen attribute.

Section 2 discussed about flowchart, the methodology used in our work. Section 3 gives the details on Weka explorer. Section 4 discussed about the attributes which are used for the classification. Section 5 gives the details on machine learning algorithms and classifiers which are used in our work along with conclusions respectively. Section 6 & 7 gives analysis and conclusions respectively.

Flow Chart Description: Before proceeding to classification of cells, the preprocessing steps are required as shown in Fig.1, which are followed like Gaussian smoothing and threshold segmentation for original mammographic images. These are performed in order to do the partition of the image into different segments based on pixel intensity values. After extracting the features of the cancer cells, then machine learning algorithms are applied to the feature extracted data so that the cells are classified as cancerous and non-cancerous.
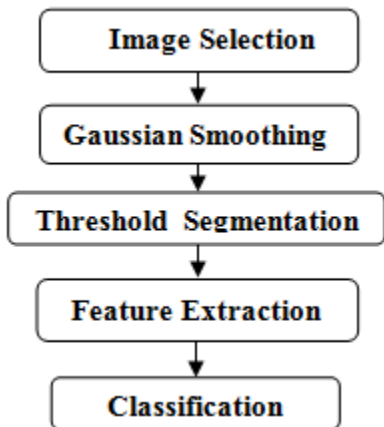
Fig. 1. Preprocessing steps before classification

(a) **Image Selection:** In this step we have collected a few original mammographic images from specialists, as shown in Fig. 2. Further Gaussian smoothing and threshold segmentation steps are performed as part of image preprocessing techniques.

(a)   (b)
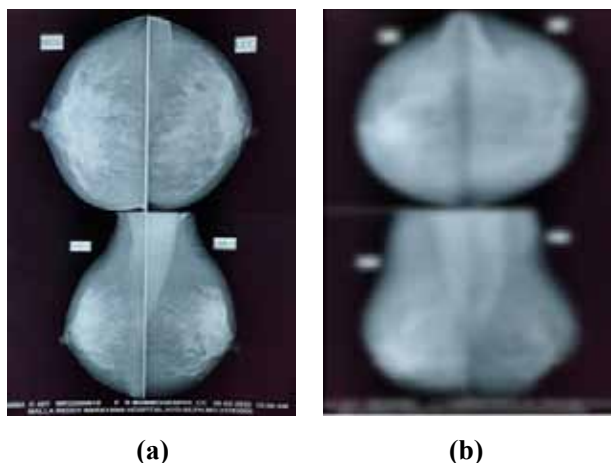
Fig. 2. Results of Gaussian smoothing step, Original mammographic Image (a), Gaussian smoothing image with variance 0.5 (b)

(b) **Gaussian Smoothing:** In image processing, Gaussian smoothing is the result of blurring an image by a Gaussian function. The result of blurring technique is a smooth blur that resembles the image seen through a translucent screen.

We have performed Gaussian smoothing to the selected mammographic images with two different variance values. After Gaussian smoothing step applied, the resulted images are as shown in Fig. 2a & 2b respectively.

(c) **Threshold Segmentation:** After performing Gaussian smoothing to the original mammographic images, the smoothened images are segmented using threshold segmentation technique. In this stage, we have assumed threshold values arbitrarily and observed a better threshold value for which the cells are able to categorize. The images after threshold segmentation step applied for the Gaussian outputs are as shown in Fig. 3.

(a)   (b)
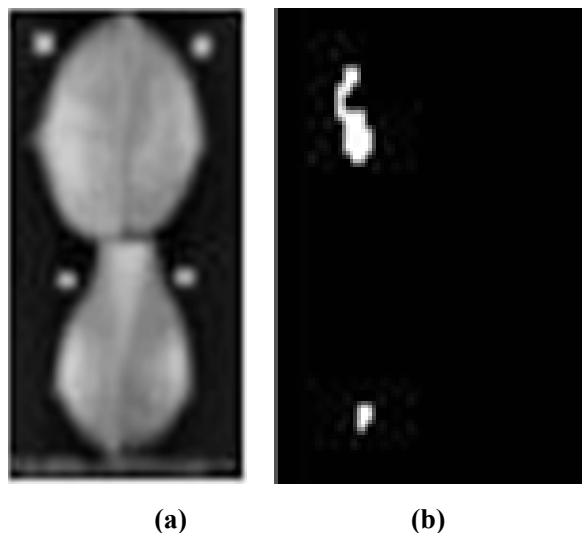
Fig. 3. Threshold segmentation for image (a) using threshold value of 0.75

(d) **Feature Extraction:** Feature extraction step is carried out on 200 breast mammograms and the results are tabulated in database, which consists of minimum to maximum range of feature values.

(e) **Classification:** In this stage, we have implemented different Machine Learning classifiers like Bagging, Naive Bayes and Naive Bayes Multinomial Text classifiers to observe number of correctly classified and incorrectly classified cells based on the chosen attributes. Further to classify cancer cells into benign and malignant.

Weka Explorer: Weka contains a collection of visualization tools and algorithms for data analysis

and predictive modeling, together with graphical user interfaces for easy access to these functions. Dataset is collected from the UCI Repository database which consists of mammographic image data in numerical form as shown in Fig.4.

Cell attribute	Menopause	Nodecapes	Inv nodes	Irradiat	Class
1000025	5	1	1	1	2
1002945	5	4	4	5	7
1015425	3	3	1	1	2
1016277	6	8	8	1	3
1017023	4	1	1	3	2
1017122	8	1	1	1	2
1018099	1	2	1	2	1
1018651	2	1	1	1	2
1033078	2	2	1	1	1
1033078	2	5	3	3	3
1035283	4	8	7	5	10
1036172	2	5	3	3	3
1041801	5	7	5	4	3
1043999	1	2	1	1	1
1044572	8	7	5	6	4
1047630	7	4	1	1	1
1048672	4	1	1	2	1
1049815	1	7	3	2	10

Feature Extracted Dataset

Fig. 4. Dataset from UCI Repository database

Attributes Used For Classification:

(a) **Menopause:** Hormonal imbalance such as continuous exposure to estrogen leads to high risk of breast cancers. In this scenario, women with natural menopause are more likely to prone to develop cancers as twice as high because of hormonal disturbances. Hence, based on Menopause attribute breast cancer cells are detected and classified into benign and malignant.

(b) **Node-Capes:** One of the main reasons for the spread of breast cancer is the cancer cells get into the blood or lymph system. Once the cancer cells are mixed in the blood, they will spread to other parts of the body. If cancer cells have spread to lymph nodes, there is a higher chance that the cells could have travelled through the lymph system and spread (metastasized) to other parts of the body.

It is more likely to find the cancer in other organs in the body when more lymph nodes are affected with breast cancer cells. Because of this, finding cancer in one or more lymph nodes often affects treatment plans. Usually, we will need surgery to remove one or more lymph nodes to know whether the cancer has spread. Even now, it is not true to say that all women with cancer cells in their lymph nodes may develop metastases. Because, some women with no cancer cells in their lymph nodes may develop metastases later. Hence based on Node-Capes attribute cancer cells are detected and classified as benign and malignant.

(c) **INV Nodes:** INV Nodes are the number (range 0 - 39) of axillary lymph nodes that contain metastatic breast cancer visible on histological examination. Hence INV Nodes are taken as an attribute to detect and classify cancer cells as benign and malignant.

(d) **Irradiate:** Accelerated Partial Breast Radiation (APBI) uses high-powered x-rays to kill breast cancer cells. In general, external beam breast is given as a course will take 3 to 6 weeks for the overall treatment to complete. Current research suggests that APBI produces low local recurrence

rates that are comparable to the recurrence rates of whole breast irradiation. Hence Irradiate is to be considered as an important attribute in detecting and classifying cancer cells.

(e) Class: The term class label is usually used in the context of supervised machine learning. Class label is a discrete attribute used as dependent variable. The class label always takes on a finite (as opposed to infinite) number of different values. Hence Class is considered as an attribute in our work.

Machine Learning Algorithm Classifiers:

(a) Bagging: ML algorithms are mainly used in statistical classification and regression. Bagging is an ML ensemble meta-algorithm used to improve the stability and accuracy of ML model. The main advantage is, it reduces variance and further helps in avoid over fitting.

(b) Naive Bayes: Naive Bayes is a simple technique for constructing classifier models that assign class labels to problem instances, represented as vectors of feature values, where the class labels are drawn from some finite set. In case of naive Bayes classifiers, a particular feature will be selected so that its value is independent of the value of any other feature among the class variables.

(c) Naive Bayes Multinomial Text: In the case of a multinomial Naive Bayes classifier, it uses a multinomial distribution for each of the features. It is a specific instance of a Naive Bayes classifier.

Analysis:

(a) Menopause Attribute: We have considered attributes related to Menopause, Node-Capes, INV Nodes, and Irradiate for correctly classified cells, incorrectly classified cells in order to observe the efficiency in each of the algorithm applied. The corresponding results are observed as shown in Table 1, 2 and 3 using the algorithms Bagging, Naïve Bayes and Naïve Bayes Multinomial Text respectively.

Table 1. Attributes and efficiency variation using Bagging algorithm

Attribute/Algorithm	BAGGING				
Catagory of cells	INV Nodes Attribute	Menopause Attribute	Node-Capes attribute	Irradiate Attribute	Class Attribute
CORRECTLY CLASSIFIED CELLS	222	236	240	223	198
INCORRECTLY CLASSIFIED CELLS	64	50	38	63	88
EFFICIENCY(%)	77.6	82.5	86.33	77.97	69.23

Table 2. Attributes and efficiency variation using Naïve Bayes algorithm

Attribute/Algorithm	NAIVE BAYES				
Catagory of cells	INV Nodes Attribute	Menopause Attribute	Node-Capes attribute	Irradiate Attribute	Class Attribute
CORRECTLY CLASSIFIED CELLS	224	233	242	217	205
INCORRECTLY CLASSIFIED CELLS	62	53	36	69	81
EFFICIENCY(%)	78.3	81.46	87.05	75.87	71.67

Table 3. Attributes and efficiency variation using Naïve Bayes MT algorithm

Attribute/Algorithm	NAIVE BAYES MT				
Catagory of cells	INV Nodes Attribute	Menopause Attribute	Node-Capes attribute	Irradiate Attribute	Class Attribute
CORRECTLY CLASSIFIED CELLS	213	150	222	218	201
INCORRECTLY CLASSIFIED CELLS	73	136	56	68	85
EFFICIENCY(%)	74.47	52.44	79.85	76.22	70.27

Efficiency Analysis: After making comparisons among the three classifiers with different attributes we have observed the overall best efficiency using a particular classifier with a particular attribute. Efficiency analysisis shown in Table 4.

Table 4. Efficiency analysis among the chosen attributes

Efficiency Analysis		
ATTRIBUTE	ALGORITHM	EFFICIENCY(%)
MENOPAUSE	BAGGING	82.5
NODE-CAPES	BAGGING	86.33
INV-NODES	NAIVE BAYES	78.3
IRRADIAT	BAGGING	77.9
CLASS	NAIVE BAYES	71.6

Conclusions

In this paper, breast cancer cell classification is done using few machine learning algorithms. Initially few mammographic images were considered and applied few image processing steps for segregation of cancer and non-cancerous cells. The classification further has been used in datasets using attributes like menopause, INV Nodes, Node caps and class. Using efficiency parameter, we have concluded that bagging classifier is best when we use Menopause, Node-Capes, and Irradiate attributes. Similarly Naive Bayes Classifier gives the best efficiency when we consider INV-nodes and Class attributes.

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Conflict of Interest: Nil

Ethical Clearance: Taken from institutional ethical committee.

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Knowledge, Attitude and Practices towards COVID-19 among Undergraduate Students in a Medical College of Delhi

Madan Mohan Majhi[1], M. Meghachandra Singh[2], Amod L. Borle[3], Anjali Rajiv[4]

*[1]Senior Resident, [2]Director Professor, [3]Assistant Professor, [4]Junior Resident,
Department of Community Medicine, MaulanaAzad Medical College, New Delhi-2*

Abstract

Background: Medical students play an important role in the prevention and control of COVID-19 by way of disseminating knowledge regarding COVID-19 among the people. It is affected by their knowledge, attitude and practices about the disease.

Objectives: To assess the knowledge, attitudes, and practices (KAP) towards COVID-19 in undergraduate medical students.

Methodology: A quick online survey was carried out among 316 participants with a self-designed, structured questionnaire in the form of goggle form. Cronbach's alpha of the study instrument was 0.71.

Statistical Analysis: Data were analyzed by SPSS, version 25. Chi-square test, Student's t-test, ANOVA and post hoc analysis were done.

Results: A total of 316 participants completed the survey questionnaire. The mean COVID-19 knowledge scorewas 18.82 ± 2.27 and overall 90% had correct knowledge. Knowledge scores significantly ($p < 0.05$) differed across age-groups and semesters. In post hoc analysis, mean knowledge score in 2nd semester students (18.11 ± 2.55) was significantly ($p < 0.05$) lower than that of 8th semester (19.56 ± 1.66). Seventy percent respondents agreed that COVID-19 will finally be controlled, 77.2% had confidence that India will win the battle against COVID-19, and 90% of the respondents agreed that hand washing with soap water will prevent them from getting the infection. 96.2% participants avoid crowded places, 95.2% participants wore face masks while going outside home and 97.5%frequently washed hands with soap and water.

Conclusion: In this study majority undergraduate students had good knowledge, showed optimistic attitude and appropriate practice towards COVID-19. However, there is need and scope for improving knowledge and practices so that every student adopts preventive and promotive measures against COVID-19.

Keywords: *Attitude, COVID-19, knowledge, lockdown, Practices, undergraduate students.*

Introduction

Coronavirus disease 2019 (COVID- 19) is an emerging respiratory disease that is caused by a novel coronavirus and was first detected in December 2019 in Wuhan, China. The disease is highly infectious, and its main clinical symptoms include fever, dry cough, fatigue, myalgia, and case fatality rate of COVID-19 was 2.3% in China, much lower than those of SARS (9.5%), MERS (34.4%), and H7N9 (39.0%).[1-3]

The World Health Organization (WHO) declared it a public health emergency of international concern on January 30, 2020 and called for collaborative efforts of all countries to prevent the rapid spread of COVID-19.[4] On March 11, there were more than 118,000 cases in 114 countries, and 4,291 people had lost their lives globally

Corresponding Author:
Dr. Madan Mohan Majhi
Senior Resident, Department of Community Medicine,
Maulana Azad Medical College, New Delhi-2
e-mail: mad.an.doc82@gmail.com

and COVID-19 was declared as a pandemic by WHO.[5] In India, when there were 469 active cases of COVID-19, and 10 deaths Prime Minister ordered 21 days lockdown on 24th march 2020.[6]

The battle against COVID-19 is still continuing in India. People's adherence to these control measures are essential, which is largely affected by their knowledge, attitudes, and practices (KAP) towards COVID-19 in accordance with KAP theory. [7]

In this line the KAP towards COVID-19 of the health care worker is of far more important to make a visible dent in the ongoing pandemic. However, to be precise KAP study of the budding health care professionals (Medical students) are few, which justifies our study by contributing to scientific knowledge in understanding of COVID19 situation. Thus this study was undertaken to assess the knowledge, attitude, and practices (KAP) towards COVID-19 among undergraduate medical students in Maulana Azad Medical College, New Delhi, India.

Methodology

This cross-sectional survey was conducted from April 25 to May 25, 2020, one month after the nationwide lockdown in India (March 24th 2020). It was not feasible to do an interview during this lockdown period; so data was collected online. Using the students data base from institution, one-page questionnaire was posted/reposted to individual students and their groups on WhatsApp as a goggle link. Along with goggle link participant information sheet was also given describing a brief introduction on the background, objective, procedures, voluntary nature of participation, declarations of anonymity, confidentiality, and notes for procedure of filling in the questionnaire. Participants agreed to participate in the study were instructed to complete the questionnaire by clicking the link.

The Institutional Ethics Committee of Maulana Azad Medcal College, New Delhi approved our study protocol and procedures of informed consent before the survey. Participants had to answer a yes/no question to confirm their willingness to participate voluntarily. After confirmation of the consent, the participant was directed to complete the questionnaire.

Study Instrument: The questionnaire consisted of two parts: demographics and KAP. Demographic variables included age, gender, and current semester of MBBS.

According to guidelines for clinical and community management of COVID-19 by the Govt. of India[8] a COVID-19 knowledge questionnaire was developed by the authors. The questionnaire had 21 questions (Table 1): 4 regarding clinical presentations, 7 regarding routes of transmission, and 10 regarding prevention and control of COVID-19. These questions were answered on a true/false basis with an additional "I don't know" option. A correct answer was assigned 1 point and an incorrect/don't know was assigned 0 points. The total knowledge score ranged from 0 to 21, with a higher score denoting a better knowledge of COVID-19. The Cronbach's alpha coefficient of the knowledge questionnaire was 0.71 in our sample, indicating acceptable internal consistency. [9]

Attitude towards COVID-19 was assessed by using 3 questions about agreement on the final control of COVID-19, India's confidence in winning the battle against COVID-19 and agreement on frequent hand washing with soap and water from acquiring infection with COVID-19. Responses were recorded on "Agree", "disagree", and "I don't know" options. Respondents' practices were assessed by 3 behaviors in recent day (after start of the pandemic), going to a crowded place, wearing a mask when going out and frequent hand washing with soap and water. Responses were recorded using Yes/No options.

Statistical Analysis: Data analysis was conducted with IBM Statistical Package for Social Sciences (SPSS) Software version 25.0. Frequencies of correct knowledge answers and various attitudes and practices were described. Knowledge score, attitudes and practices of different persons according to demographic characteristics were compared with independent samples t-test, one-way analysis of variance (ANOVA), or Chi-square test as appropriate. Post hoc (Bonferroni) analysis was done to find out the mean difference by multiple comparisons. The statistical significance level was set at $p < 0.05$ (two-sided).

Results

A total of 316 participants completed the survey questionnaire. The Mean age was 20.29±1.59 years, range 18-27 years and 194 (61.4%) participants were male. Most of the respondents 122(38.6%) were studying in the 4th semester and 132(47.2%) were from the age group 19-20 years. Other parameters were given in **table 2**. The correct response to the knowledge questions (21

questions) on the COVID-19 varied from 56.3-99.4%. **(Table 1).**

Knowledge: The mean COVID-19 knowledge score was 18.82±2.27, minimum score obtained was 7 and maximum score was 21, suggesting an overall 90.4% (18.82/21*100) correct rate on this knowledge test. Knowledge scores significantly (P<0.05) differed across age-groups and semesters **(Table 2)**. In post hoc analysis mean knowledge score of 2nd semester students (18.11±2.55) was significantly lower than the knowledge score of 8th semester (19.56±1.66).

Attitude: Majority of the respondents agreed that COVID-19 will finally be successfully controlled (69.9%). Rates of reporting "disagree" and "I don't know" were 12.7% and 17.4%, respectively. Majority of the respondents (77.2%) had confidence that India will win the battle against COVID-19, while 8.2% had no such confidence. Ninety percent of the respondents agreed that hand washing with soap water will prevent from getting the infection while, 3.8 percent participants reported "disagree" and 5.4% reported they don't know. The attitude towards the final success in controlling COVID-19 doesn't differ significantly across gender, age group, and semester of the students. Mean knowledge score of the participants did not differ significantly with attitude towards successful control and India's winning against Corona. Whereas, mean knowledge score of the participants differ significantly (p<0.05) across response agree, disagree, and I don't know in case of attitude towards hand washing with soap and water for prevention. **(Table 3).**

Practice: Practice of the participants towards COVID19 is given in the **table 4**. 96.2% participants did not practiced going to crowded places, 95.2% participants were wearing masks when going outside and Majority (97.5%) practiced frequent hand washing with soap and water. The practice during COVID-19 doesn't differ significantly across gender, age group, semesters and knowledge score of the students.

Table 1: Participants response on knowledge questions towards COVID-19 (n=316).

	Aspects of knowledge	Correct Response	
		n	%
Q1.	The key diagnostic features of COVID-19 are fever, cough, and difficulty in breathing.	299	94.6
Q2.	All persons with COVID-2019 will develop to severe cases.	305	96.5
Q3.	Those who are elderly, have chronic illnesses, are more likely to progress to severe cases.	312	98.7
Q4.	Early symptomatic and supportive care can help most patients recover from the infection.	302	95.6
Q5.	The COVID-19 virus spreads via respiratory droplets of infected individuals.	304	96.2
Q6.	Persons with COVID-2019 cannot infect the virus to others when a fever is not present.	304	96.2
Q7.	The COVID-2019 virus is transmitted through Mosquito bites.	301	95.3
Q8	The COVID-2019 virus transmitted through pet animals.	250	79.1
Q9.	The COVID-2019 virus is transmitted by eating of non-vegetarian foods.	250	79.1
Q10.	Isolation of people who are infected with the COVID-19 virus is effective ways to reduce the spread of the virus.	312	98.7
Q11.	Healthy people who have contact with someone infected with the COVID-19 virus should be quarantine in a proper place. In general, the period is 14 days.	313	99.1
Q12.	To prevent the infection by COVID-19, individuals should avoid going to crowded places such as market and malls.	314	99.4
Q13.	It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus.	291	92.1
Q14.	Frequent hand washing with soap and water; use of alcohol base hand rub are effective ways to prevent from getting infection with COVID-19.	311	98.4
Q15.	The COVID-2019 virus can be killed by taking hot water bath.	240	75.9
Q16.	The COVID-2019 virus can be killed by scanning of skin with UV radiations	178	56.3
Q17.	Corona virus can be prevented by application of charcoal powder on forehead.	284	89.9

	Aspects of knowledge	Correct Response	
		n	%
Q18.	Corona virus can be prevented by application of cow dung on the body	302	95.6
Q19.	Corona virus can be prevented by drinking of cow's urine.	304	96.2
Q20.	Haemophilus Influenza type b (Hib) vaccine can prevent COVID-2019	233	73.7
Q21.	Pneumococcal vaccine can prevent COVID-2019	238	75.3

Table 2: Knowledge score of the participants

Variables	Participants		Knowledge score	Test of significance		
	n	%	Mean±SD	t/F	df	P
Gender						
Male	194	61.4	18.79±2.15	3.487	314	>0.05
Female	122	38.6	18.87±2.45			
Age group (Years)						
18-19	108	43.2	18.37±2.29	4.723	2;313	<0.05
20-21	135	42.7	18.86±2.48			
≥22	73	23.1	19.41±1.62			
Semesters						
II	72	22.8	18.11±2.55	4.437	4;311	<0.05
IV	122	38.6	18.79±2.28			
VI	60	19.0	19.13±2.20			
VII	48	15.2	19.56±1.66			
INTERNS	14	4.4	18.86±1.87			

Table 3: Attitude of the participants

Variables	n	Successful control (Q1 of attitude)			India's winning (Q2 of attitude)			Hand washing in prevention (Q3 of attitude)		
		Agree	Disagree	I don't Know	Agree	Disagree	I don't Know	Agree	Disagree	I don't Know
Gender										
Male	194	129(66.5)	30(15.5)	35(18.0)	146(75.3)	20(10.3)	28(14.4)	174(89.4)	10(5.2)	10(5.2)
Female	122	92(75.4)	10(8.2)	20(16.4)	98(80.3)	6(4.9)	18(14.8)	113(92.6)	2(1.6)	7(5.7)
Age group (Years)										
18-19	108	79(73.1)	11(10.2)	11(16.7)	83(76.9)	10(9.3)	15(13.9)*	97(89.8)	3(2.8)	8(7.4)
20-21	135	99(73.3)	15(11.1)	21(15.6)	114(84.4)	5(3.7)	16(11.9)	124(91.9)	5(3.7)	6(4.4)
≥22	73	43(58.3)	14(19.2)	16(21.9)	47(64.4)	11(15.1)	15(20.5)	66(90.4)	4(5.5)	3(4.1)
Semesters										
II	72	55(76.4)	6(8.3)	11(15.3)	55(76.4)	5(6.9)	12(16.7)	63(87.5)	3(4.2)	6(8.3)
IV	122	82(67.2)	18(14.8)	22(18.0)	93(76.2)	11(9.0)	18(14.8)	108(88.5)	6(4.9)	8(6.6)
VI	60	46(76.7)	4(6.7)	10(16.7)	54(90.0)	2(3.3)	4(6.7)	58(96.7)	0(0.0)	2(3.3)
VII	48	32(66.7)	7(14.6)	9(18.8)	36(75.0)	5(10.4)	7(14.6)	44(91.7)	3(6.3)	1(2.1)

Variables	n	Successful control (Q1 of attitude)			India's winning (Q2 of attitude)			Hand washing in prevention (Q3 of attitude)		
		Agree	Disagree	I don't Know	Agree	Disagree	I don't Know	Agree	Disagree	I don't Know
INTERNS	14	6(42.9)	5(35.7)	3(21.4)	6(42.9)	3(21.4)	5(35.7)	14(100.0)	0(0.0)	0(0.0)
Mean Knowledge Score		18.98±2.16	18.63±2.08	18.31±2.73	18.95±2.15	18.65±2.34	18.22±2.75	18.94±2.07	19.00±2.04	16.59±4.06*

*Differ significantly

Table 4: Practice of the participants

Variables	n	Going to crowded place (Q1 of practice)		Wearing mask (Q2 of practice)		Practicing frequent hand washing (Q3 of practice)	
		Yes	No	Yes	No	Yes	No
Gender							
Male	194	10(5.2)	184(94.8)	185(95.4)	9(4.6)	187(96.4)	7(3.6)
Female	122	2(1.6)	120(98.4)	116(95.1)	6(4.9)	121(99.2)	1(0.8)
Age group (Years)							
18-19	108	4(3.7)	104(96.3)	105(97.2)	3(2.8)	106(98.1)	2(1.9)
20-21	135	3(2.2)	132(97.8)	125(92.6)	10(7.4)	132(97.8)	3(2.2)
≥22	73	5(6.8)	68(93.2)	71(97.3)	2(2.7)	70(95.9)	3(4.1)
Semesters							
II	72	4(5.6)	68(94.4)	69(95.8)	3(4.2)	70(97.2)	2(2.8)
IV	122	3(2.5)	119(97.5)	115(94.3)	7(5.7)	119(97.5)	3(2.5)
VI	60	2(3.3)	58(96.7)	57(95.0)	3(5.0)	60(100.0)	0(0.0)
VII	48	0(0.0)	48(100.0)	47(97.9)	1(2.1)	47(97.9)	1(2.1)
INTERNS	14	3(21.4)	11(78.6)	13(92.9)	1(7.1)	12(85.7)	2(14.3)
Mean Knowledge Score		17.67±3.11	18.87±2.22	18.81±2.25	18.93±2.63	18.82±2.26	18.75±2.76

Discussion

In this study, the mean knowledge score was 18.82±2.27, and overall correct rate was 90.4% on this knowledge test. Similar finding in knowledge test was reported from north India by Maheswari and colleagues.[10] Lower rate of correct response (74.5%) was reported from a study in Mumbai with different knowledge questions.[11] A community based study from China also reported similar findings in knowledge score, but in general population.[12]

We found no significant difference in knowledge score across gender which is expected from the students in any educational institution. However, knowledge score was significantly different in semester and age group of the students which may be due to the difference in knowledge score of the students across the semesters.

Positive attitude towards COVID19 was shown by majority of the students (7 out of 10) in our study whereas, Maheswari et al., 2020 reported optimistic response in 4 out of 5 medical students in north India. Nearly, 4 out of 5 participants believed that India will win battle against COVID- 19 and 9 out of 10 respondents believed the role of frequent hand washing in prevention of COVID 19 infection. No significant difference was present in attitude of the students with regards to gender, age group and semester. Attitude towards frequent hand washing in prevention of COVID19 infection was significantly influenced by mean knowledge score the participants. This may be taken as action point for enhancing positive attitude towards frequent hand washing in infection prevention in those with less Knowledge score. The positive attitude of medical students towards COVID-19, may be related to the stringent measures taken by Indian

government i.e. announcement of nationwide lockdown. Furthermore, enhanced knowledge base of medical students compared to the general population may have provided weightage.

Medical students seem very cautious and practice stringent measures to safeguard them from infection. Majority (96.2%) of participants did not go to crowded places, 19 out of 20 students wore masks when going out and 97.5% practiced frequent hand washing during the COVID-19 outbreak. Practice of the students did not differ with respect to gender, age group, semesters and knowledge score of the participants. In contrary to this study, study from Dehradun reported significant difference in practice among genders.[10]

In spite of having good knowledge score; overall 90.4% correct rate; optimistic attitude the current study still showed that 2.5% gap in hand washing, and 5% did not wore mask. These potentially risky behaviors need to be identified on priority basis and addressed by adopting proper behavioral change communication and counseling.

The strengths of our study were that participants invited for the study during critical period of COVID-19 pandemic when the students were not present in the campus, and specifically addressed the issue for budding health care professionals (medical students).

Response bias cannot be overruled in the current study as it was online survey. As Sample was taken from only one institution, it may be non-representative and hampers its generalization of the result to the other medical institutions in the country and to general population. Adequate assessment of attitude and practices by the online survey method was a difficult task and the authors acknowledge that too. Moreover, findings from the study could be tailored to create few action points for policy makers and educationists in the form of education model to enhance the knowledge of students as well as general populations to combat the ongoing pandemic. Also health promotional measures may be undertaken for a larger good.

Conclusion

In this study majority undergraduate students have good knowledge, majority showed optimistic attitude and appropriate practices towards COVID-19. Furthermore, good knowledge towards COVID-19, leads to positive attitude and appropriate practices.

Therefore, there is need and scope for promoting health education programs for enhancing optimistic attitude and appropriate practices. Our study also showed that one out of 40 students not practiced hand washing and one in 20 students did not wear mask, which mandated for need of behavior change communication.

Conflicts of Interest: Nil

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The Prevalence of Soft Tissue Calcifications in the Head and Neck Region Using CBCT among Egyptian Population

Maha Elhadidy[1], Farid Medhat[2], Nashwa Salah[3], Sherif Ali[4]

[1]Student, [2]Assistant Professor, [3]Professor, Oral & Maxillofacial Radiology Department,Faculty of Dentistry, Cairo University, Head of Oral & Maxillofacial Radiology Department, Faculty of Dentistry, Misr International University, [4]Assistant Professor, Oral & Maxillofacial Surgery Department, Faculty of Dentistry, Cairo University.

Abstract

Background: calcifications may be physiological or pathological. Understanding about soft tissue calcifications help to reach appropriate diagnosis and take the right decision whether treatment, referral, further investigations or do nothing.

Aim: To detect the prevalence of soft tissue calcifications using (CBCT) scans in the Egyptian population.

Method: Retrospective Data Analysis was performed on (417) CBCT patients' scans collected from the database available at the Oral & Maxillofacial Radiology department,Faculty of Dentistry, Cairo University. Data collection of patient sex and age was made. Data was assessed for presence or absence of calcification, type of calcification, sidedness and single or multiple occurring.

Results: There were (94) scans detected with calcifications within the whole sample size (417 scans). The prevalence was (22.54%). There were (141) calcifications detected in the (94) scans. The soft tissue calcifications detected were calcified stylohyoid ligament, tonsilloliths, sialoliths, laryngeal cartilage calcification, carotid artery calcification and only one case of ethmoidal sinolith. There were 3 cases without certain final diagnosis.

Conclusions: The prevalence of calcifications seen on CBCT images is not uncommon, dental practitioners should be aware of their presence. Their detection during routine dental examination should be made to ensure the broad evaluation of the patients.

Keywords: *Prevalence-Cone beam computed tomography-Soft tissue–Calcification.*

Introduction

Calcification is a biochemical occurrence at which calcium salts, mainly calcium phosphate, deposit in certain regions of certain organ.[1] Calcification of soft tissues in the region of head and neck can exist as physiologic or pathologic mineralization.[2]

Corresponding Author:
Maha Elhadidy
Student, Oral & Maxillofacial Radiology Department,
Faculty of Dentistry, Cairo University
e-mail: maha.hadidy@gmail.com
Mobile:002-01141509860

Heterotopic calcification denotes the deposition of calcium salts in an unorganized fashion in soft tissue. The word "heterotopic" comes from the greek roots "hetero" and "topos," which means (other place).[3,4] Heterotopic calcifications are grouped into three categories: idiopathic, dystrophic and metastatic calcification.[5]

Idiopathic calcification is found in normal tissues despite normal levels of calcium and phosphorus. It is also called calcinosis.[6] Dystrophic calcification occurs with normal serum calcium and phosphate levels. There is no systemic mineral imbalance. This type of calcification is usually confined to soft tissue injury sites. The most common causes are infection, inflammation, trauma, dulled injury.[7]

In metastatic calcification the serum levels of calcium and phosphorus are raised resulting in precipitation of the minerals in normal soft tissues. Serum calcium is increased in hyperparathyroidism, hypercalcemia and malignancy. While serum phosphate levels are increased in chronic renal failure. Metastatic calcification usually found bilaterally and symmetrically. They are very rare.[7,8]

Soft tissue calcifications within the head and neck region are seen in patients seeking dental care. They might be accompanied by clinical symptoms; or not. Some soft tissue calcifications may suggest the presence of a systemic condition and may cause threatening consequences.[9,10]Understanding of the nature of soft tissue calcifications in the head and neck helps in proper diagnosis of these calcifications and in turn taking the right decision of asking for further investigation; referral or do.[11]

CBCT has been incorporated into almost all fields of dentistry. CBCT offers 3D display of the complex anatomy of maxillofacial region.[12]CBCT reveals anatomy, hidden pathology and incidental radiographic findings that previous clinical assessment and conventional radiographic imaging modalities may have failed to disclose.[13,14,15]

Although there are some articles about the prevalence of different soft tissue calcifications in conventional imaging especially panoramic radiography, there are limited CBCT centered studies on the prevalence of soft tissue calcification in head and neck region. [10]

This study aimed to determine the prevalence of soft tissue calcifications in the head and neck region in the Egyptian population. And the results will be correlated to the demographics of the patients.

Materials and Method

Data Collection: A total of (417)consecutive CBCT scans matching the eligibility criteria were collected from the data base available at the Oral & Maxillofacial Radiology department, Faculty of Dentistry, Cairo University. CBCT images were taken using Planmeca Pro Max 3D MID® *(Asentajankatu, Helsinki, Finland).* This was approved by the research ethics committeeat faculty of dentistry, Cairo university (No:18.10.11).

CBCT scans of (0.4 mm) voxel size,scans with large field of view and scans for patients' with age range from (10-80) years old were included. While scans with poor diagnostic quality and those subjected to patient movement during acquisition were excluded.

Data Coding: Data was entered and maintained using a Microsoft Excel spreadsheet (Microsoft Office Excel, 2013). This data was categorized as the following:

1. Patient Number: For each patient, a 2 or 3 digit numerical value was entered. For easy identification and accurate total sample count.

2. Gender: Male or Female. If the gender couldn't be found in the patient's file, his/her name was used to indicate the gender. Patients with names that could work for both genders were excluded.

3. Age: The patient's age was entered as a 2-digit numerical value.

Data Analysis: Retrospective Data Analysis was performed to CBCT scans in DICOM format (*Digital Imaging and Communications in Medicine*) using (Planmeca Romexis®).Assessment of images were done by 2 radiologists one with 8 years' experience and the other with 18 years' experience. Assessments were done by each radiologist 2 times at 2 weeks interval to evaluate the intra-observational and inter-observational variability. During CBCT images assessments; neither clinical information nor demographic data of the patients were available to any of the two radiologists.

Assessment strategy for images: CBCT scans were examined in sagittal, coronal and axial cuts of the whole volume .3D volume rendering images and MIP (maximum intensity projection) were also examined. Both examiners were allowed to adjust brightness and contrast according to their subjective perception. Zooming was also allowed to provide best visualization. The examination of images was made in a low-lit room. Diagnosis was based on the radiographic appearance for detection and categorization of soft tissue calcification (if present). Assessments for the following were made;

1. Presence or absence of calcifications.

2. Type of calcification present.

3. Sidedness: unilateral (right side or left side (orbilateral.

4. Single or multiple calcifications.

Statistical Analysis: Numerical data was represented as mean and standard deviation values. Categorical data was represented as frequencies and percentages and were analyzed using Fisher's exact test. The significance level was set at p ≤0.05 within all tests. Statistical analysis was performed with IBM (IBM Corporation, NY, USA.) SPSS (SPSS, Inc., an IBM Company.) Statistics Version 26 for Windows.

Results

This study was conducted on (417) patients' scans [116 (27.8 %) for males and 301 (72.2%) for females] with the mean age of (36.33±15.43) years.

From the examined (417) patients' scans, soft tissue calcifications were identified in (94) patients' scans while (323) patients' scans were free of soft tissue calcifications. The prevalence was (22.54 %).

Out of the (94) patients' scans [28 (29.8 %) were for males and 66 (70.2%) were for females]. Mean age of patients with soft tissue calcification was (42.07±15.38).

There were (141) calcifications detected in (94) patients' scans. Which means that more than one calcification presented in the same patient. The prevalence of calcifications detected were: (16.55%) calcified stylohyoid ligament (SHL) (figure 1), (6.71%) tonsilloliths (figure 2), (5.76%) sialoliths (figure 3), (1.92%) triticous cartilage calcification, (0.96%) thyroid cartilage calcification (figure 4), (0.96%) carotid artery calcification then (0.24%) ethmoidal sinolith (figure 5). There were (3) scans which we cannot reach a certain diagnosis of them with prevalence (0.72%). The frequency (n) and percentage of calcifications of each type detected is shown in table (1).

Although only calcified SHL, tonsilloliths, sialoliths and thyroid cartilage calcification were detected within males. While; all detected calcification in the study were seen within females. Yet, the prevalence within males (24%) was higher than females (22%).

Calcified SHL, tonsilloliths and sialoliths were found in all age groups. Laryngeal cartilage calcification (triticous) were not found in age groups (≤30) years old. Laryngeal cartilage calcification (thyroid) were found only in age groups (< 30- 40) and (< 40-50). None of

carotid artery calcification (CAC) and others were found in age group (<30-40) years old. The only ethmoidal sinolith was found in age group (< 20-30) years old. Majority of the cases (15) diagnosed with SHL were in (<30-40) and (<40-50) age groups. For tonsillolith, most of the cases (10) were in (<30-40) age group. For sialolith, most of the cases (6) were in (<50-60) age group. For laryngeal cartilage calcification (Triticous), most of the cases (3) were in (<40-50) age group. For laryngeal cartilage calcification (Thyroid), cases were equally divided between (<30-40) and (<40-50) age groups. For carotid artery calcification, cases were found equally in (≤20), (>20-30), (<40-50) and (<50-60) age groups. The case diagnosed with ethmoidal sinolith were belonged to (>20-30) age group. Cases that could not be diagnosed were equally belonged to (≤20), (>20-30) and (<40-50) age groups. Frequency (n) of soft tissue calcifications in different age groups is shown in table (2).

Bilateral occurrence of calcifications was more than unilateral occurrence.

Calcified stylohyoid ligament was detected bilaterally in (94.2%) of cases with calcified SHL. While unilateral occurrence was found in (5.8%) cases. All unilateral cases occurred in the right side. Tonsilloliths was detected bilaterally in (39.3%) of cases of tonsilloliths; while unilateral occurrence was found in (60.7%). Distribution at right and left side was represented with (1:1.125) ratio. Sialoliths was detected bilaterally in (20.8%) while unilateral occurrence was found in (79.2%) of cases with sialoliths. Distribution at right and left side was represented with (1.1:1) ratio. Triticous cartilage calcification occurred bilaterally in (62.5%) of cases while unilaterally in (37.5%). Distribution at right and left side was represented with (2:1) ratio. Thyroid cartilage calcification occurred (100%) bilaterally. CAC was detected (100%) unilaterally with equal distribution at right and left side with (1:1) ratio. The only detected case ofsinolith occurred at left side. Single occurrence of calcifications was more than multiple occurrence.

There was an excellent agreement between both observations which was statistically significant for the first and second observer. There was an excellent agreement between both observers (Kappa= 0.897) which was statistically significant (p value > 0.001).

Figure (1): 3D reconstruction of CBCT shows bilateral stylohyoid ligament calcification and connection with hyoid bone in a 20 years old female patient.
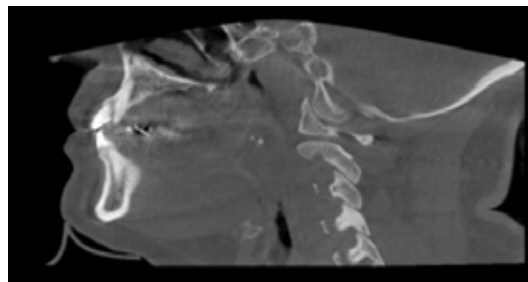
Figure (2): Tonsilloliths in a 40 years old female patient.
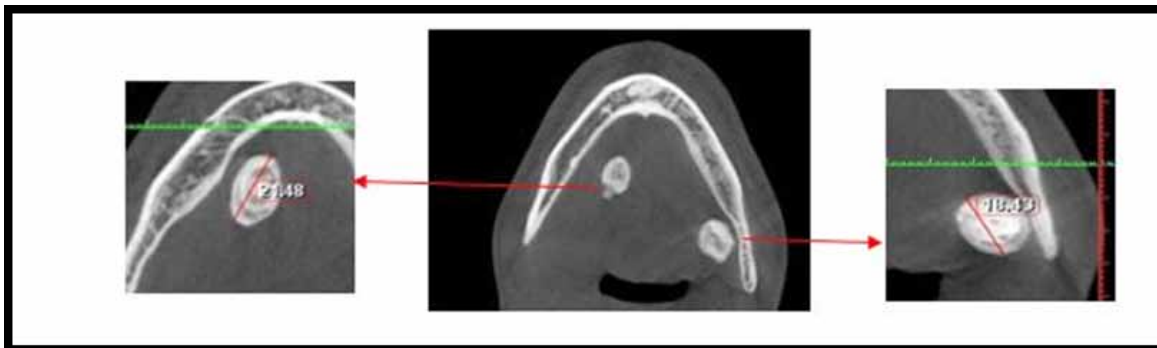
Figure (3): Axial cut CBCT shows bilateral submandibular megaliths medial to mandible. Both are of non-homogenous opacification. The linear measurement indicates that both are larger than (15mm) so considered megalith in a 35 years old male patient.
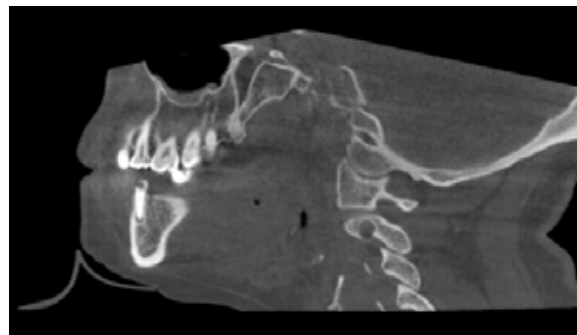
Figure (4): Sagittal cut CBCT shows perpendicular linear opacification inferior to the hyoid bone indicating thyroid cartilage calcification in a 34 years old female patient.

Figure (5): Coronal cut CBCT shows single round radiopacity in the ethmoidal sinus at the left side representing sinolith in a 23 years old female patient.

Table (1): Frequency (n) and percentage of calcifications of each type.

Calcification type	Frequency of calcifications	Percentage of patients in the whole sample (417)	Percentage of calcification in all (141)
Calcified stylohyoid ligament	69	16.55%	49%
Tonsillolith	28	6.71%	19.9%
Sialolith	24	5.76%	17%
Laryngeal cartilage calcification (Triticous)	8	1.92%	5.7%
Laryngeal cartilage calcification (Thyroid)	4	0.96%	2.8%
Carotid artery calcification	4	0.96%	2.8%
Ethmoidal Sinolith	1	0.24%	0.7%
Others	3	0.72%	2.1%
Total	**141**		**100%**

Table (2): Frequency (n) of soft tissue calcifications in different age groups.

STC (n=141)	Age group						Total
	≤ 20	> 20-30	> 30-40	> 40-50	> 50-60	> 60	
Calcified stylohyoid ligament	5	13	15	15	14	7	69
Tonsillolith	2	5	10	3	3	5	28
Sialolith	4	4	4	3	6	3	24
Laryngeal cartilage calcification (Triticous)	0	0	1	3	2	2	8
Laryngeal cartilage calcification (Thyroid)	0	0	2	2	0	0	4
Carotid artery calcification	1	1	0	1	1	0	4
Ethmoidal Sinolith	0	1	0	0	0	0	1
Others	1	1	0	1	0	0	3
Total	**13**	**25**	**32**	**28**	**26**	**17**	**141**

Discussion

Soft tissue calcifications can be incidental findings in radiographic examinations, such as panoramic radiographs or CBCT. Soft tissue calcifications are different in their anatomic location, shape, size, distribution, number, pattern of the calcification. These criteria are important factors in the radiographic interpretation of soft tissue radiopacities. [3,16]

So that, dentists should identify, diagnose, treat or refer for treatment all pathological findings on radiographs. A combination of clinical, dental and radiographic examinations help to confirm most soft tissue calcifications and if needed additional radiographic method may be used to detect them.[15]

The prevalence of soft tissue calcification in our study was (22.54 %. (The prevalence in our study is much higher than Ramadurai and N. Umamaheswari, which showed Prevalence (1.75) and Vengalath et al., study which showed Prevalence (8%).[7,8] This can reflect the superiority of CBCT with its 3D capability to detect and diagnose soft tissue calcifications over 2D panoramic radiographs used by them. While our results is close to Patil et al., study, which made a retrospective review on CBCT images of (624) patients and showed prevalence(25.48%).[3]

Calcified stylohyoid ligament had the highest prevalence value followed by tonsilloliths this matches with Diniz et al., study on CBCT images at which the calcified stylohyoid ligament had the highest prevalence(39. 04%) then tonsilloliths with (19.52%).[1] In Diniz et al., study sialoliths showed prevalence (0,47%) within the whole sample.[1] which is much less comparing to our study calcified stylohoid ligament is considered elongated if exceeded 30mm.

Also prevalence of laryngeal cartilage calcification in our study was less than Adam B. Wells, study at which triticous cartilage calcification showed prevalence of (32.3%) and thyroid cartilage calcification showed prevalence (15%) within all detected calcification.[9] As his study ensured that at least the 4th cervical vertebrae inferiorly are included in the selected scan this provided more numbers of scans that shows the area of laryngeal cartilages and in turn higher prevalence values. Regarding CAC, we detected 4 cases with (0.69%) prevalence within the whole sample. And this is considered less than Diniz et al., study which showed prevalence (4, 76%) within the whole sample.[1]

Only one case in our study was detected with ethmoidal sinolith. The presence of sinolith in the ethmoidal sinus is very rare and only 5 cases in the English literature were documented with ethmoidal sinolith as mentioned by Sava and Rusu.[16] Our case is considered the 6th one. There were 3 cases with uncertain final diagnosis as their radiographic features didn't resemble the radiographic criteria to any of the soft tissue calcifications. Absence of information about medical history, dental history and clinical examination of the patient made it harder to reach final diagnosis.

Regarding gender; although the frequency of females with calcifications was more than males, the prevalence within males was more than females because the sample includes females more than males. Some calcifications were seen only in females, we don't have certain justification for this. However, it was reported that women have been found to show greater percentage of carotid artery calcifications after menopause as the protective effect of female hormones is absent. [3,8]

Calcified stylohyoid ligament and tonsilloliths detected bilaterally more than unilaterally as detected by Diniz et al.[1] The only detected ethmoidal sinolith occurred at left side. While the other (5) documented cases, (2) cases occurred at left side, (3) at right side.[16]

Conclusion

Soft tissue calcifications are not uncommon finding in the Egyptian population. So that, the dental radiologists should be aware enough of their presence. More than one type of calcifications could be present in one patient at the same time. This makes the broad evaluation of patients' scans necessary.

Conflict of Interest: Nil.

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A Cross Sectional Study to Assess the Prevalence of Anxiety and Perception of E-Learning among School Teachers

Maneesha Godbole[1], Dattatreya Dinna Bant[2], A. Akshay Subramanian[3]

[1]Associate Professor, Department of Community Medicine, Kims Hubli, [2]Professor and Hod, Department of Community Medicine, Kims Hubli, [3]Second Year Post Graduate, Department of Community Medicine, Kims Hubli

Abstract

Background: Though E-learning has been slowly finding its way into various academic programs, the Covid-19 pandemic has suddenly forced it upon us, with no option left. For a few months now it has been the only possible method of teaching and learning. Many of the schools, as well as faculty were using it to some extent, but were not completely prepared. This posed a challenge to them. In this context, it is necessary to understand the hardships faced by the teachers, their perception about e—learning and the anxiety caused to them.

Method: A cross sectional study was conducted over a period of 4 weeks. A sample of 100 school teachers was randomly selected by convenience sampling. A structured, pre-tested questionnaire through Google forms was used to collect the data. The questionnaire assessed the benefits and disadvantages of e-learning as perceived by the teachers. Anxiety was assessed using the Hamilton Anxiety Rating Scale. Data was entered in Excel sheet and observations were tabulated and presented as proportions, using pie charts.

Results: 32% of the teachers felt that visual orientation is a positive aspect of e-learning, 67% felt that e-learning offers better opportunities for students to improve their skill set. 34% expressed that they were able to complete only 61-80% of the assigned subject matter for the day. Lack of face to face communication, poor network connectivity, and inattentiveness of students were listed as the disadvantages of e-learning. Despite training having been provided to conduct e-learning, 90% of the teachers experienced mild anxiety.

Conclusion: 58% of the teachers believed that E-learning could definitely be used on a regular basis, whereas 42% felt certain modifications and measures need to be in place before the actual process of complete E-learning could be thought of as a modality to teach school children.

Keywords: Anxiety, Perception, School Teachers, Feasibility, E-Learning.

Introduction

Teaching with the aid of electronic resources is what is meant as e-learning. It acts as a vehicle for knowledge transfer[1] and as a system of delivering formal education. It encompasses a wide range of applications[2] and processses. With the advancement in information and communication technology online access to teaching resources have become an easier task. It is a storehouse of skill set advancement and a hub where various skills can be acquired or improved. It has helped in creating a hub of education where intellectuals from different spheres of education share their intellectual property and in turn gain a few.

Until now it was used in limited settings, mostly in the corporate sector where it was used to train the employees and upgrade their skills. However, the existing Covid pandemic has left us with no choice, as it is the only possible way of maintaining continuity in the education of students.

Corresponding Author:
Dr. A Akshay Subramanian
Second Yr Post Graduate, Dept. of Community
Medicine, Kims Hubli
e-mail: aakshayqm@gmail.com

A few years ago, this same concept was slowly tried and introduced in mostly the elite schools of the country to provide a better visual orientation to students to improve their understanding of the concepts of certain subject matter. This was in the form of smart classes[3]. Even though smart classes did not quite make a huge impact in the curriculum, it did bring about a change in the way how classroom teaching was perceived. It introduced the possibility of using the internet to assist class-room teaching and increase the effectiveness of teaching. This initiated a change and made the world a smaller place for the young minds sitting in the classroom. They were able to visualise whatever they learnt, and thus better assimilate the concepts of various scientific topics. In a nut shell, everything was right there in front of them on a miniscule screen of a few inches.

E-learning gives a lot of flexibility[4], both to teachers and students alike, eliminates the barriers of individualisation of students in the class-one need not be afraid of standing in front of others and speaking. It is also cost effective, takes into consideration the individual differences in the learners, and minimises the issue of scarcity of academic staff.

In the present situation, the schools barely had time to get ready to introduce e-learning. This study was conducted to understand the perception among the teachers about the various benefits and drawbacks, and to assess the anxiety levels among them regarding the same.

Methodology

Study Design: Cross Sectional Study

Sampling: Convenience Sampling

Duration of Study: 4 Weeks (June 4 2020- July 4 2020)

Procedure: A cross sectional study was conducted among 100 school teachers, randomly selected from schools affiliated to various boards and medium of instruction, from various states of India, through personal contacts. The data was collected over a period of 4 weeks from June 4,2020 - July 4,2020. The study assessed the anxiety among school teachers caused by introduction of e-learning and their perception about the feasibility of using e-learning as a regular teaching modality for school students. Data was collected using a pre tested structured questionnaire (in English language) in the form of Google forms, after obtaining verbal consent from the teachers. Teachers who found it difficult to manage the Google forms were administered the questionnaire through a phone call and responses documented. The questionnaire assessed various parameters, including the benefits and drawbacks of E-learning and the anxiety among school teachers was assessed using the Hamilton Anxiety Rating Scale[5]. The data was entered in an Excel sheet and presented as tables and pie charts.

Results

1. Of all the 100 teachers, mean age of the teachers was 38.7 years(range - 24y-60y), comprising 68 males and 32 females

2. Of all the 100 teachers, 85 teachers worked in schools situated in urban area and 15 teachers worked in schools situated in rural areas. About 60 teachers worked in private schools, 30 in aided schools and 10 in government schools. About 43 teachers were affiliated to CBSE board,45 to state board and 12 to other boards(as shown in Table 1)

3. Of all 100 teachers, 32 percent teachers opined visual orientation as reason for favoring e- learning among other reasons of reduced travel time,convenience and reduced administrative pressure as other reasons for favouring E-learning(figure 1).Teaching content was provided before hand to about 77 percent teachers and was regularly updated in about 84 percent teachers.

4. Of all 100 teachers, 34% of the teachers opined that they could complete only about 61- 80% of the subject matter for the day while taking online class. (figure 2)

5. Of all 100 teachers, 67% of them agreed that online classes opens window for students to see a wider world and enhance their skill set while 33% of them didn't agree with the notion. 65% of the teachers didn't find the need to invest to buy new laptop or mobile to conduct online classes and remaining 35% teachers had to invest.(as seen in Table 2)

6. Of 100 teachers, more than half of them(54%) received training on basic aspects of E-learning whereas 46% teachers didn't receive any training. (TABLE 3). Out of 100 teachers, more than 1/3rd of them(37) felt that lack of face to face communication is the major problem faced while taking online classes.(figure 3)

7. Of 100 teachers, majority of them(90) had mild anxiety i.e., hamilton score between 0-17 and reamining have moderate anxiety(5) and severe anxiety(5) i.e., Hamilton score of 18-24 & 25-30 respectively(figure 4)

Table 1 shows the urban-rural distribution of the schools where the study participants teach.

Table 1

	No. of Teachers
Total Sample Size	100
Location of the school	
Urban	85
Rural	15

Table 2 assess if online classes help in student skill set advancement and the need for investing in e-gadgets to take online class.

Table 2

	No. of School Teachers
Total Sample Size	100
Online classes helps in expanding the horizon of children	
Yes	67
No	33
Need for investment to buy laptop/mobile	
Yes	35
No	65

Table 3 indicates the number of teachers to whom primary training was provided for taking online classes

Table 3

	No. of School Teachers
Total sample size	100
Traning received	
Yes	54
No	46
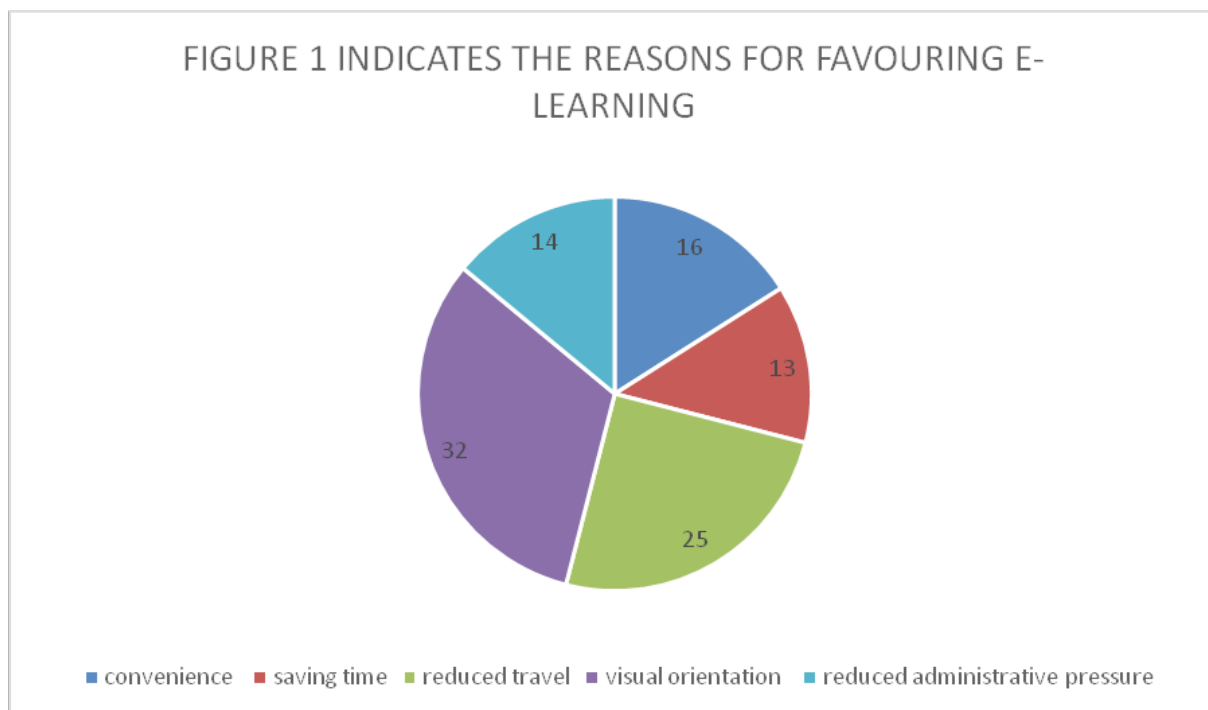
Figure 1

Figure 2
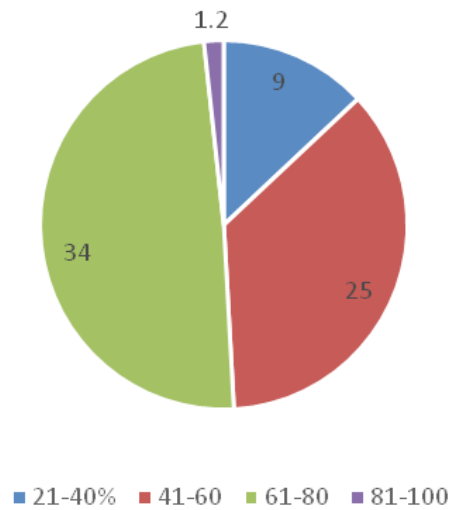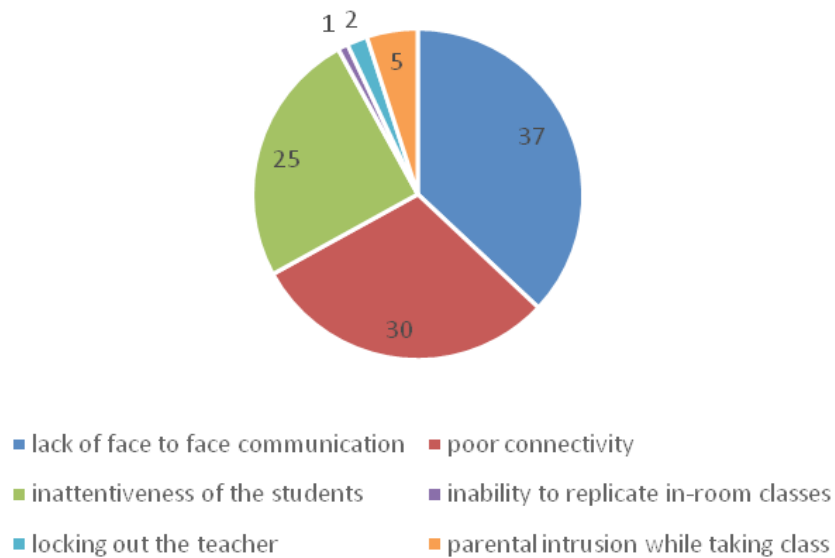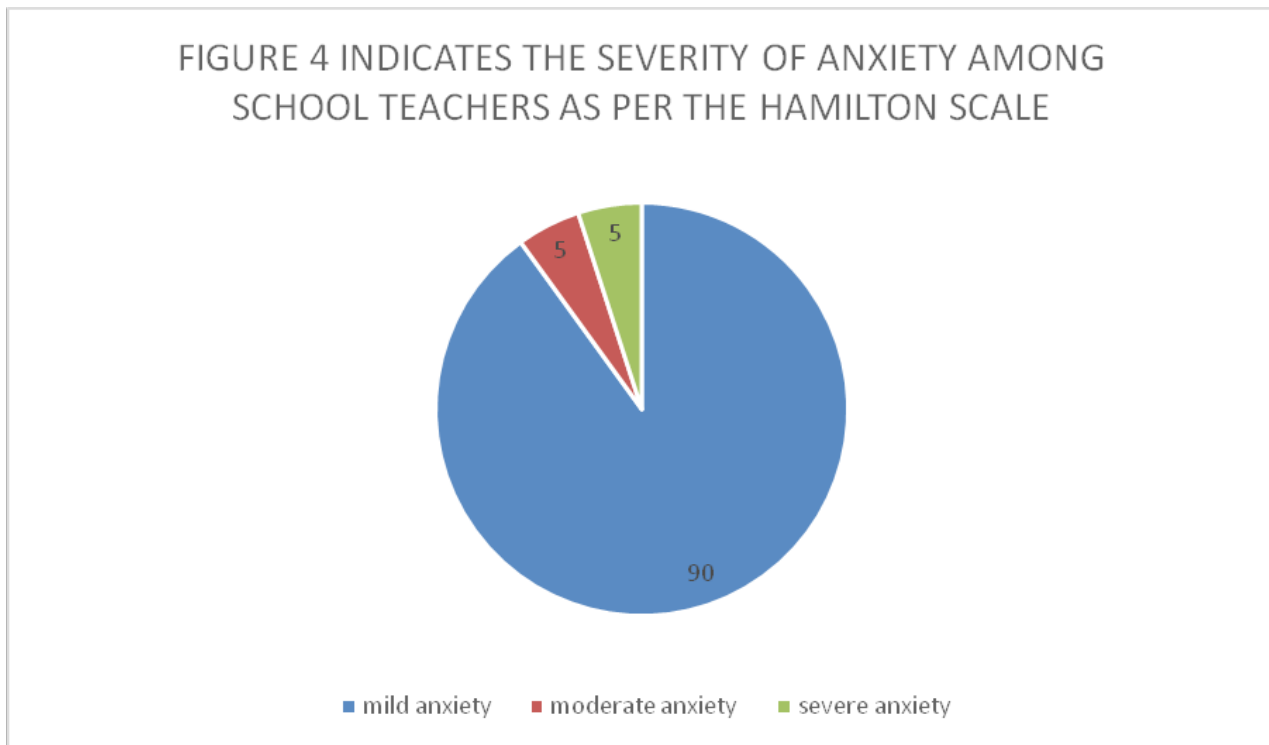
Figure 3

Figure 4

Conclusion

58% teachers believed that E-learning could definitely be a way for teaching school students in the future whereas other 42% teachers felt certain modifications and measures need to be in place before the actual process of complete E-learning could be thought about as a modality to teach school children. 90 teachers experienced mild anxiety whereas another 5 teachers experienced moderate and severe anxiety respectively.

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Risk Factors for Ovarian Cancer: A Literature Review

Marwa Mahfood Almisawi[1], Osama B. Albajalan[2]

[1]Postgraduate Student, School of Graduate Studies, [2]Senior Lecture, Department of Pre-Clinical,
International Medical School, Management & Science University, Shah Alam, Selangor, Malaysia

Abstract

Ovarian cancer is the third type of gynecologic cancer in terms of prevalence after cervical and uterine cancer. The disease is known as the silent killer as it is slowly spread without a diagnosis, which leads to the worst prognosis and high mortality rate. Libya shows low disease incidence while the high mortality rate is seen in developed countries due to a lack of proper diagnostic and treatment options. This research aims to understand the various risk factors of ovarian cancer described in literature. Based on the literature review related to various factors which are the demographic, reproductive history, hormonal factors, genetic factors, lifestyle such as diet and BMI. Various controversial in literature exist on the effect of these factors and their association with risk factors.

Keywords: *Ovarian cancer, Risk factors, conceptual, literature review.*

Introduction

Background: Ovarian cancer is the fifth leading cause of death from cancer in women aged 35-74. An approximate one in 78 women would develop ovarian cancer in the course of their lifetime. The American Cancer Society predicts there will be about 22,280 additional ovarian cancer cases diagnosed by the year 2020, and more than 14,240 people will die from ovarian cancer. The five-year survival rate is over 90 percent when women are diagnosed and treated in the early stages. Owing to the non-specific signs of ovarian cancer and the lack of early detection testing, about 20 percent of all cases are detected early, either in stage I or II. The survival rate may be as low as 28 percent if caught in stage III or higher. Each woman diagnosed with ovarian cancer has a different profile due to the nature of the disease, so it is difficult to provide a general prognosis[1].

In Libya, the number of cancer cases increased from 12.7 in 2008 to 14.9 million in 2012[2]. According to the[3],

Corresponding Author:
Osama B. Albajalan
Senior Lecture, Department of Pre-Clinical,
International Medical School, Management & Science
University, Shah Alam, Selangor, Malaysia
e-mail: drosamabaha77@gmail.com,
    osama_bahaa@msu.edu.my

the significant cases are of breast cancer, representing 11.7 % of the cases. The number of cases in 2019 reached 6308, and the number of death due to cancer is 3375. It is significantly important to understand cancer types, distribution, and risk factors in order to provide insights to protect communities and individuals. Ovarian cancer is one of the most severe types of cancer. The primary issue of ovarian cancer is that it is considered a silent disease as early detection is viewed as a challenge. This is the reason many types of research try to examine the risk factors in order to help make the early association of the disease in susceptible individuals. In this research, we aim to provide a quantitative approach in order to generalize an understanding of the risk factors of ovarian cancer in women in Libya.

According to[4], Ovarian cancer is considered the seventh most commonly diagnosed cancer among women worldwide. In Libya, ovarian cancer accounts for 4.6 % of cancer affecting women, according to the International Agency for Research on Cancer, 2018. May risk factors are associated with ovarian cancer, such as obesity, use of fertility medication, long ovulation cycles throughout life due to lack of children. Some elements showed to reduce the risk of ovarian cancer, such as breastfeeding, pregnancy, and the use of oral contraceptives [5]. The majority of the cases is related to family history through inheritance of mutated autosomal dominant gene [6].

Ovarian cancer is considered one of the most types of cancers affecting women in the world. The incidence of ovarian cancer increased to reach 4.6 % in 2018. The disease does not show symptoms in the early stage, but it becomes symptomatic when it has already spread to other parts of the body. Screening for the condition is not practical due to false-positive, which may lead to unnecessary surgical procedures. Understanding the risk factors is essential to help educate the women community about the risk factors and preventive measures in order to reduce the incidence of the disease and get an earlier diagnosis to provide a better prognosis. This paper aims to provide a review of literature of the various risk factors for ovarian cancer. Among the risk factors examined in the study are awareness, obesity, nature of the diet, ovulation information such as the age of menarche and age of menopause, pregnancy, breastfeeding, use of oral contraceptives, and family history. Scholars have controversial opinions about these risk factors and associations with ovarian cancer.

Literature Review:

Theoretical Framework: It allows for formal theories to be contextualized and for research to help choose the research design and analysis plan [7,8].

Incessant Ovulation Theory: The constant theory of ovulation reveals that ovulation traumatizes the ovarian surface, as the breakdown of follicles leads to rapid repair and damage to the ovarian surface epithelium. The process of continuous damage to the injuries and the proliferation of the ovary surface's epithelium places strain on the ovary cells, thereby increasing the risk of the reverse transcription[9,10]. Often a hundred years ago, women had several children, and ovulation was often hindered by pregnancy and lactation. Scientific evidence of a reduction of the risk of epithelial ovarian cancer by pregnancy or oral use of hormonal contraceptives by using a decreasing number of life - long ovulations. For women with and without ovarian cancer, an essential correlation between high overall ovulation and cancer was found when calculating the total lifetime ovulation number. There are also reports that in some instances of infertility, such as polycystic ovarian syndrome, people are highly at risk for developing ovarian cancers[10–12]

Gonadotrophin Theory: The gonadotrophins theory notes that prolonged exposure to gonadotropin enhances the oestrogen production of ovarian surface epithelium and may contribute to malignant transformation. Gonadotrophins can either directly affect ovarian surface epithelium, enhance transformation, or indirectly encourage the production of estrogen [10]. The rates of gonadotrophin are increasing with age and exceptionally high in menopause, in line with the age-specific ovarian cancer rate. Pregnancy and the oral contraceptive pill are lower circulating levels of pituitary gonadotrophin[13,14], although significant increases in oestrogen and human chorionic gonadotrophin (h CG) levels are observed during pregnancy[13,14]. Females with polycystic ovary syndrome seem to have a low follicle stimulant hormone and high luteinizing hormone and an elevated risk of ovarian cancer, thus supporting a gonadotrophin theory at the expense of an incessant ovulation hypothesis. Some epidemiological evidence disputes the theory of gonadotrophin. Breastfeeding women have higher Follicle-stimulating hormone levels, but evidence indicates that breastfeeding is preventive [15]. On the other hand, there has been evidence of lower rates of gonadotrophin in some ovarian cancer patients and of a higher risk of developing cancer for women with a specific low circulating gonadotrophin [10].

Hormonal Theory: The hormonal theory partly seeks to solve such conflicts and suggests an increase in the risk of cancer due to excess androgen stimulation of ovary cells. In contrast, a progesterone stimulation of the cell surface protects the cancer formation[13,14]. Androgens are produced by the ovary at a higher rate than estrogens by the developing follicles and the primary sexual steroids within the follicle fluid. It was suggested to expose cysts of epithelial incorporation found close follicle formation to elevated androgen rates. The only progestin pill that does not inhibit ovulation reduces ovarian cancer's chance to the same or higher level than the combined contraceptive pill. Progesterone levels remain high during pregnancy, and the concentrations of the dwarf circulating androgens are high. Pregnancy protection has been suggested to be consistently high in progestin levels over the course of 8-9 months, rather than by suppressing ovulation[10].

The Inflammation Theory: The ovular cycle is an inflammatory response that is strongly correlated with the invasion of leucocytes and the development of inflammatory intermediaries such as cytokines. The ovary surface epithelium cells in the surface proliferate when the pre-ovulatory follicles expand to support the changing follicle and then cell death, as the follicle wall is thin. A significant stage in the development and metastatic expansion of every tumour is the extracellular matryl proteolytic (ECM). The breakdown of the ova

and the release of the ovum leads to an increase in progesterone synthesis in ovular granulose cells, now free from paracrine control. Progesterone production around ovulation helps to maintain the completeness of DNA in the damaged ovary cells in the apoptosis wave and pre-ovulation fragmentation of DNA. Cortisol could be involved in the control of ovulation-borne inflammations. The infection can block an endogenous ovary inflammatory reaction and inhibit ovulation, causing an acute inflammatory response. These anti-inflammatory agents are thought to operate through a shared pathway based on the suppression of gene transcription factor activity, which may, after that, decrease transcript of growth factors, chemokines, and proteases, including cyclooxygenase (COX)-2, VEGF, and various interleukins and chemical chemokines. It can stimulate cell proliferation, invasion, and cell death resistance [10].

Discussion

Risk factors for ovarian cancer

Demographic Factors: Ovarian cancer is considered among scholars to be anage-related disease. The disease usually happens after menopause. According to[16,17], It indicates that ovarian cancer incidenceis more common in women over 65 years of age. Based on many studies,[18,19] indicate that the average range of ovarian cancer diagnosis among women is between 50 to 79 years. Another study also associates another factor to age: the prognosis or treatment outcome studies indicate treatment at a younger age can lead to better prognosis[18–20]. Scholars contribute to the notion that older patients receive less aggressive treatment than younger patients [21]. The age factor in prognosis is still controversial; other studies, such as [22], indicate no correlation between age and prognosis [22].

Socioeconomic Status: Socioeconomic status is sometimes viewed as one of the predictors of ovarian cancer[23]. The socioeconomic status has an indirect effect on the diagnosis and prognosis of ovarian cancer, as high social and economic status is related to increased patient awareness of symptoms, lifestyle, time of response to symptoms, and health care access to the diagnostic and treatment facilities[24,25]. A study done by[26]showed a negative relationship between educational level and the risk of ovarian cancer in a case-control study. In another study by (27) showed that low social status is linkedto more advanced illness.

Reproductive History

Menstrual-related factors: The association between the number of ovulation cycles and the risk of development of ovarian cancer is well established in the literature. A controlled study done by[28] indicated an inverse relationship between the number of ovulation cycle and the chance of development of ovarian cancer; the study indicated that if a woman did not have ovulation cycles for 7 or 8 years, it decreased the risk by 4 times [28]. The findings are supported by incessant ovulation theory. Other research uses these theories as to the base of protective measures, as any factors that reduce ovulation such as pregnancy and the use of oral contraceptives. Still, some controversy among scholars as a lack of ovulation caused by menstrual disorders is associated with an increased risk of ovariancancer [29].

Some of the risk facts for ovarian cancer are connected to the ovulation time during the female lifetime. The longer the ovulation time, the higher the incidence of ovarian cancer occurrence. The ovulation time is prolonged in case of the absence of children and pregnancy and breastfeeding as ovulation pauses during pregnancy and sometimes lactation. According to[5], not having children doubles the risk of developing ovarian cancer [5]. Other researchers, such as [30], indicate that the longer the ovulation period in the female lifetime, the higher the chance of ovarian cancer. The ovulation time can be extended by early menstruation and late menopause [30].

Age of menarche and menopause: Although the result of some studies showed a relationship between the early onset of menarche and the risk of ovarian cancer[31], other researchers reported that the age of menarche and menopause does not affect the risk of ovarian cancer[32]. Menopause also is associated with this type of cancer, and the connection is more reliable. According to[33], there is a direct correlation between menopause in late age and increased risk of ovarian cancer [33,34]. Another factor is the number of menstrual cycles in a lifetime, and this factor shows no impedance association with ovarian cancer as it is always associated with other factors [6].

Many studies support the notion that pregnancy provides protection against ovarian cancer; examples are[13,35]. The nature of pregnancy and delivery also plays a role in the risk of development of ovarian cancer.[36] performed a case-control study to understand the effect of various pregnancy criteria and their contribution as

a risk factor for ovarian cancer. The study indicated that both natural childbirth or induced abortion and the number of pregnancies decreased ovarian cancer risk [36].

Age at childbirth: The women's age at childbirth is also considered as a factor that affects ovarian cancer development. A study done by[11], The study postulated an inverse relation and the risk of ovarian cancer, and the study indicated that the older age in pregnancy, the lower the risk of ovarian cancer[11]. These findings are well supported in other studies' literature[35,37]. The studies indicated that the increase of 5 years at the first childbirth decreases the risk of ovarian cancer by 10%[38].

Hormonal factors:

Contraceptive method: The role of oral contraceptives in reducing the risk of ovarian cancer is established in the literature. Many studies support this postulation, such as[37,39]. According to [36], in a case-control study in Canada, the study proved the role of hormonal contraceptive pills in the reduction of all histological types of epithelial ovarian cancer, except for mucinous tumors[16,36]. The study also indicated that with each year's use of oral contraceptive pills by 7%[36]. The length of use of oral contraceptives is also an essential factor, and The reduced risk can continue for up to 10–15 years after the cessation of pills[37,40].

Similar to most of the risk factors of ovarian cancer, controversy about the role of oral contraceptives in reducing ovarian cancer is also documented in various studies. According to [41,42], The study indicated no relation between the use of contraceptive method and the risk of ovarian cancer[41,42].

Hormone replacement therapy (HRT): The hormonal replacement therapy is done after the age of menopause, where estrogen-progesterone (female hormones) replaces natural body hormones, which stops during the age of menopause, The aim is to reduce menopausal symptoms, such as hot flashes and vaginal discomfort[43].

Many studies investigated the effect of hormonal replacement therapy on the risk of developing ovarian cancer. Some studies indicated that the combination of estrogen-progesterone therapy after menopause does not increase the risk of ovarian cancer even in long-term use[44]. The great controversy is associated with hormonal replacement therapy as a risk factor. Some studies indicated an increased risk of developing ovarian cancer,

especially with estrogen use. The duration of the therapy is also a factor; more than 10 years of use of estrogen may increase the risk of ovarian cancer. While according to[45]. The risk of ovarian cancer increases regardless of the type of medication (estrogen or progesterone), duration, method of use, or dosage. All factors may be associated with an increased risk of developing ovarian cancer[45]. Many studies support this postulation. According to[46], oral type of hormone therapy may be linked to an increased risk of ovarian cancer in women who did not receive a hysterectomy[46]. Estrogen alone is linked to an increased risk of ovarian cancer[47], while the combination of estrogen and progesterone reduces ovarian cancer risk [44].

Use of Infertility treatments: Infertility treats increase ovulation, which, based on "incessant ovulation theory,"leads to an increased chance of developing ovarian cancer [9]. Many studies support this postulation; still, the overall results are controversial. The hormones used in fertility mediations are used to stimulate the ovaries to produce ova and hormones to increase the change of pregnancy. The use of fertility drugs is associates with a risk factor for developing ovarian cancer. According to [48], the connection between the use of fertility hormones and ovarian cancer is controversial [48]. They may be associated with devolving borderline tumors. Other scholars, such as [49], argue that the use of fertility medicine has no association with ovarian cancer. The association between fertility medicine and borderline ovarian cancer is also not confirmed[6]. However, numerous studies prove the association between some of the infertility treatment drugs and ovarian cancer. Drugs such as clomiphene citrateand gonadotropin are proved to increase ovarian cancer risk in a cohort study, and the result worsens with the dose increase[50]. Other drugs, such as Menotropin, produced similar results[51].

Lactation: The relation between breastfeeding and the development of ovarian cancer is inverse in nature. According to [52], the risk of developing ovarian cancer decrease by 8 % with every five months of breastfeeding.[6,52]. The relation between lactation in terms of duration, number of children, and the chance of development of ovarian cancer is inverse in nature [53]. According to [54], the study indicated a decrease chance of ovarian cancer by 22% in the case of lactation and lactation duration of an average of 18 months. The documented reduction of risk is related to two types of endometrioid and clear cell ovarian cancers[54].

Genetic Factors:

Family History: Family history is the most critical risk factor in the development of ovarian cancer. According to [5], the case of ovarian cancer is genetic in 5–10% of the cases. The reason is that genetic mutation and gene abnormalities are passed through families using autosomal dominant genes, which means that the female is likely to present symptoms of the diseases even if she got the gene from only one parent[55,56]. Another factor is linked to ovarian cancer, which is the female history of breast cancer and uterine cancer, which has been linked to increased incidence of ovarian cancer in many studies such as[57].

BRCA Mutations: The increased risk scarily for families, which shows Hereditary breast-ovarian cancer syndrome, which is represented in two types BRCA-1 and BRCA-2, both entails genetic abnormalities. According to [58,59], the genetic mutation in the syndrome increases the risk of both breast cancer and ovarian cancer in families [58,59]. The risk is amplified at the age between forties and fifties years of age. The risk is between 30- 60 %[48,58,59]. In the case of BRCA1, the risk of development of ovarian cancer is between 15- 45%, while in the case of BRCA2, the risk is reduced to 10-40%[59].

A study done in the united states shows that the chance of developing ovarian cancer if one of the first-degree relatives was diagnosed with the disease in five in one hindered. The risk would increase to seven in a hundred if the women had two relatives diagnosed with ovarian cancer[6,58].

Lifestyle Factors:

Nutrition and Diet: Diet and nutrition are essential factors in a personal lifestyle that significantly affects the general health condition of the individual. Similar to all the risk factors associated with ovarian cancer, Diet and nutrition are also provide controversial findings among the studies. The nature of food is believed to be an essential factor in the development of many diseases, including ovarian cancer. In a study done by[60], a positive correlation between the risk of ovarian cancer and daily consumption of fish, while the negative correlation with a daily intake of milk[60]. Other studies associate ovarian cancer with higher cholesterol intake and reduce vegetable consumption[13].

The link between diet and ovarian cancer development is established through ecological studies that determined the correlation between the two variables. The nature of food is a contributing factor in ovarian cancer. According to[61,62], some foods are associated with an increased risk of ovarian cancer, such as meat and certain fats, while foods such as vegetables and fruits showed decreased risk in relation to ovarian cancer. Also, some micronutrients (vitamins and minerals) are associated with a reduced risk of developing ovarian cancer [61,62]. The number of carbohydrates in the diet also hasan influence on increasing the risk of developing ovarian cancer. However, the association is not actively supported. It is open for debate among scholars; according to [56,63], the effect of the carbohydrate is through the glycaemic index (GI) and glycaemic load (GL);glycaemic index refers to the food ability to increase the amount of insulin present in the blood, while the glycaemic load deals with the number that the food will raise the blood sugar level [56,63]. The carbohydrates are ranked based on the glycaemic index and glycaemic load as it affects the blood insulin levels. And that depends on the nature and the degree of processing of the carbohydrate source[6].

Libya is one of the Mediterranean countries. The food pattern consumption in the mediation region is different from any other part of the world, which leads scholars to study these patterns, and it is an effect on the lifestyle and disease occurrence. The Mediterranean diet is one of the recommendations by the [64] to help reduce blood glucose levels and blood pressure as well. The Mediterranean diet plan is based on increased consumption of foods rich in long-chain n-3 fatty acids and monosaturated fats, mostly present in olive oil, which is an essential ingredient in the Mediterranean diet plan. The link between the use of such fats and diet plans is supported by some researches such as[6,65,66]. In Mediterranean countries such as Greece, Spain, and Italy, these studies indicate a low incidence of ovarian cancer in the Mediterranean region. That is contributed to the nature of the diet. Although many studies have examined the role of diet in ovarian cancer, the complete connection is not established, and it is suggested that the diet does not have a major impact on the incidence of ovarian cancer occurrence[6].

Obesity and physical activity: Factors as obesity and the nature of the diet are considered an enormous risk fact in developing ovarian cancer[59].

In general terms, obesity is a dangerous condition for general body health. An obese individual isat risk

of developing many conditions such as heart conditions, type 2 diabetes, high cholesterol, high blood pressure, and atherosclerosis, which may lead to coronary heart disease and stroke[67].

In relation to ovarian cancer, the effect of obesity is not an exception. Many studies indicated increased mortality from ovarian cancer in obese patients[68]. Many indications are used in studies as an indication of obesity, Body mass index (BMI), the waist-hip ratio is reported by[69]. However, controversy still exists as some studies, such as[14,70], only indicated the association between obesity and ovarian cancer prognosis and menopause condition. According to[70], that obesity before the age of menopause is associated with an increased risk of ovarian cancer[70][14].

The apparent association between ovarian cancer and physical activities is not yet established. However, some studies, such as[71], suggest that the inverse correlation between physical activity and risk of ovarian cancer as increase physical activity reduces risk[71].

The effect of smoking, alcohol, and caffeine consumption: Smoking, in general, has an adverse effect on health. It is also believed to have similar effects as a risk factor in ovarian cancer, according to Leitzmann et al. (2009). The study linked long-term smoking up to 20 years with obesity as it leads to double the risk of ovarian tumors[72], while [13]associate smoking with increased mortality of ovarian cancer by up to 25%. While, many studies only link smoking to one type of ovarian cancer, which is mucinous epithelial tumors[73,74]. Alcohol is studied for its relation to ovarian tumors. Several researchers around the world believe that alcohol [75]. In a study by [76], both caffeine and alcohol are believed to increase the risk of ovarian mucinous tumors[76].

Conclusion

The review of literature indicated various risk factors for ovarian cancer that are related to various factors which are the demographic, reproductive history, hormonal factors, genetic factors, lifestyle such as diet and BMI. Various controversial in literature exist on the effect of these factors and their association with risk factors. The factors may differ based on the geographic location of the patient. The need for a comprehensive prediction model for the ovarian risk factors that can help predict disease incidents.

Ethical Clearance: The study was conducted in accordance with the ethical standards of College of Medical Technology, Al-Zawiya University, Libya,

Conflict of Interest: Author declare no Conflict of Interest

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Risk Factors for Ovarian Cancer among Libyan Women

Marwa Mahfood Almisawi[1], Osama B. Albajalan[2]

[1]Postgraduate Student, School of Graduate Studies, [2]Senior Lecture, Department of Pre-Clinical, International Medical School, Management & Science University, Shah Alam, Selangor, Malaysia

Abstract

Ovarian cancer is the third type of gynecologic cancer in terms of prevalence after cervical and uterine cancer. The disease is known as the silent killer as it is slowly spread without a diagnosis, which leads to the worst prognosis and high mortality rate. Libya shows low disease incidence while the high mortality rate is seen in developed countries due to a lack of proper diagnostic and treatment options. This research aims to understand the various risk factors of ovarian cancer among the women in Libya. A questionnaire is used in a quantitative research methodology using stratified random sample over the population is divided in two classes namely healthy and diseased, based on earlier diagnosis and ovarian cancer care. The diseased and healthy women were targeted in a written survey in different hospitals and clinics in Libya. The data analysis is done in four stages. The first stage is cleaning and coding of the data. The second step is the demographic profile of the respondents. The third stage. Frequency distribution of the data in order to compare the healthy and diseased women. The fourth stage is the linear logistic regression in order to determine the risk factors for ovarian cancer and test the research hypotheses. The logistic regression analysis indicated good fit of the model. The model was able to correctly predicted 81.4 % of the cases which is 19.6 % increase over the null model. The logistic regression analysis was also used to indicate the predictors namely family history, level of obesity, ovulation information, use of birth control and breast feeding unlike awareness, nature of diet which was not predictor in the model.

Keywords: *Ovarian cancer, Risk factors, Binary logistic regression, Libya.*

Introduction

Ovarian cancer is the fifth leading cause of death from cancer in women aged 35-74. An approximate one in 78 women would develop ovarian cancer in the course of their lifetime. The American Cancer Society predicts there will be about 22,280 additional ovarian cancer cases diagnosed by the year 2020, and more than 14,240 people will die from ovarian cancer. The five-year survival rate is over 90 percent when women are diagnosed and treated in the early stages. Owing to the non-specific signs of ovarian cancer and the lack of

early detection testing, about 20 percent of all cases are detected early, either in stage I or II. The survival rate may be as low as 28 percent if caught in stage III or higher. Each woman diagnosed with ovarian cancer has a different profile due to the nature of the disease, so it is difficult to provide a general prognosis[1].

In Libya, the number of cancer cases increased from 12.7 in 2008, to 14.9 million in 2012[2]. According to[3], the significant cases are of breast cancer, representing 11.7 % of the cases. The number of cases in 2019 reached 6308, and the number of death due to cancer is 3375. It is significantly important to understand cancer types, distribution, and risk factors in order to provide insights to protect communities and individuals. Ovarian cancer is one of the most severe types of cancer. The primary issue of ovarian cancer is that it is considered a silent disease as early detection is viewed as a challenge. This is the reason many types of research try to examine the risk factors in order to help make the early association of the disease in susceptible individuals. In this research,

Corresponding Author:
Osama B. Albajalan
Senior Lecture, Department of Pre-Clinical,
International Medical School, Management & Science
University, Shah Alam, Selangor, Malaysia
e-mail: drosamabaha77@gmail.com,
        osama_bahaa@msu.edu.my

we aim to provide a quantitative approach in order to generalize an understanding of the risk factors of ovarian cancer in women in Libya.

According to[4], Ovarian cancer is considered the seventh most commonly diagnosed cancer among women worldwide. In Libya, ovarian cancer accounts for 4.6% of cancer affecting women, according to the International Agency for Research on Cancer, 2018. may risk factors are associated with ovarian cancer, such as obesity, use of fertility medication, long ovulation cycles throughout life due to lack of children. Some elements showed to reduce the risk of ovarian cancer, such as breastfeeding, pregnancy, and the use of oral contraceptives[5]. The majority of the cases is related to family history through inheritance of mutated autosomal dominant gene [6].

Ovarian cancer is considered one of the most types of cancers affecting women in the world. The incidence of ovarian cancer increased to reach 4.6 % in 2018. The disease does not show symptoms in the early stage, but it becomes symptomatic when it has already spread to other parts of the body. Screening for the condition is not practical due to false-positive, which may lead to unnecessary surgical procedures. Understanding the risk factors is essential to help educate the women community about the risk factors and preventive measures in order to reduce the incidence of the disease and get an earlier diagnosis to provide a better prognosis. The research aims to use logistic regression analysis in order to test the goodness fit of the model and test the research hypotheses to determine which variables are significant predictors as risk factor for ovarian cancer among women in Libya. The research aims to answer the question of: What is the effect of various risk factors for ovarian cancer in women in Libya?. The research study is vital to healthcare workers, doctors, and pharmaceutical companies, and women who are concerned about ovarian cancer. Among the risk factors examined in the study are awareness, obesity, nature of the diet, ovulation information such as the age of menarche and age of menopause, pregnancy, breastfeeding, use of oral contraceptives, and family history. Scholars have controversial opinions about these risk factors and associations with ovarian cancer.

Literature Review: The research is based on four theories that explain the development of cancer in the body which are Incessant ovulation, Gonadotrophin theory, hormonal theory and inflammation Theory. The theories provide a theoretical background on which the research is used to identify the risk factors included in the model framework of the research.

The socioeconomic status has an indirect effect on the diagnosis and prognosis of ovarian cancer. The high social and economic situation is related to increased patient awareness of symptoms, lifestyle, time of response to symptoms, and health care access to the diagnostic and treatment facilities. The increased patient awareness is an essential factor as it plays a role in early diagnosis through regular medical check-ups. Some studies indicated that increased awareness reduces the risk of the development of ovarian cancer[7,8]. Hence, this research postulate that first hypothesis.

H1: Patient awareness has a negative association with the risk of developing ovarian cancer in women in Libya.

The history of the family is the most significant risk factor in ovarian cancer growth. The ovarian cancer case is genetically modified in 5-10 % of cases. The explanation is that genetic variation and chromosome abnormalities were associated with an increased incidence of ovarian cancer. The hypothesis is supported by many types of research such as [5,9–14]. Hence the second research hypothesis is formulated:

H2: Family History has a positive association with the risk of developing ovarian cancer in women in Libya.

Obesity is generally harmful to the general health of the body. The risk of developing many conditions would be that a person is overweight[15]. The effect of obesity is no exception with respect to ovarian cancer. Many reports have demonstrated elevated ovarian cancer mortality in obese individuals[16,17]. Numerous signs for obesity, Body mass index (BMI), and a waist-hip ratio are reported as studies' metrics [18]. In this study the BMI will be used as indication of obesity. Hence the first research hypothesis is formulated.

H3: Obesity has a positive association with the risk of developing ovarian cancer in women in Libya.

Diet and nutrition are essential factors in personal lifestyles that have a significant impact on individuals' overall health. In addition, diets and nutrition are controversial findings in the studies in a similar way to all risks associated with ovarian cancer. In many diseases, including ovarian cancer, food is considered to be a key factor[19].

The link between diet and ovarian cancer development is determined through ecological studies, in which the correlation between the two variables is determined. The nature of food is a significant contributor to ovarian cancer. Bosetti and Edefonti et al. have reported that some of the foods are associated with an increased chance of ovarian cancer, such as meat and certain fats. A reduced risk of ovarian cancer[9,20–22] has been associated with some micronutrients (vitamins and minerals) as well. The number of carbohydrates in the diet also affects the risk of ovarian cancer developing.

In Libya, the diet is a Mediterranean diet, which is one of the guidelines for the reduction of blood glucose and blood pressure [23]. The Mediterranean Diets Program demonstrate increased consumption of foods rich in long-chain n-3 fatty acids and monosaturated fats, mostly present in olive oil[6,9,20]. Hence the second research hypothesis is formulated.

H4: The nature of diet has a positive association with the risk of developing ovarian cancer in women in Libya.

Some of the ovarian cancer risk facts are linked to ovulation time during women's lives. The longer the period of ovulation, the higher the incidence of ovarian cancer. In the absence of children and in pregnancy and breastfeeding,ovulation duration will continue as an ovulation break during pregnancy and sometimes lactation. The risk of developing ovarian cancer is doubled by not having children[5].Other investigators, including[24,25], indicate that the longer the ovulation period for women is, the higher the likelihood of ovarian cancer. Early menstruation and late menopause can extend the ovulation period [24,25].Hence the third research hypothesis is formulated:

H5: Ovulation information has a positive association with the risk of developing ovarian cancer in women in Libya.

The role of oral contraceptives in reducing the risk of ovarian cancer is established in the literature.

Many studies support this postulation, such as[26–28] The study also indicated that with each year's use of oral contraceptive pills by 7%[26]. The length of use of oral contraceptives is also an essential factor, and The reduced risk can continue for up to 10–15 years after the cessation of pills[27,29]. Hence, the research postulates the following hypothesis.

H6: The use of hormonal birth control has a negative association with the risk of developing ovarian cancer in women in Libya.

The relationship between breastfeeding and ovarian cancer development is inverse. Luan et al. report that with every five months of breast-feeding, the risk of ovarian cancer decreases by 8 percent[6,9,20,24]. Period of lactation, the number of children, and the risk of ovary cancer is in reverse type[30]. The analysis found that the risk of ovarian cancer was reduced by 22 percent for lactation and lactation, an average of 18 months, according to[31]. Hence the fifth research hypothesis is formulated:

H7: Breastfeeding has a negative association with the risk of developing ovarian cancer in women in Libya.

Methodology

In this study, we aim to investigate the risk factors for ovarian cancer using a quantitative research approach through a survey. The population of the study is the women in Libya between the age of 25 and above. The choice of sampling is Stratified sampling, in which the population is divided into two subgroups, in this research, positive ovarian cancer patients and negative ovarian cancer patients. The sample size is determined to be 196 in total of both healthy and diseased women. The research use questionnaire adapted from [6,32,33] with modification and translation to Arabic language as a mother tongue for people in Libya. The data analysis process is done through frequency distribution comparison between healthy and diseased women and logistic regression analysis. The research framework is demonstrated in figure 1.
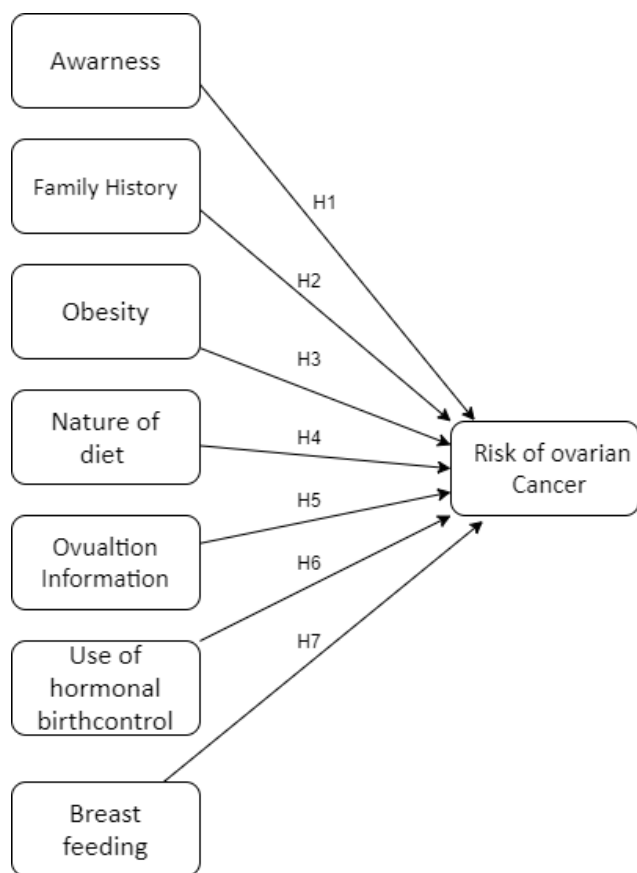
Figure 1: Research framework of ovarian cancer risk factors

The diseased women were targeted in various hospitals and clinics in Libya through a written survey. The healthy women were targeted using a written survey in the same hospitals and clinics. Ovarian cancer indicates in Libya is low. Hence the reverse faced some difficulties in reaching a large number of diseased women, and only 85 surveys were collected. In the case of healthy women, the collected survey was 139 written surveys. After filtering, the number of surveys in diseased women was 73 and for healthy women was 123

hence the total responses were 199. The data is collected from the different location all over Libya, an example of the area are Alagelaat, Benghazi, Misrata, Sabratah, Sorman, Tripoli, Zawiyah and Zealten.

Data Analysis and Results

As the survey was collected through written forms, data cleaning, and data entry was a long process during the data cleaning process BMI was manually calculated for the data as the majority of the patients do not know how to calculate it.. The questionnaire has a number of open-ended questions and a number of questions that have dichotomous categorical variables Frequency distribution of the data in order to compare the healthy and diseased women. and the linear logistic regression is used in order to determine the risk factors for ovarian cancer and test the research hypotheses. The result o the percentage distribution of questionnaire comparing healthy and diseased women is demonstrated in table 1:

For the logistic regression analysis, The First assumption is for the dependent variable to be binary on a dichotomous scale. The Second assumption required for logistic regression is for the observations to be independent of each other, this assumption is met as indicate no relation to the recorded data or observation between the variable groups. In testing for the outliers This relation is examined through observation of the Mahalanobis distance. The result of the maximum Mahalanobis distance is 15.45 that the difference in the result among the most extreme score is 15.45, which is an acceptable variation in the scores indicate that they are no outliers among the group of women [34]. In terms of linearity, this assumption indicates a linear relationship between each of the dependent variables within each group of the independent variable. The linearity is tested through a scatterplot matrix[35].

Table 1 Percentage distribution in response to questionnaire comparing healthy and diseased women

Variable		Healthy	Diseased
(Dependent) Diagnosed ovarian cancer		123	
Awareness	Heard of ovarian cancer	70%	100%
	Read about ovarian cancer	33%	50%
	Regular check-ups	63%	63%

Variable		Healthy	Diseased
History	Ovarian cancer family history	5%	83%
	Breast cancer family history	10%%	68%
	Treated with ovarian cancer in the family	4%	59%
	Relationship	55% second degree relative 8% sister 4% mother	11% mother 7% sister
BMI	Underweight Normal Overweight Higher obese	0% 43% 53% 3%	1% 33% 42% 24%
Nature of diet	Fat and meat consumption	60% moderate 33% low	70% moderate 25% low
	Fruits and vegetable consumption	80% moderate 12% high	60% moderate 33% low
	Carbohydrate intake	65% moderate 30% low	51% moderate 24% low
	Olive oil consumption	51% moderate 38% low	66% moderate 17% low
Ovulation information	Age of menarche (between 12-15)	70%	87%
	Age of menopause (reached at 55)	11%	15%
	Number of pregnancies (up to four times)	30%	17%
	Have children	88%	87%
Use of hormonal birth control	Use of contrapositives	75%	24%
	Type of contraceptives	68% Birth Control Pills	13% Birth Control Pills
	Length of use	56% for one year or less 13.2% for 2 years	52% for one year or less 26% for 2 years 19% for 3 years
Breastfeeding	Breastfeeding (yes)	75%	55 %
	Length of Breastfeeding	74% one year or less 26 % for three years	76% one year or less 17 % for three years

After ensuring that the assumptions required for logistic regression analysis are met, the analysis is performed. The independent variables entered in the model are awareness, history, family history, level of obesity, nature of the diet, ovulation information, use of birth control, and breastfeeding. The resulting output from SPSS. In the null model, the correctly predicted 61.8%. Wald chi-square test, which is a test. The null hypothesis is rejected as the p-value is less than 0.05. The test is done at only 1 degree of freedom as there is only one predictor in the null model. The exponentiation of the B coefficient "Exp(B)" is the odds ratio, which is equal to 0.61, the result is indicated in table 2.

Table 2 Result of null model testing

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.481	.146	10.889	1	.001	.618

The output of the model of the correctly predicted cases and not correctly predicted based on the model is demonstrated in table 3, compared to the observed cased. The table indicates that 106 cases are observed to have no ovarian cancer and are correctly predicted; 56 of the cases are observed to have ovarian cancer and are correctly predicted. While only 17 were predicted, get ovarian cancer and are wrongly predicted, and 20 were predicted not to get ovarian cancer and were wrongly predicted. The Overall Percentage gives the overall percentage of correctly predicted cases by the model; this model demonstrates 81.4% correct prediction of the model, which is a significant improvement over the null model by 19.6%.

Table 3 Overall predicted percentage of the model

	Observed		Predicted		Percentage Correct
			Diagnosed ovarian cancer		
			No	Yes	
Step 1	Diagnosed ovarian cancer	No	106	17	86.2
		Yes	20	56	73.7
	Overall Percentage				81.4
a. The cut value is .500					

The Hosmer-Lemeshow tests are used to test the null hypothesis for the predictions made by the model fit. The nonsignificant chi-square indicated by the p-value is more significant than 0.05, which indicates a good fitness of the model. The results are indicated in table 4.

Table 4Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	15.883	8	.064

The logistic regression model is used to predict which of the variables provide a statistically significant result. This is used through observation of the Wald chi-square value and p-value used. The overall result is that the logistic regression was used to understand the effect of awareness, family history, level of obesity, nature of the diet, ovulation information, use of birth control, and breastfeeding as risk factors for ovarian cancer in Libya. The results indicated that the logistic regression model was statistically significant, $\chi2(7) = 85.9$, $p < .0005$. The model predicts 81.4 % of the total variance, which is a 19.6% increase over the null model. The result indicated that Body mass index (BMI), family history, breastfeeding, ovulation information, and use of hormonal birth control all have p values less than 0.05. Hence they are statistically significant predictors for the model. While the awareness and diet have a p-value of more than 0.05 are not statistically significant. Breastfeeding is a significant predictor; an increased breastfeeding period is 2.8 more likely to prevent ovarian cancer. Family history is the second-highest predictor; the result indicates that women with a positive family history are 2.1 more likely to get ovarian cancer. BMI is also a significant predictor; as a result, indicated that women with high BMI are 2 times more likely to develop ovarian cancer. Decreased use of birth control indicates a high probability of developing ovarian cancer, also increase in the ovulation information such as early age of period and late age of menopause, decreased number of pregnancies and children is more likely to develop ovarian cancer. Decreased use of hormonal birth control will increase the chance of ovarian cancer. The result is demonstrated in table 6.

Table 6 Variables in the model

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP (B)	
								Lower	Upper
Step 1ᵃ	BMIrange	.700	.320	4.780	1	.029	2.015	1.075	3.775
	AWAR	.059	.199	.088	1	.766	1.061	.718	1.567
	HISTO	.722	.232	9.680	1	.002	2.059	1.306	3.245
	FEEDING	-1.026	.164	39.070	1	.000	2.791	2.023	3.850
	OVUL	-.332	.140	5.611	1	.018	.718	.545	.944
	BIRTH	-.800	.126	40.559	1	.000	.450	.351	.575
	DIET	.144	.153	.891	1	.345	1.155	.856	1.559
	Constant	-2.368	1.478	2.568	1	.109	.094		
a. Variable(s) entered on step 1: BMI range, AWAR, HISTO, FEEDING, OVUL, BIRTH, DIET.									

Discussion

The majority of diseased women were between the ages of 41-60. (70% of the respondents). This finding supports the idea that ovarian cancer is an age-related disease that usually occurs after menopause as indicated in the study by[36,37], which demonstrated ovarian cancer incidence is more common in women around the age of 60 years of age and other studies by[38,39], it indicates that the average range of diagnosis of ovarian cancer among women is between 50 to 79 years

Awareness as a risk factor for ovarian cancer: The level of awareness is relatively low among both the diseased and the healthy women, as a result, indicated that only 50% of the diseased and 33% of the healthy women read about ovarian cancer. Both healthy and diseased women receive regular check-ups, which may be explained by the high level of education demonstrated in the demographic profile of the respondents.

The result of the logistic regression analysis indicated that awareness was not a predictor in the proposed model for risk factors. The result shows different findings in comparison to other studies by[7,8,32], which indicated increased patient awareness of symptoms, lifestyle, time of response to symptoms, and health care access to the diagnostic and treatment facilities.

Family history of ovarian cancer as a risk factor: The questionnaire of the healthy and diseased women indicated that the majority of diseased women have relatives that had either ovarian cancer or breast cancer. The result indicated a close association between family history and the risk of developing ovarian cancer.

These findings were supported by the logistic regression analysis, which indicated that family history is a predictor for ovarian cancer. The result indicated that Family history is the second-highest predictor; the result indicates that women with a positive family history are 2.1 more likely to get ovarian cancer. The findings of the study are similar to the findings of[5,9–14].

Level of obesity as risk factor for ovarian cancer: The BMI is a good and acceptable indication that can easily be calculated based on the height and weight data collected from the respondents. The result indicates that the diseased women are 68 % overweight and obese compared to only 56% of the healthy women. High percentage of healthy women fall in the normal wight which can be a result of high level of health awareness. Additionally, the result of the logistic regression indicated that BMI is a significant predictor as increased value of BMI among women is 2 times more likely to develop ovarian cancer. The result supports the findings of[16,40,41].

Nature of diet as risk factor for ovarian cancer: The result indicated that diseased women demonstrated high fat and meat consumption and diseased consumption of fruits and vegetables compared to healthy women. Although diseased women indicated high consumption of olive oil compared to healthy women. The result of logistic linear regression indicated that nature of diet is not a significant predictor for the risk factor model proposed in the study. The result is similar to other studies that have examined the role of diet in ovarian cancer which indicate that a complete connection is not established, and it is suggested that the diet does not

have a major impact on the incidence of ovarian cancer occurrence[6].

Ovulation information as risk factor for ovarian cancer: The ovulation information considered in this research are the age of period, age of menopause, number of pregnancies, and number of children. The result indicated that diseased women research puberty earlier than healthy women, the age rage described in the age profile indicate that the majority of respondent were between age of 40-60 which is an early age of menopause. This explain that a small percentage of the sample reached menopause. In relation to the number of pregnancies, diseased women showed decreased in this number in comparison to healthy women. Similar result in relation to the number of children which showed that diseased women had higher percentage of not having children in relation to healthy women. The result of logistic regression indicates that ovulation information is a significant predictor for risk of development of ovarian cancer. The findings is similar to findings discussed in the previous studies as the association between the number of ovulation cycles and the risk of development of ovarian cancer is indicated in[17,42].

Use of hormonal birth control as risk factor for ovarian cancer: The result indicated that the majority of healthy women used contraceptives in comparison to diseased women. The healthy women used birth control pill more than the diseased women, although the length of use was similar in both groups. The result of the logistic regression indicated that use of hormonal birth control is among the predictor variables for the development of ovarian cancer which is indicated as a risk factor. The result indicated that decreased use of birth control indicates high probability of developing ovarian cancer. The findings of the study are similar to findings discussed in the literature. such as[26–28].

Breast feeding. as risk factor for ovarian cancer: The majority of healthy women indicated natural breast feeding and for longer period in comparison to diseased women. the result of logistic regression indicated that breastfeeding is a significant predictor, increased period of breast feeding is 2.8 more likely to prevent ovarian cancer. The findings of the study is similar to findings of other studies such as .[6,24].

Conclusion

This research aimed to understand the risk factors associated with ovarian cancer with focus on the women in Libya. Menarche and menopause, menstrual factors, age at birth. Ovulation information progresses are some of the most important risk factors described by many scholars. While a decreased number of ovulation cycles are generally believed to be associated with low risk based on theory of incessant ovulation.

Family history is the key risk factor in ovarian cancer development. Factors such as obesity is considered a huge risk factor for ovarian cancer. Other factors included in the study include ovarian cancer awareness, the use of hormonal birth control.

The field for future research in the area of risk factors associated with ovarian cancer is filled with many possibilities and topics for the research in order to understand the nature of risk factors for ovarian cancer which many be associated with prevention or easily diagnosis that led to decrease the mortality rate from ovarian cancer. In this research, it was limited to only Libya, other countries in the Mediterranean region should be included in order to completely reject or accept the hypotheses that postulate the relation between ovarian cancer and diet especially the Mediterranean diet. Future research should also consider the association with socioeconomical factors which may lead to increased awareness which helps with early detection and better prognosis of the diseased. The duration of Breast feeding and duration of use of hormonal birth control need additional focus in future research. Other Factors should be included such as the use of fertility medicine or assassination with other drugs. The study was done on a cross-section setting, longitude studies is recommended especially for this type of cancer as it is an age related and it takes time to develop.

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Evaluation of the Efficay of Computer Guided Lag Screw Fixation in Comparison to Conventional Lag Screw Fixation in Anterior Mandibular Fractures. Randomized Clinical Trial (RCT)

Mohamed K. Nasr[1], Hesham A. Hakam[2], Khaled A. Salah[3]

[1]*Assistant Lecturer Oral and Maxillofacial Surgery Department Faculty of Dentistry Cairo University in Egypt,*
[2]*Professor,* [3]*Assistant Professor, Oral and Maxillofacial Surgery Department Faculty of Dentistry,*
Cairo University

Abstract

Background and Objective: This study aimed to compare the use of computer guided technology to place lag screws in anterior mandibular fracture in comparison to convectional technique

Materials and Method: This study included twenty-six patients divided into two equal groups, where fixation in group A utilized computer guided patient specific guide to fix anterior mandibular fractures using lag screws. In group B anterior mandibular fractures were fixed using lag screws in the conventional way. Both groups were compared in terms of stability and the need of auxiliary fixation devices.

Results: Both techniques showed uneventful healing and showing insignificant difference between them concerning stability and the need for auxiliary fixation device.

Conclusion: Although the use of computer guided technology didn't offer significant advantage over the conventional technique yet it provides more easy and reliable way especially for beginners introduced to the technique.

Keywords: *Lag screw, computer guided, anterior mandibular fracture.*

Introduction

Several authors favor lag screws over other fixation systems due to its advantages which outweigh bone plates in several aspects, due to presence of compression generated by the use of lag screw which is not the case with mini plates, as a result more fracture gap reduction can be achieved. The extensive use of the lag screw technique have not been recommended due to complication either temporary or permanent due to its technical sensitivity, hence a lot of surgical skill is demanded to benefit from such technique without it's complication.[1,2]

With experiencing different fixation devices, the use of lag screws saves time during fixation, hence reducing intraoperative time when compared to different types of plates especially compression and reconstruction plates since no time is wasted to accurately adapt bone plates.[3]

Concerning interference with reduction upon fixation in anterior mandibular fracture it is proved that lag screws do not interfere while compression and reconstruction plates do, due to failure to achieve perfect plate bends to comply to the irregular complex mandibular lateral surface.[4,5]

Unless the insertion of either lag screws or bicortical bone plate screws are carefully planned in mandibular

Corresponding Author:
Mohamed Kadry Nasr
Address: 35 Mohie el dien abo el ezz St. Dokki, Giza, Egypt
e-mail: m.kadry2011@gmail.com
Telephone number: +201200560027

fractures the pathway of the screw or the drill bit might endanger the intramedullary structures like invisible roots of teeth and inferior alveolar canal, this risk is much more realized in lag screws than in bone plates screws due to the long distance and oblique fashion of the lag screws in dentate area.[4,6,7]

Not to mention that failure of inexperienced surgeons to use a proper drilling angel while performing the osteotomy in the anterior mandibular fracture result in increased pressure on the drill bit farther above its shear strength limit ending up with a fractured bit imbedded in the bone, needing excessive bone removal to access the bit for removal.[4,6,8]

Materials and Method

Study Population: 26 patients were selected suffering from anterior mandibular fracture. The history and detailed medical examination data for each patient was collected in a chart prepared specially for this study. Standard preoperative patients' photographs were taken. Pre-operative and post-operative computed tomography were done for each patient.

Pre-operative planning and surgical procedure: In both groups pre-operative computed tomography was performed and DICOM (Digital Imaging and Communications in Medicine) files were inserted in specialized software for surgical planning and simulation"Mimics innovation suite 15.0".

Group A (Computer guided lag screw fixation group): Pre-operatively on the surgical planning software the mandibular fractures were separated, manipulated into pre-fracture position (virtual reduction) and then three-dimension drill guide (patient specific surgical guide) is virtually constructed to guide the drills intra operatively to the planned position of the lag screws. The design of the surgical guide was then exported to a three-dimensional printer to print the surgical guide using printing material medical grade Acrylonitrile butadiene styrene (ABS) a thermoplastic amorphous material.

Before surgery the Surgical guide was immersed in Cidex 2% for 10 hours for sterilization and rinsed with saline prior to surgical procedure.

Intra operatively under general anesthesia mandibular anterior vestibular incision was done and fracture exposed. Inter maxillary fixation was achieved then bone reduction clamp was used to reduce the bone

fracture and maintain it until the lag screws are placed. Then the surgical guide to placed and adapted to the anterior mandibular surface and fixed with two mini screws. Drilling the osteotomy for the lag screws were done through the surgical guide. After the osteotomies were completed the surgical guide were removed and counter sinking was done and the lag screws were inserted, then the bone reduction clamp was removed and intermaxillary fixation was released and bimanual manipulation was done to check stability (if instability was found mini plate as an addition fixation device were used). Then the surgical wound was sutured back.
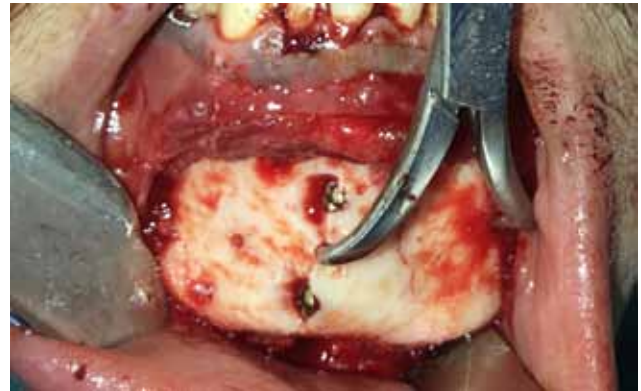
Fig. 1: Bone reduction by bone clamp and lag screws placed

Group B (Conventional lag screw fixation group): Pre- operatively on the surgical planning software the same steps performed for group A was done except for the designing of the surgical guide.

Intra operatively under general anesthesia the same surgical steps for group A was done except that no surgical guide was used to determine the position and angulation of the osteotomies. Instead two osteotomies were done, one as a tension band and the other as stabilization band and both osteotomies were placed as much as possible perpendicular to the fracture plane.

Post-operative: During the follow up visits (1-week post-operative, 4-weeks post-operative, 6 weeks post-operative form day of surgery) patients were checked for stability, occlusion, wound healing, and inferior alveolar nerve paresthesia in addition to other complications as infection were evaluated for each patient.

Results

For all patients, the surgical procedures were performed without any major complications.

Clinical Results: The early postoperative period for all patients went uneventful with no significant complications. All patients showed postoperative edema with variable degrees which resolved completely by the end of the follow up period.

Table 1 Post-operative stability assessment

	1-week post-operative	**4-month post-operative**	**6-weeks post operative**
Group 1	All case stable	All cases stable	All cases stable
Group 2	11 out of 13 was stable 2 unstable: managed by IMF	All 11 cases were stable	All 11 cases were stable

According to student T-test the p value for primary stability at 1st week post-operative equals 0.07632616 which is greater than 0.05 indicating that the observed results are due to chance and there is no significant difference between both groups.

Concluding that we accept the null hypothesis that there is no difference between the group A (computer guided lag screw placement) and group B (conventional lag screw placement) concerning the achievement of primary stability.

There was no difference between both groups at one month post-operative to perform statistical difference.

In Group A 4 out of 13 cases required supplemental fixation in the form of mini plate with screws.

In Group B 5 out of 13 cases required supplemental fixation in the form of mini plate with screws.

According to the student T test the P value for neurosensory disturbance equals 0.20789246 which is greater than 0.05 indicating that the observed results are due to chance and there is no significant difference between both groups. Concluding that we accept the null hypothesis that there is no difference between the group 1 (computer guided lag screw placement) and group 2 (conventional lag screw placement) concerning the need for supplemental fixation intra operative

Discussion

This study aimed to compare the efficiency of computer guided lag screw fixation in comparison to conventional lag screw fixation. All cases in the study in both groups showed uneventful healing with bone union at the end of the follow up period.

In comparing the efficiency of the intervention (computer guided group) to obtain primary stability in comparison to the control group (conventional lag screw fixation) it was found that the intervention group is more superior over the control group, however this superiority was statistically insignificant. In our opinion the fact that all of the cases in the intervention group achieved stability thorough out all of the follow-up period is due to the fact that the use of computer guided ensured precise placement and engagement of the tip of the screw to the far cortex offering enough resistance to designment under function. The instability found in the control group during the follow-up period wasn't found intraoperative after fixation although resistance was found upon tightening the screws and stability was checked by bimanual manipulation. In our opinion this may be due to failure of the conventional technique to engage the far cortex and leaving the tip of the lag screw only engaging the spongiosa which is quite enough to maintain stability intra operative, however upon function in the post-operative period the engagement of the spongiosa only offer little resistance to maintain stability resulting in the two cases of instability post-operative out of thirteen patients.

In this study the need for supplemental fixation devices was noted to be insignificant between both groups. The need to apply an auxiliary fixation device was due to either failure to achieve mechanical stability using lag screws only or due to the limited area anatomically leading to substituting the superior lag screw by a mini-plate.

In the computer guided group, the angulation of the lag screw in respective the fracture line was controlled effectively to be nearly at right angle to the fracture line, hence sliding of the fracture segments over one another leading to inaccurate anatomical reduction upon tightening. The achievement of a perpendicular placement of the lag screw to the fracture line is not always reliable during drilling in the conventional way

as illustrated before and requiring a lot of skills by the surgeon and quite experience with the lag screw technique.

In this study during tension band fixation in the control group we refrained in a lot of instances to use a superior lag screw due to the presence of long mandibular canine. Our result concur with the results of Ellis and Ghali 1991 and with the results of Emam and Stevens 2012.[7,9]

In our current study we did not experience drill bit fracture in any of the cases of both groups, this contradict with results of kallela et al 1999 who had one broken bit out of 11 patients and with the results of Tiwana et al 2007 who had 6 broken bits in 6 patients out of 102 patients.[6,8]

In our study we did not experience injury to teeth roots or collision with mental foramen as experienced by previous authors including Assael 1993 and Ellis 2012.[7,10]

It was noted that after drilling through the surgical guide and its removal in the intervention group debris was found from the material of the surgical guide on the bone, they were washed off by saline solution and no tissue reaction was observed during the follow-up period

Conclusion

In the current study the use of computer guided technology was used in placement of lag screws in anterior mandibular fractures and was compared to the conventional technique. The study yielded that the use of the computer guided technology didn't offer any statistically significant advantage over the conventional technique in terms of stability, avoiding complications and the need for additional fixation devices.

However, the use of computer guided would offer a significant advantage for beginners in using the lag screw technique, since the technique requires a lot of experience, skills

Competing Interests: No Conflict of Interest

Ethical Approval: The Ethics and research committee, Faculty of Dentistry, Cairo University approved the study and patients' consent was obtained.

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Association of Prevalance and Severity of Dental Caries with Consumption of Food and Beverage Across Age and Gender among 6-12 Years Old Children in Chennai, Tamilnadu

Neethu Rappai[1], M. Vishali[2], D. Prabu[3], Sunayana Manipal[4], Rajmohan[4], Bharatwaj V.V.[5]

[1]*Under Graduate,* [2]*Post Graduate Student,* [3]*Master of Dental Surgery, Professor and HOD,* [4]*Master of Dental Surgery, Reader,* [5]*Master of Dental Surgery, Lecturer, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamilnadu, India*

Abstract

Objective: To investigate the prevalence and severity of dental caries with correlation of food and drink consumption across age and gender in children aged 6-12 years in Chennai.

Materials and Method: Among different schools in Chennai, schools in Ramapuram were selected and the students were selected by multistage random sampling. The pre-validated questionnaire was used, which comprises of open ended questions about diet, brushing technique along with their demographic details. Then the clinical examination was carried out to know about the caries prevalence and severity. A statistical analysis was done.

Results: Snack food was consumed by large amount of children. 60 percentage of children consumed large amount of carbonated drink than fresh juices. Low privileged population consumed large amount of sugar in their tea or milk. When considering all variables, intake of confectionery was solitarily related with dental caries prevalence and consumption of tea with sugar was solitarily related with caries severity.

Conclusion: Large amount of snacks and carbonated drinks were consumed by majority of children and resulted in dental caries.

Keywords: *Children, dental caries, prevalence, food.*

Introduction

"A clean tooth will not decay."
–Uttered by Leon Williams

Always a dynamic relationship exist between oral health and sugar intake. Diet plays a significant role as factors responsible for maintaining the integrity of teeth by its effect on quantity, PH and composition of saliva and plaque PH.[1] Considering the diseases of an oral cavity, dental caries is the foremost thing in mind. The increased prevalence of dental caries is mainly due to lack of awareness hence the disease can be eradicated by means of implementation of oral health programs and use of fluoride tooth paste. Sugar consumption is considered one of the most important cause for dental caries especially sucrose.[2]

Dental caries affects all the humans irrespective of age and gender with worldwide distribution. Dental caries is a multifactorial complex disease, remains the chronic disease of childhood. The most common bacteria, the mutant's streptococci, in particular streptococcus mutants are considered to be most significant bacteria in the initiation of demineralization process leads to dental caries. Diet act as a local factor on oral health, mainly for maintaining integrity of teeth that is by means of PH and composition of saliva and plaque.[2] Dental caries

Correspondence Author:
Dr. M. Vishali
Department of Public Health Dentistry, SRM
Dental College and Hospital, Ramapuram, Chennai,
Tamilnadu, India
e-mail: vishalimahesh95@gmail.com

can be termed as a microbiological process that leads to dissolution and destruction of organic and inorganic matrix. Prevalence of dental caries is of high concern.

According to Federation Dentaire International, nutrition is defined as the sum of the process by which an individual takes in and utilizes food. This study investigated the significant association caries experience with food and drink consumption among children.[3] Sugar can be termed as easily fermentable carbohydrate. Sucrose, glucose and fructose. The average daily intake was estimated at 5 times the intake of school days and 2 times the intake at weekends divided by 7.

Acid products, formed by bacterial fermentation of dietary carbohydrate in the entail plaque are the requirement for the initiation of dental caries.[4] Host tissue interactions with various risk factors such as carcinogenic bacteria, saliva, fermentable carbohydrate and absence of fluoride in the oral environment, influence of bacterial colonization as well as either the determination or demineralization of tooth surface.[5]

Considering fruit juices particularly, sweetened with artificial sugars and soft drinks contain significant amount of added sugar can cause demineralization of enamel and their improper feeding in infant leads to early childhood caries.[6] Caries is mostly seen in young children due to various reasons. One of the most common causes for the increase scale of dental caries is the diet especially that diet may cause caries when there is too little fluoride.[7]

While considering early experiments it had been shown the co-relationship between prevalence of dental caries and sugar consumption is not clear in few older experiments were as within last few decades fewer reports have shown significant associations between differing measures in intake of sugar with occurrence of dental caries.[8,9] The majority of intake of sugar was hidden in carbonated drinks and processed food. Contribution for total sugar intake in children and adults is mainly by sweetened added sugars. Consequently, carbonated soft drinks will likely to be continued to be trending worldwide and this trend may have a detrimental effect on the dental health because sugared soft drinks are potentially carcinogenic. Females are much more prone to dental caries than male.[10]

The evidence and prevalence of dental caries is rising in low income countries because of availability and frequent consumption of sugary foods and drinks.[11]

According to Shen et al those children aged from 6years living innon-fluoridated and fluoridated communities denotes few improvements in prevalence of dental caries that has taken place over decades.[12] The aim of this study is to study the correlation of prevalence and severity of dental caries with food and beverage intake.

Materials and Method

A clinical examination was done in children aged 6-12 years in different schools of Chennai using multistage sampling method. Out of different blocks in Chennai, Ramapuram block was selected by lottery method. 8 different schools were there out of which 4 schools were selected by random sampling method. Prior permission was taken from the principals of the schools. Ethical approval was obtained by the ethical committee of department of public health dentistry, SRM dental college. The total number of students in every school neared 500. The schools were independent and not state funded. The questionnaire was extracted from the study done by Sayegh et al in the year 2002 [13]. In both the languages questionnaire was prepared for the convenience of the parents and children. The questionnaire consisted a variety of questions that included food consumed during breakfast, lunch, dinner, snacks, drinks, method and technique of brushing etc. It also included questions such as information on children's date of birth, gender, children's current or past medical history. A pre sampling was done among 30 children's. The parents of school children had completed questionnaires was utilized for obtaining information about dietary habits. A clinical examination was conducted to obtain information about the prevalence as well as severity of dental caries. With parents' consent, an oral examination is done for every child. Data were obtained by means of direct data entry program. The samples were separated according to the gender and age. The oral health examination comprises of an identification of decayed, missed or filled tooth. The clinical examination was carried out by using plane mouth mirror and periodontal probe. The ethical approval was obtained from ethical committee of Public Health Dentistry, SRM Dental College.

Caries was recorded according to the DMFT index (Henry T. Klein, Carrole E. Palmer and Knutson J.W., 1938). D indicates decayed, M indicates missing tooth and F indicates filled tooth. A tooth was considered as decayed only if there was visible evidence of cavitation including untreated caries and filled teeth with secondary cariesas per DMF criteria for decayed tooth. The missing

tooth was indicated when the teeth missing is believed to be lost due to caries and no successor was observed and filled when the cavity is filled with restorative material. Clinical examination was done and prevalence of caries and severity was recorded.

Data Analysis: All data were analyzed and recorded. Chi-square test had been used to determine the relationship between various types of food/drink intake with caries prevalence and severity. SPSS version 13.5 was used for the analysis of the data.

Results

The results where mainly related to dental examination and information from parents by means of the completed questionnaires which included clinical findings of 346 boys and 156 girls.

Table 1: Relation between food consumed during morning

		What does your child have for Breakfast?					
		IDLI/DOSA/BREAD		Milk		Others	
		N	n %	n	n %	n	n %
Gender							
Male		136	50.4%	87	61.7%	58	65.2%
Female		134	49.6%	54	38.3%	31	34.8%
Age							
5				1	.7%	3	3.4%
6		27	10.0%	26	18.4%	10	11.2%
7		79	29.3%	51	36.2%	15	16.9%
8		59	21.9%	25	17.7%	16	18.0%
9		52	19.3%	18	12.8%	25	28.1%
10		33	12.2%	10	7.1%	8	9.0%
11		14	5.2%	9	6.4%	9	10.1%
12		6	2.2%	1	.7%	3	3.4%
What is the caries severity?	dmf>4	91	33.7%	58	41.1%	35	39.3%
	dmf<=4	179	66.3%	83	58.9%	54	60.7%
What is the caries prevalence?	Caries free	180	66.7%	71	50.4%	48	53.9%
	Caries	90	33.3%	70	49.6%	41	46.1%

Table 1 shows the relationship between foods consumed during morning denotes the proportion and number of children in relation to type of food consumed during breakfast. The children having milk is food to have more caries due to large consumption of sugar.

Table 2: Relation between food consumed during lunch

	What does your kid have for Lunch?					
	Chapatti		Rice		Others	
	N	n%	N	n%	n	n%
Gender						
Male	73	64.0%	168	52.5%	40	60.6%
Female	41	36.0%	152	47.5%	26	39.4%

		What does your kid have for Lunch?					
		Chapatti		Rice		Others	
		N	n%	N	n%	n	n%
Age							
5		2	1.8%			2	3.0%
6		11	9.6%	37	11.6%	15	22.7%
7		39	34.2%	91	28.4%	15	22.7%
8		15	13.2%	72	22.5%	13	19.7%
9		20	17.5%	65	20.3%	10	15.2%
10		14	12.3%	29	9.1%	8	12.1%
11		8	7.0%	21	6.6%	3	4.5%
12		5	4.4%	5	1.6%		
What is the caries severity?	dmf>4	43	37.7%	118	36.9%	23	34.8%
	dmf<=4	71	62.3%	202	63.1%	43	65.2%
What is the caries prevalence?	Caries free	59	51.8%	198	61.9%	42	63.6%
	Caries	55	48.2%	122	38.1%	24	36.4%

Table 2 shows the relation between food consumed during lunch shows the relationship between different foods consumed during lunch. The children having rice is found to have caries than other children. Caries prevalence is much more in males as consumed to females.

Table 3: Relation between food consumed during snacks.

		What does your kid have for Snacks?					
		Biscuits		Chips/Snacks		Others	
		N	n%	N	n%	n	n %
Gender							
Male		115	52.8%	130	60.7%	36	52.9%
Female		103	47.2%	84	39.3%	32	47.1%
Age							
5		1	.5%	2	.9%	1	1.5%
6		28	12.8%	29	13.6%	6	8.8%
7		70	32.1%	50	23.4%	25	36.8%
8		42	19.3%	45	21.0%	13	19.1%
9		39	17.9%	45	21.0%	11	16.2%
10		22	10.1%	21	9.8%	8	11.8%
11		13	6.0%	16	7.5%	3	4.4%
12		3	1.4%	6	2.8%	1	1.5%
What is the caries severity?	dmf>4	80	36.7%	78	36.4%	26	38.2%
	dmf<=4	138	63.3%	136	63.6%	42	61.8%
What is the caries prevalence?	Caries free	51	41.3%	66	33.5%	22	11.0%
	Caries	127	87.7%	138	88.5%	55	70.0%

Table 3 shows that the children consuming large amount of snacks is found to have more caries than other children.

Table 4: Relation between food consumed during dinner.

		What does your kid have for Dinner?					
		Tiffin		Rice		Others	
		N	n %	N	n %	n	n%
Gender							
Male		130	57.3%	98	50.5%	53	67.1%
Female		97	42.7%	96	49.5%	26	32.9%
Age							
5				2	1.0%	2	2.5%
6		33	14.5%	17	8.8%	13	16.5%
7		63	27.8%	61	31.4%	21	26.6%
8		39	17.2%	46	23.7%	15	19.0%
9		44	19.4%	38	19.6%	13	16.5%
10		22	9.7%	21	10.8%	8	10.1%
11		19	8.4%	7	3.6%	6	7.6%
12		7	3.1%	2	1.0%	1	1.3%
What is the caries severity?	dmf>4	84	37.0%	68	35.1%	32	40.5%
	dmf<=4	143	63.0%	126	64.9%	47	59.5%
What is the caries prevalence?	Caries free	145	63.9%	107	55.2%	47	59.5%
	Caries	82	36.1%	87	44.8%	32	40.5%

Table 4 states that the children having Tiffin which consists of large amount of starch are found to have high risk of caries.

The results indicated that 59 percentage consumed idly/dose/bread for their breakfast, 73 percentages have chapatti for their lunch, 60 percentages have chips for their snacks, and 67 percentages have other items for dinner. Majority of kids have coca cola/Pepsi as drinks. Considering the prevalence of dental caries in children, significantly the risk had associated with confectionary and had sweets and carbonated drinks (p<0.05). When considering the severity of dental caries, the risk was significantly associated with beverage(tea) consumption (p value <0.05). The prevalence and severity of caries in respect to snack food consumption was found high. Carbonated drinks were consumed more than fresh juice; few children report to have fresh juice than carbonated drink. Less privileged children have tea with sugar in large amount.

Discussion

In children, dental caries (tooth decay) is considered as the main oral disease. Although dental caries is preventable it still affects many children, mainly those who are in a disadvantaged social background .When sucrose is added to milk, it renders milk carcinogenic.[14] The review of relationship between sugar consumption and dental caries was studied by Woodward and Walker who collected data for every country was obtained from the F.O. light company, sugar consumption was estimated, a positive but less significant association was seen between the average sugar consumption and DMF scores.[15]

In 1987, 1988 and 1989, a survey was performed yearly dietary studies in combination with registration of dental caries in children aged 6 to 12 years. It was found that this group of children had more questionable diet. Most of the sugar taken by humans is found mainly in carbonated drinks and processed foods.[16]

The biway relationship between sugar consumption and dental caries is influenced by many facts about sugar consumption like total amount, frequency of consumption, the varying sugar content of foods, physical form of sugar containing foods etc.[17] Another study in Australia proves that sugar sweet beverages

intake by Australian children is higher when compared to India.[18]

Dental caries is a complex disease, the cause of which has received significant attention during the nineteenth and most of twentieth century. According Global epidemiology study South Asia is found to have higher caries rate accounts for upto 90%in children aged 12 years.[11]

Sugar sweetened beverages are one of the most important source of refined carbohydrate in developed nation such as United States and Australia.[19] A controversial issue, regarding bovine milk and its cariogenic potential in human is still under review but the animal studies found non-cariogenic potential to bovine milk however the question regarding humans is still an controversy.[20] Previous investigation shows that in children extreme conditions like protein malnutrition and severe starvation increased the carcinogenic potential of fermentable carbohydrates.[21] Brushing with fluoridated tooth paste is the simplest and considered as effective way to prevent tooth decay. Added, lack of knowledge about the appropriate dietary habits in children may add unfavorable relationship with oral health.

The analysis represents the prevalence and severity of dental caries in relation to snack food consumption. It was shown that many children from low privileged to have cakes, biscuits confectionaries, and snack food were low it may play a positive role in oral health.

The children whose caries severity is found to have d m f greater than 4 drank more liquids with sugar. A worldwide change in thediet and lifestyle practices had occurred before the few decades notably increase of consumption of sugary and fatty foods. Higher carbonated soft drink consumption increases the number of dental caries in primary teeth compared to other fluid but almost more than 50 percent of children were frequently consuming carbonated drinks.[22]Children consuming large amount of food and carbonated drinks were shown in the table. Breakfast along with drinks did not change with age and gender. Regardless of one's socio-economic status,in urban parts of developing nation compared with rural group consumption of sugar added foods and drinks were frequently taken urban area. From the findings in relation to the breakfast and dinner were similar. 60 percentage children had sweet items during dinner and 40 percentage cooked vegetables.60 percentage of children had milk or tea with sugar in large amount. In this present study it was ended with that children with high caries prevalence had poor dietary habits compared those children were caries free. Study of types of consumption, food habits, nutritive value of diet have been analyzed. Snack food items were consumed in large amount by children. Because of worldwide change in diet has been noticed in recent years stated that consumption of large amount of food and drinks had shown the prevalence of caries.

The study findings found that moderate to high level of caries experience is noted in children who have carbonated drinks, drink (milk) with added sugar and refined carbohydrates.

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Probiotic Streptococcus A12 Strain in Caries Prevention: A Systematic Review

Noreen Qazi[1], Madhura Pawar[2], Ann P. Tharakan[3], Preeti P. Padhy[4]

[1]MDS Student II Year, [2]Associate Professor, [3]MDS Student III Year, [4]MDS Student I Year, Department of Pedodontics and Preventive Dentistry, Dr. D.Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India

Abstract

Background: Dental Caries is a biofilm-mediated multi factorial disease affecting around 5 billion people worldwide. A consensus is now emerging that caries preventive measures should not only correct the environmental pressures responsible for the plaque biofilm dysbiosis, but also help to maintain a healthy resident microbiome which plays a crucial role in preventing caries and promoting oral health. This PROSPERO registered review (registration no 166695) aimed to examine the evidence on the role of probiotic Streptococcus A12 in caries prevention.

Objectives: To know the effectiveness of A12 strain in caries prevention in early stages of disease onset.

Intervention: Streptococcus A12 strains.

Results: A preliminary search yielded a total of 2630 studies recorded through database searching and 23 additional records were identified through manual search. From 2653 articles, 2504 were excluded based on screening through review of titles. 8 articles were included for qualitative synthesis. Streptococcus A12 strains demonstrates antimicrobial efficacy by neutralization of the environment by arginine metabolism.

Conclusion: Streptococcus A12 strains demonstrates antimicrobial efficacy by neutralization of the environment by arginine metabolism, which leads to the reduction in Streptococcus mutans count and helps in lowering the acidic nature of saliva is the potential strength of A12 strain. Due to a lack of controlled clinical studies on probiotics for caries prevention, evidence on their caries-preventive potential is weak. Future studies are needed to examine the probiotics as a potential agent against cariogenic pathogens.

Keywords: *Dental caries, Probiotics, Probiotic Streptococci, Streptococcus A12, caries prevention.*

Introduction

Dental Caries belongs to a group of diseases that are considered "complex" or multifactorial, with no single causation pathway, and therefore are not amendable to simplistic preventive solutions such as the elimination of one type of organism.[1] Microbial culture techniques have demonstrated that Mutans Streptococci or Lactobacilli, can contribute to the caries process at different stages[2] and Candida Albicans can significantly enhance the cariogenic virulence of plaque biofilm.[3] Although many preventive and interceptive treatments are available, dentalcaries is still a constant concern in children. "Fluorides" being highly effective and economicalmay not be sufficient alone to prevent dental caries. Even with regular use of fluoride, carieslesions can still develop when there are more than 6 dietary exposures per day.[4] A consensus is now emerging that caries preventive measures should aim not only to correct the environmental pressures of the plaque biofilm but also help maintain a healthy microbially diverse, resident

Corresponding Author:
Dr. Noreen Qazi
BDS (MDS Pedodontics and Preventive Dentistry)
Dr. D.Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India
Contact Number: 7038000624
e-mail: noreenqazi7@gmail.com

microbiota.[5] Preventive and restorative products should target only cariogenic bacteria without effecting the resident oral microflora or they should inhibit only the virulence factor.[6] A healthy oral microbiome is important in preventing dental caries and understanding it has become mandatory. The oral cavity is composed of a diverse group of microbial species that are harmful as well as healthy.[7] Probiotics are strains of live microorganisms which when administered in adequate amounts provides a health benefit on the host. Most probiotics are Gram-positive bacteria that belong to the genera Lactobacillus or Bifidobacterium. Studies based on the use of the intestinal probiotics Lactobacillus Rhamnosus GG, Lactobacillus Reuteri, and Bifidobacterium have each reported achieving reduced levels of Streptococcus mutans. However, these strains have limitations in terms of their colonization of oral tissues.[8] However very recently, two natural oral commensal species Streptococcus Dentisani and Streptococcus A12 Strains have demonstrated promising probiotic effects against dentalcaries.[9] They not only inhibit growth of mutans streptococcus but also moderate plaque pH through their arginolytic actions.[10] Streptococcus A12 competes with the dental pathogen Streptococcus mutans using various gene products with diverse functions. A12 displayed enhanced competitiveness by (i) disrupting intercellular communication pathways of S. mutans, (ii) sensing and resisting antimicrobial peptides, and (iii) producing factors involved in theproduction of a putative antimicrobial compound. The rationale of this systematic review is toreview the published literature with the purpose of knowing the importance of using streptococcus A12 as a preventive method for dental caries management.

Method

The present study is reported as per PRISMA-ScR guidelines.

Study Protocol: The study protocol was prepared prior to conducting the study selection and registered on PROSPERO with registration no.166695. The protocol was drafted using PRISMA-ScR guidelines and included the following sections–study aim, search strategy, eligibility criteria, outline for data summary charting as per consensus by all the contributors of the study.

Inclusion Criteria: Any in vitro study, clinical trial, systematic review with/without meta-analysis, umbrella review/meta-evaluation, narrative review addressing the role of streptococcus A12 in caries prevention were included in the review.

Exclusion Criteria: Studies with no keywords, specific components, commentaries, opinions, and articles in languages other than English were excluded from the review.

Database Search Strategy: A search strategy was developed using keywords related to role of probiotic Streptococcus A12 strain in caries prevention. Data was searched through the database, PubMed, and Google scholar from 1st January 2001 till 31st December 2019. Further, references of the identified articles were hand searched prior to initiating the screening process to identify potential records for inclusion in the review. All possible search using the search strategy was conducted until December 2019. The search strategy included the use of the keyword "Probiotics" whereby "probiotic" was limited and the wild card specified any further number of characters for search by the databases. Then, a Boolean operator "AND" was incorporated in the database search to connect the keyword "caries". The keyword "prevention" was not included in the search to identify a larger number of records on probiotic and caries using the most significant keywords.

Study selection and data charting: Irrespective of the study design, peer-reviewed articles in English that fulfilled the inclusion/exclusion criteria, addressing the role of probiotic Streptococcus A12 strain in caries prevention were eligible for inclusion. The base map for final inclusion was—Population (Any),Intervention- (Probiotic Streptococcus A12),Outcome- (Caries prevention)

The study selection and data charting process were performed by two independent reviewers (NQ and MP). Disagreements in the process were resolved by seeking expert advice from two other reviewers (APTand PP). The articles for final inclusion in the review were as per the consensus of all the reviewers. The data charted for the included studies was as per the pre-approved registered protocol. The variables extracted to chart the data were author (year), location, study type and objectives, results and conclusion, and inferred limitations. The charted data was approved and confirmed by all the reviewers prior to summarising the results. Finally, the search yielded 8 studies to be included in the systematic review.

Data Collection Process: The reviewers extracted the data separately from the selected papers. This

information was transferred to a data extraction sheet. Data items that were included for extracting the data were:

1. Author's name- Name of the author

2. Year of publication- Year in which the study was published

3. Purpose of the study- Aim and objectives of the study

4. Study design- Whether the study was in vitro, in vivo, clinical trial, randomized controlled trial

5. Sample size- Sample size for that study

6. Duration of the study- The time for which the study was conducted

7. Study setting- The place where the study was conducted

8. Intervention- Probiotic intervention against cariogenic pathogen.

9. Probiotic Strain - Streptococcus A12 used as a probiotic Strain

10. Adverse effects- Any complications reported

11. Inference- The conclusion of the study

12. Result- Outcome of the study

13. Remark- The remarks by the authors

Results

Evidence Selection: In the evidence selection of this present review, 2630 no of records were identified from databases and 23 additional records were identified through manual searches. From the search of reference lists of identified records, one additional study was identified for possible inclusion. The study was retrieved for screening and eligibility assessment. Therefore, a total of 2653 records were identified. 149 records were screened for title and abstract content; of which 2504 were excluded. Fulltexts of 10 articles were reviewed for eligibility assessment and eventually 8 were included in the review based on the inclusion/exclusion criteria. Since streptococcus A12 was not used as a probiotic in two of the articles. It was the main reason for excluding the min this review.

Evidence insights on Streptococcus A12 for caries prevention: Eight articles that met the inclusion criteria reported to have shown that the strain specific Streptococcus A12 can express high ADS activity under

environmental conditions commonly occurring in oral biofilms. It can directly inhibit growth of S. mutans by producing H_2O_2 and can disable bacteriocin production via interference with the CSP-ComDE pathway which may provide substantial protection to a human host against dental caries.[10] Streptococcus dentisani and Streptococcus A12 are two species which show particular promise as potential probiotics. Both species are active colonizers of the tooth surface, increase the pH of dental plaque through the arginolytic pathway and inhibit the growth of mutans streptococci. In addition, Streptococcus A12 produces a challisin-like protease that disrupts pheromone signalling.

Discussion

As per WHO, probiotics are defined as "live micro-organisms which when administered in adequate amounts confer a health benefit on the host".[11] Several invitro studies examining the effect of probiotics on caries prevention have been conducted in the last two decades using different probiotics strains and species; however, probiotic colonization in the oral cavity is transient. Therefore, formulations enhancing probiotics survival are needed to impart long-standing caries-preventive benefits.

Summary of evidence: This systematic review tries to report the role of A12 strain in caries prevention in early stages of disease onset. Baker, J.L discussed the development of novel modalities to prevent caries. The author provided an insight of most promising methodologies in development that exploit the exclusive nature of the healthy oral microbiome. It was concluded that probiotics derived from the dental plaque of healthy individuals sharply antagonize cariogenic species, such as Streptococcus mutans. Meanwhile, targeted antimicrobials allow for the killing of specific pathogens, allowing reestablishment of a healthy microbiome, presumably with its protective effects. The author also stated that the prohibitive cost associated with sufficiently rigorous clinical trials, and the status of dental caries as a non-life-threatening condition would likely to impede the advancement of new therapeutics to market.[12] Lee, K. conducted an in vitro study to explore the ability of a novel oral bacterial isolate, Streptococcus A12, to compete with the dental pathogen Streptococcus mutans using various gene products with diverse functions. Results showed that commensal oral streptococci, like A12, could express high ADS activity under environmental conditions commonly occurring in

oral biofilms. They could also directly inhibit growth of S. mutans by producing H_2O_2 and disable bacteriocin production via interference with the CSP-ComDE pathway.[7] Zaura, E. and Twetman, S. discussed the role of oral pre- and probiotics in caries prevention and caries management. The authors suggested the possibility of prebiotic arginine and arginolytic probiotics as a future synbiotics for caries prevention and management of dental caries and need for the development and evaluation of such a combination was highlighted by the author[13].Poorni et al discussed the importance of using various probiotic Streptococcus strains as a preventive and therapeutic method for dental caries management. The oral probiotic S. salivarius JH produced important in vitro inhibitory activity toward strains of S. mutans and Streptococcus sobrinus, the principal species of MS associated with human dental caries. However, the author stated the lack of clinical research pertaining to the use of probiotic streptococcal strains in caries prevention[8] Philip, Nemphasised the importance of maintaining a healthy diverse oral microbiome for long-term caries control. The authors stated that natural oral commensal species had double probiotic action, as they could not only inhibit the growth of major oral pathogens but also moderate plaque pH through their arginolytic actions. Given the polymicrobial nature of dental caries, it was predicted that diagnostic, preventive, and treatment strategies directed toward specific bacterial species would not be universally effective.[9]Burne, R.Areviewed a healthy microbiome and the mechanisms by which beneficial bacteria promote health is that an inherent characteristic of the most abundant members of the oral flora, those that potentially play the greatest roles in health and disease. The authors stated thatt he microbiome colonizing a healthy tooth actively generated alkaline products from salivary and dietary substrates, neutralizing plaque acids and creating a resting plaque pH that was favourable for remineralization.[14] Elevated resting plaque pH had been correlated with ammonia levels, and a higher resting plaque pH meant that an equivalent amount of acid production from ingestion of fermentable carbohydrates would result in a higher terminal pH in tooth biofilms.[15] Thus,one-way commensals were actively beneficial to dental health was through alkali generation.[16] It was also concluded that the commensals had other active mechanisms to interfere with the growth and/or expression of virulence of S. mutans.[17] About 5 genetic lociof Streptococcus A12 had been identified that influence the competition of A12 with S. mutans. Haung et al. conducted an in vitro study to explore the microbiological, molecular, and genomic basis for the desirable properties of streptococcus A12. In light of the strong correlation between the absence of dental caries and high dental plaque ADS activity, results showed that oral bacteria with constitutionally high ADS expression levels might have significant potential for applications in probiotic therapies to prevent and control dental caries.[10] Laleman et al. evaluated the effect of probiotics in the prevention of caries. The results showed that the probiotic and control group were compared after treatment, significantly more patients in the probiotic group had low mutans streptococci (<105 CFU/ml) counts and significantly less patients had high (>106 CFU/ml) counts. Regarding the Lactobacillus counts, comparing the probiotic and control group at the end of the probiotic use, no significant differences could be observed, neither in low (<104 CFU/ml) nor in high Lactobacillus (>106 CFU/ml) counts. Within the limitations of the available data, authors concluded that probiotics might decrease the mutans streptococci counts suggesting that probiotics could have a positive effect in the prevention of caries.[18]

The results described by various research groups were encouraging, but the scientific evidence is still unclear, and the level of evidence is only moderate. The current systematic review has shown the lack of clinical research pertaining to the use of probiotic streptococcal strain A12 in caries prevention. As there is paucity of clinical research in this field, and the focus of future studies should be on the evaluation of the effect of streptococcal strain A12 on plaque formation, on modulation of the composition of the oral microbiota and their influence on caries risk. Further clinical research is vital to determine the exact dose, treatment time, and ideal vehicles for specific strain of probiotic Streptococcus A12.

Future Recommendations: The Research on probiotic mechanisms employed by Streptococcus A12 provided essential insights into how beneficial bacteria may help maintain oral health, thereby aiding in the development of therapeutics which can improve the practice of clinical dentistry. It can be very well utilized as a preventive routine in paediatric practice under dentists or parents' supervision. Moreover, it can be incorporated in any form like probiotic drinks, pills, tablets or added to existing products like gum, mouthwash, toothpaste etc. Administering probiotic in candies and lollipop can be well accepted by the children.

Conclusion

Based on the findings of our review, it can be concluded that there is insufficient evidence that probiotics can prevent caries, but they can reduce the mutans streptococci counts. Arginine-based probiotics, especially Streptococcus A 12 have been proposed for caries prevention; however, its eligibility for classification as true probiotic needs to be carefully addressed. Due to a lack of clinical studies on probiotics for caries prevention, evidence on their caries-preventive potential is weak. Our review clearly identifies the need to further explore the caries-preventive effects of probiotic to optimize their use in clinical dentistry.

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Socio-Demographic Characteristics, Nutrition Profile and Health Related Practices of Soliga Tribes in Karnataka, India

P. Puneetha[1], Sudha Sairam[2], Asna Urooj[3], U.V. Mani[4]

*[1]Research Scholar, [2]Guest Faculty, [3]Professor and Chairperson, [4]Emeritus Professor,
Department of Food Science and Nutrition, University of Mysore, Mysore*

Abstract

Nutritional status is an important influence on overall health and wellbeing of a population. One of the vulnerable group is tribal population. The main tribe found in Karnataka is Soliga tribal community, majority of them have low economic status. Hence, malnutrition can be the most common condition arising in this community due to inadequate intake of dietary nutrients. In this purposive, free-living study, the detailed information on the population distribution, nutritional status, nutrient intake of Soliga community (30-65 years) were assessed using standardised questionnaires which included health and lifestyle related Knowledge, Attitude and Practice (KAP) questions. Anthropometric measurements were assessed using standard method. The dietary and nutrient intakes were collected using food frequency questionnaires and 24-hour dietary recall method. The tribal colonies mainly depended on minor forest produce and manual labour for livelihood, and majority of the study population were economically deprived. The BMI was normal in men, whereas women were undernourished. The 24-hour dietary recall data revealed that the subjects followed 2 major meals, about 97% population consumed mixed type of diet, the intake of macronutrients was lower than the recommended dietary allowances. The KAP survey revealed that subjects possessed good health and hygiene related knowledge and attitude, but poorly practiced. Constant monitoring of nutritional status and bridging the gaps in nutritional KAP of the tribal population can provide early warning of any deterioration in their health and nutritional status, hence facilitating effective planning and implementation of nutrition interventions in this unique population.

Keywords: *Soliga tribes, Nutrient intake, Nutritional status, Knowledge, Attitude and Practice (KAP), Primitive Tribes, RDA.*

Introduction

Malnutrition is one of the health issues which seek immediate attention from all the health sectors, as it is one of the risk factor for development of several health problems. The prevalence of malnutrition is not restricted to population of any age group or economical status. It is seen in most affluent population as obesity, overweight or as malnutrition in other population particularly under privileged as undernutrition.[1] This includes the tribes and primitive tribes living in interior forests in many parts of India. The tribal populations are recognised as socially and economically vulnerable. Their lifestyles and food habits are different from rural and urban population. They depend on minor forest produce and manual labour for livelihood, and do not have adequate income. Their food consumption pattern is dependent on the vagaries of nature and varies from extreme deprivation (in the lean seasons) to high intakes (in the post-harvest period).[2]

Higher prevalence of undernutrition in tribal population is due to poverty, lack of awareness, failing to utilize the available nutrition supplementation programmes from government. Additionally, poor

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Corresponding Author:
Dr. Sudha Sairam
Guest Faculty, Department of Studies in Food Science & Nutrition, University of Mysore, Mysore
Current Designation: Assistant Professor, Department of Nutrition & Dietetics-FLS, JSS AHER, Mysore
e-mail: sudhasairam16@gmail.com

environmental sanitation and lack of safe drinking water; increased morbidity from water-borne infections, environmental conditions that favour vector-borne diseases, lack of access to health care facilities resulting in increased severity or duration of illnesses.[1,3]

Soliga tribes are an aboriginal forest tribe inhabiting in the states of Karnataka and Tamil Nadu since time immemorial.[4,5] The tribes are constituted in southern parts of India. They are described themselves as "Children of Bamboo". The dialect of the tribe is Soliga Nudi in Kannada script being used for writing.[6] In Karnataka they are mainly distributed in the interior of the forests, skirting the slopes of the Biligirirangana (B.R) Hills and Mahadeshwara (M.M) Hills of Chamarajanagar district.[4]

The Soliga community, for their survival, they mainly depend on shifting cultivation which is the traditional form of agriculture for centuries and along with hunting.[6,7] B.R. Hills forest is declared as tiger reserve in December, 2010 as BRT wildlife sanctuary.[9] Due to extensive deforestation, frequent natural calamities like drought and fire in forest, peoples are restricted to access into forest has led to the change in the traditional dietary practices, acute shortage and non availability of food and change in lifestyle pattern of Soliga tribes.[10] These conditions clearly indicate the need for continuous monitoring of nutritional status of the Soliga population which can provide early warning of any deterioration in the nutritional status in the tribes, so that appropriate intervention can be initiated. Hence, research studies identifying the nutritional deficiencies and health risk factors should receive attention and based on these data, specific intervention programmes can be taken up to improve nutritional status of vulnerable population. With this background, in the present study the anthropometric status, dietary intake and nutritional status of Soliga tribes spread around the B.R. Hills region in Karnataka were assessed using appropriate tools and method.

Materials and Method

Research Design: Research was carried out by observations, questionnaire, and personal interviews with soliga tribes across the B.R. Hills. The study is purposive in nature. It is learnt from the review of literature that, there are hardly few studies on the life style, nutritional status, dietary habit and KAP in reference to nutrition of the Soliga tribes with socio-economic and cultural background. The aim of the study is to describe the diet and dietary habit and nutritional status for these tribes.

Study Area: Located in Chamarajanagara district, Karnataka, Indiathe Soliga tribes have been living in B.R. Hills for centuries.[5,7] They live in a tribal settlement called "Podu", each comprising of a group of 10 to 50 huts. Totally 61 podu are situated inside as well as in the periphery of the BRT Wildlife Sanctuary area, out of which 8 Podu were selected for the study. They are as follows-Yarakanagadde Podu, Seegebetta Podu, Kalyani Podu, Manjigundi Podu, Hosa Podu, Purani Podu, Bangle Podu and Muthagadagadde Podu.

Selection of Subjects: The study was conducted on free living subjects who are residing in B.R. Hills belonging to Soliga community. Around 100 subjects were recruited (50 women and 50 men) aged between 30-65 years old, and exclusion criteria was pregnant and lactating mothers, below 30 and above 65 years and subjects with severe clinical conditions. Human Ethical clearance was obtained from the Institutional Human Ethics Committee, University of Mysore, Mysore, Karnataka, India for conducting the present study. (IHEC-UOM No 49a/M.Sc/2015-16). All the subjects were included in the study based on their willingness to participate and were assured of confidentiality of the information collected.

Data Collection: The data such associo-economical status, anthropometric measurements, dietary pattern, 24 hour dietary recall were collected using standardized questionnaires and appropriate tools. Mean nutrient intake and nutrient deficit was analysed by comparing the actual intake with RDI as per ICMR guidelines of 2010.[11,12]

Statistical Analysis: Data were entered into Microsoft Excel (2007) and analysed using the SPSS version 16.0 (SPSS inc., Chicago, IL, USA).

Results and Discussion

Socio-economic and demographic profile of the study group: The BRT wild life sanctuary area spreads over 571.06 sqkms. Approximately around 2,905 families were residing in the study area and all were mostly dependent on forest resources for their livelihood. The selected study population belonged to settelemts viz., Seegebetta Podu, Kalyani Podu, Manjigundi Podu, Yarakangadde Podu, Purani Podu, Hosa Podu and Bangle Podu.

The demographic data showed that the subjects were native to the tribal habitat and followed Hindu religion,

the population distribution consisted more between age group of 30-50 years. Literacy rate was only 25%, with education only up to primary school, about 95% had nuclear family type. The type of physical activity was heavy in men (74%) as they worked in nearby coffee plantation as daily wage labourers; remaining were involved in agriculture or as daily wages work. About 46% of women were observed doing heavy physical activity which included collection of water from distant water resources, grinding, collecting wood etc. Since the source of income for most of the subjects was through daily wages, the annual income of 77% of subjects ranged between INR Rs.5,000/- to Rs.10,000/-.

The morbidity profile data collected was limited with only two subjects confirmed with diabetes and hypertension, whereas obesity, leprosy and CVD was observed in one person each. This can be attributed to lack of knowledge on non-communicable diseases (NCD's) and less access to PHC facility in that region. The study region had only two health care setup, one Government Ayurvedic hospital, non-functioning during study period and a hospital run by Vivekananda Girijana Kayana Kendra (VGKK).

Anthropometric assessment of selected subjects: The mean anthropometric measurements of subjects are presented in Table 1. The somatic status of the subjects assessed showed that subjects irrespective of belonging to different podu possessed similar physical stature and anthropometric parameters such as height, weight, MUAC, waist and hip measurements. Similar pattern was observed in the WHR & BMI classification.

Classification based on WHR: The classification of subjects as per WHR ranges (Figure 1) showed that 40% of men and 70% of women subjects had normal WHR. 52% and 8% of men population had WHR between 0.81-0.9 (abdominal obesity-1) and less than 0.9 (abdominal obesity-2) respectively. The higher WHR in men can be attributed to the change in food intake pattern, i.e., introduction of foods other than their traditional foods.

Classification based on BMI: The classification of subjects as per BMI grading is represented in Figure 2. From the data on BMI, it was observed that 54% men and 58% women were under normal BMI category, 28% & 32% were undernourished and 16% & 4%overweight respectively. Obesity (grade I) was observed in 2% and 6% of men and women respectively. The anthropometric assessment showed that most of the subjects had normal BMI which may be due to the geographical condition, consumption of available foods and rigorous physical activity. The prevalence of malnutrition was higher in women than men, similar trend was observed in the prevalence of overweight or obesity. Many research studies supports the prevalence of malnutrition and micronutrient deficiencies in tribal population, the incidences of overweight & obesity indicates the phase of nutrition transition, acceptability of foods other than traditionally followed food pattern.

Dietary Assessment of the selected subjects:

Food frequency record: The variety and food consumption pattern was recorded using Food frequency Questionnaire (FFQ) according to food groups. The subjects predominantly consumed rice and finger millet daily (100% subjects), followed by wheat (71%) and Jowar (54%) subjects. The commonly used pulse were toor dhal (96%), followed by green gram dhal (70%), black gram dhal (57%), horse gram dhal (77%), cow pea (81%) and field bean (80%). Black gram dhal was consumed by 31% subjects once in a month. Significantly higher percentage of subjects consumed locally grown roots and tubers such as carrot (74%), potato (86%), onion (100%), radish (46%), and tomato (100%). Other vegetables like beans and brinjal were consumed on weekly basis. Green leafy vegetables (GLV) such as *Solanumnigrum* (Ganikesoppu in Kannada) and *Alternantherasessilis* leaves (Honganne in Kannada) were consumed by 54% of subjects once in a week since they were the forest produce and locally available. It was observed that the consumption of vegetables and GLVs was seasonal and subject to availability.

In the fruit group banana was the only fruit used once in a week by 69% of subjects. Other fruits like apple (65%), orange (71%), mango (72%), sweet lime (65%), pomegranate (65%), papaya (57%), guava (65%), jack fruit (72%), watermelon (64%), and pomela fruit (Kannada name–Chakotha) (60%) were consumed occasionally. Milk was consumed daily by only 43% subjects, butter-milk by 6%, curd by 5%, clarified butter (ghee) was never consumed by the subjects. About 45% of the subjects were reported to consume egg once in a week, whereas meat (91%) and poultry (84%) was on monthly basis, consumption of fish was very rare. The less frequency of these foods groups can be attributed the lower income status and less availability of the product.

Among confectionaries, jaggery was main source of sweetener, used daily by 99% subjects, occasionally intake of sugar. Majority of subjects expressed non consumption of bakery or junk foods, chocolates, commercial fruit juice and carbonated beverages. The intake of nuts and oilseeds was dependent mainly if self-cultivation or on availability. About 59% subjects included coconut in the diet weekly and groundnut (54%) twice in a week. Among fats and oils, currently only commercially available refined sunflower oil was consumed as it was distributed by Government under Tribal Welfare schemes.

Nutrient intake assessment using 24-hour dietary recall method: The mean nutrient intake and nutrient deficit of the study population are presented in Table 2. The detailed information of food consumption was recorded using 24 hour dietary recall method. The actual nutrient intake of the subjects was compared with the prescribed Indian RDA and accordingly the nutrient deficit was calculated. The energy deficit was observed in 36% of men & 27% women, but the mean protein intake (66%) was similar in both gender. Fat intake was observed to be very less than RDA with percentage of women (84%) showing higher deficit in fat intake deficit than men (74%). Although the energy, protein and fat intakes were inadequate when compared to RDA, it did not reflect on their body weight as BMI was in Normal range for majority of the subjects irrespective of the podu.

Government initiative: To ameliorate the nutritional status of the tribal population, the Department of District Tribal Welfare office, Chamarajanagara district, Chamarajanagara initiated the scheme "Poustika Aahara Yojane" (nutritious food supplement) from the year 2011. Under this scheme selected food items were supplied to target groups every year for a period of 6 months: particularly during rainy season (June to November). This scheme has been successfully implemented in the Chamarajanagara district giving better nutritional support for the target population, who are socio-economically deprived because of unemployment, severe environmental conditions and also to prevent migration of the tribal population. Along with this program, the tribes were also provided with the monthly ration from public distribution system (Society Ration) which included Finger millet (15 kg), Lentil (5 kg), Horse gram (3 kg), Cow pea (1 kg), Green gram (1 kg), Jaggery (4 kg), Cooking oil (2 lt), Egg (45 no.) and Ghee (Clarified butter-1 kg). It is noteworthy that the food and nutritional security of tribal communities mainly depended on natural food sources available in forest or self-farming and various assistance programmes provided by the Governmental agencies.

Nutrition and health related KAP among selected subjects: The questions on the diet, nutrition and hygiene related knowledge, their attitude towards them and related practices were asked as yes or no format, and are presented in Tables 3 and Table 4. It was observed that most of the subjects possessed fair knowledge regarding food and various food groups and cooking method. They also had the good knowledge on health and hygiene aspects, and ill effects of consumption of alcohol, smoking, chewing of tobacco. About 67% of the study population had good knowledge of common illness and traditional medications. The subjects were aware of the beneficial effects of foods they consumed but lacked the knowledge regarding macro and micro nutrients present in the food items.

The subjects knowledge on health and hygiene aspects did not reflected in their attitude and practices. About 77% of subjects did not consume meals on time and followed minimal or no exercise regime. 80% of the subjects had the habit of skipping meals. Around 66% of study population were taking medications without doctor prescription. The subjects were unaware of effects of cooking and processing on food and practiced poor to fair hygiene and sanitation aspects. The KAP questions revealed the characteristic traits in knowledge, attitude and behaviours about health and hygiene related factors, which is very essential to improve knowledge and also to bridge the gaps between knowledge and implementation.

Limitations: The study did not cover the other podutribes residing in the BRT Sanctuary, due to the following reasons, 1) Limited time period, 2) Difficulty in access to interior podu of the forest due to lack of transportation and presence of wild life, 3) Availability of the subjects and 4) Conservative nature of the subjects. However, inspite of these limitations the insights gathered from the data are valuable, covering the objectives of present study and could lead to plan better strategy and design specific research study for future work.

Table 1. Mean anthropometric measurements and indices of selected subjects (n=100)

Age: 30-65yrs	Gender	
	Men (n = 50)	**Women (n = 50)**
Height [cm]	156.52 ± 8.70	148.76 ± 7.38
Weight [Kg]	49.46 ± 9.23	43.33 ± 6.94
Waist [cm]	70.5 ± 9.36	67.9 ± 7.88
Hip [cm]	84.26 ± 7.41	84.78 ± 8.98
MUAC [cm]	23.11 ± 2.86	22.6 ± 2.69
BMI	20.30 ± 3.23	19.50 ± 2.72
WHR	0.83 ± 0.05	0.76 ± 0.05

MUAC- Mid Upper Arm Circumference, BMI- Body Mass Index, WHR- Waist Hip Ratio

Table 2. Mean nutrient intake of selected subjects with nutrient adequacy (n=100)

Nutrients	Actual dietary intake		RDI*		Nutrient deficit (%)*	
	Men (± SD)	**Women (±SD)**	**Men**	**Women**	**Men**	**Women**
Energy (Kcal)	1731.65±559	1619.49±666	2730	2230	1000(36)	611(27)
Protein (g)	39.94±12.37	36.85±14.51	60.0	55	20.11(34)	18.18(33)
Fat (g)	10.43±10.03	8.98±10.15	30	25	22.17(74)	20.7(83)
Dietary fibre (g)	49.73±10.48	45.57±10.50	40	40	161.4(81)	167.57(84)
Calcium (mg)	622.59±299	493.27±165	600	600	22.03†(4)	106.8(18)
Iron (mg)	15.15±5.79	14.14±6.98	17	17	1.91(11)	2.85(17)
Thiamine (mg)	1.07±0.80	0.80±0.23	1.4	1.1	0.49(35)	0.29(26)
Riboflavin (mg)	0.61±0.16	0.50±0.15	1.6	1.3	0.99(62)	0.79(61)
Niacin (mg)	7.08±2.59	6.86±3.12	18	14	10.92(61)	7.13(51)
Vitamin-C (µg)	43.12±22.39	39.69±12.59	40	40	2.86†(7)	1.69(4)
β Carotene (µg)	894.99±278	814.73±284	4800	4800	3910.39(81)	3984.97(82)

Note: Values in parenthesis indicate percentage (%) intake of nutrients, RDI- Recommended Dietary Intake, * represents recommended intake of nutrients and † represents excess nutrient

Table 3. Health and hygiene related knowledge and attitude among subjects (n=100)

Sl No	Health and hygiene related knowledge and attitude	Yes	No
1	Food is important for health	87	13
2	Food is consumed		
	to fill the stomach	95	-
	to maintain good health	-	-
	Both	5	-
3	Cereals, pulses and millets are major source of most nutrients	43	57
4	Consuming ragi ball (finger millet pudding) is better than rice	78	22
5	Fruits and vegetables are good for health	86	14
6	Water is important for health	18	82
7	Sprouted/fermented foods are good for health	58	42
8	Green leafy vegetables are good for health	76	24

Sl No	Health and hygiene related knowledge and attitude	Yes	No
9	Chapathi and ragi ball are rich in fibre	67	33
10	Washing of chopped vegetables leads to leaching of micronutrients	43	57
11	Steaming is better than deep frying or baking	70	30
12	Consumption of unsafe foods can lead to food borne diseases	61	39
13	Soft/liquid diet helps in fast recovery in medically ill patient	67	33
14	Do you think following regular meal timing good for health	23	77
15	Do you think regular physical activity or exercise helps to maintain good health condition	-	100
16	Do you prefer eating outside/junk food	7	93
17	Does excess of bakery food consumption be avoided	64	36
18	Do you prefer fruits overjunk foods	100	-
19	Do you believe eating of unripe papaya may lead to abortion	65	35
20	Do you know smoking, consumption of alcohol or tobacco and its products (Khaini, Zarda, Paan Masala) are injurious to health	100	-

Table 4. Health and hygiene related practices among subjects (n=100)

Sl No	Health and hygiene related practice	Yes	No
1	Do you follow 3 major meals per day	20	80
2	Do you consume the following		
	a. Milk	-	-
	b. Tea	100	-
	c. Coffee	-	-
3	How often do you consume fruits		
	a. Daily	2	-
	b. Weekly	11	-
	c. Monthly	3	-
	d. Occasionally	84	-
4	Do you drink around 2 lt of water per day	72	28
5	Do you drink boiled water, when safety of the water is in doubt	35	65
6	Do you re-use the oil which is used once or twice	99	1
7	Do you wash vegetables and fruits thoroughly before use?	79	21
8	Do you use thoroughly cleaned utensils for cooking/eating purpose	53	47
9	Do you regularly clean the cooking and food storage area	76	24
10	Do you cook foods in vessels covered with lids	53	47
11	Do you smoke/consume alcohol/tobacco every day	38	62
12	Do you follow myths and believe in any particular food	1	99
13	Do you maintain good personal hygiene	76	24
14	Do you brush your teeth and take bath every day	24	76
15	Do you wash hands before eating	78	22
16	Do you wash hands after defecations with water or soap	80	20
17	Do you go for regular health check-up	11	89
18	Do you take any medications without physician's prescription	94	6
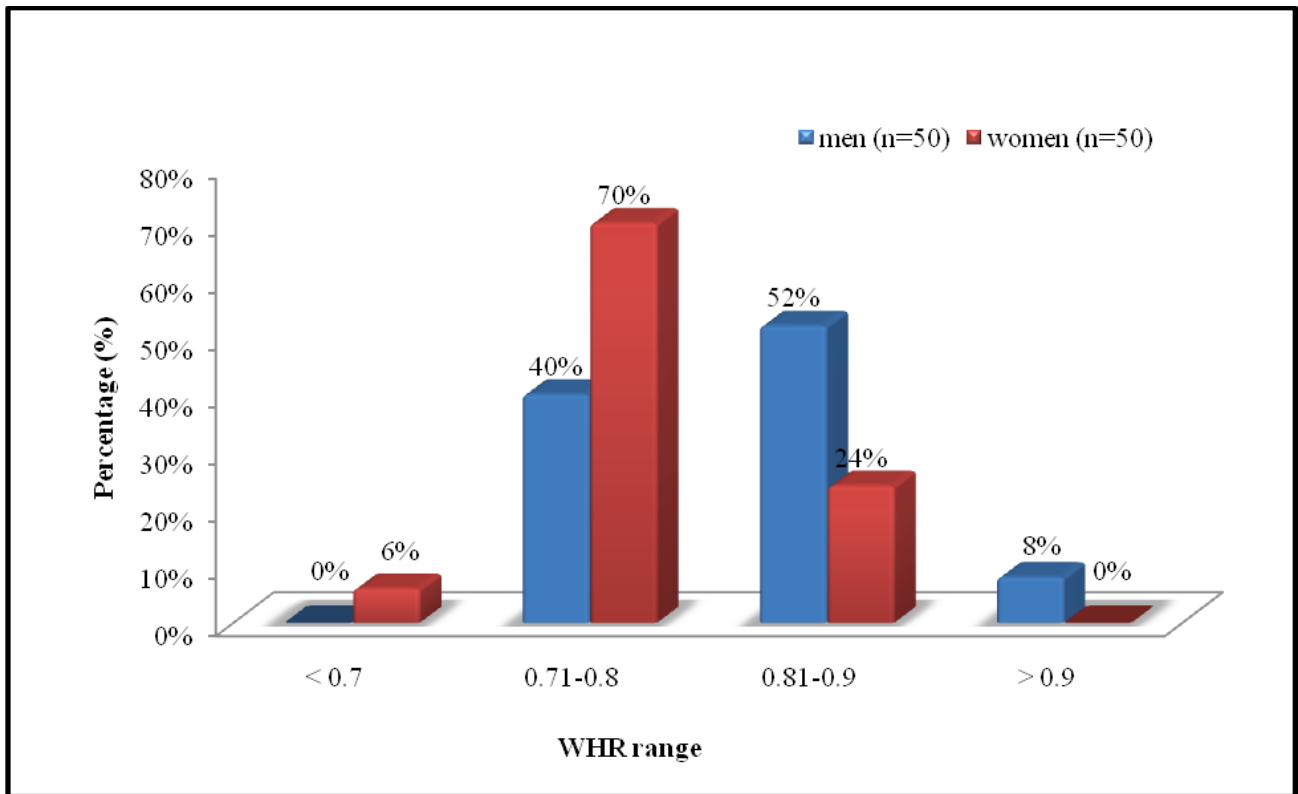
Figure 1. Classification of subjects based on WHR (n=100)
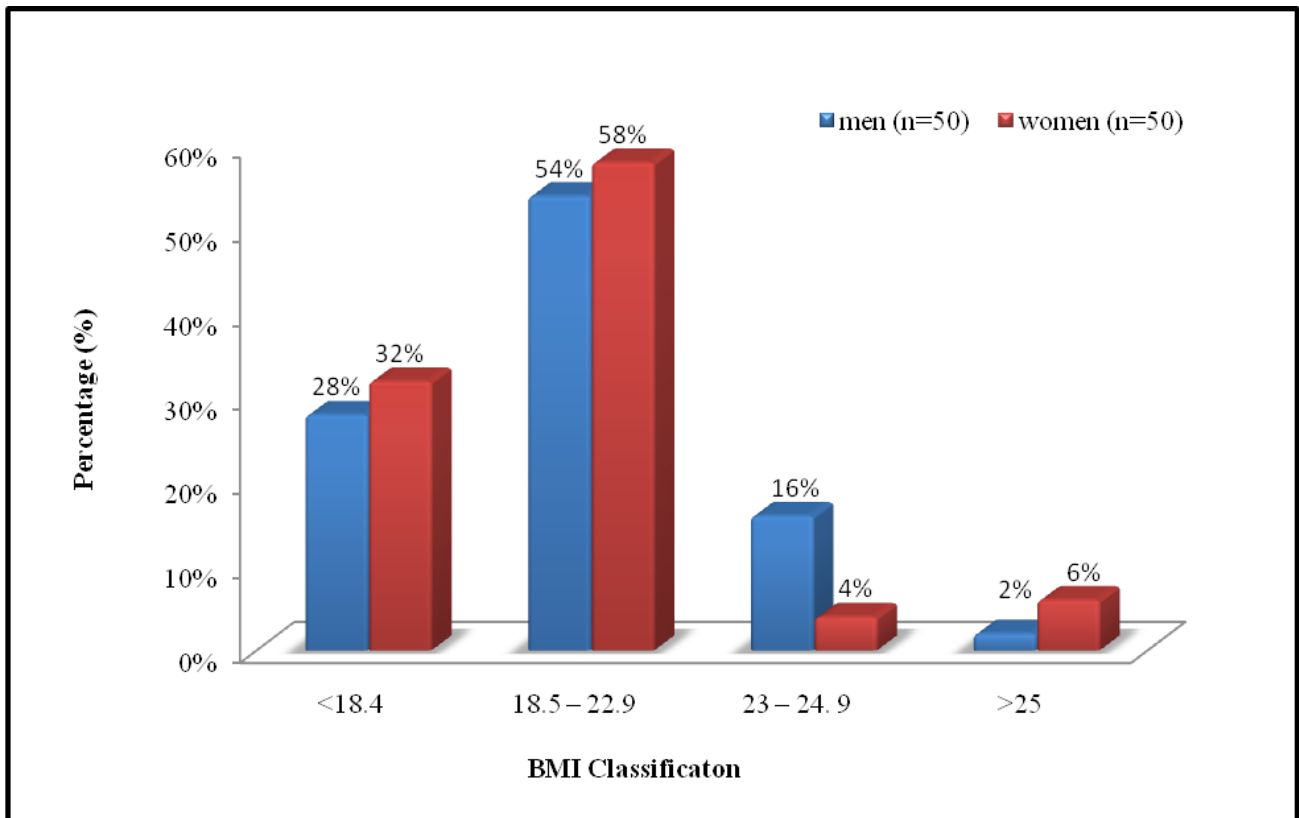
Figure 2. Classification of subjects based on BMI (n=100)

Conclusion

The Soliga tribe is one of the primitive tribe of Karnataka residing mainly in B.R. Hill region. Previous research studies on Soliga community have focussed on the diversity, distribution and ecology, but studies on the dietary intake of primitive tribes are very few. **Till date there are no reports on the food frequency intake, nutrient intake and nutrient deficit in Soliga tribal community, hence this study is first ever survey conducted covering these aspects.** Further studies overcoming the limitations and covering the larger Soliga population enables to continuously monitor any changes in the dietary pattern and lifestyle practices. Research studies not only facilitate effective implementation of nutritional interventions, also helps in protect and safe documentation of the rich traditional and indigenous ecological knowledge which is passed on from generations.

Conflicts of Interest: Authors declare that there are no conflicts of interest.

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Use of Infrared Light Fomentation for Pain Relief in Postpartum Mothers with Episiotomy

Pavani Boddupalli

*Facilitator, Dr Dias LuceetaAmelia Alexio, Department of Obstetrics and Gynaecology,
Saveetha Medical College And Hospital, Chennai, Tamilnadu*

Abstract

Background: Post delivery is decisive period for post-partum women who had undergone episiotomy which is a throbbing and disquiet procedure during this time. So the aim of the study is to appraise the effect of infrared light fomentation therapy on episiotomy wound pain relief among postpartum women.

Aim: To asses the level of episiotomy wound pain among postpartum mothers before and after infrared fomentation.

Methodology:

1. The study participants will be selected among postpartum mothers having normal vaginal delivery with episiotomy within 2 hours.

2. Accordingly 30 postpartum Women will be randomly selected and allocated into matched groups.

3. Written consent will be obtained from recruited Postpartum mothers.

4. **Intensive Phase:**

   a. Twice a day until the fourth day morning infrared lamp and normal episiotomy wound care (two spoons betadine in 4 glasses of water).

   b. Best and worst levels of pain will be measured using 10 pain scale from 0(none) – 10(severe).

5. **Technique of procedure:** Infrared light will be placed 45cm away from the perineum and heat emitted with 220V will be used for 10-15 minutes then pain will be assessed.

6. **Appraising phase:** The results will be compared for the 4 following days follow up of infrared fomentation therapy in postpartum mothers with episiotomy.

Results: The study show that the intensity of pain decreased with the infrared light fomentation on episiotomy had good results and pain relief is seen at the end of 4th day of follow up.

Conclusion: Post-partum women who apply infrared lamp therapy on episiotomy display faster pain relief than those who do not.

Keywords: *Episiotomy, infrared light lamp therapy, pain relief, postpartum mothers.*

Introduction

Pregnancy is a transformative event in women's lives in which they experience to a great extent pain post-partum due to tender perineum[1]. Post-partum time may turn out to be further challenging when mother suffers from perineal harm as a result of episiotomy can be delineated as the procedure in which vaginal orifice is enlarged through an incision of the perineum[2]. This procedure is commonly done for almost all women to help for a safety and easy labour particularly their first delivery.

This incision befalls either through the second phase of labour or right earlier the labour.

Episiotomy comprises some types such as[3]:

Medio-lateral

Median

Lateral

J-shaped

Of these, medio-lateral episiotomy is pain and tenderness.

The episiotomy inhibit more extensive child birth injury.

It is the only surgical procedure that is carried out without the patients contract.

The perceived advantages of episiotomy include:

Begin clean and clear incision

Easy to mending and recovered well than tears

They believed to maintain muscle relaxation of pelvic floor and perineum[1]

Less frequent problems related to episiotomy are[9]:

Discomfort

Oedema

Bleeding

Haematoma

Infection

Mental upset

INFRARED LIGHT therapeutic effect of aggregating the blood supply and releasing the pain[4]. This will increase the supply of oxygen and nutrient accessible to the tissues accelerate the removal of waste products and help bring about the resolution of inflammation when the heat is mild the relief of pain is almost certainly due to the sedative effect on the superficial sensory nerve endings. It is also aids to accomplish muscular relaxation and for the release of muscle spasm in injury and inflammation.

It has an appropriate substitute intervention for those with episiotomy injury and has the biological outcome on cutaneous vasodilation due to release of chemical vasodilators, histamine and has potential direct consequence on blood vessels[10].

So infrared light fomentation therapy for episiotomy wound becomes the way of preventing and reducing maternal morbidity as well as it is in affordable cost[12][13][14].

Methodology

1. An official letter from the department of obstetrics and gynaecology of saveetha medical college, Chennai was obtained.

2. The study subjects were selected among the post-partum mothers having normal vaginal delivery with episiotomy.

3. Accordingly, 30 post-partum women were randomly selected.

4. Data collection: Written consent was obtained from the post-partum women after explaining the purpose of the study to gain their cooperation. A good relationship was established with the post-partum mothers.

Data collection was carried out through four phases:

i.   Interviewing

ii. Assessment

iii. Implementation

iv. Appraising

Interviewing Phase: Visit all the postpartum women at Maternity ward and Then accordingly 30 post-partum women randomly selected with inclusion criteria having normal vaginal delivery with episiotomy.

Assessment Phase: In this phase the post-partum Mother's of Normal vaginal delivery with episiotomy wound are questioned and collect the baseline data of episiotomy wound pain required for number pain scale.

Implementation Phase: This phase done at the physiotherapist ward.

Technique of Procedure: The infrared lamp was used for the randomly selected 30 post-partum mother of normal vaginal delivery with episiotomy wound which sited at distance of 45 cm away from the perineum and the heat emitted with 220 volts used for 10-15 minutes then level of pain was assessed.

Appraising Phase: The pain relief of episiotomy wound is followed up till 4th day evening. Collected data were gathered over a period of 5 month (February 2020 to June 2020).

Results

Table 1: 30 women are participated in the study.

Days	Mean±SD
Day 1	6.53±1.94
Day 2	4.7±1.393
Day 3	2.1±1.061
Day 4	0.5±0.50

The above table show the decrease of pain intensity from 6.53±1.94 at the first day of assessment to 0.5±0.50 at the 4th (last day) of assessment.

Table 2: Comparison of day 2 with day 1

95% CI	-2.708 to -0.95
Standard Error	0.436
P Value	0.0001

Those women applied the infra-red lamp on day 2 attained good pain relief when compared day 1.

There is a statically significant data observed in table 2 where p value is 0.0001.

Table 3: Comparison of day 3 with day 1

95% CI	-5.23 to -3.62
Standard Error	0.404
P Value	<0.0001

Those women applied the infra-red lamp on day 3 attained good pain relief when compared day 1.

There is a statically significant data observed in table 3 where p value is <0.0001.

Table 4: Comparison of day 4 with day 1

95% CI	-6.762 to -5.29
Standard Error	0.366
P Value	<0.0001

Those women applied the infra-red lamp on day 4 attained good pain relief when compared day 1.

There is a statically significant data observed in table 4 where p value is <0.0001

The study show the intensity of pain decreased with the infrared light fomentation on episiotomy had good results and pain relief is seen at the end of 4th day of follow up.

Discussion

In obstetrics, episiotomy is one of the supreme common Procedures, which executes during the last part of the second Phase of delivery. The mother undergoing this procedure is categorised by greater blood loss in combining with labour, and there is a risk of improper wound restorative and increased pain during early postpartum. Pain causes stress and hampers the women's ability to give care for their newborn. Infrared light can infiltrate 2-3 cm profound into our body and not only permits fast pain relief but also helps in absorption of moist, prevents growth of microorganisms, loosening tight muscles, aids in healing damaged tissue, and wound healing.

With similarity of the current study, an intervention study was conducted by Kaur (2013)[15] to compare the effect of dry heat versus moist heat on pain and wound restorative at episiotomy location among postnatal mothers admitted in Nehru Hospital, Chandigarh. Where, the subjects in group one (dry heat) had lesser pain intensity than those in group two (sitz bath) after the intervention. While results of the present study revealed that, the mean and standard deviation of episiotomy wound pain score is decreased by 4th day of follow up. Where infrared light fomentation is dry heat application. In this studywe compared the days to show the effectiveness of infrared light fomentation therapy on pain relief.

Likewise, a quasi-experimental study done in Rural Hospital in India also (2010)[10] on postnatal mothers. The study results made known that the pain of postnatal mothers due to episiotomy wound is decreased by the application of dry heat. And this study shows the comparative way of decreased pain intensity for 4 days follow up in episiotomy wound in postpartum mothers and the effectiveness of infrared light fomentation therapy by the follow up days.

Conclusion

It was obvious from the findings of study that the post-partum women who applied infrared lamp therapy on episiotomy display faster pain relief. So, infrared therapy can be applied as effective way of management by health personnel in their daily caring the post-partum mothers.

Therefore the study recommended that:

1. Joining the infrared therapy as a main part of post-partum instructions for the women for its imperative role in improving quality of life during post natal period.

2. Developing and adopting appropriate cost effectiveness, easy to use method for relieving pain and eliminate women suffering as well as decrease spread of infection at this critical period.

Ethical Clearance: After IEC approved the post partum mothers were invited to take part in our study. Informed consent was obtained.

Source of Funding: There is no funding support for this study.

Conflict of Interest: There is no Conflict of Interest.

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Feeding Pattern Followed by Hospitals for Patients with Dengue Fever: An Observational Study

Poornima S.[1], Anees Fathima Thabassum Z.[2], Khyrunnisa Begum[3]

[1]Post Graduate, Department of Studies in Food Science and Nutrition, University of Mysore, Mysuru,
[2]Assistant Professor, Department of Clinical Nutrition and Dietetics, Sri Devaraj Urs Academy of Higher
Education and Research, Kolar, [3]Professor (Rtd), Department of Studies in Food Science and Nutrition,
University of Mysore, Mysuru

Abstract

Background: Dengue is an acute viral infection and occurs in three different conditions- Dengue fever (DF), dengue hemorrhagic fever (DHF) and dengue shock syndrome. Supportive and symptomatic treatment is indicated during infection, however less is known about feeding care obligatory in its management.

Objective: it was aimed to study feeding care offered to DF patients admitted to hospitals.

Materials and Method: An observational study was conducted on 48 patients (16 children and 32 adults) diagnosed for dengue fever and admitted to hospital (3 -government and 2-private hospitals were included) during the months of January to May. Details regarding medical symptoms, body temperature, state of consciousness, food tolerance and food intake from day 1 to day 5 was obtained. Oral intake of water and IV infused were recorded.

Results: Relationship existed between symptoms, state of consciousness and tolerance to food and water; accordingly patients were classified as seriously sick, moderately sick and mildly sick. Patients with body temperature >102°F, abdomen pain, hepatomegaly and dehydration was associated with food intolerance and non-responsiveness (seriously sick), they took significantly longer time to develop food tolerance compared to their counterpart with less serious conditions ($p < 0.0001$). Severity of sickness affected hospital stay, severely sick patients stayed longer as compared to the mildly sick (children 4.67±0.94 vs 4±0; adults 6.43±3.16 vs 3.67± 1.11 days).

Majority of adults (71.9%) and children (56.3%) received normal diet. Energy and protein intake of patients (adults and children) in all the three groups were markedly lower than the RDA. Energy intake increased significantly from 1st to 5th day in all three groups. Differences in energy intake (adults-5.0±2.6 Kcals to 18.0±6.5 and children 10.0±3.8 - 29.0±6.8 Kcal/kg/day) was extremely significant ($p < 0.001$) among severely sick compared to the moderately (adults 11.0±1.6- 17.0±4.9 and children 20.0±2.9- 23.0±6.9 Kcal/kg/day) and mildly sick patients (adults 17.0±2.1- 21.0±3.8 and children 38.0±7.8- 39.0±5.7 Kcal/kg/day). Protein intake among both adults and children was very low. All patients regardless of the conditions received IV fluids at time of hospital admission. Severely sick received higher volumes of IV infusions and less quantity of oral fluids compared to the moderate and mildly sick. With improvement in conditions, it crisscrossed with reduced IV infusions and increased oral intakes. Each patient had different fluid needs and varied each day.

Corresponding Author:
Dr. Anees Fathima Thabassum Z.
Assistant Professor, Department of Clinical Nutrition and Dietetics, Sri Devaraj Academy of Higher Education and Research, Kolar,Karnataka
e-mail: aneesfathima17@yahoo.co.in

Conclusion: Presently, diet management of DF patient is less judicious. In view of poor tolerance and unconsciousness that prevail, food selection should be carefully managed. Easily digestible and nutritious drinks such as fruits juices and soups should be included

to complement for improving electrolyte disturbance and dehydration. Data base should be developed about feeding requirements for DF patients.

Introduction

Dengue infection is one of the most common arbo-viral diseases worldwide. It is prevalent in most of the tropical and sub-tropical countries and is caused by four serotypes (DEN-1, DEN-2, DEN-3 and DEN-4) in humans.[1] The World Health Organization (WHO) estimates that every year 50–100 million symptomatic dengue virus (DENV) infections occur worldwide, resulting in approximately 500,000 hospitalizations and 22,000 deaths.[2-5] In India, dengue is a long-standing public health problem having significant health impacts and loss of life. Shephered et.al (2014) estimated that dengue costs India approximately $1.11 billion annually.[2,6]

Presently, dengue is found to emerge in more than 60 countries making it a classic example of re-emerging infectious disease with a significant and widespread public health impact.[2,7] In addition, an alternative DENV vector, Aedes albopictus, has spread into temperate geographical regions, further expanding the global range of the virus.[2,5,8,9] The characteristic symptoms of dengue are: a sudden-onset fever, headache (Typically behind the eyes), arthralgia, myalgia, nausea, flushing and rashes Dengue is also referred as "break-bone fever" owing to the presence of muscle and joints pains. In few cases abdominal symptoms such as nausea, vomiting, abdominal pain, hepatomegaly and tenderness in the right iliac fossa are also reported. The course of infection is divided into three phases: febrile phase in which body temperature rises to over 40°C (104°F), followed by critical phase. During critical phase a significant fluid accumulation occurs in chest and abdominal cavities. The third phase follows organ dysfunction and severe bleeding (Typically from the gastrointestinal tract) leading to shock and haemorrhage. 95.8% of patients with platelet count between 20,000-50,000/cu.mm and 61% of patients less than 25000 had bleeding manifestations.[9]

Severe cases however, are reported in less than 5% of all dengue cases. The recovery phase occurs next, with resorption of the leaked fluid into the bloodstream. This usually occurs over a period of two to three days. Mortality rate is higher among severe cases.[7]

Current management of dengue infection does not have any specific treatment except cautious monitoring and appropriate fluid replacement therapy.[10,8] The treatment is supportive and includes diminishing the fever and balancing fluids and electrolytes. During the time of infection patients are not able to eat & drink because of unconsciousness, loss of appetite, poor tolerance to food & eating problems.[10]

Generally patients complain of fatigue & weakness and therefore, expectedly there is weight loss following an episode of dengue infection.[11] There are very few reported studies to indicate the nutritional care warranted for dengue.[12,13] It is important to develop data base about nutritional care obligatory during dengue infections and post infective periods. The objective of the present investigation is to review the feeding care offered to patients admitted to hospitals.

Methodology

The investigation was an observational study carried out during months January to May. The prospective patients were identified at time of their admission to hospital after being diagnosed for dengue fever (DF). A total of five hospitals (3 -government and 2-private) from Mysore city- a major city from south India were included for the study. Criteria charted for the final selection of subjects included the following: patients having diagnosed with dengue fever and having following symptoms: fever and general aches and pain (myalgia, headache, Retro-orbital pain), stomach problems like abdomen pain, loose motion, nausea IgG, IgM, NSl positive, platelet counts between 20,000-50,000/cu.mm, age 1-85yrs also those who agreed to participate in the study. Exclusion criteria included were: Age > 85 years, pregnant and lactating women, patients with DHF or any other complications. The study was approved by IHEC, University of Mysore. Forty eight patients participated in the study, among them 16 were children (<17years) and 32 were adults. Patients were visited daily.

SOAP was obtained from medical records. Especially patient's condition such as symptoms, state of consciousness, body temperature, and food tolerance, diet prescribed and volume of IV infused were obtained from medical record of the respective patients. Food intake was recorded individually with the

help of patient's attendant. Attendants were requested to record food eaten including water intake daily for five consecutive days using a standardized cup provided to them.

State of food tolerance was recorded daily to identify number of days required to develop food tolerance and improvement in eating. Each patient participant was followed till he/she was discharged

Results and Discussion

A total of 48 patients' were included for the study, selection was strictly based on criteria charted for the study. All the patient participants were those identified with dengue fever (DF) without any complications and admitted to medical wards. Sixteen children and thirty two adults formed the study population, there were 56.3 and 65.5% male children and adult patients while the rest were female patients (43.8% children and 34.4% Adults). Percentage of male patients with DF was higher among both children and adults; however, Chi.Sq analysis did not indicate significant association. Several studies from S E Asia have also reported higher incidences of DF and DHF among male subjects[14].
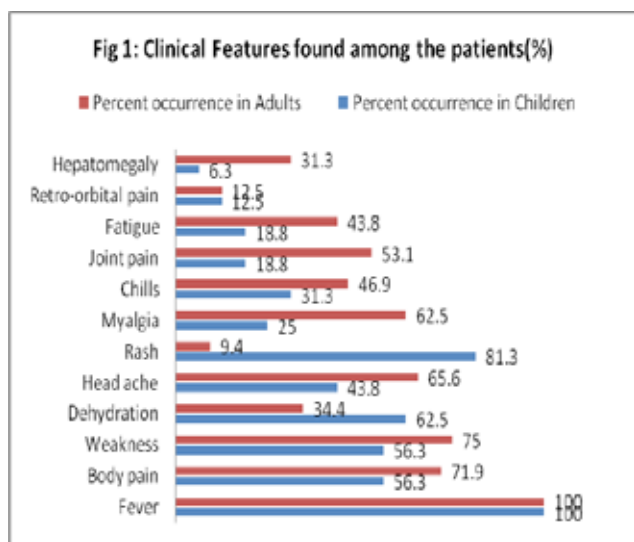
Fig. 1 presents clinical features found among participants at the time of admission to hospital. All the patient participants had fever, while presence of other symptoms occurred in varied frequencies. Symptoms that are seen in higher frequency were body pain (56.3 children, 71.9 adults), weakness (56.3 % children, 75.0 %adults), dehydration (62.5% children, 34.4 %adults) and head ache (43.8% children, 65.6% children).Other symptoms that appeared in relatively higher proportion were myalgia (25% children, 62.5 % adults), chills

(31.3% children, 53.1 % adult), fatigue (18.8 % children, 43.8 % adults), Retro-orbital pain (12.5 % children, 12.5 % adults) and hepatomegaly (6.3 % children, 31.3 % adults). Rash was found in markedly higher proportion (81.3%) among children.

State of consciousness and tolerance to food and water seen among DF patients appeared to have an association with the medical conditions. We speculate these to be important influencing factors with concern to feeding care of patients with DF.

Therefore, we made an attempt to associate the symptoms found among patients, state of consciousness and tolerance to food and water and tentatively classified patients as seriously sick, moderately and mildly sick.

We have presented symptoms as those as '**constant**' because these symptoms were present in all the patient participants while the '**occasional** symptoms' were considered as those that occurred in majority of patients. A perusal of table 1 presents the details; there is clear evidence that constant presence of fever >102°F, abdomen pain, hepatomegaly and dehydration was associated with intolerance and non-responsiveness in both children and adult patients.

On the other hand low grade or intermittent fever and absence of hepatomegaly were associated with delayed / good response and better tolerance to food and water. It is obvious therefore that presence of certain symptoms in patients warns for special feeding care at least during the initial days until patients developed tolerance. There are sufficient references to indicate importance of feeding care when body temperature is high.

We also recorded time taken by DF patients to gain consciousness and develop tolerance to food and water, the data is presented in table 2. It is obvious from the table that those whom we grouped as seriously ill took relatively longer time to develop tolerance to food and water as compared to less serious conditions. Children who were seriously sick took 2.83±0.90 days while those who were moderately and mildly sick required 2.5±1.26 and 2±0 days respectively. The difference in time taken was not statistically significant at 5% level. Adults on the other hand took longer time to develop tolerance; seriously sick patients took 4.29± 1.67days, moderately sick took 3.58±1.80 and mildly sick patients had better tolerance and were able to consume food and water by 1.58± 0.64 days.

Table 1: Details about the patient's condition: food tolerance, associative symptoms and state of responsiveness

Food tolerance at the time of admission	Patients Nos (%)	Associative symptoms		State of Responsiveness	We referred the Condition As
		Constant	Occasional		
Totally Intolerant	Children 6 13%	Fever (>102°F), Headache, Body pain, Myalgia, Chills, Weakness	Abdomen pain, Hepatomegaly, Dehydration, Joint pain,	Non Responsive	Severely sick
	Adults 7 15%	Fever >102°F), Head ache, Body pain, Myalgia, Chills, Weakness	Abdomen pain, Hepatomegaly, Dehydration, Joint pain, Weakness.		
Moderately tolerant	Children 6 13%	Intermittent Fever (±99°F), Body pain, Dehydration, Weakness	Abdomen pain, Myalgia, Head ache	Delayed Response > 11 seconds	Moderately sick
	Adults 13 27%	Intermittent Fever (±99°F), Headache, Body pain, Myalgia, Chills, Weakness	Abdomen pain, eye pain, Dehydration, joint pain, Weakness		
Tolerant	Children 4 8%	Intermittent Fever (±99°F), Body pain	Joint pain, Chills, Weakness, giddiness	Immediate Response < 10 seconds	Mildly sick
	Adults 12 25%	Intermittent Fever (±99°F), body pain, Head ache, Chills	Myalgia, joint pain, Giddiness, Weakness		

The time taken by the adult patients to develop tolerance to food and water was statistically extremely significant ($p < 0.0001$).

Our results explicitly indicate the condition among adult patients to be poor compared to children. It is also important observation that patients with serious condition required longer hospitalisation. Mean days of hospitalisation for children were 4.67 ± 0.94, 4.33 ± 1.80 and 4 ± 0 days while those for adults was 6.43 ± 3.16, 4.58 ± 1.89 and 3.67 ± 1.11 days for seriously sick, moderately and mildly sick patients respectively. The differences in days of hospitalisation was however, not significant statistically.

Diets provided by the hospitals are presented in fig 2. Majority of the patients were provided normal diet (56.3 and 71.9%children and adults) followed by soft diet (31.3 and 12.5% children and adults). Only a small percentage of patients were provided with full fluid and only one adult (3.1%) patient was given clear fluid. The pattern of food offered was based on the tolerance level of the patient.

Energy and protein intake of the patients (adults and children) were calculated for five days to realize the energy and protein provided by food consumed by patients.

Table 2: Mean number of days required for food tolerance and hospital stay of the patients

N	State of tolerance	No of days taken to develop tolerance (Mean±SD)	Hospital stay (Mean±SD)
Children			
6	Totally intolerant	2.83±0.90	4.67±0.94
6	Moderately tolerant	2.5±1.26	4.33± 1.80
4	Tolerant (Improved eating)	2±0	4±0

N	State of tolerance	No of days taken to develop tolerance (Mean±SD)	Hospital stay (Mean±SD)
ANOVA- df:2, Sig.at 1% F-0.8965 -NS F- 0.7140 - NS			
Adults			
7	Totally intolerant	4.29± 1.67	6.43±3.16
13	Moderately tolerant	3.58±1.80	4.58± 1.89
12	Tolerant (improved eating)	1.58± 0.64	3.67± 1.11
ANOVA df: 2, Sig.at 1% F-9.7874 *** F- 1.8235 NS			

Fig 2: Type of diet to the patients by hospital dietary(%)
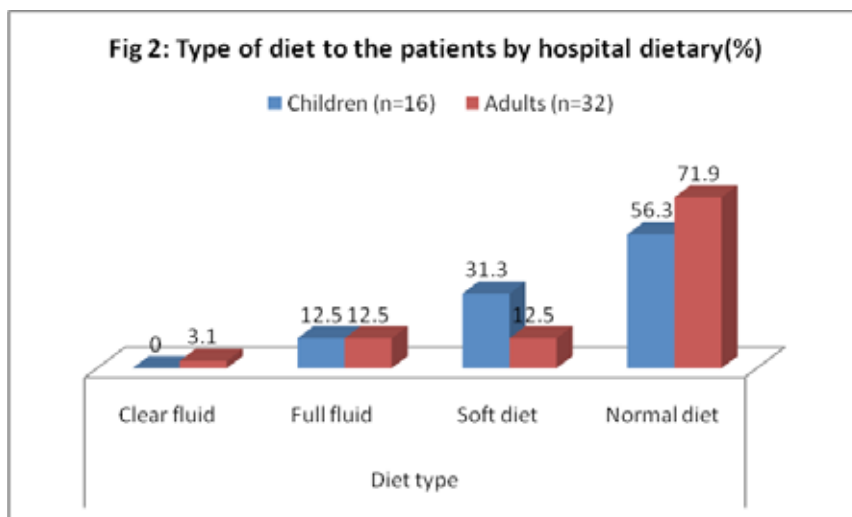
It can be seen from table 3, mean Kcals intake /kg body weight by severely sick individuals varied between 5.0±2.6 to 18.0±6.5 Kcals during day 1 to day 5 and are markedly lower than the RDA for adults according to ICMR.

An eventual improvement in food intake from day 1 was observed with every passing day, thereby on 5th day of hospitalization mean energy intake increased to 18.0±6.5 Kcal /kg body weight, differences in intakes were statistically highly significant ($p< 0.001$) among the severely sick. Energy intake among the moderately and mildly sick patients were comparatively better compared to severely sick although their intake were also markedly lower than RDA.

Table 3: Mean energy and protein intake of patients for first 5 days of hospital stay –adults (intake/kg/day)

Adult Patients	No.	Days of feeding					ANOVA df- 4
		1	2	3	4	5	
Severely sick (SS) Mean Energy intake Kcals	7	5.0±2.6	8.0±3.5	12.0±5.9	16.0±5.0	18.0±6.5	F- 8.4474 P- 0.0001
Mean Protein intake g		0.1 ±0.1	0.2 ± 0.1	0.2 ± 0.1	0.3 ± 0.1	0.4 ± 0.1	-
Moderately sick (MoS) Mean Energy intake Kcals	13	11.0±1.6	14.0±3.9	14.0±4.6	14.0±1.6	17.0±4.9	F- 4.5746 P – 0.01
Mean Protein intake g		0.3 ± 0.1	0.3 ± 0.1	0.3 ± 0.1	0.3 ±0.1	0.4 ± 0.1	-
Mildly sick (MlS) Mean Energy intake Kcals	12	17.0±2.1	19.0±4.3	20.0±2.1	20.0±0.7	21.0±3.8	F- 3.2670 NS
Mean Protein intake g		0.3 ±0.0	0.4 ± 0.0	0.4 ±0.1	0.3 ±0.1	0.4 ±0.1	-
ANOVA df- 2	F=	75.3291	18.1325	11.0824	12.7731	2.2640	-
	P	0.0001	0.0001	0.001	0.001	NS	

Adult Patients	No.	Days of feeding					ANOVA df- 4
		1	2	3	4	5	
Tukey's Post Hoc Test for Energy Intake							
Significant differences found in mean intake between days of feeding							
Severely sick		Day: 1 vs 4; 1vs 5; 2vs 4; 2 vs 5 differences were statistically significant					
Moderately sick		Day: 5 significantly different from days 1,2, 3 & 4					
Differences in mean intake due to severity of sickness							
Days		**1**	**2**	**3**	**4**		**5**
		SS vs MoS SS vs MlS MoS vs MlS	SS vs MoS SS vs MlS MoS vs MlS	SS vs MlS MoS vs MlS	SS vs MlS MoS vs MlS		NS

Mean differences in energy intake of the moderately sick patients from day- 1 to day 5 were mildly significant statistically ($p < 0.01$). Tukey's post hoc test was employed to indicate the significance. It is also clear from table 3 that differences in energy intake between the three groups of patients with different severity is different and were significant statistically on each day of comparison.

Energy intake was significantly higher among the mildly sick patients. Protein intake was extremely low among all the three group of patients varying from 0.1 ±0.1g /kg body weight (severely sick) to 0.3 ±0.0 g / kg body weight (moderately and mildly sick), although there was a small increase in intake by 5th day of hospitalisation. No statistical analysis was performed.

A perusal of Table 4 indicates energy and protein intakes by children, a trend similar to that of adults can be seen. Energy intake by children exhibited proportionality to severity of sickness; mildly sick children consumed higher proportion of calories than those with moderate sickness while severely sick children consumed least amount of energy during days1 to 4. Differences between the groups for all the days of comparison were significant statistically ($p < 0.0001$ –day1; $p < 0.01$-day2 & 3; $p < 0.05$-day 4). Mean protein intakes were lower among children in all the three groups, however, small increase in intakes were noted during the five days assessment period. It is obvious from tables 3 and 4 that patients with DF were unable to eat and the reasons for poor intake could be intolerance, loss of appetite, anorexia due to high body temperature, and food rejection. Literature provides limited references to diet management in dengue infection, however, according to WHO, management of dengue does not have any specific treatment. Prompt and meticulous fluid resuscitation and monitoring are the main stay of life saving measures.[15-17]

Table 4: Mean energy and protein intake of patients for first 5 days of hospital stay-Children (intake/kg/day)

Patients-Children	No.	Days of feeding					ANOVA
		1	2	3	4	5	
Severely sick (SS) Mean Energy intake Kcals	6	10.0±3.8	18.0±3.0	19.0±4.3	27.0±6.3	29.0±6.8	df 4 F=13.679 P-0.0000
Mean Protein intake g		0.3±0.1	0.6±0.3	0.5±0.4	0.8±0.1	0.8±0.3	
Moderately sick (MoS) Mean Energy intake- Kcals	6	20.0±2.9	22.0±4.7	24.0±7.8	27.0±8.2	23.0±6.9	df- 4 F=0.974 NS
Mean Protein intake g		0.5±0.1	0.4±0.1	0.6±0.1	0.5±0.1	0.4±0.1	
Mildly sick (MlS) Mean Energy intake Kcals	4	38.0±7.8	31.0±6.4	36.0±8.1	39.0±5.7	-	df 3 F=1.013 NS
Mean Protein intake g		0.8±0.3	0.7±0.3	0.7±0.2	0.8±0.2	-	-

| Patients-Children | No. | Days of feeding | | | | | ANOVA |
		1	2	3	4	5	
ANOVA df 2	F	41.330	9.598	7.7296	4.442	-	
	P	0.0001	0.01	0.01	0.05	-	
Tukey's Post Hoc Test For Energy Intake							
Significant differences found in mean intake between days of feeding							
Severely sick		Days: 1 vs 3; 1 vs 4; 2vs 3; 2vs 4; 2 vs5; 3 vs 5.					
Differences in mean intake due to severity of sickness							
Days		1	2	3	4	5	
		SS vs MoS, SS vsMlS Mos vs MlS	SS vs MlS MoS vs MlS	SS vs MlS MoS vs MlS	SS vs MlS MoS vs MlS	-	

Recently published studies on fluid infusions both oral and IV (intra vascular) suggests that total fluid requirement significantly increase with severity of sickness.[8] Senanayake AM Kularatne (2015) reported that incidences of vomiting and abdominal pain are linearly proportional to severity of patient's condition haemorrhagic fever (DHF) require increased fluid resuscitation than leading to dehydration, hence patient with Dengue haemorrhagic fever (DHF) require increased fluid resuscitation than those with DF.[8] Appropriate and timely fluid replacement allows patient recovery and prevents development of severe condition; this stresses the need for initiating appropriate fluid therapy at the early stages of dengue infection. Normal Saline should be the first line IV fluids for all.[8,13,15]

Table 5: Mean water consumed orally and IV given to patients during first six days of hospital stay-children

| Patients children | No. | Daily oral intake of water (ml) -- days Mean ± Sem | | | | | ANOVA F= |
		1	2	3	4	5	
Severely sick	6	508.0±192.7	533.0±199.9	700.0±262.5	375.0±109.4	475.0±133.4	0.396 NS
Moderately sick	6	492.0±37.4	558.0±166.9	692.0±38.1	700.0±66.6	850.0±61.2	6.139 P- 0.01
Mildly sick	4	1000.0±50.0	1025.0±0.0	1550.0±0	1466.7±0.0	-	266.065 P-0.01
ANOVA P =0.01	F=	3.390 NS	3.360 NS	6.748 Sig	38.299 Sig	-	-
Tukey's Post Hoc Test for Water Intake							
Significant differences found in mean water intake between days							
Moderately sick		Days: 1 vs 5 and 2 vs 5.					
Mildly sick		Days: 1 vs 3and 2 vs 3.					
Differences in mean intake due to severity of sickness							
Days		1	2	3	4	5	
		NS	NS	1 vs 3	2 vs 3	-	
Volume of IV fluid given (ml)							
Severely sick	6	732.0±244.9	712.0±376.6	300.0±41.2	300.0±45.8	195±18.37	1.569 NS

Patients children	No.	Daily oral intake of water (ml) -- days Mean ± Sem					ANOVA F=
		1	2	3	4	5	
Moderately sick	6	464.0±113.6	712.0±164.0	442.0±44.2	520.0±123.4	490.0±10.0	1.296 NS
Mildly sick	4	476.7±171.7	520.0±40.0	600.0±0	100.0±0.0	-	12.699 NS
ANOVA P=0.01	F=	0.838 NS	0.141 NS	12.887 Sig	5.416 NS	-	-
TUKEY'S POST HOC TEST FOR IV FLUID							
Differences in mean daily IV fluid infused **due to severity of sickness**							
Days	1		2	3	4	5	
	NS		NS	1 vs 2 & 3; 2 vs 3	NS	-	

Table 6: Mean water consumed orally and IV given to patients during first six days of hospital stay-Adults

Patients adults	No.	Daily oral intake of water (ml) -- days Mean ±Sem					ANOVA Sig. at 0.01 F=
		1	2	3	4	5	
Severely sick	7	1057.0±106.6	1064.0±101.4	1393.0±173.9	1464.0±191.9	1450.0±192.7	1.706 NS
Moderately sick	13	1431.0±91.2	1654.0±171.6	2000.0±145.5	2167.0±200.0	2120.0±184.3	3.796 Sig
Mildly sick	12	1317.0±99.8	1638.0±182.2	1809.0±143.2	1663.0±98.6	1667.0±68.0	2.112 NS
ANOVA	F=	2.992 **NS**	2.812 **NS**	3.343 **NS**	4.393 **NS**	4.659 **NS**	-
Tukey's Post Hoc Test for Water Intake							
Significant differences found in mean water intake between days							
Moderately sick		Days: 1 & 2 vs 3, 4, 5.					
Volume of IV fluid given (ml)							
Severely sick	7	1083.0±129.9	1050.0±144.3	917.0±129.9	750.0±94.5	500.0±0.0	4.543 Sig
Moderately sick	13	1085.0±91.5	818.0±66.7	722.0±95.0	750.0±120.1	750.0±69.3	2.723 NS
Mildly sick	12	883.0±105.9	760.0±76.5	500.0±0.0	667.0±68.0	500.0±0.0	6.386 Sig
ANOVA	F=	1.2600 NS	2.414 NS	5.515 Sig	0.231 NS	9.326 Sig	-
Tukey's Post Hoc Test for IV Fluid							
Significant differences in mean IV fluid infused between days							
Severely sick		Days: 1, 2 & 3vs 4,5.					
Mildly sick		Days: 1 & 2 vs 3,4, 5					
Differences in mean daily IV fluid infused due to severity of sickness							
Days	1		2	3	4	5	
	NS		NS	1 vs 2 & 3; 2 vs 3	NS	-	

Harris E, demonstrated that oral intake of plain water during the 24 h before being seen by a physician was statistically associated with decreased risk for hospitalization.[18] We assessed fluids consumed orally as well as the IV infusion (Tables: 5& 6). We found large inter and intra group variations, as evidenced by high SDs, it suggests that each patient has different needs and vary day to day, however they were statistically not significant. All the patients regardless of their conditions received IV fluids at the time of hospital admission; other reports endorse this observation indicating that normal Saline as IV was the first line of treatment for all patients.[8] IV infusions frequently pose a risk of fluid overload during the management of dengue patients

therefore providing oral fluids judiciously along with IV fluids is vital.[10]

In our study, Patients with severe sickness received higher volumes of IV infusions and less quantity of oral fluids as compared to those with moderate and mild sickness. With improvement in conditions, it crisscrossed wherein IV infusions reduced and oral fluids increased. Research evidence is scarce with regards to actual fluid requirement during critical phase of dengue infection.[8,13]

Conclusion

It is obvious therefore that, primarily the management of dengue patients befalls on medical treatment; however, diet is an important complementary element in the course of management. Electrolyte disturbances and hypokalemia leading to acute neuromuscular weakness and dehydration that are common to dengue infection[10] can be effectively handled through appropriate dietary manipulation.

Although, references about feeding patients with DF are sporadic, the available literature does suggest suitable foods for dengue patients.[10,19,20] In presence of food intolerance, vomiting and diarrhoea along with fever, diets should be simple and include digestible fluids, juices and soups.[10] Foods rich in vitamin C, magnesium, zinc are particularly reported to be of great importance.[19] Further, reports suggest benefits about use of certain foods such as juice of black grapes, pomegranate, amla (Phyllanthus emblica), guava and papaya as well as goat's milk. Chlorophyll is reported to be beneficial, nevertheless that extracted from guava leaves and papaya leaves have special mentions.[12,19] Infections in general cause loss of physiological reserves leading to malnutrition with serious consequences. Hence, it is utmost important that dieticians should volunteer in the feeding care of patients admitted to the hospital and adopt evidence based approaches. Dietary care is essential during sickness and complements medical treatment.

Ethical Clearance: obtained from Institutional Ethical Committee, University of Mysore.

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Vaccine Preventable Diseases among Mothers of Under Five Children

Praveen S Pateel[1], Deelip S. Natekar[2], Shridhar G. Pujari[3], Daneshwari S Hiremath[4]

[1]Asso. Professor & HOD of Nursing Foundation, [2]Principal, [3]Asso. Professor & Department of Medical Surgical,
[4]Asso. Professor & Department of Child Health Nursing, Shri BVVS, Sajjalashree Institute of Nursing Sciences Navanagar, Bagalkot

Abstract

A quasi experimental study was conducted using one group pre test and post test research design. Convenient sampling technique was used to select 50 mothers of under five children at Bagavati village, of Bagalkot Dist, Karnataka. Data was collected using structured knowledge questionnaire.

Result: The result**s** reveal that the overall mean score was 30% in the pre test and 65.5% in the post test. Majority of the mothers had inadequate knowledge in pre test. After the implementation of Information Booklet with an enhancement of 33.5% mothers of under five children had more adequate knowledge regarding Vaccine Preventable Diseases. Paired 't' test showed that there was a significant improvement between pre test and post test scores with 't' value of 11.03 at $P<0.05$.

Conclusion: The study findings revealed that information booklet on vaccine preventable diseases is effective an improving knowledge of mothers of under five children.

Keywords: *Knowledge; information booklet; vaccine; preventable; underfive children .*

Introduction

Our children are the future generation of the nation hence its our responsibility in prevention of children related to seven killer diseases of the under five children, Vaccines are prepared to work by training and preparing the body's to develop the natural defences the immune system to recognize and fight off viruses and bacteria. If the body is exposed to those disease conditions to causing pathogens later, it will be ready to fight and destroying them quickly[1].

When a child gets vaccinated against a disease, their risk of infection is also reduced so that they're also far less likely to transmit the disease to others. As more children in a community get vaccinated, fewer children remain vulnerable, and there is less possibility for passing the pathogen on from person to person. Lowering the possibility for a pathogen to circulate in the community protects those who cannot be vaccinated due to other serious health conditions from the disease targeted by the vaccine[2].

Children are innocent, trusting and full of hope and joy. Their childhood should be joyful and loving. Their lives should mature gradually, as they gain new experiences. Each child is a unique person, a person whose future will be affected for better or worse by the influences that mould his or her life during the early years. One child will grow up to become a joy to God and parents and a blessing to others. Another will grow up and become a menace to society. Many others will live out their lives unfairly good ways. The future of any society depends on its children. Parents are laying the foundation for their child's lives. So the parents have a very key role and opportunity to help promote the health of the children. Children who receive their immunizations on time are healthierchildren[3].

Corresponding Author
Dr. Praveen S Pateel
Designation: Asso. Professor & HOD of Nursing Foundation
Address: Shri BVVS, Sajjalashree Institute of Nursing Sciences Navanagar, Bagalkot
e-mail : drpraveenspatil@gmail.com
Mob.: 9743240191

Under five children death occurred each year more than 10 million children die before they reach their fifth birthday. Seven in ten of these deaths are due to just five preventable and treatable conditions: pneumonia, diarrhoea, malaria, measles, and malnutrition, and often a combination of these each year more than 10 million children die conditions. The estimated proportion of deaths in which under nutrition is an underlying cause is roughly similar for diarrhoea 61%, malaria 57%, pneumonia 52%, and measles 45%. This problem causes a higher under-five mortality rate especially in South-East Asia[4].

Statement of the Problem: "Effectiveness of Information Booklet on Vaccine Preventable Diseases among Mothers of under five children, of Bagavati village of Bagalkot Dist, Karnataka".

Objectives:

1. To assess the pre-existing knowledge regarding vaccine preventable diseases among mothers of under five children.

2. To assess the knowledge regarding vaccine preventable diseases among mothers of under five children at Bagavati village after administering the information booklet.

3. To evaluate the effectiveness of information booklet by comparing the pretest and posttest knowledge scores regarding vaccine preventable diseases among mothers of under five children

4. To find out the association between pretest knowledge scores of mothers of under five children and their selected socio demographic variables.

Research Methodology

Research approach: Quantitative research approach

Research design: quasi experimental one group pretest and post test design

Variables:

Independent Variable: Information booklet on knowledge regarding vaccine preventable diseases among mothers of under five children of Bagavati village of Bagalkot Dist, Karnataka.

Dependent Variable: Knowledge regarding the vaccine preventable diseases among mothers of under five children of Bagavati village of Bagalkot Dist, Karnataka.

Extraneous Variables: Age, religion, types of family, Educational Qualification, Occupation, Number of children, previous knowledge and Source of Information on vaccination.

Population: Target populations for the present study were mothers of under five children attending selected villages of Bagalkot dist.

Sample and Sample Size: Sample is the subset of a population selected to participate in a research study. This study samples were the Mothers of under five children of Bagavati village of Bagalkot dist.

The sample for the present study were 50 mothers of under five children attending selected villages of Bagalkot dist.

Sampling Technique: Non probability convenient sample technique was used for study, to select 50 mothers of under five children.

(A) Inclusion Criteria:

1. Mothers who are willing to participate.

2. Mothers who are available at the time of data collection.

(a) Exclusion Criteria:

1. Mothers who attended any research studies about vaccine preventable disease.

2. Mothers who are illiterate.

Organization and Presentation of the Data: Collected data were edited, tabulated, analyzed, interpreted, and findings obtained were presented in the form of tables and diagrams presented under the following sections.

Section I: Analysis of the demographic variables of the mothers of under five children at Bagavati village.

Section II: Analysis and interpretation of pretest knowledge score of mothers of under five children at Bagavati village on vaccine preventable diseases.

Section III: Analysis and interpretation of posttest knowledge score of mothers of under five children at Bagavati village on vaccine preventable diseases

Section IV: Analysis and interpretation of the effectiveness of information booklet among mothers of under five children at Bagavati village on knowledge regarding vaccine preventable diseases.

Section V: Analysis and interpretation of pretest knowledge score and the socio demographic variables of mothers of under five children at Bagavati village.

Section I: Analysis of the demographic variables of the mothers of under five children at Bagavati village.

Age of the Mothers: Below 24 years (42%), 25-30 years (20%), 31-35 years (28%) and 36 years and above (10%).

Religion: Hindu (95%), Christian (1%), Muslim (04%) and any other (0%).

Marital Status: unmarried (00%), married (94%), divorced (2%), and widow (4%).

Education Status: SSLC (62%), PUC (24%), under graduate (14%), and post graduate (00%).

Occupational Status: Housewife (37%), coolie (27%), employees (13%) and agriculture (11%).

Type of family: Nuclear (40%) and joint (60%).

Monthly Income: Below Rs.5000 (22%), Rs.5001-10000 (32%), Rs. 10001-15000 (32%) and Rs. 15001 above (14%).

Number of children: One (32%), Two (50%), Three (16%), 4 and more(2%).

Previous knowledge on vaccination: Yes (22%) and No(78%).

Source of information on vaccine preventable diseases: Family member (28%), health personnel (30%), mass media (42%) and any other(00%).

Section II: Analysis and interpretation of pretest knowledge score of mothers of under five children at Bagavati village on vaccine preventable diseases.

Table 1: Aspect wise pre test mean knowledge score on vaccine preventable diseases N=50

Sl. No.	Aspects	Maximum score	Pretest Knowledge scores		
			Mean Score	SD	Mean %
1.	Meaning	7	1.74	1.32	24.8%
2.	Poliomyelitis	5	1.68	1.0	33.6%
3.	Measles, Mumps, rubella	6	1.12	1.09	18.7%
4.	Diphtheria, Pertussis, Tetanus	8	3.08	1.23	38.5%
5.	Tuberculosis and other diseases	4	1.06	0.88	26.5%
Total		**30**	**8.68**	**3.92**	**28.9%**

Table 2: distribution of subjects according to the pretest knowledge scores N=50

Level of knowledge	Frequency	%
Inadequate knowledge	45	90%
Moderate knowledge	05	10%
Adequate knowledge	0	0%
Total	**50**	**100%**

Table 2 indicate the overall pretest level of knowledge among subjects. 90% subject had inadequate knowledge, 10%of subjects had moderate knowledge and none of them had adequate knowledge.

Section III: Analysis and interpretation of posttest knowledge score of mothers of under five children at Bagavati village on vaccine preventable diseases

Area on vaccine preventable diseases:

Table 3: aspect wise post test knowledge score on vaccine preventable diseases. N=50

Sl. No.	Aspects	Maximum score	Post test Knowledge scores		
			Mean Score	SD	Mean %
1.	Meaning	7	4.54	2.03	64.8%
2.	Poliomyelitis	5	3.02	1.08	60.4%
3.	Measles, Mumps, rubella	6	3.68	1.33	61.3%
4.	Diphtheria, Pertussis, Tetanus	8	4.44	1.48	55.5%
5.	Tuberculosis and other diseases	4	2.68	0.97	67%
	Total	**30**	**18.00**	**5.20**	**65.5%**

Table 3 indicate the overall posttest level of knowledge among subjects. 18% subject had inadequate knowledge, 60%of subjects had moderate knowledge and 22% of them had adequate knowledge.

Section IV: Analysis and interpretation of the effectiveness of information booklet among mothers of under five children at Bagavati village on knowledge regarding vaccine preventable diseases.

Table 4: comparison of pretest and posttest knowledge score of subjects regarding vaccine preventable diseases. N=50

Area of knowledge	Knowledge score				Paired 'test	DF	Significance
	Pretest		Posttest				
	Mean	SD	Mean	SD			
Meaning	1.74	1.32	4.54	2.03	t=8.6	49	p=0.005*** Significant
Poliomyelitis	1.68	1.0	3.02	1.08	t=8.61	49	p=0.005*** Significant
Measles, Mumps, rubella	1.12	1.09	3.68	1.33	t=12.06	49	p=0.005*** Significant
Diphtheria, Pertussis, Tetanus	3.08	1.23	4.44	1.48	t= 6.0	49	p=0.005*** Significant
Tuberculosis and other diseases	1.06	0.88	2.68	0.97	t= 9.09	49	p=0.005*** Significant
Total	**8.60**	**3.89**	**18.00**	**5.20**	**t=15.03**	**49**	**p=0.005*** Significant**

***Very high significant at p< 0.005

Table 5: Percentage of knowledge gain on different aspects of structured knowledge questionnaire N=50

Area of knowledge	Pretest knowledge score	Posttest Knowledge score	Mean % of knowledge gain
Meaning	24.80%	64.80%	40.00%
Poliomyelitis	33.60%	60.40%	26.80%
Measles, Mumps, rubella	18.70%	61.30%	42.60%
Diphtheria, Pertussis,Tetanus	38.50%	55.50%	17.00%
Tuberculosis and other diseases	26.50%	67%	40.50%
Total	**30%**	**65.5%**	**33.5%**

Table 5 shows knowledge score percentage before and after the administration of information booklet. Mothers of underfive children gained 33.5% overall knowledge on regarding meaning of vaccine preventable diseases.

Section V: Analysis and interpretation of pretest knowledge score and the socio demographic variables of mothers of under five children at Bagavati Village

The association posttest level of knowledge and their demographic variables. Age, education, Number of children and previous knowledge on vaccination were significantly associated with their pretest level of knowledge. There was no significant association between religion, family Income, type of family, and source of information regarding. This association was statistically significant and it was calculated using Chi square test. There search hypothesis H_2 was accepted. Hence the objective 4 is achieved.

Conclusion

The results of the study show that the difference between the pre-test and post- test knowledge score of mothers of under five children is statistically significant and the enhancement shows the effectiveness of information booklet on vaccine preventable diseases.

Recommendations:

• A similar study may be conducted on a large sample for wider generalization.

• A comparative study can be done to assess the knowledge, attitude and practice of rural and urban mothers regarding Vaccine Preventable Diseases.

• A study can be done to evaluate a planned teaching program on Vaccine Preventable Diseases.

• A follow up study may be conducted to evaluate the effectiveness of Information Booklet.

Ethical clearance certificate is obtained from the: Shri B V V S Sajjalashree Institute of Nursing Sciences Navanagar Bagalkot

Source of Funding: Self

Conflict of Interest: Nil

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Incidence of Vitamin D Levels in Cord Blood of Newborns and Correlation with Maternal Vitamin D: Our Experience

Preeti Lamba[1], Dayachand[2], Yogesh Kumar Goel[3], Linika Valecha[4]

[1]Post Graduate 3rd Year, Department of Paediatrics Saraswathi Institute of Medical Sciences Hapur (U.P.), [2]Professor, Department of Paediatrics Ncr Institute of Medical Sciences, Meerut, [3]Professor, Department of Paediatrics Saraswathi Institute of Medical Sciences Hapur (U.P.), [4]Post Graduate 3rd Year, Department of Medicine Saraswathi Institute of Medical Sciences Hapur (U.P.)

Abstract

Vitamin D deficiency is common in northern India but there are limited data in pregnant women and neonates. This study aimed to determine the prevalence of vitamin D levels in cord blood of newborns and the association with maternal vitamin D. A total of 50 pregnant women and their neonates were included. Clinical data and venous maternal blood for calcium,phosphate, albumin, alkaline phosphatase, magnesium, intact parathyroid hormone, and vitamin D were obtained on the day of labor. Cord blood was collected following delivery to evaluate vitamin D status of newborns. Mean serum maternal and cord blood 25OHD levels were 25.42 ± 8.07 and 14.85 ± 5.13 ng/mL. The prevalence of vitamin D deficiency (25OHD < 12 ng/mL) and insufficiency (25OHD 12–20ng/mL) in cord blood of newborns were 20.2 and 69.1%,respectively. There was a significant correlation between maternal and cord blood vitamin D levels ($P< 0.001$). The factors associated with cord blood vitamin D deficiency were low maternal 25OHD level and no vitamin D supplement during pregnancy.

Conclusion: There is a high prevalence of vitamin D deficiency among the neonates. Adequate prenatal vitamin D supplementation should be implemented as routine antenatal care.

Keywords: *Vitamin D deficiency. Cordblood. Newborns. Pregnancy.*

Introduction

Vitamin D plays an important role in bone metabolism and maintaining bone health. The main sources of vitamin D in humans are from sunlight exposure and dietary intake[1]. Several factors contribute to the vitamin D status, including aging, the use of sunscreen, skin hyperpigmentation, and the sun intensity, including the season and the latitude[1]. Although abundant ultraviolet B (UVB) exposure is available though out the year, vitamin D deficiency (VDD) remains a common problem in northern India[2]. Since

25-hydroxyvitamin D (25OHD) crosses the placenta, there is a strong correlation between maternal and cord blood 25OHD levels [3]. Previous studies have reported a high prevalence of VDD in maternal serum and cord blood[4]. To the best of our knowledge, the prevalence of VDD among newborns has never been reported in India and the routine supplementation of vitamin D in pregnant women and newborns has not yet been established. Most previous studies have defined VDD as 25OHD levels of < 20 ng/mL; however, global consensus recommendations on the prevention and management of nutritional rickets have been recently established that define vitamin D deficiency and insufficiency as < 12 and 12–20 ng/mL, respectively[5]. Weaim to evaluate the prevalence of VDD in the cord blood of newborns according to this definition and the association with the maternal vitamin D status.

Corresponding Author:
Dr. Preeti Lamba
Post Graduate 3rd Year, Department of Paediatrics,
Saraswathi Institute of Medical Sciences, Hapur (U.P.)
e-mail: preetychoudhary45@gmail.com
Mobile No.: 8059992888

Materials and Method

Patients: A total of 50 pregnant women aged 18–

45 years old and carrying a term singleton fetus and their neonates were enrolled in the study at Saraswathi institute of medical sciences, Hapur during October 2018 to April 2019. Term pregnancy was defined as 37–41 weeks of gestation. Infants that were admitted to the Neonatal Intensive Care Unit, and born with congenital malformation and syndrome were excluded. Pregnant women were asked for their sociodemographic data, multivitamin supplementation during pregnancy, and their use of sunscreen. The obstetric history and newborn data were obtained fromthe medical records. Venous maternal blood samples, for calcium, phosphate, albumin, alkaline phosphatase, magnesium,intact parathyroid hormone, and 25OHD were obtained on the day of labor. Cord blood was collected following delivery to evaluate the vitamin D status of the newborns.

Biochemical Assays: The plasma levels of calcium, phosphate, magnesium, and albumin were measured using an Automated Analyzer. Intact parathyroid hormonewas measured using a chemiluminescent microparticle immunoassay. 25OHD was analyzed using a chemiluminescent microparticle mmunoassay. All the hormonal assays were performed according to the manufacturers' protocols. Vitamin D deficiency was defined as 25OHD < 12 ng/mL, insufficiency as 25OHD 12–20 ng/mL, and sufficiency as 25OHD > 20 ng/mL.

Statical Analysis: Statistical analysis was performed using SPSS version 22. Normally distributed data were expressed as the mean ± stan-dard deviation. We performed analysis of variance (ANOVA) and Chi Pearson's correlation analysis was used to explore relationships. AP-value < 0.05 was considered significant.

Results

In total, 50 pregnant women, mean age 28.59±5.91 years, were included in the study. There were 20 primiparous (40%) and 30 multiparous women (60%).

The mean gestational age was 38.6 ± 1.01 weeks. 24 women(48%) were taking vitamin D supplements during pregnancy with an average dose of 400 IU/day.

The mean BMI before pregnancy was 22.42 ± 4.38 kg/m^2.

There were 17 women (34%) reported to routinely use sunscreen.

Of the newborns, 25(50%) were females and 43 (86%) were classified as appropriate for their gestational age.

The mean birth weight and length were 3096.38 ± 374.3 g and 52.04 ± 1.92 cm,respectively.

The mean serum maternal and cord blood 25OHD levels were 25.42 ± 8.07 and 14.85 ± 5.13 ng/mL, respectively. Onaverage, the serum cord blood 25OHD level accounted for 57% of the maternal 25OHD level. The prevalence of vitamin D deficiency and insufficiency in newborns, defined as 25OHD < 12 and 12–20 ng/mL, were 20.2 and 69.1%, respec-tively.

There was a significant correlation (P<0.001) between the maternal and cord blood vitamin D levels . There was no association between the vitamin D level in cordblood with the birth weight (P= 0.86), birth length (P= 0.51), and head circumference (P=0.33).When comparing between the groups, the mothers of infants with a deficient or insufficient level of vitamin D in cordblood had a lower 25OHD level .

The lowest percentage of maternal supplementation was found in the deficient group. There was no difference in the maternal levels of calcium, phosphate, magnesium, and intact parathyroid hormone. The birth weight and length were not different between the groups.

Mothers supplemented with vitamin D demonstrated a higher 25OHD level. In the group of mothers supplemented with vitamin D during pregnancy (n=24), vitamin D insufficiency was noted in 4 mothers (16.6%) and 20 neonates (83.3%). Although the 25OHD levels in cordblood were not different, the prevalence of cord blood VDD was significant lower in the supplemented group.

Discussion

To the extent of our review, this is the first study in north India evaluating the vitamin D status in cord blood using the definition and diagnosis of global consensus recommendations on the pre-vention and management of nutritional rickets and the association with maternal vitamin D status. Our study showed a high prevalence of VDD and insufficiency in the cord blood of new-borns and a significant correlation between maternal and cordblood vitamin D levels. A total of 20.2% of these newborns had VDD and 69.1% had vitamin D insufficiency, despite 49% of their mothers reporting

the use of multivitamin supplements during pregnancy. Several studies have evaluated the vitamin D status in cord blood.

In a study in Brazil, 29.2% of the infants tested had VDD and 51.3% had vitamin D insufficiency at birth.

A large cohort study from the Netherlands also showed a high prevalence of VDD in neonates (46%), especially among those with a non-European ethnic background.

Another studyfrom India showed a large proportion of neonates (95.7%) hadhypovitaminosis D (serum 25OHD < 20 ng/mL) [6].

In our study, the maternal 25OHD level and use of vitamin Dsupplements during pregnancy were associated with the vitamin D status in neonates. A large study in Canada reported that the key factors associated with the neonatal 25OHD level were maternal age, dairy intake, supplement use, and 25OHD level.

Marshall et al. reported that a younger maternal age and an increased number of pregnancies were associated with cordblood vitamin D deficiency or insufficiency . Another study also found that the risk factors of VDD in newborns were the maternal 25OHD and alkaline phosphatase levels. Exposure to sunlight is the main source of vitamin D and sunscreen use could contribute to VDD . However, our data showed no association between VDD and sunscreen use. Thisis similar to the study in Brazil, which reported that sun expo-sure and the use of a sunscreen were not associated with VDD in women and newborns . Our study showed no significant differences in the maternal levels of calcium, phosphate, magnesium, and intact parathyroid hormone between vitamin D-deficient and sufficient mother; however, there was a trend that low vitamin D levels in the mother lead to higher PTH values as is observed in other studies.

In the present study, the use of vitamin D supplements decreased the prevalence of cord blood VDD but not vitamin D insufficiency. Despite taking vitamin D supplements during pregnancy, cord blood VDD was found as 6.5% and vitamin D insufficiency was noted as 19.6% in mothers and 84.8% in their neonates. These could be due to an inadequate dose of vitamin D since the average dose of vitamin D intake in our subjects was only 400 IU/day. Recently, global consensus guidelines have recommended that pregnant women should receive 600 IU/day of vitamin D .Sufficiency limit of 25OHD is still debated.

The Endocrine Society recommends that 25OHD value of 30 ng/mL should be the actual lower normal limit for adults, whereas the Institute of Medicine defines this limit as 20 ng/mL. Our study showed that mean maternal 25OHD levels of the newborns with deficient,insufficient, and sufficient vitamin D status were 15.3, 26.6, and 37.1 ng/mL, respectively. Also, mean 25OHD level of 14.8 ng/mL in cord blood is about 57% of maternal level. These data suggest that maternal 25OHD level should be above 30 ng/mL for sufficient vitamin D status in newborns and maternal 25OHD level greater than 20 ng/mL seems to be adequate for preventing cord blood vitamin D deficiency.

Conclusion

Serum 25OHD level of 20 ng/mL might be the lower normal limit for general population, but based on the results of our study, we might propose that this limit should be at least 30 ng/mL for pregnant women that must supply their offspring. We acknowledge the potential limitations of our study. First, our study was conducted only in an urban area thus could not represent the overall population. Second, we did not evaluate the adherence of taking multivitamin supple-ments and did not record the dietary vitamin D intake.

Finally we did not collect all the maternal data that may correlate with cord blood vitamin D status, including maternal skin color and sunlight exposure. However, it is unlikely that these factors will have overly affected the results because all the studied mothers were of the same ethnicity and the sunlight exposure data obtained from the questionnaires may be inaccurate be-cause they self-reported information and therefore there was a possibility of recall bias.

Ethical Clearance: Taken from ethical committee of institution.

Source of Funding: Self

Conflict of Interest: Nil

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A Study of Serum Glucose in Birth Asphyxia

Preeti[1], Dayachand[2], Yogesh Kumar Goel[3], Linika Valecha[4]

[1]*Post Graduate 3rd Year, Department of Paediatrics Saraswathi Institute of Medical Sciences Hapur (U.P.),*
[2]*Professor, Department of Paediatrics Ncr Institute of Medical Sciences, Meerut,* [3]*Professor, Department of Paediatrics Saraswathi Institute of Medical Sciences Hapur (U.P.),* [4]*Post Graduate 3rd Year, Department of Medicine Saraswathi Institute of Medical Sciences Hapur (U.P.)*

Abstract

Introduction: Perinatal asphyxia is a common neonatal problem and contributes significantly to neonatal morbidity and mortality. Glucose is an essential nutrient for the brain. Abnormally low level can cause encephalopathy and have the potential to produce long-term neurological injury.

Material and Method: A prospective study done at saraswathi institute of medical sciences,hapur with 65 cases in comparison to 65 controls for evaluation of serum glucose in birth asphyxia.

Results: In our study we found that serum glucose level was found to be lower among cases as compared to control population and the difference between the groups were statistically significant both at 48 and 72 hours. The cases had serum glucose levels lower than controls but there was significant difference between the severity of birth asphyxia or with severity of HIE staging.

Conclusion: Perinatal asphyxia is an important cause of neonatal hypoglyemia, severity of all these correlates with severity of asphyxia and HIE staging.

Keywords: *Perinatal asphyxia,neonatal hypoglycemia, hyperinsulinemia, apgarscore,foetal distress.*

Introduction

Perinatal asphyxia is a common neonatal problem and contributes significantly to neonatal morbidity and mortality. Around the world, neonatal hypoxia (birth asphyxia) or fetal hypoxia (stillbirth) is assessed to represent 23% of the 4 million neonatal deaths and 26% of the 3.2 million stillbirths each year.[1] An assessed 1 million children who endure birth asphyxia live with neurodevelopmental morbidities, including cerebral palsy, learning inabilities and mental deficiency, Consistently, 104 children lost their life in a hour because of asphyxia.[2] that may be, roughly 8% of the absolute worldwide pediatric mortality (age under five years) making it a significant issue. Because of an absence of assets, non-industrial nations are more influenced. However this is a worldwide issue requiring dire consideration.[3]

Glucose is an essential nutrient for the brain. Abnormally low level can cause encephalopathy and have the potential to produce long-term neurological injury. Serum glucose levels decline after birth until 1-3 h of age, when levels spontaneously increase in normal infants. In healthy term infants, serum glucose values are rarely <35 mg/dl between 1 and 3 h of life, <40 mg/dl from 3 to 24 h and <45 mg/dl after 24 h of life.[4] In birth asphyxia, hypoglycaemia is due to glycogen depletion secondary to catecholamine release and to an unexplained hyper insulinemic state. An initial phase of hyperglycaemia and hyperinsulinemia (5-10 min following an acute event due to a catecholamine surge which inhibits insulin release and stimulates glucagon release) may be followed within 2-3 h by profound hypoglycaemia.[5]

Materials and Method

Source of Data:

- Inborn and out born newborn babies who are, admitted to Neonatal Intensive Care Unit of Saraswathi Institute of Medical Sciences, (A tertiary care centre) from November 2018 to October 2020.

Inclusion Criteria:

Control Group: Babies with Apgar score >7 at 1 minute.

Study group (Cases): Babies with APGAR score of ≤ 7 at 1 minute.

Exclusion Criteria:

1. Babies with congenital cardio pulmonary malformation

2. Those neonates who born to mother with diabetes mellitus and hypertension treated with diuretics, given general anesthesia, phenobarbitone, pethidine, magnesium sulphate and other drugs likely to cause depression.

3. Suspected metabolic diseases.

4. Neonates born to mothers on anti-epileptics.

Method of collection of data:

• Study place: Saraswathi Institute of Medical Sciences, Hapurafter taking approval from institutional ethical committee.

• Study period: 2 years from November 2018 to October 2020.

• Sample size: 130 newborns of which 65 are cases and 65 are controls

• Study design: Prospective study

At the time of enrolment an informed written consent was obtained from parents.

Data is recorded regarding maternal history, birth events, APGAR score, weight and sex of the neonate.

Thorough clinical & neurological examination of all neonates included in the study conducted.

Asphyxiated neonates were monitored for hypotonia, seizures and other signs in the post neonatal period in NICU.

All asphyxiated neonates (as per WHO definition) with clinical features of Hypoxic Ischaemic Encephalopathy were staged by Sarnat & Sarnat staging[37].

On the basis of Apgar score at 5 minutes the asphyxiated babies were grouped as mild (score of 6,7), moderate (score of 4,5), severe (score of 3 or less).

Blood sample of every neonate were sent at <24 hrs, 48 hrs and 72 hrs of life for estimating the levels Blood glucose.

Statistical analysis is done by calculating mean ± standard deviation, paired t-test, ANOVA test.

Results

Incidence of birth asphyxia in a tertiary care centre (Saraswathi Institute of Medical Sciences, Hapur):

Total inborn cases of birth asphyxia = 126

Total inborn deliveries = 1841

Incidence = 126/1841 x 100 = 6.8%

Sex distribution among cases and controls: The study included 65 subjects each of control and study group with majority being males(63.07% and 64.60% resp.) in both groups.

Place of delivery among cases and controls: The study included 65 subjects each of control and study group in which 80% of cases are delivered in hospital as compared to control in which 84.7% of subjects delivered in hospital.

Mode of delivery among cases and controls: The study included 65 subjects each of control and study group in which among cases 47.6% were delivered by LSCS and 52.3% by vaginal delivery as compared to control group in which 44.6% delivered by LSCS and 55.3% by vaginal delivery.

Antenatally registered pregnancies among cases and controls

Out of 65 cases, 78.46% were antenatally booked & 21.53% were unbooked while in control group, 87.69% were antenatally booked & 12.3% were unbooked.

Table 1: Distribution of cases and controls according to severity of birth asphyxia

Severity of Asphyxia	Apgar score (at 5 min)	N	%	P-value
Mild	6,7	26	40%	
Moderate	4,5	26	40%	0.003
Severe	1,3	13	20%	

Our study population included majority with of neonates with mild and moderate birth asphyxia accounting for 40% each & severe birth asphyxia accounting for 20%.

Table 2: Distribution of cases according to HIE staging

HIE stage	N		Group
I	Count		11
	%		17.1%
II	Count		30
	%		45.7%
III	Count		13
	%		20.0%
No	Count		11
	%		17.1%
Total	**Count**		**65**
	%		**100%**

Majority of cases were in HIE stage II accounting for 46%, with stage III, stage I and no

HIE were 20%, 17% and 17% respectively.

Serum glucose disturbances in Birth Asphyxia:

Table 3: Serum glucose among cases and controls

Serum glucose	Group	n	Mean (mg/dl)	SD	Z
< 24 hrs	Cases	65	34.8	3.77	5.76 p=0.01
	Controls	65	60.6	0.74	
48 hrs	Cases	65	38.9	2.76	4.05 p=0.01
	Controls	65	75.6	0.84	
72 hrs	Cases	65	41.2	2.09	4.03 p=0.01
	Controls	65	80.9	0.67	

In our study we found that serum glucose level was found to be lower among cases as compared to control population and the difference between the groups were statistically significant as p value is <0.05 both at 48 and 72 hours.

Table 4: Serum glucose levels with severity of birth asphyxia

S. glucose	Birth asphyxia	n	Mean (mg/dL)	SD	F	p
< 24 Hrs	Severe	13	28.8	2.67	1.342	0.16
	Moderate	26	43.6	1.98		
	Mild	26	47.8	2.10		
48 Hrs	Severe	13	34.6	2.54	5.243	0.01
	Moderate	26	48.92	1.67		
	Mild	26	53.91	0.98		
72 Hrs	Severe	13	36.80	2.56	3.434	0.03
	Moderate	26	52.70	0.99		
	Mild	26	62.82	0.87		

Table 5: Serum glucose levels with severity of HIE staging

S. calcium	HIE Stages	n	Mean (mg/dL)	Std Deviation	F	p
< 24 Hrs	0	11	82.60	0.87	2.100	0.08
	1	11	68.86	0.45		
	2	30	46.54	1.34		
	3	13	28.80	1.87		
48 Hrs	0	11	84.02	0.76	3.908	0.03
	1	11	69.87	0.54		
	2	30	52.90	0.45		
	3	13	34.60	1.76		
72 Hrs	0	11	89.01	0.65	2.213	0.05
	1	11	62.78	0.70		
	2	30	50.82	1.08		
	3	13	36.80	1.54		

In our study we found that serum glucose level was found to be lower among cases as compared to control population and the difference between the groups were statistically significant both at 48 and 72 hours. The cases had serum glucose levels lower than controls but there was significant difference between the severity of birth asphyxia or with severity of HIE staging.

Table 6: Mortality among cases according to HIE staging

HIE staging	Cases		Mortality rate
I	N		0
	%		0%
II	N		6
	%		20%
III	N		8
	%		61.53%

In our study we found that mortality rate is directly proportional to HIE staging among cases as mortality is maximum i.e. 61.53% in HIE stage III .

Discussion

A prospective study done in which 65 asphyxiated neonates were compared with 65 normal healthy neonates for serum glucose for a period of 72 hrs from birth.[6] Gestational age, birth weight, relevant perinatal history, findings on physical examination and systemic examination are recorded on predesigned proforma. Neurologic examination was done. HIE staging was done with Sarnat and Sarnat staging. Serum glucose was monitored at 24 hours, 48 hours and at 72 hours.

The study group consisted of 40% of neonates with mild and moderate asphyxia and 20% of neonates with severe asphyxia. Among the 65 asphyxiated neonates 54 neonate had HIE, 17.1 % in Stage I, 45.7% in Stage II and 13 % in stage III .

Sex Distribution: Our study noted that males (64.60%) were more affected than females(35.4%). In the study done by Mac Donald and others [7], incidence of asphyxia was 54% in male babies and 46% in female babies which correlated well with the study.

Comparative studies showing mean serum glucose levels among cases and controls

The mean serum calcium value was among the cases 48.55+0.96 mg/dl as compared to controls had 59.19+0.12 mg/dl.

PallabBasu[10] and colleagues found that mean serum glucose levels were lower in asphyxiated babies (46.85 + 0.95 mg/dl) as compared to controls (59.50 + 0.51mg/dl) with p value of <0.001.

In our study we found that serum glucose level was found to be lower among cases as compared to control population and the difference between the groups were statistically significant both at 48 and 72 hours not as low as study by PallabBasu.

Conclusion

Perinatal asphyxia is an important cause of neonatal hypoglyemia, severity of all these correlates with severity of asphyxia and HIE staging. Male with normal hospital delivery neonates have a higher incidence of birth asphyxia. There is linear correlation between severity of asphyxia and HIE staging with hypoglycaemia.

Ethical Clearance: Taken from ethical committee of institution.

Source of Funding: Self

Conflict of Interest: Nil

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Opportunistic Screening for Prediabetes in a Tertiary Care Ophthalmic Eye Hospital

Prema K. Chande[1], Preethi John[2], Rajiv Raman[3], Sangeetha Srinivasan[4]

[1]Research Scholar, Lotus College of Optometry, [2]Professor, Chitkara School of Health Sciences, Chitkara University, [3]Professor, Sankara Netralaya, Medical Research Foundation, [4]Researcher, Vision Research Foundation

Abstract

Background: Diabetes mellitus is a well know public health issue. Prediabetes is a precursor to diabetes mellitus and early detection of this state of impaired fasting glucose, with intervention can be reversed to a state of normal glucose regulation. Healthy adults often visit eye hospitals for their eye care needs and aim of this study is to assess opportunistic screening for prediabetes in ophthalmic OPD.

Method: Subjects from the age group of 25-45 years visiting an eye hospital or accompanying family members were invited to participate in the study. Following informed consent, height, weight, was measured using standard tests and body mass index (BMI) was calculated. Body Fat Mass (BFM) was assessed using an Omron Body Fat device. HbA1c was performed and prevalence of prediabetes was calculated.

Results and Conclusions: 118 subjects enrolled in the study, 43 were known diabetics and 75 were normal adults between the age of 25-45 years. Using HbA1c test, 41/75 were diagnosed to have prediabetes, which is almost 54.66% of the entire normal study population.

Screening for prediabetes in ophthalmic outpatient areas could be repeated with a larger sample to substantiate the opportunity to screen for prediabetes.

Keywords: *Prediabetes, screening, HbA1c, Body Fat Mass.*

Introduction

The International Diabetes foundation estimated in the 2019 atlas that India has 77 million adults in the age group 20-79 years with diabetes and this number is estimated to grow to 125 million by year 2040. The age adjusted prevalence is estimated to be 8.8%.[1,2] People with diabetes are known to develop systemic and ocular complications and the onset of the these complications are associated with duration of disease.[3]The prevalence of diabetes and prediabetes in India reported by the ICMR INDIAB group in 2017 showed that the prevalence of diabetes was 7.9% and prediabetes was 10.3%.[4-6]

Corresponding Author:
Prema K. Chande
Address: Lotus College of Optometry, Lotus Eye Hospital, 13, NS Road, JVPD, Mumbai 400049
e-mail: prema@lcoo.edu.in

The Chennai Urban Rural Epidemiological study with a mean follow up of 9.1 years showed that amongst the ones with prediabetes at the baseline over the follow up period, 58.9% of them converted to diabetes whereas, among the normal individuals 19.4% of them converted to diabetes during the follow up period of 10 years.[7]

The aim of the study was to examine the efficacy of opportunistic screening for prediabetes. The study was conducted in an ophthalmic outpatient department where healthy adults often visit optometrists and ophthalmologists for refractive error management.

Subjects and Method

This was a cross sectional observational study done to compare those who had no diabetes, prediabetes and diabetes. Subjects with or without known diabetes between age of 25-45years were enrolled in the study. Anjana R etal[6] for their study included adults with a

cut off of 25 years of age and found the mean age to become diabetes was 40 years. Therefore, the age group of 25-45 years was included in this study. Sample size was calculated based on the prevalence of DR in a prediabetic population using the below details.

Sample Size = $Z(1-\alpha/2)^2 \, p(1-p)/d^2$

Sample Size = $1.96^2 \times 0.079 \, (1-0.079)/0.05^2 == 112$

Where p = 7.9% prevalence of DR in prediabetic population and d=5% with a confidence interval of 95%.[8]

The study obtained ethics approval from the institutional review board. Following informed consent, participants underwent HbA1c testing using the Bayer A1CNow point of care device test (Bayer Health Care LLC, Sunnyvale, CA, USA).

Individuals were classified as normal or having prediabetes based on their HbA1c values. The definition to diagnose them was based on the guidelines provided by the American Diabetic Association, of HbA1c values between 5.7%- 6.4%. Those with known diabetes were either by self-report or had HbA1c values higher than 6.5%.[9]

Height, weight, waist circumference and hip to weight ratios were measured using standard tests, and the body mass index was calculated. Body Fat Mass (BFM) was assessed using an Omron Body Fat device.[10] The Omron Body Fat device assessment device utilizes a bio impedance method to measure body fat mass. Subjects were then classified based on the WHO criteria as shown in Table 1.

Statistical Analysis: Statistical analysis was done using IBM SPSS package to estimate the mean and standard deviation. Continuous data were assessed for normality of distribution using a Kruskal-Wallis test. Prevalence prediabetes was calculated among the normal population. Statistical analysis was done for assessing the use of Body Fat as tool for screening for prediabetes and comparing it to the gold standard values of HbA1C test. The sensitivity and specificity were calculated. A chi-square test for independence was used to compare body fat values and prediabetes, with a level of significance of 0.05. Chi-square test was performed for measuring the association of obese/overweight body fat mass values in prediabetes and normal population. P value of <0.05 was the considered as the level of significance with a confidence interval of 95%.

Results

Of the 118 subjects enrolled in the study, 43 (36%) were previously known to be diabetic; of the 75 individuals who were potentially non-diabetic, 41 (54.66%) were identified as having prediabetes and 34 (29%) were non-diabetic (normal).

The demographics and clinical characteristics of the study group are shown in Table 2. The mean age of the study group was 36.89 + 6.30 years and 46% were men. The mean HbA1C values in the normal, prediabetic and diabetic groups were 5.3+0.2%, 5.9+0.2% and 8.3+2.6%, respectively and were significantly different between the groups (p<0.001).Table 2 shows the BFM and BMI values for each of the groups. The sensitivity and specificity were calculated for prediabetes for both BMI and BFM and shown in Table 3. The sensitivity for body fat was 82.9% and specificity was 17.6%. BFM had a high rate of false positives (68.3%). The sensitivity and specificity of BMI for prediabetes was found to be 41.03% and 75% respectively.

The test results were statistically significant with a p value <0.001, thereby establishing an association between increased body fat mass and prediabetes.

Table 1. Standard WHO Classification for BMI and BFM

Category	Fat mass %		BMI Criteria
	Men	Women	
Low	<10%	<20%	<18.5
Normal	10-20%	20-30%	18.5-25
Overweight	20-25%	30-35%	25-30
Obese	>25%	>35%	>30

Table 2. Demographics, Mean ± HbA1c, BMI and BFM of 3 groups

S.No.	Group	Mean Age in years	Mean HbA1c in %	MeanBMI in kg/m^2	Mean BFM in %
1.	Normal	34+5.9	5.3+0.2	24.32+3.19	29.57+6.27
2.	Prediabetic	41+5.9	5.9+0.2	24.51+4.77	31.42+7.89
3.	Diabetics	43+4.3	8.30+2.6	25.69+3.57	28.90+5.51

Table 3. Normal/Low and Overweight/Obesity results based on BMI and BFM

S.No.	Group	BMI Normal/Low	BMI -Obese/ Overweight	BFM Normal/Low	BFM/Obese/ overweight
1	Normal (N=34)	65%	35%	18%	82%
2	Prediabetic (N=41)	59%	41%	17%	83%
3	Diabetics (N=43)	51%	49%	19%	81%

Discussion

Prevalence of prediabetes is varied in different studies as the criteria and cut off for impaired fasting glucose and glycated hemoglobin values vary from guidelines provided by International Diabetes Federation, American Diabetic Association (ADA) and World Health Organization (WHO). However, HbA1c is considered as a reliable test as it is not prone to day to day fluctuations and it shows a steady state of blood glucose levels over the period of few months. Prevalence of prediabetes in Asian population as reported by Yipet al.[11] and Sadikot et al[12] based on ADA criteria were 53.1% and 55.5%, respectively. The present study has reported 54.6% prevalence of prediabetes based on ADA criteria. [12,13]

Use of handheld body fat mass assessment was validated by Vasudev et al in the Chennai Urban Rural Epidemiological study.[14] They validated three different method to assess body fat mass and concluded that the handheld impedance method is comparable to the other two method. Kesavachandran et al[15] reported that high body fat percentages in individuals with normal BMI values. Mainous et al[16] concluded that among healthy BMI range individuals, prevalence of prediabetes and abdominal obesity was present. The present study is in agreement, with the above two studies, as 58% of prediabetic subjects had normal BMI values and 72% of the subjects with normal BMI range were obese or over weight based on BFM values. [14,15]

Myerset al[17]reported that sedentary lifestyle and body fat mass were positively co related and Yokota et al[18] in their study on predictive models of conversion to prediabetes identified that increased body fat mass and physically inactive lifestyle were positive predictors. The present study showed that 83% of the prediabetics were in the obese or over weight category.

Although the specificity in the present study was lower, the sensitivity was high. Grimesetal[19] in the study on the use of screening tests stated that a trade-off between sensitivity and specificity needs to be done based on the condition that is being screened and the cost of diagnostic test. If the increase in false positives only leads to the patient getting an advice on lifestyle correction as in this case, is not going to add to anxiety or burden of health care.

Nakasone et al[20] and Armato et al[21] in their studies demonstrated that successful treatment for prediabetes to STOP (Acronym) Diabetes could be easily achieved with weight loss with correction in nutrition and adding physical activity to existing lifestyle.

Vanderwood et al[22] in their study on non-invasive screening for prediabetes using anthropometric measurements found that BMI has sensitivity of about 68% and low specificity and this study agrees with the same. Dillon et al[23] in their study on non-invasive breath test for screening for prediabetes reported that using an infrared breath test analyzer can detect excretion of glucose derived breath CO_2 in individuals with prediabetes or early stage diabetes. However, the body fat assessment tool is more cost effective and can be easily used by optometrists and primary care health personnel to screen for prediabetes.

Conclusion

Screening for prediabetes in ophthalmic outpatient areas could be repeated with a larger sample to substantiate the opportunity to screen for prediabetes.

Disclosure: The author reports no conflicts of interest in this work.

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Functional Outcome of Hemiarthroplasty in Femoral Neck Fracture After Two Years of Surgery

Priti Ranjan Sinha

Assistant Professor, Department of Orthopaedics, Saraswathi Institute of Medical Sciences, Hapur

Abstract

Introduction: Fractures of the neck of the femur have always presented great challenges to orthopaedic surgeons and remain in many ways today the unsolved fractures as far as treatment and results are concerned.

Method: To evaluate the functional results at two years or more of Hemiarthroplasty of Hip done at Tata Main Hospital, Jamshedpur between January 2000–Dec 2000. To evaluate the variables which affect the final functional outcome.

Results: In this study of functional outcome of hemiarthroplasty 2 years after surgery, total no. of cases done during year 2000 (Jan 2000–Dec 2000) was 57(n). Out of these 57 cases 19 (33.33%) were male and 38 (66.66%) female. Females had double the no. of hemiarthroplasties than males. The mean age at operation was 67.03 years.

Conclusions: The functional outcomes may be improved further by a multidisciplinary approach to care, provided by team of health care personnel working closely together, may be an effective way to improve the short and long term outcomes.

Keywords: *Fractures; hemiarthroplasty; intracapsular.*

Introduction

Fractures of the neck of the femur have always presented great challenges to orthopaedic surgeons and remain in many ways today the unsolved fractures as far as treatment and results are concerned. With life expectancy increasing with each decade, our society is becoming more of a geriatric society. Primary prosthetic replacement is indicated in elderly patients (>70 years of age) with displaced intracapsular fracture neck of femur. In this age group preservation of femoral head is not important. With increasing age the arguments against hemiarthroplasty diminish since the life expectance of the patient becomes less than that of the arthroplasty and the functional demands on the hip are less[1]. Advantages of hemiarthroplasty are that, it allows immediate weight bearing, to return elderly patients to activity and avoid complications of recumbency and inactivity. Prosthetic replacement eliminates a vascular necrosis and nonunion as complications of femoral neck fracture. Prosthetic replacement of displaced neck factures reduces the incidence of re-operation as compared to internal fixation. The incidence of re-operation within 2 years range from 20% to 50% after internal fixation. The re-operation rate after hemiarthroplasty within the same interval was 6% to 18%.[2] Hemiarthroplasty constitutes an important modality of management in elderly patients. A significant number of elderly patients with displaced intracapsular fracture neck of femur undergo primary prosthetic replacement. To manage this great number of cases requires a considerable amount of finance and manpower. Also, a sizeable number of patients are lost to follow up and we do not know there exact outcome. To optimize the costs involved and know the outcome, we designed a study to know the functional outcome of hemiarthroplasties after two completed years. There

Corresponding Author:
Dr. Priti Ranjan Sinha
Asisstant Professor, Department of Orthopaedics,
Saraswathi Institute of Medical Sciences
e-mail: doc110@rediffmail.com
Mobile No.: 9717282175

different types of arthroplasty are available, namely a hemiarthroplasty (unipolar or bipolar) or a total hip replacement arthroplasty. The arthroplasty may be fixed with cement or may be friction fit type.

The unipolar arthroplasty, prosthesis designed by Moore and Thompson is commonly used. Austin Moore in 1940 developed a hemiarthroplasty.[3] He later perfected a hemi replacement endoprosthesis made of vitallium which incorporated the proper neck-shaft angle and had fenestrations in the them which made it a "self- locking prosthesis". He also developed a specific posterior approach which after repeated modifications come to be known as the "The Southern Approach".[4]

Material and Method

It is a retrospective study of prospectively collected date done in Tata Main Hospital, Jamshedpur, done during one year period from July 2002- July 2003. All the patients who sustained a femoral neck fracture and underwent primary prosthetic replacement in the year 2000 were taken for study. There were no exclusion criteria. The whole process was based on very accurate, computerized maintenance of records in our Hospital. The process of study started with my scanning of records through M.O.T. registers. I searched for all hemiarthroplasties done in year 2000. I noted down all the relevant details. Then with the help of data entry operators in the computer section of our Hospital, I took out the location of the patient at the time of admission. As this is an Industrial Hospital and a referral Hospital, most of the patients are from within the vicinity of this Hospital.In the next stage, I took out the case sheet of all my patients and obtained the relevant information from it.

In the final stage, I went to each patients residence and did a door to door survey. Many of my patients addresses were changed, but with the help of neighbours, I was guided to the correct place. I was able to collect information about more than 90% of my patients with this procedure.

Basic information for those included in the study was obtained from the patients themselves or from close relations where the patient was not able to give correct information. Total number of cases of hemiarthroplasties done in 1 year period [01-01-2000---31-12-2000] was 57 (n=57).

Result

In this study of functional outcome of hemiarthroplasty 2 years after surgery, total no. of cases done during year 2000 (Jan 2000 – Dec 2000) was 57(n). Out of these 57 cases 19 (33.33%) were male and 38 (66.66%) female. Females had double the no. of hemiarthroplasties than males.

The mean age at operation was 67.03 years. Mean age for females at operation was 65.5 years. Mean age for males at operation was 70.1 years. The no. of survivors after 2 years was 43(75.6%). 14(24.40%) patients had expired. Of the expired; 9(64%) were females and 5(36%) were males. Of all expired males, maximum mortality (40%) was in the age range of 70–80 years and in females it was 60-70 years (44.44%). 3 males (60%) and 2 females (22.22%) expired in the time interval 0-3 months post- surgery. Total mortality at 3 month was 8.77%.2 males (40%) and 4 females (44.44%) expired in the time interval 3-6 months post-surgery. Total mortality at 6 months was 19.39% .In the time interval 6-9 months there were no mortality in either male or female group .In the time interval 9-12 months 2 females (22.22%) expired. Total mortality at 12 months was 22.81%.In the interval 12-15 months, 15-18 months, 18-21 months there were no mortality in either male or female group. 1 female (11.11%) expired in the time interval 21-24 months post surgery. Thus total mortality at 24 months was 24.40% . The mean hospital stay was 24.57 days. Maximum no of patients had a hospital stay in range of 20-30 days 26 (45.6%). Highest and lowest duration of hospital stay was 61 and 7 days, respectively. The no of patients having pre-existing medical condition was 46 (80.7%). The various medical conditions were Anaemia (Hb<10 gm%) 25, COPD 5, CVA 6, Cardiac Arrhythmias 2, Diabetes Mellitus 7, Hypertension 22, Hemi paresis 5, Infective Endocarditis 1, Myocardial Infarction 1, Pulmonary tuberculosis 1, Parkinsonism 2, Seizure disorder 1, Valvular heart disease 1. The no of patients who underwent revision surgery were 5 (9%). The no of patients who had dislocation were 5 (9%). Out of 5 dislocations, 4 were unipolar and 1 bipolar.4 dislocations (80%) were associated with posterior approach and 1 was associated with anterolateral approach. The no of patients having post-op complications were 5 (9%). The various post-op complication were superficial stitch abscess 2 (3.50%),wound dehiscence 1 (1.75%) and deep seated infection 1 (1.75%). The no of patients having other complication were 24 (42.10%). They

were pressure sore 15 (26.31%), urinary infection 8 (14.03%), bladder incontinence 1 (1.75%). The no of patients walking independently before fracture were 46 (80.70%), with walking stick 5 (8.71%) and non-ambulatory 6 (10.52%). The no of patients using walking Aids immediate post-operatively (3-6 months) were walker 16 (28.07%), crutches 27 (47.37%), non-ambulatory 14 (24.56%). The level of ambulation 2 years after surgery were independent walkers 21 (48.83%), with walking stick 20 (46.51%), crutches 1 (2.32%)and walker 1 (2.32%). Of the surviving patients after 2 years surgery 17 (39.53%) had Oxford Hip Score in the range of 12-24 (Good), 20 (46.51%), in the range 24-26 (fair), 6 (13.95%) more than 36(poor).

Discussion

A significant number of elderly patients undergo this surgery. It is a major surgery and a time-tested procedure for management of fracture neck of femur elderly patients. So, I undertook this study to know the variables which effect the final outcome of surgery, optimize the costs involved and to know, what can be done to better the final outcome. My study was a retrospective study. This study was possible because of very good computerized record keeping of our hospital. This is the biggest hospital in this area with a good trauma car. It caters to a large population in and around this town. It is an Industrial hospital and gives free treatment to their employee, and their family, a patient who is not in this company also gets treatment. Hedlund et al (1987) found a female to male predominance of 2:1 for patients >65 years of age for fractures of neck of femur. (32) Gullberg et al(1997) corroborated the same finding in their study. (33)In our study, 38 (66.66%) of cases were females and 19 (33.33%) cases were males. (2:1). Females had double the no of hemiarthroplasties than males. The mean age of operation was 67.03 years. Mean age for females was 65.5 years and mean age for males was 70.1 years at the time of operation. The mean age was less in our study as compared to studies of Western workers. Our mean age compared to a study done in Thailand by Nipatasaj et al (1995) where it was 68.4 years.(20) Thus, it indicates that in our set up patients have fracture neck femur at younger age compared to Western Countries. Marcus et al (1992) had found mortality at 3 months to be 7% and 24% at 24 months.(17) Jalovoora et al (1991) found mortality to be 12% at 3 months 19% at 12 months and 21% at 18 months.(16) Nather. A et al (1995) found in their studies the mortality rates at 3,6 and 12 months to be 6.4%,9.1% and 15%, respectively.(19)In our study, the no of survivors after 2 years was 43 (75.6%). The no of expired was 14 out of which 9 (64%) were females and 5 (36%) were males. Mortality at 3,6,12and 24 months were 8.77%,19.39%,22.81% and 24.40%.Richmond et al (2003) found that greatest mortality risk following hip fracture to be within 3 months of fracture with standardized mortality rates approaching that of control population by 2 years. Patients aged 65-84 had higher mortality risk when compared with patients aged >= 85. American society of Anaesthesiologists classification was predictive of increased mortality risk in younger patients, with these patients having triple the mortality risk when compared to the reference population at 2-year follow-up. The data demonstrate that hip fracture is not associated with significant excess mortality amongst patients older than age 85. Amongst younger patients, however, those with ASA classification of 3 or 4 have significant excess mortality following hip fracture that persists up to 2 years after injury.(34)

Conclusion

The functional outcomes may be improved further by a multidisciplinary approach to care, provided by team of health care personnel working closely together, may be an effective way to improve the short and long term outcomes. In managing such cases physicians must understand the nature of injury, the potential impact on the patients level of functioning, and the secondary impact on the patients family. The primary goal of management is to return the patient to his or her level of function before the fracture. For most patients, this goal is best achieved by operative management followed by early mobilization. Physicians must recognize the complex problems associated with fractures and develop treatments plans that address all the factors that may affect the outcome.

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Covid-19 and Low Platelet Count-A Relationship

Priyanka Dhingra

Post Graduate 3rd Year, Department of Pathology Saraswathi Institute of Medical Sciences Hapur (U.P.)

Abstract

Background: Easily accessible, inexpensive, and widely used laboratory tests that demonstrate the severity of COVID-19 are important. Therefore, in this study, we aimed to investigate the relationship between mortality in COVID-19 and platelet count, Mean Platelet Volume (MPV), and platelet distribution width.

Method: In total, 100 COVID-19 patients were included in this study. The patients were divided into two groups. Patients with room air oxygen saturation < 90% were considered as severe COVID-19, and patients with ≥90% were considered moderate COVID-19. Patient medical records and the electronic patient data monitoring system were examined retrospectively. Analyses were performed using the SPSS statistical software. A p-value <0.05 was considered significant.

Results: The patients' mean age was $64,32 \pm 16,07$ years. According to oxygen saturation, 38 patients had moderate and 62 had severe COVID-19. Our findings revealed that oxygen saturation at admission and the MPV difference between the first and third days of hospitalization were significant parameters in COVID-19 patients for predicting mortality. While mortality was 8.4 times higher in patients who had oxygen saturation under 90 % at hospital admission, 1 unit increase in MPV increased mortality 1.76 times.

Conclusion: In addition to the lung capacity of patients, the mean platelet volume may be used as an auxiliary test in predicting the mortality in COVID-19 patients.

Keywords: *Coronavirus Infections; Blood Platelets; Mean platelet volume; Mortality.*

Introduction

The World Health Organization (WHO)[1] declared a pandemic on March 11th, 2020, after the identification of > 118,000 novel 2019 coronavirus disease (COVID-19) cases in 114 countries. As of 7 May 2020, a total of 3,825,028 cases had been identified in 187 countries, and unfortunately, 267,996 patients had died[2].

The clinical spectrum of COVID-19 appears to be wide, encompassing asymptomatic infection, mild upper respiratory tract illness, severe viral pneumonia with respiratory failure, and even death. In particular, older age, d-dimer levels greater than 1 μg/mL, higher

Corresponding Author:
Dr. Priyanka Dhingra
Post Graduate 3rd Year, Department of Pathology,
Saraswathi Institute of Medical Sciences, Hapur (U.P.)
e-mail: priyanka.dhingra07@gmail.com
Mobile: 8130803392

SOFA score on admission, and co morbidities such as cardiovascular disease, diabetes, chronic respiratory disease, and oncological diseases were associated with worse prognosis and in-hospital death[3, 4]. Treatment strategies including drugs, vaccines, or targeted therapy approaches have been limited until now[5]. Easily accessible, inexpensive, and widely used laboratory tests that show the severity of COVID-19 are important. Mean platelet volume (MPV) and platelet distribution width (PDW) are widely and routinely used in clinical practice worldwide. Higher MPV and increased PDW have been found in sepsis, and PDW was found to be a poor prognostic factor in severe sepsis[6]. However, the role of these parameters in COVID-19 has not been investigated. In this study, we aimed to investigate the relationship between mortality in COVID-19 and platelet count, MPV, and PDW.

Materials and Method

Study Setting: This is a retrospective cohort study that was conducted between April 01, 2020, and April

15, 2020, in a tertiary training and research hospital. The hospital where the study was conducted was designated as the coronavirus pandemic hospital in the province by the Ministry of Health. The hospital has a total of 400 patient beds, 85 of which are intensive-care beds. Patient medical records and the electronic patient data monitoring system were examined retrospectively.

Study Group: Patients diagnosed with COVID-19 were included. Complete blood count, C-reactive protein (CRP), and biochemistry tests are routinely performed on patients who attend the emergency department with complaints compatible with COVID-19 such as cough, fever, and shortness of breath. Also, Lung Computed Tomography (CT) is performed on patients who have shortness of breath, after their examination by the responsible doctor. At the same time, oro-nasopharyngeal swab (ONS) samples are taken from the patients for molecular analysis to reach a definitive diagnosis. Patients with advanced bilateral pneumonia, and/or tachypnea (respiratory rate > 26/minute), and/or arterial oxygen saturation < 90% in room air are followed up in the intensive-care unit, while patients with moderate clinical symptoms are followed up in the hospital wards. A second swab sample was taken from hospitalized patients with a negative first sample. When one of the two samples taken was positive, the patient was diagnosed with COVID-19, and if both were negative, COVID-19 was excluded.

Study Design: The patients were divided into two groups according to the lowest oxygen saturation during their first two days after hospital admission. Patients with oxygen saturation < 90% in room air were considered severe COVID-19, and patients with ≥90% were considered moderate COVID-19. Complete blood count and CRP values were obtained from patients on the day of hospital admission and on the third day of hospital follow-up. Patients who were discharged within 28 days after diagnosis of COVID-19 and who continued to undergo follow-up in the hospital on the 28th day of patient monitoring were accepted as survivors. Patients who died within the 28 days of patient monitoring were recorded as non-survivors. Thrombocytopenia was defined as grade 1: absolute platelet count (APC) 150,000 – 100,000/mm^3; grade 2: 99,000 – 50,000/mm^3; grade 3: < 49,000/mm^3. Lymphopenia was defined as grade 1: absolute lymphocytes count (ALC) 1500- 1000/ul; grade 2: ALC 999–750/ul; grade 3: ALC < 750/ul.

Results

In total, 100 COVID-19 patients were included in this study. The study population consisted of 44 females and 66 males, and their mean age was 64,32 ± 16,07 years. According to oxygen saturation, 38 patients had moderate and 62 had severe COVID-19. Since nine of the patients were discharged ≤ 3 days, they did not have a third-day analysis. Thrombocytopenia was observed in (25.1 %) patients on the hospital admission day and in (24.1 %) patients on the third follow-up day. On admission day, 20 patients had grade 1, 4 patients had grade 2, and one patient had grade 3 APC. On the third follow-up day, 19 patients had grade 1, 3 patients had grade 2, and 2 patients had grade 3 APC. On admission day, severe COVID-19 patients had significantly higher white blood count (WBC), neutrophil, and CRP values than moderate COVID-19 patients (p < 0.05). On the third follow-up day, WBC, neutrophil, platelet, MPV, and CMV values were significantly higher in severe patients than moderate COVID-19 patients (p < 0.05). On admission day, 29 patients had grade 1, 16 patients had grade 2, and 20 patients had grade 3 ALC. On the third follow-up day, 24, 20, and 26 patients had grade 1, 2, and 3 ALC, respectively. The mean lymphocyte value was lower in severe COVID-19 cases compared to moderate COVID-19 cases both on the day of hospital admission and on the third follow-up day (p < 0.05). The difference among WBC, neutrophil, platelet, and CRP between two days in severe and moderate COVID-19 patients was significant (p < 0.05).

Among the 100 COVID-19 patients, (26.04 %) of them died within the 28-day follow-up. The age of the deceased patients was greater that of the survivors. Thrombocytopenia was observed in (39.3 %) of the non-survivors and in (19.5 %) of the survivors (p=0.003). WBC, neutrophil, CRP, and PDW in non-survivors were significantly higher than in survivors in both admission day and the third day of follow-up (p=0.001). On the other hand, MPV in non-survivors was significantly lower than in survivors only in the third follow-up day (P < 0.005).

According to the multiple logistic regression model for mortality, in case of an increase of 1 unit MPV difference (MPV differences between 1st and 3rd day), the probability of death increases 1.762 times. In addition, the probability of death of patients with oxygen saturation < 90 % is 8.405 times higher than that of patients with oxygen saturation ≥ 90 %.

Discussion

Our findings revealed that oxygen saturation at admission and MPV difference between the first and third days of hospitalization were significant parameters in COVID-19 patients for predicting mortality. While, mortality was 8.4 times higher in patients who had oxygen saturation under 90 % at hospital admission, 1 unit increase in MPV between the first and third days of hospitalization increases mortality 1.76 times. In addition to the lung capacity of the patient, MPV may be used as an auxiliary test in predicting the mortality in COVID-19 patients.

Primary inflammation triggered by rapid viral replication and release of potent proinflammatory cytokines occurs in the early stages of COVID-19 infection[7]. In addition to pulmonary infiltrate and diffuse alveolar damage, widespread endothelial inflammation due to viral infection of the endothelial cell can strengthen the further secretion of various inflammatory cytokines[8]. Neutrophils and leukocytes might reinforce the cytokine storm other than lymphocytes in COVID-19 because prominent lymphopenia has been developed in most COVID-19 patients, especially in severe ones[9]. In a meta-analysis, researchers found that severe illness was associated with lower lymphocyte and higher leukocyte counts[10]. In our study, while the leukocyte and neutrophil values of severe cases on the day of admission to hospital were higher than in mild cases, the lymphocyte values were low, too ($p < 0.05$). Moreover, on the third day of hospitalization, leukocyte and neutrophil levels were increased even more in severe cases and decreased in mild cases ($p < 0.05$). However, on the third day, although the lymphocyte values in severe cases decreased much more than in mild cases, the difference was not significant.

Zhao et al.[11] reported that a lymphocyte count of less than 1.5×10^9/L may be useful in predicting the severity of clinical outcomes. They found that there was a three-fold increased risk of severe COVID-19 with the presence of lymphopenia. Our study revealed that leukocyte and neutrophil values in non-surviving patients were higher than in survivors both on the day of admission and on the third day of the follow-up, but the difference in the increase between the first and third days was not significant. On the other hand, the decrease in lymphocyte values of the patients who died was significant. Therefore, the power of the decrease in lymphocyte value in showing mortality was higher than that of the elevation in leukocyte and neutrophils. So, clinicians should closely monitor patients with lymphopenia.

Some studies have found a relationship between thrombocytopenia and the severity of the COVID-19 and related mortality. It has been reported that mortality increases as platelet count decreases[12, 13]. Interestingly in our study, although thrombocytopenia was more likely to occur in non-survivors than in survivors, we did not find any correlation between platelet level and disease severity or mortality. Non-survivors had lower platelet counts than survivors on both admission day and third follow-up day, but this difference was not statistically significant. Similar to our study, other studies reported that platelet values were found to be normal in many patients at the time of hospital admission[14]. These differences between studies may be related to the time of the tests. Also, hydroxychloroquine, azithromycin, and enoxaparin treatment have been started in most countries when COVID-19 is suspected. These drugs can cause thrombocytopenia[15,16]. Another reason for the difference between studies may be that thrombocytopenia caused by drugs and thrombocytopenia caused by the disease present an intricate structure.

On the other hand, platelet indices, MPV, and PDW, were found to be higher in non-survivors on both admission day and third follow-up days. To our knowledge, this study is the first one specialized in the association between platelet indices and in-hospital mortality in patients with COVID-19. According to our results, every 1 unit increase in MPV increased mortality by 1.76 times. The mechanism of change in platelet indices in COVID-19 patients is probably multifactorial.

Conclusion

Three hypotheses related to platelet count and structure are proposed in COVID-19. Firstly, as with other coronavıruses, thrombocytopenia is possibly due to infection of the bone marrow. Secondly, platelet destruction by the immune system. Thirdly, platelet consumption due to aggregation in the lungs[17]. Generally, platelet production increases as platelet count decreases. An increased number of young platelets is also functionally more active than older platelets. These changes may explain the increase in platelet indices, MPV, and PDW.

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Prevalence of Diabetes Mellitus and its Risk Factors in Urban Field Practice Area of Chitradurga

Ramya V.[1], Pavithra R.[2], Nagendra Gowda M.R.[3]

[1]Associate Professor, [2]Assistant Professor, [3]Professor, Dept. of Community Medicine, Basaveshwara Medical College & Hosp., Chitradurga, Karnataka

Abstract

Introduction: Diabetes mellitus is one of the non-communicable disease which has become a major global health problem. A study done by the Indian Council of Medical research (ICMR) in 1970s reported a prevalence of 2.3% in urban areas[1,2] which has risen to 12-19% in 2000s. Although improving control of diabetes in India is important, the associated risks of tight control in high risk groups should also be kept in mind.

Objectives: To study the prevalence of diabetes in urban population and to estimate the usefulness of the Indian diabetes risk score for detecting undiagnosed diabetes.

Materials and Method: This is a community-based cross-sectional (descriptive) study carried out in the urban field practice area of Basaveswara Medical College and hospital which covers a population of 31186 from July to October 2019. Data was collected by using a validated questionnaire by house to house visit to find out the prevalence and the risk of diabetes mellitus in general population by using Indian diabetes risk score.

Results: A total of 624 respondents were interviewed. Among them 298(24.35%) females and 326(26.63%) were males. Most 422(34.48%) had no family history of diabetes mellitus and 338 (27.61%) individuals were in the overweight category. Out of these overweight persons, 36.6% had high diabetic risk score.

Keywords: *IDRS; Risk for diabetes; Socio-demographic factors.*

Introduction

Diabetes Mellitus is an" iceberg" disease. It is one of the noncommunicable disease which has become a major global health problem. There is increase in both prevalence and incidence of diabetes globally. The global diabetes prevalence in 2019 is estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045. The prevalence is higher in urban (10.8%) than rural (7.2%) areas, and in high-income (10.4%) than low-income countries (4.0%).[1] The Indian Council of Medical Research (ICMR) study done in the 2017s reported a prevalence of 7.3% in 17 states of India.[2] Thus, the prevalence rates of diabetes are increasing rapidly.

Because of the increasing burden of the disease, its iceberg nature, its complications and the potential to prevent these complications with effective diagnosis and treatment, active efforts are required for the early diagnosis of diabetes. The risk factors like age, gender, family history are non-modifiable while others like smoking, diet, physical activity, hypertension, diabetes etc. are modifiable. Thus for noncommunicable diseases a typical screening or preventive strategy may not work and principles of primordial prevention have to be applied effectively. Early identification of at-risk

Corresponding Author:
Dr. Pavithra R.
Assistant Professor, Dept. of Community Medicine,
Basaveshwara Medical College & Hosp., Chitradurga,
Karnataka
e mail: pavithra.ramanna@gmail.com

individuals and appropriate lifestyle intervention would help in preventing or postponing the onset of diabetes mellitus. This highlights the need for simple, low cost tools to aid early screening of diabetes.[3]

A novel approach utilising simple non-invasive scores can offer a potential for mass screening programmes. The Indian Diabetes Risk Score (IDRS) was developed by V Mohan and his colleagues in Madras Diabetes Research Foundation (MDRF), Chennai and is considered to be one of the strongest predictor of incident diabetes in India.[4] It is for identifying undiagnosed diabetic subjects using four simple parameters like age, waist circumference, family history of diabetes and physical activity. It is an efficient tool to categorize the risk of diabetes mellitus in community. It also helps in detecting undiagnosed type 2 diabetes. The present study aims at assessing the risk for type 2 diabetes mellitus among adults in urban area of Chitradurga.

The aim of this study is to assess the risk of diabetes mellitus in adults above 20 years, using the Indian diabetes risk score (IDRS) developed by Mohan *et al*.[4] The specific objectives are to study the prevalence of diabetes in urban population and to estimate the usefulness of the Indian diabetes risk score (IDRS) for detecting undiagnosed diabetes.

Materials and Method

A cross-sectional (descriptive) study carried out in the urban field practice area of department of Community Medicine, Basaveswara Medical College, Chitradurga, covering the total population of 31186. From the center, four wards were selected by purposive sampling, and all population above the age of 20 years, presented on the day of survey and willing to participate were taken as a sample population for the study. The total number of selected subjects were 700 (13%- non - responder) and surveyed sample from all four wards was 624. The duration of survey was from July to Oct 2019.

In all subjects, family history of Diabetes was obtained and details on physical activities and other parameters were assessed using a validated questionnaire.[5] Waist measurements were obtained using standardised technique. Physical activity assessed by asking the following question (A) How physical demanding is your work (occupation)? (B) Do you exercise regularly in your leisure time? (C) How would you grade your physical activity at home? Than combined score of A+B+C = >3 vigorous/strenuous, 2 moderate, 1 mild, 0 sedentary was calculated. Analysis for high risk was done as per Indian Diabetes Risk Score (IDRS) developed by Mohan *et al,*[4] and parameters comprising two modifiable (waist circumference, physical activity) and two non-modifiable risk factors (age, family history) for diabetes.

IDRS analysis was done using all the four parameters: If age <35 years score = 0; if 35-49 years score = 20; if>50 years; score = 30; waist circumference < 80 cm for female and <90 cm for male then score = 0; >80-89 cm for history = 0, family history present either parent = 10, both parents =20. After adding all four parameters high risk score (>60 very high risk, 30-50 moderate risk, <30 low risk) was helpful to identify subjects at high risk for diabetes and also raised awareness about diabetes and its risk factors. activities vigorous exercise or strenuous work score= 0; moderate exercise work/home = 10; mild exercise work/home = 20; no exercise and sedentary work/home= 30; family history of diabetes, no family history = 0, family history present either parent = 10, both parents =20. After adding all four parameters high risk score (>60 very high risk, 30-50 moderate risk, <30 low risk) was helpful to identify subjects at high risk for diabetes and also raised awareness about diabetes and its risk factors. No ethical issues were involved as no intervention was carried out; however, verbal consent was obtained to proceed with the survey.

Data were entered into Microsoft excel sheet and analyzed using SPSS 17.0 software. Frequency and percentages (descriptive statistics) were calculated. Pearson's Chi-square was used as a test of significance. P-value < 0.05 was considered statistically significant.

Results

A total of 624 respondents were interviewed of these, 272(43.59) were in 20-30 years' age group, 326(52.2%) were females. Majority 380(60%) were Hindus. A total of 304(48.72%) subjects were at moderate risk (IDRS 30-50) for diabetes and 232(37.18%) had high risk for diabetes (IDRS>60) [Table 1].

Table 1: Distribution of respondents according to socio demographic Profile.

Category		Number	Percentage %
Age Group	20- 35 years	272	43.59
	36-49 years	156	25.00
	> 50 years	196	31.41
Sex	Male	298	24.35
	Female	326	26.63
Religion	Hindu	380	60.90
	Muslim	244	39.10
IDRS Score category	>60 (Very high)	232	37.18
	30-50 (Moderate risk)	304	48.72
	<30 (low Risk)	88	14.10

Table 2: Distribution of respondent according to their body mass index (BMI) status and diabetes risk as per Indian diabetes risk score (IDRS)

Body Mass Index	Indian Diabetes Risk Score			
	Low	Moderate	Very High	Total
<18.5 (Underweight)	16 (47.1)	2 (5.9)	16 (47.1)	17 (100)
18.5-24.99 (Normal range)	76 (30.2)	84 (33.3)	92(36.5)	126 (100)
25-29.99 (Pre obese)	56 (20.3)	120 (43.5)	100(36.2)	138 (100)
30 and above (Obese)	12 (19.4)	26(41.9)	24(38.7)	31(100)
Total	**160 (25.6)**	**232(37.2)**	**232(37.2)**	**624(100.0)**

P Value – 0.04

There was a statistically significant association between body mass index and Indian Diabetes Risk Score.

Table 3: Distribution of respondents according to their known status of diabetes and IDRS.

Total subjects studied (N= 624)		High IDRS in known diabetic (N= 104)	
Known cases of diabetes	Percentage	Number	Percentage
104	16.7	74	71.15

Prevalence of diabetes in studied population was 16.7 %. Out of these, 71.15% of known cases of diabetes mellitus had high (>60) IDRS. Co-relation between BMI and IDRS shows that, if BMI increases from less than 18.50 to more than 30, chances of high risk for developing diabetes mellitus also significantly increase.

Discussion

In the present study, the prevalence of people at high risk of diabetes was 37.18%.A study conducted by Reshma S Patil *et al.*[6] in 2011–12 in an urban slum of Pune, Maharashtra reported the prevalence of high risk to be 37% which is similar to our study. Whereas a study conducted at urban Pondicherry by Sanjay Kumar Gupta[7] was 31.2% and in Rural TamilNadu[8] was 18.66%. A study conducted at Mysuru district the people at high risk of diabetes was 22%.[9]

There was a statistically significant association between body mass index and Indian Diabetes Risk Score. Similar results were observed by Sanjay Gupta at Rural area of Tamilnadu.[8]

According to the study conducted by Sanjay Kumar Gupta *et al*. in an urban area of Pondicherry [7] only 12% of the people who had diabetes had a positive family history and in our study 57.69% of the respondents gave

a positive family history. This difference may be due to different life-styles and socio-economic status of the respondents.

Prevalence of diabetes in studied population was 16.7%. Out of these, 71.15% of known cases of diabetes mellitus had high (>60) IDRS. Similar results were observed in a study conducted at urban Pondicherry. In their study 76.47 % of known cases of diabetes mellitus had high IDRS.

Conclusion

This study estimates the usefulness of simplified Indian diabetes risk score for identifying undiagnosed high risk diabetic subjects in India. Use of the IDRS can make mass screening for undiagnosed diabetes in India more cost effective.

Ethical Clearance: Taken from Institutional ethical committee of Basaveshwara Medical College and Hospital Chitradurga.

Source of Funding: Self

Conflict of Interest: There is no conflict of Interest

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Demographic Trends of Acute Poisoning in a Rural Teaching Hospital of Telangana

**Ranga Rao Beemathati[1] , Shyam Siddharth Rao Patharla[2],
Souri Reddy Pyreddy[1], Shilpa Narsimhulu Panthagani[3]**

[1]*Associate Professor, Deptt. of Hospital Administration,* [2]*Assistant Professor, Deptt. of Hospital Administration,*
[3]*Postgraduate, Deptt. of Hospital Administration, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda District, Telangana, India*

Abstract

Background: It is estimated that poisoning accounts for over 1 million morbidities worldwide annually. Poisoning is a significant problem in rural India. The objective of this study was to understandthe pattern and demographic profile of poisoning in a tertiary care teaching hospital.

Method: A retrospective cross-sectional record based study was carried out at Kamineni Institute of Medical Sciences, Nalgonda,Indiain the year 2019. Demographic details such as age, sex, type of poison consumed, route of exposure, factors affecting morbidity (need for ventilator support) and outcome of the patient were collected and documented in a structured format.

Results: A total of 255 acute poisoning cases were admitted during the year 2019. The ratio of males (56.47%) and females(43.53%) was nearly 1:1. Poisoning was seen highest in the age group of 14-30 years (36%) followed by the 31-50 years age group (23.92%). The most common route of exposure was by ingestion. Overall, the mortality rate was 11.76%. The common poisonous agents consumed were insecticides(26.66%) followed by pharmaceutical products(15.68%).

Conclusion: Insecticides were the most common agent for poisoning in our setting. It was found that the younger age group of 14-30 years is most vulnerable to acute poisoning and consequent mortality. Efforts should be made to create awareness and to educate the population regarding the importance of early admission and its effect on reduction in mortality. Poison-associated morbidity and mortality rates vary by region and may change over a certain period of time as new drugs and chemicals are introduced. Further studies to understand the reasons for coming into contact with poisons could possibly contribute to the prevention and early treatment of poisoning.

Keywords: *Acute poisoning, Insecticide poisoning, Poison-associated mortality.*

Introduction

It is estimated that poisoning accounts for over 1 million morbidities worldwide annually.[1]In someregions, fatality rates are estimated to be as high as 20% and the World Health Organization predicts that over 200,000 individuals lose their lives as a result of pesticide poisoning alone each year. The higher toxicity of available poisons in the developing countries and the shortage of medical services in these countries contribute to higher mortality rates due to poisoning (10%–20% in comparison with 0.5%–1% in developed countries).[2] Poisoning is the most common type of lethal self-harm in Asian countries in that it accounts for more than 60% of all deaths.[3] Poison-associated morbidity and mortality rates vary by region and may change over a certain period of time as new drugs and chemicals are

Corresponding Author:
Souri Reddy Pyreddy M.D.
Associate Professor, Deptt. of Hospital Administration, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda District, Telangana, India
e-mail: hosp.admin@kimsmedicalcollege.org

introduced. Understanding the pattern of intoxication in a certain region would possibly contribute to the early diagnosis and treatment of poisoning.[4,5]

The incidence of poisoning cases is increasing due to changes in the lifestyle and social behaviour of humans.[6] In developing countries, the mortality related to acute poisoning is very high. This high mortality is a reflection of the wide availability of highly toxic compounds such as pesticides and limited resources to treat poisoned patients. In developing countries with insufficient drug and chemical regulations, lack of surveillance systems and easy access to more toxic drugs or chemicals have been blamed for higher poisoning rates.[7] The prevalence and types of poisoning vary considerably across the world and depend on socioeconomic status and cultural practices as well as on local industrial and agricultural activities. Household chemical agents and prescribed drugs are the most common poisoning agents in the developed world, but agrochemicals are the most common poisoning agents in developing countries.[8,9]

Acute poisoning is a frequent reason for emergency admission. It has been reported that acute poisoning approximately constitutes 10% of admission in medical emergency departments in India.[10] It is estimated that up to half a million population worldwide die every year as a result of poisoning, particularly due to pesticide poisoning.[11] Poisoning is the fourth common cause of mortality in India.[12]

The pattern of poisoning in our country differs from that in the Western countries. In India, organophosphorous insecticides are the leading poisons. In contrast, in the western countries, the most frequently used agents for self-poisoning include tranquilizers, hypnotics and sedatives.[13] Easy availability of a variety of poisonous substances due to rapid development in science and technology combined with increased demand from industry and agriculture has tremendously increased the incidence of poisoning cases. A number of chemical substances, which were developed to save the agricultural products from rodents and pests so as to protect the humans from starvation are in fact themselves becoming maneaters.[14] Reducing deaths due to poisoning requires effective medical management of acute poisoning. Knowledge about pattern of poisoning cases in a region is important for early diagnosis and prompt treatment. This is essential for introducing the new and evaluating the old preventive measures at regular intervals.[15] Poisons are of such diverse natures that they are classified by origin, physical form, chemical nature, chemical activity, target site or use.[16]

Based on origin: Poisons are of microbial, plant, animal or synthetic origin. An example of a plant toxin is the belladonna alkaloid hyoscyamine, which is found in belladonna (*Atropa belladonna*) and jimsonweed (*Datura stramonium*). Animal poisons are usually transferred through the bites and stings of venomous terrestrial or marine animals, the former group including poisonous snakes, scorpions, spiders, and ants, and the latter group including sea snakes, stingrays, and jellyfish. Synthetic toxins are responsible for most poisonings. "Synthetic" refers to chemicals manufactured by chemists such as drugs and pesticides as well as chemicals purified from natural sources such as metals from ores and solvents from petroleum. Synthetic toxins include pesticides, household cleaners, cosmetics, pharmaceuticals, and hydrocarbons. *b) Based on physical form:* The physical form of a chemical—solid, liquid, gas, vapour or aerosol—influences the exposure and absorbability. Because solids are generally not well absorbed into the blood, they must be dissolved in the aqueous liquid lining the intestinal tract if ingested or the respiratory tract if inhaled. Solids dissolve at different rates in fluids, however. For example, compared with lead sulphate granules, granules of lead are practically nontoxic when ingested, because elemental lead is essentially insoluble in water, while lead sulphate is slightly soluble and absorbable. Even different-sized granules of the same chemical can vary in their relative toxicities because of the differences in dissolution rates. For example, arsenic trioxide is more toxic in the form of smaller granules than is the same mass of larger granules because the smaller granules dissolve faster. A poison in a liquid form can be absorbed by ingestion or by inhalation or through the skin. Poisons that are gases at room temperature (e.g., carbon monoxide) are absorbed mainly by inhalation, as are vapours, which are the gas phase of substances that are liquids at room temperature and atmospheric pressure (e.g. benzene). Because organic liquids are more volatile than inorganic liquids, inhalation of organic vapours is more common. Although vapours are generally absorbed in the lungs, some vapours that are highly soluble in lipids (e.g. furfural) are also absorbed through the skin. Aerosols are solid or liquid particles small enough to remain suspended in air for a few minutes. Fibres and dust are solid aerosols. Aerosol exposures occur when aerosols are deposited on the skin or inhaled. Aerosol toxicity is

usually higher in the lungs than on the skin. An example of a toxic fibre is asbestos, which can cause a rare form of lung cancer (mesothelioma).Many liquid poisons can exist as liquid aerosols, although highly volatile liquids, such as benzene seldom exist as aerosols. A moderately volatile liquid poison can exist as both an aerosol and as a vapour. Airborne liquid chemicals of low volatility exist only as aerosols.

Based on chemical nature: Poisons can be classified according to whether the chemical is metallic versus non-metallic, organic versus inorganic or acidic versus alkaline. Metallic poisons are often eliminated from the body slowly and accumulate to a greater extent than non-metallic poisons and thus are more likely to cause toxicity during chronic exposure. Classification based on acidity is useful because, while both acids and alkalis are corrosive to the eyes, skin, and intestinal tract, alkalis generally penetrate the tissue more deeply than acids and tend to cause more severe tissue damage.

Routes of Exposure a. Injection: Although not a common route of exposure for poisons, injection is the only route in which the entire amount exposed is absorbed regardless of the chemical. b. *Ingestion:* Ingestion is the most common route of exposure to toxic chemicals. Most chemicals diffuse across the cell membrane.c. *Inhalation:* The absorption of inhaled gases and vapours differs from that of aerosols and thus will be discussed separately. (Figure 1)[17]

The objective of this study was to understand the pattern of mortality from acute poisoning in a tertiary care teaching hospital.

Material and Method

Study Design: A retrospective cross sectional record based study.

Sample Size: A total of 255 patients were admitted in EMD in 1 year.

Study Setting: Kamineni Institute of Medical Sciences, Nalgonda, India.

Study Period: January 2019 to December 2019(one year).

Data Source: Relevant medical records were obtained from the Medical Records Department.

Exclusion Criteria: The circumstances of poisoning and chronic poisonings were excluded from the study.

Data Collection: Data includes demographic details such as age and sex, the type of poisoning consumed, the route of exposure, factors effecting morbidity like need of ventilator support and outcome of the patient were collected and documented on a structured form.

Statistical Tool: Data was entered into Microsoft Excel spread sheet. Tabulated chi-square test was used to know the significance.

Results

255 cases with diagnosis of poisoning were admitted to the emergency medicine department during the study period. The number of males exposed was higher 144(56.47%) than females 111(43.53%). In 68(26.66%) cases the poison was identified as being an organophosphorous agent. 78(30.60%) patients required to be put on ventilator support and the remaining (69.40%) were not on ventilator support. Mortality was observed among 30 cases (11.76%). Highest number of cases were seen in the age group of 14-30 years i.e. 153 out of 255 cases (60%)with a chi-square value of 96.08 and p value of 0 indicating that it is highly significant. 196 cases were reported due to ingestion of poison, while 14 were due to inhalation of poison. The remaining 45 cases of poisoning were due to snake bite and scorpion sting.

Table 1: Age Wise Distribution

Age	n (N=255)	Percentage (%)
1-13	15	5.88%
14-30	153	60%
31-50	61	23.92%
51-70	24	9.41%
>70	2	0.78%

Table 2: Route of Poisoning

Route of poisoning	n (N=255)	Percentage (%)
Ingestion	196	76.86%
Inhalation	14	5.50%
Others	45	17.64%

Table 3: Type of Poisoning

Type of poisoning	n (N=255)	Percentage (%)
Herbicide	30	11.76%
Insecticide	68	26.66%
Tablet overdosing	57	22.35%
Unknown poisoning	40	15.68%
Others(bite & stings)	60	23.55%

Table 4: Outcome

Outcome	n (N=255)	Percentage (%)
Discharge	194	76.07%
LAMA	16	6.27%
Referred	15	5.90%
Death	30	11.76%

Table 5: CHI Square For Age and Type of Poisoning :

Age	Frequency	Type of poisoning	Frequency
1-13	15	Herbicide	30
14-30	153	Insecticide	68
31-50	61	Tablet overdosing	57
51-70	24	Unknown poisoning	40
>70	2	Others(bite & stings)	60
Chi-square value: 96.0			
P-value: 0			
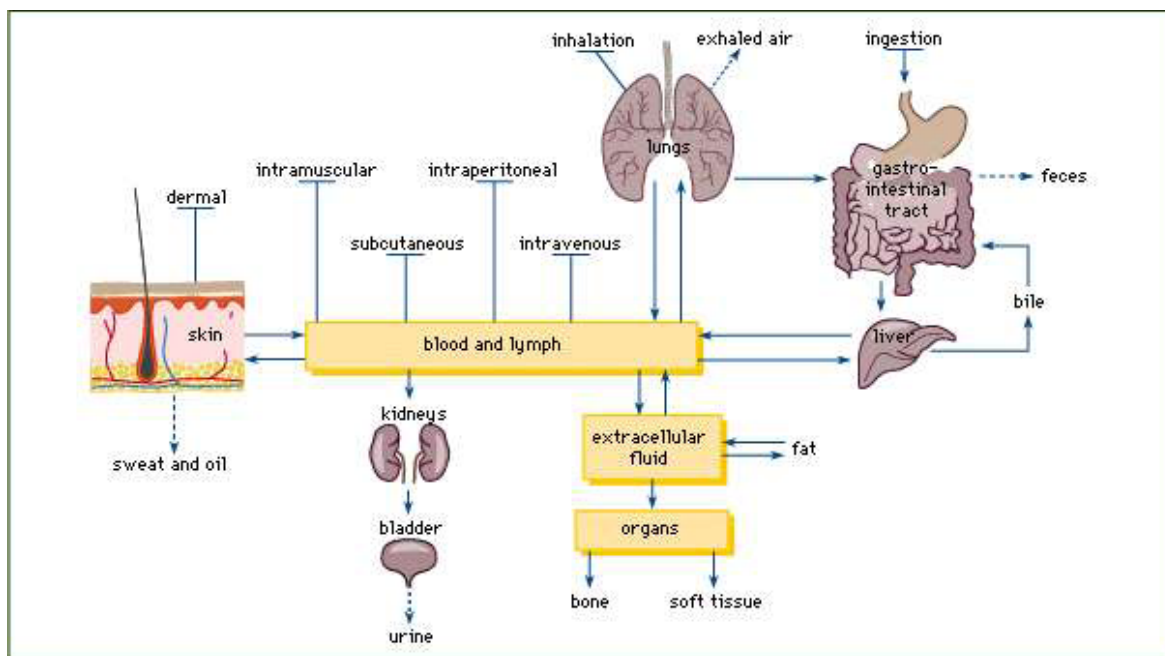
Figure 1: Routes of exposure to poisons.

Discussion

Our study showed that the maximum number of poisoning cases were reported due to insecticide consumption (26.66%) which is expected in an agrarian setting. It correlates with other studies Gupta P et al showing 57.2% of poisonings to be because of organophosphorous compounds.[15] Mukul Joshi et al showed 25.8%, which was the leading cause of poisoning in their study. This is in contrast to Patel M et al, in which consumption of household products (44.6%)was the leading cause followed by pesticides(14.9%).[18,19]

Acute poisoning was most commonly seen in males (58.44%) which is similar to studies like Gupta P et al (57.58%) and Somasundaram KV et al (64.7%).[15,20] However in a study done by Jamil H[13] there was a greater percentage of females, 52.8%(1003 cases out of 1900).

Poisoning was common among the age group 14-30 years (60%) which is the productive age group. In the study done by Jamil H, 77% of their patients fell under the age group of 11- 30 years which is consistent with our study.

Conclusion

Pesticides are the most common chemicals used to inflict self-harm in developing countries. This is because of the weak regulations and poor health-care services, the consequences of poisoning are much worse than in the developed world. The results of this study underscore the urgent call for additional regulatory controls on pesticides and pharmaceuticals which are the most common toxic agents. It can be concluded that children, whose circumstances of poisoning are mainly unintentional are at a high risk of poisoning. The study also revealed that poisoning was common in young adult males with consequent higher mortality. The findings of this study identify the need for health education in the general public on chemical safety, particularly with regard to pesticides and pharmaceuticals to prevent morbidity and mortality. In addition, information on the prevention of snake bites may be incorporated in public health messages, especially during the rainy season when most snake bites generally occur. It is equally important that health care providers are well educated regarding initial response to symptomatic children after poisoning, subsequent triage and supportive care for more efficient utilization of available limited resources. Complications, though rare are potentially preventable through community education and awareness on timely attention to seek medical care and avoidance of potentially harmful first aid practices. Further prospective studies are required to explore the pattern of poisoning for longer time periods. This may aid in creation of models for predicting poisoning in the different regions which may provide for effective diagnosis, management and prevention of poisoning.

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Ethical Clearance: Not needed.

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Traumatic Spinal Cord Injury, an Overview of Epidemiology and Management in Vindhya Region

Ranjeet Kumar Jha[1], Rachna Gupta[2]

[1]Assistant Professor, Department of Neurosurgery, Shyam Shah Medical College, Rewa,
[2]Professor, Department of Surgery, Shyam Shah Medical College, Rewa

Abstract

Background: Traumatic spinal cord injury (SCI) is a life changing neurological condition with substantial socioeconomic implications for patients and their care-givers. Recent advances in medical management of SCI has significantly improved diagnosis, stabilization, survival rate and well-being of SCI patients.

Objectives: The objectives of this study were (1) to determine the characteristics of patients sustaining spinal trauma in India and (2) to explore the association between patient or injury characteristics and outcomes after spinal trauma.

Method: The study includes patients admitted with TSCI admitted at the Central shyam shah memorial medical college and associated government medical college, from March 2019 to March 2020. Patient enrolled for the study were admitted directly or after being referred from peripheral health centers. Both conservatively managed and operated patients were taken into account

Results: Most patients were middle-aged (mean age = 51.0 years; median age = 55.5 years; range = 18.0 to 72.0 years), male (60.4%), injured from falls (72.4%), and treated in a private setting (59.9%). Fractures in the lumbar region (51.0%) were most common, followed by thoracic (30.7%) and cervical (18.2%). More than 1 in 5 (21.6%) patients experienced a treatment delay greater than 24 hours, and 36.5% arrived by ambulance. Thirty-day mortality and complication rates were 2.6% and 10.0%, respectively. Care in the public hospital system (odds ratio [OR] = 6.7, 95% CI = 1.1-41.6), chest injury (OR = 11.1, 95% CI = 1.8-66.9), and surgical intervention (OR = 4.8, 95% CI = 1.2-19.6) were independent predictors of major complications.

Conclusions: Treatment in the public health care system, increased severity of injury, and surgical intervention were associated with increased risk of major complications following spinal trauma. The need for a large-scale, prospective, multicenter study taking into account spinal stability and neurologic status is feasible and warranted.

Keywords: *Spinal trauma, spinal fracture, India, complications, reoperation, mortality, public versus private hospitals, spinal surgery.*

Introduction

Vindhya region comprises of four districts, Rewa, Satna, Sidhi, Shahdol. It is one of the major parts of

Corresponding Author:
Dr. Ranjeet Kumar Jha
Assistant Professor, Department of Neurosurgery,
Shyam Shah Medical College, REWA
e-mail: ranjeetjha20 @gmail.com
Mobile No.: 9005949482

Madhya Pradesh near its northern part, sharing its border with Uttar Pradesh. It is one of the largest rural areas of the country with agriculture being the main occupation. Medical facilities have been very limited with a single medical college in rewa, before the inauguration of Shahdol medical college. A new superspeciality hospital has been recently constructed in rewa with neurosurgery, cardiology and CTVS branches. Population in the region is 657750[1] the study was conducted in the department of neurosurgery at Shyam shah medical college, rewa

from march 2019 to march 2020. It includes all the cases of spinal trauma, admitted directly or after being referred from peripheral centres. A total of 198 cases were observed. Amongst them, 68 cases had thoracic injury. 86 patients had lumbar spine injury and 22 patients had cervical spine injury and rest 22 patients had spine injury at more than one segment. Thoracic and lumbar regions were affected more commonly. Age wise categorization showed that most common age group was 25 to 50 which consisted of 138 cases. Below 25 years, the number of cases was 41. Remaining 19 cases were from 50 plus age group. Most common mode of injury was road traffic accident. Fall from bike due to collision with other vehicles being the most common reason. Road traffic accidents (RTA) accounted for around 70% cases ie; 136 of total 198 cases. Fall from height was responsible for 52 cases. 8 cases came after assault. 2 cases came after trivial injury who were later found to have atlanto axial dislocation. Gender wise, malepercentage was high, accounting for atleast 80 % cases whereas female case percentage was only about 20%.

Materials and Method

Our study was a prospective, institute-based analysis of spine injury patients. The study includes patients admitted with TSCI admitted at the Central shyam shah memorial medical college and associated government medical college, from March 2019 to March 2020. Patient enrolled for the study were admitted directly or after being referred from peripheral health centers. Both conservatively managed and operated patients were taken into account. Permission of the Ethics Committee ofssmc, rewa was taken. The patients who expired before reaching the department were excluded from this study.

Results and Observation

In our study, the most common cause of spine injury was road traffic accident including hills, roof, trees, electricity pole, and stairs (70%) followed by fall from height, including trees, hills, stairs or roof of home (28%), which is comparable to other case series of India.[10] The most well-known influenced age bunch in this investigation was 20–39 years followed by 50–59 years. It tends to be seen that 56.14% (n = 32) patients go under the 20–39 years' age gathering, implying higher rate in youthful, dynamic, and beneficial populace of the general public. Injury in 50–59 years' age gathering (26.32%, n = 15) was generally because of fall. Like different investigations of India, male sex is more

inclined to SCI.[12-16] Higher occurrence in guys can be clarified by assessment of etiological components, with men being more presented to chance variables since they are more dynamic because of occupations. Moreover, this is presumably because of family unit remain of females. Cervical wounds were the most well-known spinal wounds with 52.63% (n = 30). No sacral wounds were found. Most regular wounds discovered were crack disengagements of C5–C6 level. There was no instance of SCIWORA in the examination. SCI was found in 91.22% (n = 52) of spinal injury patients. Based on American Spinal Injury Association (ASIA) : Comparison of method of injury in various arrangement Series Fall from tallness (%) RTA(%) Chacko et al. (India, 1986)[12] 55.2 12.8 Lan et al. (Taiwan, 1993)[13] 23.3 61.6 Shingu et al. (Japan, 1994)[14] 29.2 44.6 Karacan et al. (Turkey, 2000)[16] 36.5 48.8 Present examination 59.42 35.08 RTA – Road car crash: Comparison of sex proportion in various arrangement Series Year Male:female proportion Chacko et al. (India, 1986)[12] 1986 13.5:1 Lan et al. (Taiwan, 1993)[13] 1993 4:1 Shingu et al. (Japan, 1994)[14] 1994 4.3:1 Chen (India, 1999)[15] 1999 3.7:1 Karacan et al. (Turkey, 2000)[16] 2000 2.5:1 Present investigation 4.18:1 . Mode of Spinal Injury (n=57) Mode of injury No of patients (%) Fall: Fall from slopes, steps/rooftop/tree/electric shafts 34 (59.64) RTA: RTA/RTA in the end prompts fall into profound canyon 20 (35.08) Fall of hefty item/avalanche 2 (3.5) Assault 1 (1.7) Total 57 RTA – Road auto collision reviewing, serious neurological wounds (ASIA B and higher) were found in 48.07% (n = 25) of patients. In 82.45% (n = 47) cases, no related injury was distinguished. The most widely recognized related injury was head injury (10.52%) trailed by chest injury. Occasional circulation of SCI demonstrated a stamped increment during summer, trailed by stormy season meaning .Age conveyance of spinal rope injury expanded development of individuals in this season. The normal season of transportation of patients was 15.35 h. During transportation, >90% of patients were not joined via prepared staff, who should realize how to deal with patients with SCI. Under 15% (n = 8) of patients were discovered to be shipped with cervical immobilizer in situ. The normal time of medical clinic remain was 22.83 days, with the most extreme time of stay being 111 days. During the treatment time frame, one patient passed on because of respiratory inconveniences. Decision SCI has a significant impact on individual as well as on family and society by mental and efficient way. The vast majority of the investigations in clinical

literary works are from created countries, whose epidemiological information are unique. Non-industrial nations like India ought to have an appropriate public arrangement of SCI detailing, which will be useful in recognizing hazard factors, different epidemiological elements, their preventive measures, and recovery. Public ought to likewise be taught and prepared about SCI and importations of right on time and appropriate transportation of SCI patients. Occurrence of RTAs can be diminished by actualizing exacting traffic rules; besides, in the current examination, liquor was one of the main sources of RTA and drive drunk must be restricted carefully. Age bunch 50–59 years is especially powerless against tumble from steps, rooftop, bed, and so forth Like other non-industrial nations, India doesn't have public level approach for care of mature age individuals. In contrast to different pieces of the nation, the upper east portion of India doesn't have spinal recovery habitats, which likewise builds the grimness of SCI patients. In spite of the fact that this examination is confined to one establishment just, it may not be the genuine portrayal of the study of disease transmission of this piece of the nation. Nonetheless, it very well may be taken as a pattern, as Sikkim is geologically like other northeastern conditions of india.

Discussion

We identified 64 papers from 28 countries. The incidence of SCI in developing countries was 25.5/million/year. Males (82.8%) were more likely to sustain SCI than females. The mean age of SCI occurrence was 32.4 years. The relative frequency for following subgroups of SCI was: MVC 41.4% and falls 34.9%; complete and incomplete SCI were 56.5 and 43.0%, respectively; paraplegia and tetraplegia were 58.6 and 40.7%, respectively. However, there was no significant difference between MVC and falls, complete and incomplete SCI, paraplegia and tetraplegia. The most commonly reported complication was the development of pressure ulcers.

Conclusion

Traumatic SCI represents a heterogeneous and complex pathophysiology. While pre-clinical research on SCI has been an ongoing endeavor for over a century, our understanding of SCI mechanisms has been increased remarkably over the past few decades. This is mainly due to the development of new transgenic and preclinical animal models that has facilitated rapid discoveries in SCI mechanisms. Although SCI research has made an impressive advancement, much work is still needed to translate the gained knowledge from animal studies to clinical applications in humans.

Ethical Clearance: Taken from ethical committee of institution.

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Role of Lumbar Puncture In Traumatic Brain Injury

Ranjeet Kumar Jha[1], Rachna Gupta[2]

[1]Assistant Professor, Department of Neurosurgery, [2]Professor, Department of Surgery,
Shyam Shah Medical College, Rewa

Abstract

Background: Cerebrospinal fluid (CSF) drainage via ventricular puncture is an established therapy of elevated intracranial pressure (ICP). In contrast, lumbar CSF removal is believed to be contraindicated with intracranial hypertension.

Method: We investigated the safety and efficacy of lumbar CSF drainage to decrease refractory elevated ICP in a small cohort of patients with traumatic brain injury (TBI). A score (0–8 points) was used to assess computed tomography (CT) images for signs of herniation and for patency of the basal cisterns. All patients received lumbar CSF drainage either as a continuous drainage or as a single lumbar puncture (LP). Type and method of CSF drainage, mean ICP 24 h prior and after CSF removal, and adverse events were documented. Outcome was assessed after 3 months (with dichotomized Glasgow outcome scale).

Results: Eight patients were evaluated retrospectively. $n = 5$ suffered a moderate, $n = 2$ a severe TBI (one Glasgow coma score not documented). The CT score was ≥ 5 in all patients prior to LP and decreased after puncture without clinical consequences in two patients. The amount of CSF removal did not correlate with score changes ($P = 0.45$). CSF drainage led to a significant reduction of mean ICP (from 22.3 to 13.9 mmHg, $P = 0.002$). Continuous drainage was more effective than a single LP. Three of eight patients reached a favorable outcome.

Conclusions: Lumbar CSF removal for the treatment of intracranial hypertension is effective and safe, provided the basal cisterns are discernible, equivalent to ≥ 5 points in the proposed new score. The score needs further validation.

Keywords: *Intracranial hypertension, intracranial pressure, lumbar drainage, multimodality monitoring, score, traumatic brain injury.*

Introduction

Horrible mind injury (TBI) is a significant reason for grimness and mortality and a main source of death with an expected yearly rate of 262 cases for each 100,000 populace in Europe.[15] An expansion in intracranial pressure (ICP) is one of the key pathogenic instruments for the advancement of optional mind harm and for

helpless result after TBI.[10,16] Throughout the most recent many years, a normalized, evidence-based flight of stairs way to deal with treat expanded ICP was developed.[2,18] Whereas outside ventricular seepage of cerebrospinal liquid (CSF) through frontal burr-hole craniostomy is one set up strategy to diminish intracranialhypertension.[13,19] a couple of studies have assessed the wellbeing and handiness of lumbar CSF expulsion in the setting of raised intracranial hypertension.[1,8,12,19] Supratentorial or potentially infratentorial herniation stays a significant worry under these circumstances.[4,6] The point of this pilot study was to dissect imaging changes found in patients going through lumbar CSF expulsion to treat posttraumatic intracranial hypertension, and to build up a score that would allow to assess the danger of cerebral herniation related with lumbar CSF waste.

Corresponding Author:
Dr. Ranjeet Kumar Jha
Assistant Professor, Department of Neurosurgery,
Shyam Shah Medical College, REWA
e-mail: ranjeetjha20 @gmail.com
Mobile No.: 9005949482

Materials and Method

The choice to put a lumbar seepage (LD) was based on an interdisciplinary agreement of clinicians with aptitude in neurosurgery and neurointensive consideration. The patients had a place with two gatherings: (1) they either had effectively limited ventricles, with the goal that ventricular cut was accepted to be troublesome or potentially just of short-term viability, or (2) they exhibited an inconsistency between ICP estimated with intraparenchymal gadgets andThe choice to put a lumbar waste (LD) was based morphological discoveries on CT examines accepted to cause raised ICP, for example, diffuse mind growing.

Method

All patients going through lumbar CSF expulsion for the treatment of stubborn ICP after moderate or serious TBI between November 2017 and July 2020 were included. All patients had an intraparenchymal ICP checking gadget set up. Suggested rules for the consideration of patients with TBI were continued altogether patients. Stubborn ICP was characterized as ICP >25 mmHg in the wake of having gotten normalized and raising nonsurgical treatment, as per standard working methodology (e.g., developing of sedation, hyperosmolar treatment, and mellow hyperventilation) and following the rules of the Brain Trauma Foundation.[2] Once clinical treatment had fizzled, lumbar CSF expulsion was thought about to keep away from an excessive prolongation of sedation[5,14] or as a middle advance before continue with decompressive craniotomy or barbiturate unconsciousness. Lumbar CSF seepage was started either by single lumbar cut (LP) with the patient in the sidelong prostrate position, or by putting a discontinuously open LD (both alluded to as LP), or by putting a consistently open LD. In all patients with a nonstop seepage, CSF was depleted at the degree of the foramen of Monroe. LP wasperformed between days 1 and 13 after injury. ICP esteems furthermore, unfavorable functions were recorded. For information understanding the hourly ICP estimations of the 24 h going before and the 24 h following the lumbar CSF access were found the middle value of. Clinical result was resolved following 3 months utilizing the Glasgow result score (GOS), dichotomized into positive (GOS 4 and 5) and horrible (GOS 1–3). All patients went through CT checking inside 8 h earlier furthermore, after LP or LD. Spatial intracranial connections were assessed efficiently by investigating the width of the prepontine storage, the width of the quadrigeminal storage, and assess indications of uncal and additionally foraminal herniation. Uncal herniation was characterized as either present or then again missing if there should be an occurrence of prolapse of the uncus temporalis beneath the linea of the upper tentorial edge. Foraminal herniation was characterized as the cerebellar tonsil(s) at or beneath the degree of the occipital foramen. A point esteem was appointed to adjustments related with every thing in view of observational grounds . A base score of 5 or higher was accepted to be important to guarantee a safe evacuation of lumbar CSF.

Results and Observation

Clinical data of eight patients is summarized . The average age was 54.1 years (range 27–70 years). Six patients were males (75%). The initial Glasgow coma score (GCS) ranged from 3 to 15. The patients had either suffered severe ($n = 2$) or moderate ($n = 5$) TBI. In one patient the initial GCS was not documented. Five patients underwent prior evacuation of an intracranial hematoma either by osteoplastic ($n = 2$) or by osteoclastic ($n = 3$) craniotomy.

CSF removal via the lumbar route was accomplished by either single puncture/intermittently open drainage (LP, $n = 4$) or by continuous drainage (LD, $n = 5$). One patient underwent a single puncture initially and a continuous drainage thereafter.

The amount of CSF removed by either LP or LD was 23.5 ml/24 h (mean, SD 16.41, range 0–40 ml) following lumbar access. The CT score ranged between a minimum of 5 and a maximum of 8 before starting CSF drainage and between 3 and 8 after CSF drainage . In four patients the score showed no alteration. The score decreased (indicating a reduction of the cisternal space) after CSF drainage in two patients, and increased in two patients. The decrease was without clinical consequences. Narrowing was observed in the prepontine cistern and the quadrigeminal cistern. One patient showed an uncal herniation on both sides after lumbar CSF withdrawal without mydriasis or other clinical signs of cerebral herniation . Regarding the amount of CSF removed within the first 24 h, there was no statistically significant difference between the patients with a worsening of the imaging score (31.5 ml, SD 10.6) and those with a stable or improved imaging score (19.5 ml, SD 18.64, $P = 0.45$). Lumbar CSF removal led to a reduction of ICP in all patients . Mean ICP was 22.3 mmHg (SD 3.0)

before CSF drainage and was 13.9 mmHg (SD 4.7) after drainage (*P* = 0.002). A constantly open lumbar CSF drainage was significantly more effective than a single LP [Figure 1]. The ICP decreased by 13.2 mmHg (mean, SD 3.0) with constant drainage and by 2.7 mmHg (mean, SD 1.3) with intermittent open or single LP (*P* = 0.0003).

No severe adverse events were registered in association with the procedure in this cohort, especially no clinically evident case of herniation or infection associated with lumbar CSF removal. However, in one patient we observed radiological signs of uncal herniation on one CT scan.

A favorable outcome after 3 months was observed in three patients (37.5%). Four patients attained a GOS of 3, whereas one patient remained in a persistent vegetative state (GOS 2).

Discussion

The main findings of this study are, first, that it is safe to perform lumbar CSF removal in the setting of an increased ICP provided the basal cisterns are discernible and bilateral uncal herniation is absent. Second, the use of a score provides a structured approach to prepuncture image analysis and may add to the safety of the procedure. Third, continuous removal of CSF might be more effective than intermittent drainage.

TBI-related intracranial hypertension is associated with poor outcome.[1] Drainage of CSF in patients with intracranial hypertension is known to be an effective way to decrease ICP.[12,19] However, lumbar CSF removal under these circumstances remains a controversial procedure due to the perceived risk of cerebral herniation and the risk of infection.[4,9] As a matter of fact, we performed the procedure only in selected patients attended in the neurosurgical intensive care unit, where a high level of nursing expertise regarding LD is available, after carefully evaluating all options for ICP management by interdisciplinary discussion. Although not statistically significant in our small, retrospective patient series, the amount of CSF removed via the lumbar route may play a role in patients whose imaging score worsened. We suggest that the lowest amount that effectively reduces the ICP should be removed. Future studies need to elaborate on this aspect.

We did not record any infection associated with lumbar CSF drainage. LD, especially when performed as a continuous drainage, might be associated with an increased risk of CSF infection.[3] However, Schade and Schinkel[17] reported that the risk of infection with continuous lumbar CSF drainage and the infection-associated death remains low.

This study has limitations. The sample size is small and data analysis is retrospective. We therefore limited our analysis to the immediate effects of lumbar CSF removal on the ICP course. Whether this influenced the clinical outcome remains highly speculative.

Conclusion

Lumbar CSF drainage represents an efficient and safe treatment to reduce intracranial hypertension, provided the images prior to LP are carefully analyzed, the right conclusions are drawn, and nursing expertise in handling of the drainage is guaranteed. The newly introduced "Innsbruck Intracranial Reserve Score", an image-based score to predict the safety of lumbar CSF drainage, needs further validation in a larger prospective trial before its use can be recommended on a more general basis.

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Comparison of Two Educational Approaches on Knowledge Regarding Diet among Type II Diabetes Patients in East Delhi

Reeta Devi[1], Mongjam Meghachandra Singh[2]

[1]*Assistant Professor (Sr. Scale), School of Health Sciences, Indira Gandhi National Open University, Maidan Garhi, New Delhi, [2]Director-Professor, Department of Community Medicine, Maulana Azad Medical College, New Delhi*

Abstract

Background: Different educational approaches might lead to different levels of understanding among diabetics. The present study compared the effectiveness of self-learning module (SLM) versus use of power point presentation (PPT) on the knowledge of diet among type II diabetes patients (T2DM).

Methodology: This was a quasi-experimental study with pre and post-test design, conducted in the community setting. 85 T2DM patients each were randomly allocated to either SLM or PPT and 170 were controls without intervention. A pre-tested semi-structured questionnaire assessed knowledge on diet and nutrition during baseline (pre-test) and 6 months after intervention (post-test). Changes in knowledge after intervention was assessed using X^2, Mc Nemar, paired 't' test. $p<0.05$ was considered as significant.

Results: Both SLM and PPT were equally effective in increasing knowledge on the role of diet in diabetes, different food items. PPT was significantly more effective in increasing the mean knowledge score regarding diet in post-test (28.04±7.34) versus SLM (25.07±6.74) ($p<0.001$). PPT was more effective than SLM on some aspects of diet viz. concept of carbohydrate as energy giving source, sources of carbohydrates (potato and bread), meat as source of protein, "protein" as body builder; good oils (saffola, cannola, olive oil), avoidance of butter; high glycaemic index (GI) foods (glucose, watermelon), medium GI food (muesli, honey, digestive biscuits), low GI (dalia, brown bread, oats), protein as body building food, meat as source of protein, consumption of fibre rich diet.

Conclusion: Both SLM and PPT were effective, more so with PPT on several aspects of diet and nutrition among study subjects. Active interaction along with visual presentation of educative material in powerpoint can be considered for educating T2DM patients on diet and nutrition during home visits by health workers.

Keywords: *Diet, Diabetes, Self-learning module, power point presentation.*

Introduction

Understanding basic concept of the components of diet helps in planning a diabetic diet. Lesser et al observed that knowledge regarding diet can change unfavourable dietary pattern among diabetics.[1] Expert dieticians' recommendations on diet can help in preventing complications of diabetes.[2] Having adequate knowledge about food items, dietary management in type 2 diabetes mellitus (T2DM) can influence dietary behaviours.[3]

A higher diet quality has been associated with reduced risk of all cause mortality in T2DM patients.[4,5] One of the factors hindering intake of prescribed diabetic diet was lack of motivation.[6] A diabetic diet comprises of eating healthiest food in moderate amounts, at regular intervals, rich in nutrients, low in fat and calories.[7]

Corresponding Author:
Dr. Reeta Devi
Assistant Professor (Sr. scale), School of Health Sciences, Indira Gandhi National Open University, Maidan Garhi, New Delhi 110068
e-mail: devireeta@gmail.com

Variations exists in the dietary behaviours among T2DM patients. A study from Indonesia showed that patients of T2DM had moderate level of dietary behaviour.[8] Several educative approaches can be directed towards changing behaviours of patients of T2DM. There is paucity of studies evaluating effectiveness of educative method such as self learning module (SLM) and use of power point presentation (PPT) in the community setting for T2DM patients. Hence, this study was planned with the objective to compare the effectiveness of SLM versus PPT on the knowledge about diet and nutrition among type 2 diabetes mellitus (T2DM) patients in the home setting.

Material and Method

This was a community based quasi-experimental study with pre and post-test design. A survey in an East Delhi residential colony identified 340 type II diabetic patients aged 20 years and above. They were enumerated, divided into four groups consecutively each having 85 T2DM patients, randomized by lottery method into intervention group with self-learning module (SLM), power point presentation (PPT) and two other groups as control.

In absence of comparable studies, sample size calculation was done based on the assumption :50% knowledge on diet and nutrition at baseline (pre-test), and assuming increase to 60% in SLM and 75% in PPT, without improvement in control group in post-intervention (post-test)on diet and nutrition after 6 months of follow up. At 80% power, 5% alpha error, 10% attrition, a sample size of 85 T2DM patients in either group was adequate. However, we had taken 170 T2DM patients in the control.

Baseline information (pre-test) on knowledge regarding diet and nutrition was collected in both intervention and control groups in the households by interviewing the study subjects using a pre-tested semi-structured interview schedule after taking written informed consent.

A self-learning module covering role of diet, nutrition related to food items of carbohydrates, proteins, fat/oil, glycaemic index, consumption of salt, fibre diet in diabetes was prepared in English and Hindi. Content was validated by 21 experts. Content in English was translated into Hindi and retranslated back to English by two language experts and corrected. PPT was prepared in English and Hindi with same material used in SLM. SLM and PPT were trial tested among 5 T2DM patients (2 in English, 3 in Hindi) each group, in a nearby residential block to the study area,was feasible and acceptable. SLM was distributed in English/Hindi as per choice of the study subjects and discussed for one and half hours individually inhomes. In PPT, study subjects were shown PPT (English/Hindi as per participant's choice)in a laptop in the homes. A DVD with handout was distributed to the subjects. Additionally, intervention and control groups received routine care from their treating physicians. Post-test evaluation was done after 6 months of the intervention using pre-tested interview schedule in pre-test.

Knowledge on diet/nutrition was scored (one score for each correct food item, maximum 40). The study was approved by Doctoral Committee, School of Health Sciences, research unit of Indira Gandhi National Open University, New Delhi. Chi-square, Fisher's exact, Mc Nemar's, paired and unpaired 't' test were used to compare knowledge between groups. 'p<0.05' was considered significant.

Findings: Maximum study subjects were aged 50-59 years (39.7%). Overall, 54.4% were males. Age, gender distribution was similar across study groups(Table 1). Overall, maximum (70.3%) were graduate and above, 1 (0.3%) was unemployed (control); maximum (38.2%) were doing household work, maximum (84.7%) were Hindus, 53.2% had per capita family income Rs.10001-20000/month. Literacy,occupation, economic status was similar across study groups (p>0.05).

Table 1. Distribution of socio-economic and demographic characteristics of the study subjects

Variables	SLM No (%) n=85	PPT No (%) n=85	Control No (%) n=170	Total No (%) n=340	X², df, 'p' value
Age Groups (Years)					
20-29	0(0.0)	0(0.0)	3(1.7)	3(0.9)	9.66,8,0.28
30-39	5(5.9)	1(1.2)	6(3.5)	12(3.5)	

Variables	SLM No (%) n=85	PPT No (%) n=85	Control No (%) n=170	Total No (%) n=340	X^2, df, 'p' value
40-49	12(14.1)	17(20.0)	30(17.7)	59(17.4)	
50-59	32(37.6)	39(45.9)	64(37.7)	135(39.7)	
60-69	32(37.6)	23(27.1)	49(28.8)	104(30.6)	
70-80	4(4.7)	5(5.9)	18(10.6)	27(7.9)	
Gender					
Male	44(51.8)	42(49.4)	99(58.2)	185(54.4)	2.1,2,0.34
Female	41(48.2)	43(50.6)	71(41.8)	155(45.6)	
Literacy status					
Read and write	2(2.4)	6(7.1)	6(3.5)	14(4.1)	13.91,8, 0.08
Primary	6(7.1)	5(5.9)	8(4.7)	19(5.6)	
Secondary	14(16.5)	5(5.9)	20(11.8)	39(11.5)	
Senior secondary	3(3.5)	5(5.9)	21(12.4)	29(8.5)	
Graduate and above	60(70.6)	64(75.3)	115(67.7)	239(70.3)	
Occupation					
Unemployed	0(00.0)	0(00.0)	1(0.6)	1(0.3)	4.63,8, 0.79
Government job	14(16.5)	11(12.9)	20(11.7)	45(13.2)	
Private job	15(17.6)	12(14.1)	36(21.2)	63(18.5)	
Business	7(8.2)	11(12.9)	17(10.0)	35(10.3)	
Household work	34(40.0)	36(42.4)	60(35.3)	130(38.2)	
Retired	15(17.6)	15(17.6)	36(21.2)	66(19.4)	
Religion					
Hindu	75(88.2)	69(81.2)	144(84.7)	288(84.7)	6.71,4,0.152
Muslim	1(1.2)	5(5.9)	2(1.2)	8(2.4)	
Sikh	5(5.9)	4(4.7)	5(2.9)	14(4.1)	
Christian	2(2.4)	4(4.7)	13(7.6)	19(5.6)	
Jain	2(2.4)	3(3.5)	6(3.5)	11(3.2)	
Per capita family income per month (Rs.)					
Up to 10000	20(23.5)	9(10.6)	28(16.5)	57(16.8)	12.46,6,0.052
10001-20000	49(57.6)	45(52.9)	87(51.2)	181(53.2)	
20001-30000	15(17.6)	26(30.6)	41(24.1)	82(24.1)	
30001 and above	1(1.2)	5(5.9)	14(8.2)	20(5.9)	

Figure 1 shows knowledge was similar between study groups regarding role of diet (p>0.05).

In post-test, SLM/PPT showed equally significant improvement in knowledge on aspects of role of diet in diabetes (p<0.01).

SLM versus PPT in post-test: Provides nutrition: p=0.42; Maintains body weight:p=0.26; Controls blood sugar: p=0.40; Maintains general health: p=0.26

SLM/PPT were effective in improving knowledge during post-test (p<0.05), but not in control group(Figure 2). PPT was effective than SLM for changes in knowledge on potato and bread (p<0.05). Knowledge of carbohydrate (energy giving food) improved to 40%, 58.8% and 12.9% in SLM, PPT (p<0.01) and control groups (p>0.05) respectively, more in PPT than SLM (p=0.01).

Figure 1. Knowledge on role of diet in diabetes in pre and post test

Figure 2. Knowledge on energy giving food items in pre and post test
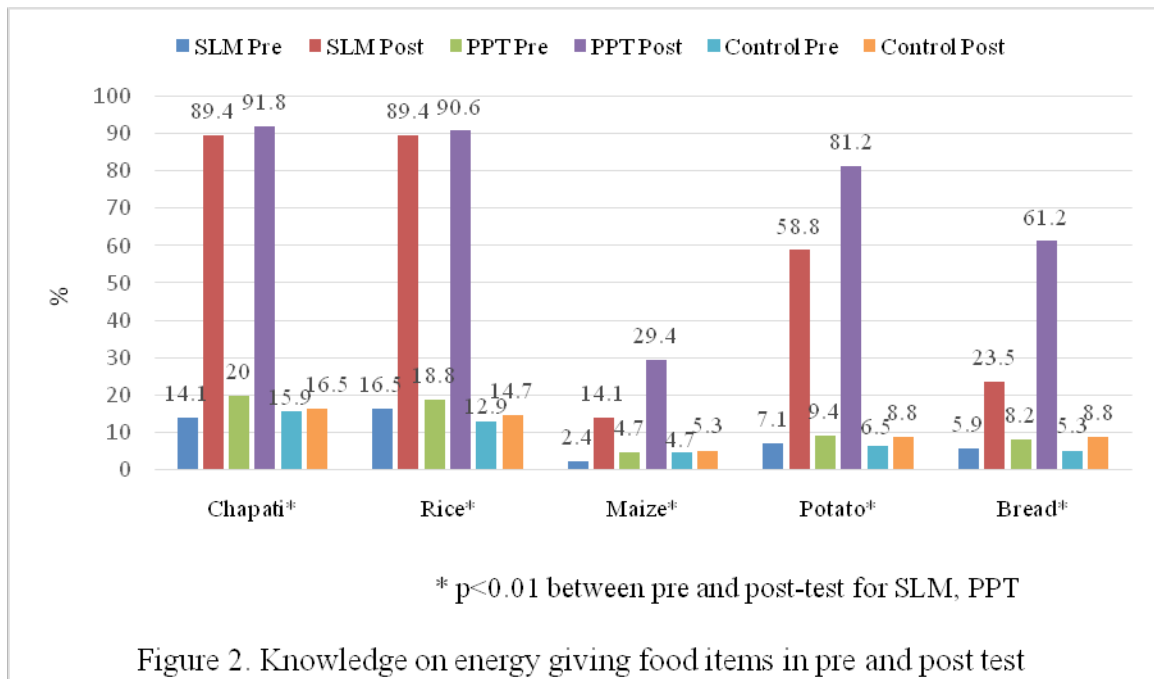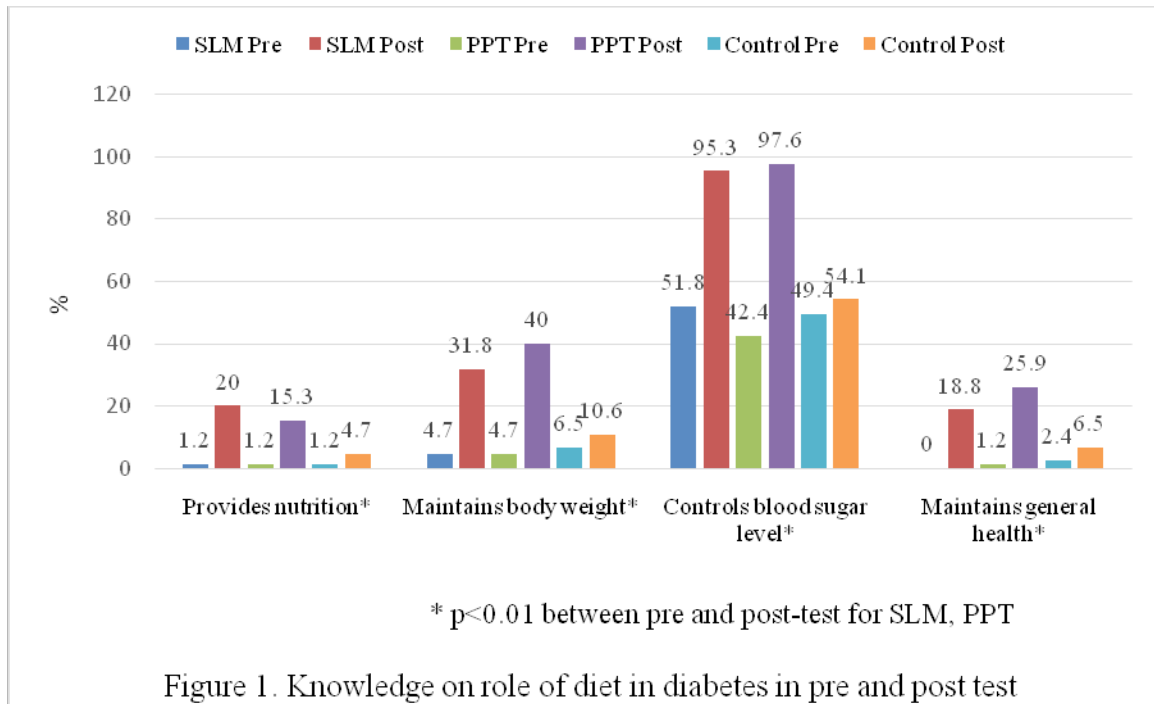
SLM vs PPT in post-test: Chapati (p=0.59); Rice (p= 0.79); Maize (p=0.10); Potato (p=0.001); Bread (p<0.001)

SLM/PPT were effective in increasing knowledge in post-test on food items: meat, egg, pulses and paneer (p<0.05), higher for meat in PPT (p<0.05)(Figure 3).Knowledge on protein (body building food) improved to 50.6%, 71.8% and 15.3% in SLM, PPT respectively (p<0.01),not in control (p>0.05) and PPT was effective than SLM (p<0.01).

* p<0.01 between pre and post-test for SLM, PPT

Figure 3. Knowledge on body building food items in pre and post test
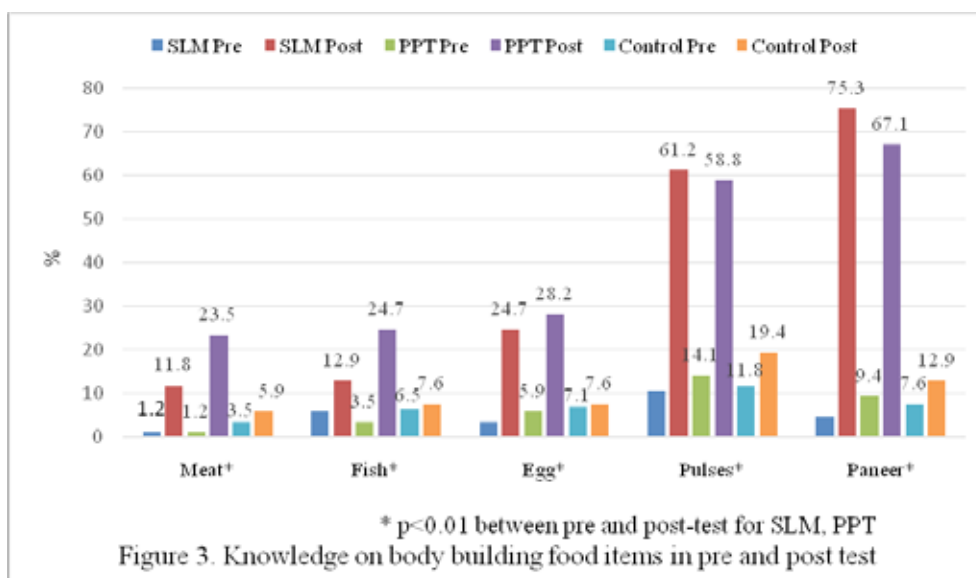
SLM versus PPT in post-test: Meat (p= 0.03); Fish (p= 0.05); Egg (p= 0.60); Pulses (p=0.75); Paneer (p=0.23)

In table 2, during pre-test, knowledge about good oils, avoidance of fats or oil was similar between the study groups (p>0.05). PPT was effective in increasing knowledge about saffola, canola and olive oil (p<0.05), SLM only for canola (84.7%)(p<0.05). PPT was better than SLM about avoidance of butter (p=0.03).

Table 2. Knowledge on good oils, fats or oil to be avoided among the study groups in pre and post-test

Knowledge on good oils	Groups			'p' value
	SLM No (%) n=85	PPT No (%) n=85	Control No (%) n=170	
Saffola (Safflower oil)				
Pre	28 (32.9)	21 (24.7)	35(20.6)	0.09
Post	34 (40.0)	39 (45.9)#	39(22.9)	0.0003
Canola (Rapeseed oil)				
Pre	45 (52.9)	53 (62.4)	104(61.2)	0.36
Post	72 (84.7)#	67 (78.8)#	111(65.3)	0.001
Olive oil				
Pre	4 (4.7)	2 (2.4)	4(2.4)	0.53
Post	10 (11.8)	16 (18.8)#	8(4.7)	0.0015
Fats/oil to be avoided				
Butter				
Pre	43 (50.6)	36 (42.4)	77(45.3)	0.54
Post	73 (85.9)#	81 (95.3)#	79(46.5)	<0.001
Ghee (Clarified Butter)				
Pre	34 (40.0)	33 (38.8)	73(42.9)	0.79
Post	68 (80.0)#	60 (70.6)#	76(44.7)	<0.001
Coconut oil				
Pre	6 (7.1)	2 (2.4)	4(2.4)	0.12
Post	20(23.5)#	18 (21.2)#	7(4.1)	<0.001

Significant between pre and post (p<0.05),

SLM versus PPT in post-test: Saffola: p= 0.05; Canola: p=0.32; Olive oil: p=0.09

Butter: p= 0.03; Ghee: p= 0.15; Coconut oil: p= 0.71

Both interventions were equally effective in increasing knowledge on amount of salt intake per day in post-test, knowledge on various fibre rich food items (p>0.05) (Table 3). Knowledge regarding consumption of fibre rich diet daily improved to 71.8% in SLM, 90.6% in PPT group, not in control. PPT was effective than SLM regarding fibre rich diet (p=0.002).

Table 3. Knowledge on salt intake, fibre rich diet among study groups in pre and post-test

Aspects of knowledge	Groups			'p' value
	SLM No (%) n=85	PPT No (%) n=85	Control No (%) n=170	
Salt intake less than 5 gms. per day*				
Pre	76 (89.4)	68 (80.0)	134(78.8)	0.105
Post	83 (97.6)#	81 (95.3)#	138(81.2)	<0.001
Fibre rich food items				
Leafy vegetables				
Pre	60 (70.6)	63 (74.1)	126(74.1)	0.82
Post	85 (100)#	85 (100)#	133(78.2)	<0.001
Fruits				
Pre	26 (30.6)	22 (25.9)	53(31.2)	0.67
Post	80 (94.1)#	82 (96.5)#	57(33.5)	<0.001
Whole pulses				
Pre	20 (23.5)	15 (17.6)	34(20.0)	0.62
Post	61 (71.8)#	60 (70.6)#	40(23.5)	<0.001
Whole grains				
Pre	22 (25.9)	19 (22.4)	41(24.1)	0.86
Post	81 (95.3)#	82 (96.5)#	49(28.8)	<0.001
Fibre rich diet to be consumed daily**				
Pre	51 (26.8)	43 (50.6)	96(56.5)	0.45
Post	61 (71.8)#	77 (90.6)#	103(60.6)	<0.001

Significant between pre and post (p<0.05)

SLM versus PPT in post-test :*p= 0.40; Leafy vegetables: p=1.00; Fruits: p= 0.46; Whole pulses: p=0.86; Whole grains: p=0.70, ** p=0.002

During pre-test, subjects' knowledge on glycaemic index (GI) was nil (Table 4). PPT was more effective than SLM regarding knowledge on high GI items (>70) (glucose and water melon); medium GI (>56-69) food items (muesli, honey, digestive biscuit), low GI (<55) food items (dalia, brown bread, oats) (p<0.05).SLM/PPT were equally effective in improving knowledge of other GI food items.

Table 4. Knowledge on different glycaemic index food items among study groups in post-test

Glycaemic index (GI) of food items	Groups			'p' value
	SLM No (%) n=85	PPT No (%) n=85	Control No (%) n=170	
Food releasing sugar rapidly in blood (High GI >70)				
Mashed potato	84(98.8)	83(97.6)	0	<0.001
Glucose	29(34.1)	51(60.0)#	3(1.8)	<0.001
White rice	19(22.4)	23(27.1)	1(0.6)	<0.001
Corn flake	33(38.8)	44(51.8)	0	<0.001

Glycaemic index (GI) of food items	Groups			'p' value
	SLM No (%) n=85	PPT No (%) n=85	Control No (%) n=170	
Water melon	38(44.7)	55(64.7)#	0	<0.001
Food releasing sugar in medium amount in blood (Medium GI >56-69)				
Muesli	4(4.7)	19(22.4)#	0(0.0)	<0.001
Unpeeled boiled potato	80(95.2)	83(97.6)	0(0.0)	<0.001
Basmati rice	50(58.8)	61(71.8)	0(0.0)	<0.001
Honey	27(31.8)	41(48.2)#	0(0.0)	<0.001
Digestive biscuit	55(64.7)	70(82.4)#	0(0.0)	<0.001
Whole wheat bread	17(20.0)	28(32.9)	0(0.0)	<0.001
Food releasing sugar slowly in blood (Low GI <55)				
Banana	7(8.2)	5(5.9)	0(0.0)	0.0014
Mango	12(14.1)#	2(2.4)	0(0.0)	<0.001
Orange	72(84.7)	77(90.6)	0(0.0)	<0.001
Apple	20(23.5)	18(21.2)	0(0.0)	<0.001
Kiwi	15(17.6)	16(18.8)	0(0.0)	<0.001
Walnut	35(41.2)	34(40.0)	0(0.0)	<0.001
Almond	27(31.8)	24(28.2)	0(0.0)	<0.001
Green vegetable	43(50.6)	55(64.7)	0(0.0)	<0.001
Dalia	19(22.4)	67(78.8)#	0(0.0)	<0.001
Brown bread	17(20.0)	34(40.0)#	0(0.0)	<0.001
Oats	37(43.5)	52(61.2)#	0(0.0)	<0.001
Skimmed milk	18(21.1)	21(24.7)	0(0.0)	<0.001

Between SLM vs PPT # p=0.001

Figure 4 shows in post-test, knowledge scores increased higher in SLM to 25.07±6.7, 28.04±7.3 in PPT group, except control **(**6.84±3.8) (p=0.18).

PPT was effective than SLM in increasing knowledge on diet (p=0.005). During pre-test, overall, 9.7% knew and had diet chart, 5.3.% followed it.
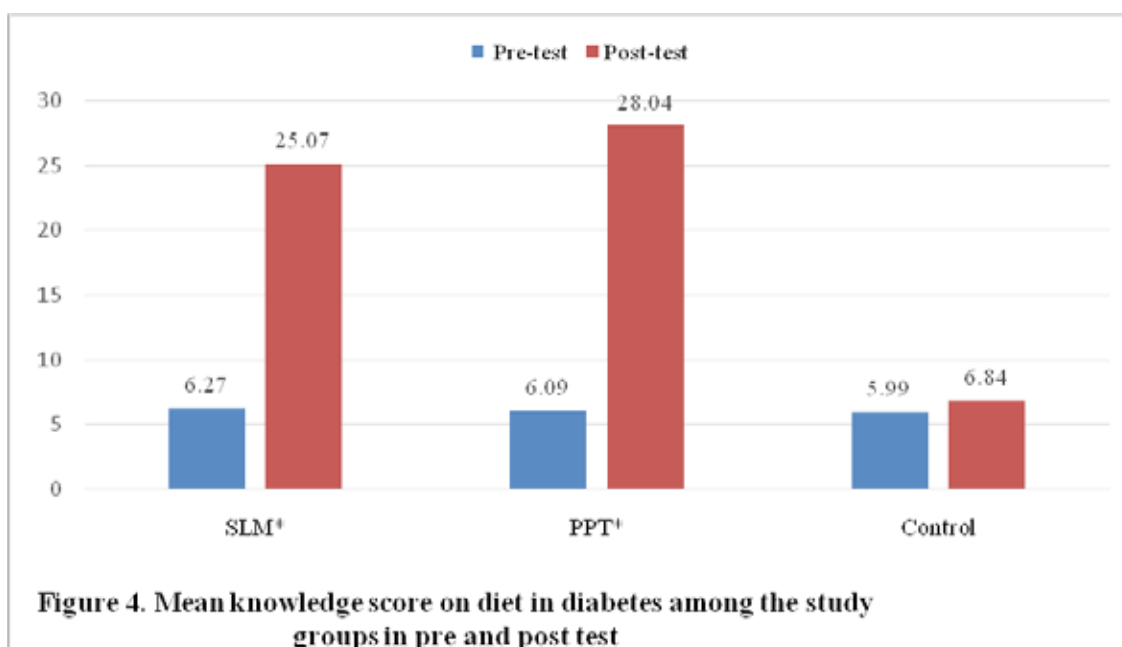
Figure 4. Mean knowledge score on diet in diabetes among the study groups in pre and post test

*P<0.001 (pre vs post-test), p<0.01 between SLM vs PPT (post-test)

Discussion

In present study, SLM/PPT were equally effective in increasing knowledge on the role of diet in diabetes. Priya D et al observed that 11.4% subjects knew about restriction of foods among diabetics.[9] Primanda et al observed 92.9% diabetic patients had high knowledge about diabetic diet.[8] Jain et al observed that 58.5% diabetic patients had average score regarding diabetic diet.[10] The differences in the knowledge regarding diet could be due to differences in the literacy level, knowledge received from healthcare providers and dieticians.

In this study the overall mean knowledge score at baseline, on aspects of diet was 6.12 ± 3.4. Han CY et al observed that study subjects had a poor mean percentage score of $39.7\% \pm 17.7$ on diabetes nutrition knowledge, and diet quality of $54.2\% \pm 9.4$.[6]

A study showed poor dietary practices among diabetics, 48% controlled intake of fatty foods.[11] In our study, 9.7% had diet chart, 5.3.% followed it. This is lower than 10.5% following diet chart in Nepal.[12] Roaeidet al showed 0.3% diabetic patients were on diet control.[13] Tan et al reported 16.4% subjects adhered to dietary regime.[14] Several studies reported following recommended diet chart by 29% to 45.9% diabetes patients.[15-18]

Both SLM/PPT were effective in improving knowledge on different food items after 6 months. PPT was more effective in improving knowledge regarding diet in post-test (28.04 ± 7.34) than SLM (25.07 ± 6.74) viz.concept of carbohydrate as energy giver, sources of carbohydrates, protein (meat) and "protein" as a body builder; good oils, high, medium and low GI foods ($p<0.05$).

Different approaches for diabetes education were reported. Zheng et al provided 2-session health education on T2DM patients, 2nd session used power point presentation incorporating diet and self-management. Dietary control score showed improvement from 4.23 ± 1.62 in preintervention to 5.75 ± 0.28.[19]

Gehlawat et al showed that structured group diabetes education was effective after 6 months in following a healthful eating plan.[20] Fu et al observed diabetes knowledge increasing from 12.97 ± 4.04 score (pre) to 17.14 ± 3.00 in post-intervention, 17.03 ± 2.23 at one month followup.[21] Hu J et al showed positive effects on participants' self-management of diet.[22] Teufel-Shone et al supported family based approach to diabetes control.[23]

Deng F observed that most interventions were done in group format, few in community settings.[24] Health education messages was effective in reducing obesity, improving dietary patterns of diabeticss.[25]

Individualised patient education session showed improved knowledge and compliance to dietary recommendations.[26,27] Time spent with healthcare professionals affected dietary adherence for self-care among diabetics.[28,29]

Conclusion

Present study showed interaction along with visual presentation of educative material in power-point was effective and can be considered for teaching T2DM patients on diet and nutrition by health workers using tablet or laptop. In its absence, self-learning module can be given to the patients for improvement in diabetic dietary care.

Conflict of Interest: Nil

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Ethical Clearance: From Doctoral Committee, School of Health Sciences, Indira Gandhi National Open University

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Clinical assessment of Open Reduction Internal Fixation (ORIF) of Mandibular Body Fractures Using Computer-Assisted Polyetherether Ketone (PEEK) Custom Made Plates Versus Conventional Titanium Plates: A Randomized Clinical Trial

RofaidaA. Abaas[1], KhaledA. Salah[2], RagiaMounir[3]

[1]*Assistant Lecturer,* [2]*Assistant Professor,* [3]*Professor, Oral and Maxillofacial Surgery Department Faculty of Dentistry Cairo University in Egypt*

Abstract

Background and objective: This study aimed at clinical assessment of ORIF of mandibular body fractures using computer-assisted PEEK custom made plates versus conventional titanium plates.

Materials and Method: Sixteen patients were divided into 2 equal groups. Patients in both groups underwent ORIF of mandibular body fractures. In the study group, the fractures were stabilized using computer-assisted PEEK custom made plates. In the control group, the mandibular body fractures were stabilized using 2.3 & 2.0 titanium plating system. Each patient was assessed in terms of postoperative occlusion, wound dehiscence and mental nerve paresthesia. Moreover, operative time was evaluated in both groups.

Results: The postoperative recovery and healing phase were uneventful in all patients. No postoperative complications were observed except in one case in the study group (PEEK) where wound dehiscence & mental nerve paresthesia were experienced. Postoperative occlusion was satisfactory in both groups with an insignificant difference (p>0.05) regarding the assessment criteria. However, the custom made PEEK plates showed the advantage of decreasing operative time and accuracy of reduction.

Conclusion: Patient specific PEEK plate showed satisfactory clinical outcomes in ORIF of mandibular body fractures. Additional advantages include saving time & effort during the surgery.

Keywords: *PEEK, custom made plates, ORIF.*

Introduction

In the last decade, the rate of facial injuries increased, 25% of these injuries are mandibular fractures and 11-36% of these fractures are body fractures. A plenty of treatment choices is used for stabilization of mandibular body fractures including: 1-non surgical intervention and 2- surgical intervention using titanium plating system which is considered the gold standard yet.[1]

Several attempts were made to overcome the disadvantages of titanium plates, these disadvantages include: 1-sepsis with subsequent dehiscence accounted for 50% to 60% and 2-the need for 2nd surgery with documented rates 52-86% within 6 months to 12 months which is due to the significant difference between Young' modulus of elasticity of titanium & that of the cortical plate of bone with subsequent inefficient load transfer between bone and implant which is known as the stress shielding phenomenon. As a result bone loss

Corresponding Author:
Rofaida Atef Abbas
Address: 228 Villa al Kawthar. 6 October, Giza, Egypt
e-mail: rofaida.atef@dentistry.cu.edu.eg
Telephone Number: +201289980034

will occur with subsequent risk of aseptic loosening of titanium plates.[2,3]

Accordingly, this trial will be held using polyether ether ketone (PEEK) to overcome such problems. PEEK is a linear semi-crystalline poly-aromatic polymer which has dimensional properties close to that of living bone in terms of strength and stiffness. The major beneficial property of PEEK is its lower Young's modulus of elasticity which is close to that of the cortical bone and therefore, it is likely to eliminate themajor problem encountered with titanium plating system which is the stress shielding phenomenon. It is highly durable, resists a high degree of temperature greater than 300 degree C and can be used without adverse tissue effects. Moreover, the computer-assisted custom made PEEK plates will make fracture reduction more accurate and will offer a great advantage of less time consuming.[3,4]

Materials and Method

Materials

Study Group: The plates used in this study were the patient specific PEEK plates manufactured by computer-aided design and computer-aided modeling (CAD/CAM) system. The plate was 4 mm thickness and consisted of 2 horizontalarms – a superior and an inferior one - connected together. The patient specific PEEK plates were fixed using titanium screws.

Control Group: Conventional 2.3 & 2.0 titanium plates on the superior and inferior borders respectively fixed using titanium screws.

Fig. 1: ORIF using patient specific PEEK plate

Study Population: 16 patients with mandibular body fractures were selected. The history and detailed medical examination data for each patient was collected. A preoperative computed tomography (CT) scan was taken. Fabrication of the custom made PEEK plate was carried out using (CAD/CAM) system.

Clinical Data: Postoperative occlusion, wound dehiscence and mental nerve paresthesia were evaluated for each patient. Also, the operative time was evaluated in both groups.

Radiographic Data: Immediate postoperative CT scan was obtained using the same machine and exposure parameters [Axial cuts, DICOM file, Gantry tilt zero and minimal thickness of 0.6mm] as for the preoperative CT scan. DICOM data processing, segmentation, 3D virtual model reconstruction, virtual reduction of the fractured segments and designing patient specific PEEK plates were obtained.

Results

Majority of both groups were males 7 (87.5%) with only one (12.5%) female. The mean age of the cases in the study group (PEEK) was (30.20±1.84) while for the control group (Titanium) was (29.17±1.37). Most of the cases had unilateral fractures in the right side [5 (62.5%), 4 (50.0%)] & didn't have associated fractures [6 (75.0%), 4 (50.0%)].

Surgical Results: For all patients, the surgical procedures were performed without any major complications. However, in onecase in the study group,mental nerve injury was occurred during reduction and fixation of the fractured segments

Clinical Results: The postoperative recovery and healing phase were uneventful in all patients. No postoperative complications were observed except in one case in the study group (PEEK) where wound dehiscence was noted 1 week postoperatively and treated by irrigation and wound care .Moreover, in the same patient, chin paresthesia was noted which was attributed to mental nerve injury. None of the patients included in the study were necessitated second surgical intervention. **Table (1).**

Table (1): Complications of all patients included in the study

	Group I (PEEK)	Group II (Titanium)
Wound dehiscence	1	-
Mental nerve injury	1	-
The need for 2nd surgery	-	-

The postoperative occlusion was evaluated via Visual analogue scale (VAS) utilizing University of Washington Quality of Life Questionnaire (UW-QOL v4). The parameters included in this study were activity, chewing & swallowing. All patients included in the study enjoyed good postoperative occlusion regarding the mentioned parameters. For different occlusal parameters, there was no significant difference between both groups (p>0.05). **Table (2).**

Table (2): Mean and standard deviation (SD) values for VAS scores in both groups

Feature	VAS scores (Mean±SD)		p-value
	Group I (PEEK)	**Group II (Titanium)**	
Activity	9.56±8.16	9.62±2.93	0.985ns
Chewing	8.92±6.35	8.75±8.877	0.966ns
Swallowing	9.33±3.22	9.50±3.02	0.915ns

The average operative time in the control group (Titanium) was significantly higher than that of the study group (PEEK) (p=0.002).

Radiographic Results: The immediate postoperative CT data revealed proper reduction & alignment of the fractured fragments in the study group (PEEK). The patient specific PEEK plates were perfectly adapted to the fractured segments.

(a)   (b)

Fig. 2(a) Post-operative clinical photograph & (b) Post-operative reformatted lateral reconstruction of CT data of the patient specific PEEK plate in study group (PEEK)

Discussion

Open Reduction Internal fixation (ORIF) of mandibular body fractures using titanium plating systems had several drawbacks including sepsis with subsequent wound dehiscence and the need for 2nd surgery which is attributed to bone loss as a result of the elevated modulus of elasticity of titanium hardware. Accordingly, attempts were made to overcome problems encountered with the titanium plating system.[2,5]

In this study, custom made PEEK plates were used in ORIF of mandibular body fractures. The main beneficial property of PEEK material is its lower modulus of elasticity that is close to that of living bone with subsequent elimination of the problem of stress shielding phenomenon encountered with titanium plating system. PEEK material has other advantages including biocompatibility, mechanical strength, durability, resistance to high degree of temperature without dimensional alteration.[3][4]

No postoperative complications were observed except in one patient in the study group (PEEK) where wound dehiscence was noted 1 week postoperatively and treated by irrigation and wound care. Moreover, in the same patient, chin paresthesia was noted which was attributed to mental nerve injury as a result of handling of the fractured segments during reduction & fixation. This is inconsistent with the results reported by **Yang et al.**[6] **(2014)** who reported there was no wound dehiscence occurred in the 12 patients included in their studies who underwent PEEK cranioplasty.

In agreement with the results obtained in this study, **Thien A et al.**[7] **(2015)** reported that the complication rate for PEEK cranioplasty was 25% and wound dehiscence was 4.2%. Similar results were obtained by **Jonkergouw et al.**[8] **(2016)**.

In the control group (Titanium), there were no infection or wound dehiscence and need for 2nd surgery which are inconsistent with the results obtained by **Bakathir et al.** [9] (2008), **O'Connell et al.**[10] (2009) & **Pan et al.**[2] (2013) who concluded that infection/wound dehiscence was the main reason for plate removal in the mandible upon using the titanium plating system.

The postoperative occlusion was evaluated via Visual analogue scale (VAS) utilizing University of Washington Quality of Life Questionnaire (UW-QOL v4). The parameters included in this study were activity, chewing & swallowing.

All patients included in the study enjoyed good postoperative occlusion regarding the mentioned parameters. For different occlusal parameters, there was no significant difference between both groups ($p>0.05$).

There was a significant difference regarding the operative time between both groups ($p=0.002$) which is consistent with the studies performed with **Scolozzi et al.**[11] (2012) and **Yang et al.**[6] (2014) where a significant decrease in the operating time was noticed in the computer-assisted custom made PEEK plates which was attributed to minimal to none intraoperative adjustments of the custom made plates.

In this study, the patient specific PEEK plates offered optimum reduction & alignment of the fractured segments (proximal & distal) which was the key for successful reduction of both segments and subsequently the key for optimum functional results post-operatively which is in agreement with **Voss et al.**[12] (2016).

Competing Interests:

Conflict of Interest: No

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Symptoms of Irritable Bowel Syndrome (IBS), Dietary Habits and Stress in Working Women

Sangeeta BSR[1], Melita Sheilini[2], Charlet Jasmine Vaz[3]

[1]MSc Nursing Student, [2]Assistant Professor-Selection Grade, Department of Medical-Surgical Nursing,
[3]Lecturer Department of Fundamentals of Nursing, Manipal College of Nursing Manipal, MAHE, Manipal,
Udupi District, Karnataka

Abstract

Background: Functional gastro-intestinal disorders are mostly found in women due to the fluctuations in female sex hormones. The effects of hormones and stress have a great influence over the gastrointestinal symptoms and causes impaired bowel symptoms.

Objective: The aim of this study was to identify the symptoms of Irritable Bowel Syndrome and the findings may fetch more data on the influence of dietary habits and stress in the causation of IBS.

Materials and Method: The study was conducted among 188 women employees from Manipal Academy of Higher Education institutes of Manipal using stratified proportionate sampling. A validated questionnaire was used for assessing the symptoms, dietary habits and stress causing IBS.

Results: The results revealed that, 19(10.1%) participants reported having IBS symptoms. Majority, 12(63.3%) expressed having moderate perceived stress. Chi-square analysis proved statistically significant association between the IBS symptoms experienced and milk intake (χ^2=11.329, p=.010) as well as stress (χ^2=14.293, p=.001).

Conclusion: The working women population remains the vulnerable group of IBS sufferers due to lack of time and being negligent towards their health.

Keywords: *Syndrome, Irritable Bowel, Diet, Stress, Habits, Women, Work.*

Introduction

The IBS global impact report of 2018 states that the rate of prevalence of IBS in women is approximately 1.5-3 times higher as compared to men. It is mostly seen in working women with a peak incidence rate ranging between the ages 25-54 years.[1] The study aimed at exploring the role of dietary habits and stress over IBS and the prevalence of IBS. The brain-gut interaction plays a major role in the exacerbation of IBS in women. Foods rich in high Fermentable Oligosaccharides, Disaccharides, Monosaccharides and Polyols (FODMAPs) disturbs the gut and lead to the intensification of IBS.[2] Interestingly, there is an association between the IBS symptoms and dietary habits and stress as reported in this study. Irritable Bowel Syndrome is a chronic disease and its symptoms (abdominal pain, diarrhoea, etc) causes excessive discomfort, limitation of activities and changes in mental images. This study aimed at investigating the symptoms of IBS, dietary habits and stress among the women employees considering the fact that working women have very little time to concentrate on their health and the food habits. As they have a dual role of managing their work as well as their family, they are

Corresponding Author:
Dr. Melita Sheilini
Department of Medical-Surgical Nursing, Manipal College of Nursing Manipal, MAHE, Manipal, Udupi District, Karnataka-576104
e-mail: shyli.mel@manipal.edu
Telephone No.: 8095976561
Fax: 0091-08202922572

prone for higher perceived stress which in turn may lead to neglecting the various symptoms of their body.

Materials and Method

The study adopted the quantitative survey approach with a descriptive survey design considered as appropriate. Participants were recruited from the teaching institutes of Manipal which included 188 women employees i.e., teaching faculty and non-teaching staff (clerical) of MAHE, Manipal. Stratified proportionate sampling was used in which each institute was considered as strata and proportionately the number of subjects from each stratum were taken.

The symptom Assessment scale for IBS was developed by the researcher. It is a dichotomous questionnaire with four items as abdominal pain relieved with defecation, abdominal pain associated with altered bowel frequency, abdominal pain with bloating/ abdominal distension and abdominal pain associated with altered stool formation and passage. The reliability for this tool was 0.99 and was calculated using test-retest method.

Scale to assess the dietary habits influencing IBS was developed by the researcher, which included 16 items that were rich in high FODMAPs to assess the dietary habits of employees who were reported to have Irritable Bowel Syndrome (IBS). It was a 4-point rating scale (4- daily, 3-frequently, 2- rarely, 1- never). Cronbach's alpha was used to assess the reliability and it was found to be 0.86.

The Perceived Stress Scale (PSS) is a standardized tool developed by Sheldon Cohen, used for measuring the perception of stress and the due permission from the author was taken prior its usage in the study.[3] The PSS consisted of 10 items. The items in the PSS ask about feelings of stress perceived during the last one month. It is a 5-point scale (4- never, 3- almost never, 2- sometimes, 1- fairly often, 0- never). Among the 10 items, six items were negatively stated, for those statements the scoring was reversed. The interpretation was based on the total score, higher the score, more is the stress perceived (0-13= low stress, 14-26= moderate stress, 27-40= high perceived stress). Cronbach's alpha was used to assess the reliability and was found to be 0.803 and the established one was 0.810.

Results and Discussion

Overall, 188 participants completed the survey. Apparently 111 (59%) of the sample were above 35 years of age, 124 (66%) were non-vegetarians while 107 (56.9%) were non-teaching staff and 103 (54.8%) were with <10 years of experience (Table 1).

Minimal 15 (8%) participants reported the presence of illness (Table 2).About 19 (10.1%) participants reported to have abdominal pain with varying symptoms of IBS (Table 3).

Out of 19 who had symptoms, 16 (84.2%) reported the consumption of patties daily and 15 (78.9%) reported the consumption of milk daily (Table 4). Majority 12 (63.3%) reported having moderate level of perceived stress (Table 5). Statistically significant association was found between the IBS symptoms, consumption of milk (p=.010) and stress (p=.001) (Table 6).

The symptoms reported in this study included mainly abdominal pain with bloating/distension and abdominal pain with hard/lumpy stools 3 (1.6%). About 16 (8.5%) of them were on regular medications prescribed by doctor for their illnesses. The findings of the study conducted in United States among the patients of IBS revealed that out of 1718 respondents, 161 reported with the symptoms of IBS. The most frequently reported symptoms were abdominal pain with bloating 86 (53.4%), abdominal pain with diarrhoea 51 (31.7%) and abdominal pain with constipation 24 (14.9%). About 127 (79%) consumed over the counter drugs.[4] In support to the study findings a prospective study done in Nigeria among 858 patients to investigate the most common symptoms of IBS reveal that 37.2% had abdominal pain with diarrhoea, 25.4% had alternating diarrhoea and constipation 41.3% had abdominal pain with bloating and 50.4% had abdominal pain which relieved on defecation.[5]

The data on dietary habits in this study reported that, 16 (84.2%) participants reported to consuming patties under deep fried foods daily, 15 (78.9%) consumed milk under the item milk products and 11 (57.9%) reported consumption of wheat frequently. The above study findings contradict the findings of the study conducted in Northern Inida among 33 patients with IBS which reported that the total dietary fibre intake and intake of fibre from vegetables, fruits and pulses are lower in patients with IBS.[6] Another study carried out in Poland among 32 women who reported to have IBS, the most frequently consumed food items daily included sweets

(83%), mango (10%), and cereals (7%). Women consuming foods rich in high FODMAPS such as sweets and mangoes had the most prominent IBS symptoms. An association was found between the IBS symptoms and the intake of milk (χ^2 =11.329, p =.010).[7] The findings of a cross-sectional study done in Norway among 4621 pre-university students of 20 colleges to identify the relationship between the symptoms of IBS and foods such as coffee, milk and cabbage. Dietary assessment was done using FODMAPs questionnaire. About 388 subjects were diagnosed with IBS. Higher intake of foods such as milk, coffee, carbonated beverages and cabbage were associated with IBS (p>.001, p>.0035, p>.012, p>.0015). The severity of symptoms was associated with a higher intake of coffee and milk.[8]

In this study, 12 (63.3%) participants had moderately perceived stress. There was statistically significant association found between the symptoms of IBS and the perceived stress (χ^2 =14.293, p=.001). In contrast to this study findings,a cross-sectional study was done among the nursing students at the International Islamic University in Malaysia, which revealed that there was no association between the students with IBS and their level of stress (p =.214).[9] The findings of the present study support the findings of a case-controlled study done on 123 IBS patients revealed a significant association between the IBS symptoms and stress (p=.0254).[10]

Conclusion

The present study revealed that women population is the most affected group prone to symptoms of IBS and its ill effects. Most of the vulnerable group of IBS sufferers remain in the age group of 20-50 years. Diet plays a major role in the exacerbation of the IBS symptoms and stress intensifies these symptoms simultaneously. Most of the women neglect it and take over-the-counter medicines to have cure, but IBS requires a prompt identification and the right treatment to prevent complications in long run.

Table 1: Frequency and Percentage of Sample Characteristics. N=188

Variables	Frequency	Percentage
Age in years		
20-35	77	41
> 35	111	59
Type of diet		
Vegetarian	64	34

Variables	Frequency	Percentage
Non- vegetarian	124	66
Type of duty/job		
Teaching staff	81	43.1
Non- teaching staff	107	56.9
Years of experience		
<10	103	54.8
11-20	48	25.5
> 20	37	19.7

Table 2: Frequency and Percentage of Clinical Variables. N=188

Clinical variables	Frequency	Percentage
Are you suffering from any illness?		
Yes	15	8
No	173	92
If yes, specify		
Blood pressure	2	1.1
Thyroid	4	2.1
Arthritis	1	0.5
Asthma	2	1.1
Diabetes	2	1.1
Migraine	1	0.5
Wheezing and cold	1	0.5
Bronchitis	1	0.5
Neck pain	1	5
Are you on any prescribed regular medications?		
Yes	16	8.5
No	172	91.5
If yes, specify		
Tab Amlopress	3	1.6
Tab Thyronorm	4	2.1
Tab Stamlo	1	0.5
Inhalers	2	1.1
Ayurvedic	1	0.5
Mucaine gel	2	1.1
Haemoglobin tablets	1	0.5
Tab Obimet	1	0.5
Steroids	1	0.5
Are you taking medications without prescriptions?		
Yes	1	0.5
No	187	99.5

Clinical variables	Frequency	Percentage
If yes,		
Number of tablets per day	1	0.5
Duration of taking medications		
< 6 months	1	0.5
6 months- 1 year	0	0
>1 year	0	0

Table 3: Symptoms of IBS in frequency and percentage. N=188

Symptoms of IBS	Frequency (f)	Percentage (%)
Abdominal pain		
Yes	19	10.1
No	169	89.9
If yes,		
Relieved with defecation	1	0.5

Symptoms of IBS	Frequency (f)	Percentage (%)
Relieved with defecation and constipation	1	0.5
Relieved with defecation and diarrhoea	1	0.5
Relieved with defecation, constipation and bloating	2	1.1
Relieved with diarrhoea and constipation	1	0.5
With diarrhoea	2	1.1
With bloating and hard stools	1	0.5
With diarrhoea and bloating	1	0.5
With bloating, hard stools and mucus passage	1	0.5
With hard stools and mucus	1	0.5
With diarrhoea & constipation	1	0.5
With bloating/distension	3	1.6
With hard or lumpy stools	3	1.6

Table 4: Dietary habits influencing IBS in Frequency and Percentage. N=19

Dietary habits	Daily		Frequently		Rarely		Never	
	f	(%)	f	(%)	f	(%)	f	(%)
Fast foods								
Burger	0	(0)	0	(0)	4	(21.1)	15	(78.9)
French fries	0	(0)	0	(0)	4	(21.1)	15	(78.9)
Pattie	16	(84.2)	0	(0)	3	(15.8)	0	(0)
Sandwich	0	(0)	0	(0)	5	(26.3)	14	(73.7)
Chicken fingers	0	(0)	0	(0)	1	(5.3)	18	(94.7)
Caffeine								
Coffee	7	(36.8)	1	(5.3)	5	(26.3)	6	(31.6)
Black tea	4	(21.1)	1	(5.3)	1	(5.3)	13	(68.4)
Vegetable								
Cabbage	2	(10.5)	9	(47.4)	6	(31.6)	2	(10.5)
Milk products								
Ice cream	1	(5.3)	3	(15.8)	12	(63.2)	3	(15.8)
Milk	15	(78.9)	4	(21.1)	0	(0)	0	(0)
Yogurt	7	(36.8)	3	(15.8)	3	(15.8)	6	(31.6)
Buttermilk	6	(31.6)	7	(36.8)	5	(26.3)	1	(5.3)
Sweeteners								
Sugar	9	(47.4)	3	(15.8)	3	(15.8)	4	(21.1)
Jam	0	(0)	1	(5.3)	7	(36.8)	11	(57.9)
Honey	1	(5.3)	2	(10.5)	7	(36.8)	9	(47.4)

Table 5: Perceived Stress of sample in Frequency and Percentage. N=19

Level of perceived stress	Frequency	Percentage
Low stress (0-13)	6	31.7
Moderate stress (14-26)	12	63.3
High perceived stress (27-40)	1	5

Table 6: Association between IBS symptoms and dietary habits. N=188

Symptoms of IBS	Milk		$\chi^2_{(df)}$	p value
	Rarely	Frequently		
Experienced	3	16	11.329(3)	.010*
Not experienced	31	138		

Symptoms of IBS	Stress			$\chi^2_{(df)}$	P value
	Low	Moderate	Severe		
Experienced	4	12	3	14.293 (2)	.001*
Not experienced	33	134	2		

*Significant at p<.05

Ethical Clearance: The ethical clearance was obtained from the Institutional Ethical Committee (IEC No. 704/2018) and CTRI registration (CTRI/2018/12/016636) was done. Informed consent was taken from the patients before collecting the data.

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Clinical Fracture of Fiber Reinforced Resin Composite Versus Conventional Resin Composite Restorations in Endodontically Treated Molars: A Randomized Clinical Trial

Sherifa Ahmed Abdelaziz Kandil [1], Mohamed Riad Farid[2], Shereen Hafez Ibrahim[3]

[1]*Assistant Lecturer of Conservative Dentistry, [2]Professor of Conservative Dentistry, [3]Assistant Professor of Conservative Dentistry, Faculty of Dentistry, Cairo University, 11 Saraya El Manial street, Kasr El Einy, Cairo, Egypt*

Abstract

Background: Short fiber reinforced resin composite (Ever X Posterior) is a bulk fill resin composite indicated as a core dentine substitute at high stress-bearing areas improve strength and fracture toughness of conventional resin composite and restored teeth. So, this randomized clinical trial was conducted to validate clinical performance of short fiber reinforced resin composite in endodontically treated molars.

Method: 56 participants having endodontically treated lower molars with moderate amount of remaining tooth structure were randomly enrolled in this trial and received either Ever X Posterior covered by Gaenial posterior or only Gaenial posterior resin composite that applied according to manufacturer instructions. Mann-Whitney U test was used for intergroup comparisons and Wilcoxon signed rank test was used for intragroup comparisons. The significance level was set at p ≤ 0.05. No statistically significant difference was observed between both tested groups for all USPHS criteria at different follow-up periods except for color match favoring Gaenial posterior with a significant difference between both groups.

Conclusion: Both types of restorations showed an acceptable clinical performance along 1 year follow-up period.

Keywords: *Clinical fracture, Direct resin composite, Endodontically treated molars,*

Introduction

Restoration of endodontically treated teeth is one of the main challenges in restorative dentistry due to chemical-physical and bio-mechanical alterations, increasing the incidence of their dental fracture.[22] The resistance of endodontically treated teeth is directly affected by the amount of remaining tooth structure. So, the main goal of the dentist for restoring endodontically treated teeth should be application of conservative approach.[6] Direct resin composite restorations have been proposed as one of the treatment options for restoring endodontically treated teeth. They are the most conservative restorations preserving sound tooth structure, can bind to tooth structure, reinforce tooth, and reduce time of treatment compared to the other treatment options.[23]

One of the recent advances in resin composite technology is the evolution of Short Fiber-Reinforced Composite (SFRC) that contain short E-glass fibers allowing it to resist crack propagation, thus enhancing the strength and the fracture toughness of conventional resin composite and restored teeth.[3] Although many invitro studies evaluated the performance of SFRC, there is a little data validating its clinical performance.

Thus, this randomized clinical trial was proposed to evaluate the clinical performance of SFRC (Ever X Posterior, GC Corp., Tokyo, Japan)versus microhybrid resin composite (G-ænial® Posterior, GC, Tokyo,

Corresponding Author:
Sherifa Ahmed Abdelaziz Kandil
Address: 185 Emtedad Ramses 2, Nasr City, Cairo, Egypt
e-mail: sherifaahmed@dentistry.cu.edu.eg

Japan) restorations in endodontically treated molars over 1 year. The proposed hypothesis was alternative hypothesis that SFRC restorations would have better clinical performance than microhybrid resin composite restorations in endodontically treated molars.

Subjects and Method

This prospective, randomized controlled trial was conducted between January 2019 and March 2020 at Conservative Dentistry clinic, Faculty of Dentistry, Cairo University. The trial was registered in Clinical Trials Registry (clinical trails.gov) with number (NCT03515265)

Eligible participants aged from 18 years to 55 years were those who had endodontically treated lower molars with moderate amount of remaining tooth structure[27]: Class II cavity (3 walls) with thickness of the remaining walls not less than 2 mm.[18] Participants were excluded when they had teeth with failed endodontic therapy, absence of opposing, evidence of any parafunctional habits, advanced periodontal diseases, or temporomandibular joint disorders. The selection criteria are very critical for clinical success of restorations.

Sample Size Calculation: Based on the previous study[4], if the success rate against fracture of the control group was about 99% and If there was truly no difference between the standard and experimental treatment, then 46 patients were required to be 80% sure that the limits of a two-sided 95% confidence interval would exclude a difference between the standard and experimental group of more than 10%. The number was to be increased to a sample size of 56 to compensate for losses during follow up (20% more than the calculated).

Randomization, Sequence Generation, and Allocation Concealment: In two parallel groups (n= 28 restorations), fifty six participants (26 males and 30 females) with the mean age of intervention(SFRC) (34.54±10.18) and comparator (microhybrid resin composite group) (34.39±10.41), were randomly enrolled in the trial through an online randomization web based tool (https://www.random.org/). Random numbers were placed in an opaque sealed envelope arranged by contributor who was not further involved any more in the subsequent phases of the clinical trial. For each participant, informed consent was taken after explaining the trial objectives and phases to the participant. The fifty sixth participants completed follow up times of the trial.

Clinical Procedures: All clinical procedures were done by the same operator who couldn't be blind to the type of resin composites used due to difference in their application.

After assessment of root canal treatment, the teeth were isolated by rubber dam (Sanctuary®Powder Free Latex Dental Dam, Malaysia).[14] Temporary filling was removed from the cavity. The cavity was then checked for any remaining carious lesions or any undermined enamel to be removed. A stainless steel gauge caliper 0-10 (SALVIN, Germany) was used to measure the thickness of the remaining walls to be 2 mm at minimum and the distance between cavity floor to occlusal surface was measured by a graduated periodontal probe (by Martin, Germany) to be 5-6 mm. An appropriate pre contoured sectional matrix with the corresponding ring (TOR VM, Russia) and a proper sized wooden wedge were applied to restore the missing proximal wall.[24]

All the restorative materials were applied according to the manufacturer instructionsTable (1). Selective enamel etching technique[10]35-40% phosphoric acid gel (Vococid, VOCO, Germany) was applied on the enamel margins only for 15 seconds, rinsed by water for 15 seconds and gently dried by blotting with cotton pellet. Universal bond [20](G-Premio Bond, GC, Tokyo, Japan) was applied and rubbed on the etched enamel and dentin surfaces, left undisturbed for 10 seconds then dry for 5 seconds at max air pressure and light cured for 5 seconds by a LED light curing unit (Woodpecker Light Cure I Led, China) with an intensity of 1600 mW/cm². The light intensity was checked periodically with the radiometer attached to the light curing device.

Centripetal technique was used to build up missing proximal by application of microhybrid resin composite. Mulling of highly viscous microhybrid resin composite is recommended for better marginal adaptation. For the SFRC group Figure (1), SFRC was packed in the cavity with an increment up to 4mm thickness ensuring that there was enough (1-2 mm) space left for the overlaying microhybrid resin composite on the surface as recommended by the manufacturer to ensure high esthetics and wear resistance. For the microhybrid resin composite group, all the cavity was filled by only microhybrid resin composite using incremental technique. Finally, all restorations were finished and polished.

Table (1): Material's specification, composition, lot number, and manufacturer.

Material	Specification	Composition	Lot Number	Manufacturer
Ever X Posterior	Short fiber reinforced resin composite (bulkfill)	Bis-GMA 10-20 wt%, TEGDMA 5-10 wt%, silicon dioxide 5-10 wt %, barium glass 60-70 wt%,glass fiber 5-15 wt%, PMMA, photoinitiators	1811191	GC Corp., Tokyo, Japan
G-ænial Posterior	Micro-hybrid resin composite (conventional)	UDMA, DMA co-monomer, Inorganic filler >100 nm; Fluoroaluminosilicate, Inorganic filler <100 nm; Fumed silica, Pre-polymerized fillers (16-17 μm); Strontium and lanthanoid fluoride Filler (wt/vol %): 77/65, photoinitiators	1807031	
G-Premio BOND	Universal adhesive	10-MDP, phosphoric acid ester monomer, dimethacrylate, 4-MET, MEPS, acetone, silicondioxide, photoinitiators	1810093	

Figure (1) a) prepared cavity in lower right first molar, b) application of SFRC in the center of the cavity while the peripheries are from microhybrid resin composite, c) 1-2 mm space left for the overlaying microhybrid resin composite, d) final direct SFRC restoration.

Clinical Evaluation: Clinical performance of dental restorations was evaluated at 6 and 12 months using modified United States public health service criteria (USPHS) as criteria of assessment[5] by two well-trained experienced blinded assessors Table (2). In some cases, as both assessors scored differently, they discussed until reaching a consensus.

Statistical Analysis: Categorical data were presented as frequencies and percentages and were analyzed using fisher's exact test. Numerical data of age was tested were represented by mean and standard deviation values and were analyzed using independent t-test. Ordinal data were presented as frequencies and percentages and were analyzed using Mann-Whitney U test for intergroup comparisons and Wilcoxon signed rank test for intragroup comparisons. The significance level was set at p ≤ 0.05 for all tests. Statistical analysis was performed with

IBM® SPSS® (SPSS Inc., IBM Corporation, NY, USA) Statistics Version 26 for windows.

Table (2): Modified USPHS criteria for clinical evaluation.

Outcome	Criterion	Score	Description	Measuring method
Primary outcome	Gross fracture	Alpha	Restoration is intact and fully retained	Visual inspection with mirror
		Bravo	Some portion of the restoration is still intact and can be repaired	
		Charlie	Restoration is completely fractured.	
Secondary outcome	Color match	Alpha	The restoration matches the shade and translucency of the adjacent tooth.	Visual inspection with mirror
		Bravo	There is a mismatch in the shade and translucency but it is within the normal range of tooth shade.	
		Charlie	The mismatch is beyond the normal range of the tooth shades and translucency.	
	Marginal integrity	Alpha	The explorer does not catch and there is no visible crevice along the margin of the restoration.	Visual inspection with mirror and explorer
		Bravo	The explorer catches and there is visible evidence of a crevice but the dentin or the base are not exposed.	
		Charlie	There is crevice defect extended to the dentin	
	Cavosurface marginal discoloration	Alpha	There is no visual evidence of any marginal discoloration at the junction of the restoration and the adjacent tooth structure	Visual inspection with mirror
		Bravo	There is visual evidence of shallow marginal discoloration.	
		Charlie	There is visual evidence of deep marginal discoloration toward a pulpal direction.	

Table (3): Frequencies (n) and Percentages (%) of (Modified USPHS criteria) in both groups.

Evaluation criteria	Score	Baseline SFRC %	n	Baseline Microhybrid resin composite %	n	6 months SFRC %	n	6 months Microhybrid resin composite %	n	12 months SFRC %	n	12 months Microhybrid resin composite %	n	Intra group P-value= SFRC	Intra group P-value= Microhybrid resin composite
Gross fracture	Alpha	100%	(28)	100%	(28)	100%	(28)	96.4%	(27)	100%	(28)	96.4%	(27)	1ns	0.368ns
	Charlie	0%	(0)	0%	(0)	0%	(0)	3.6%	(1)	0%	(0)	3.6%	(1)		
	Inter group P-value=	1ns				0.313ns				0.313ns					
Color match	Alpha	71.4%	(20)	100%	(28)	71.4%	(20)	100%	(28)	71.4%	(20)	100%	(28)	1ns	1ns
	Bravo	28.6%	(8)	0%	(0)	28.6%	(8)	0%	(0)	28.6	(8)	0%	(0)		
	Charlie	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)		
	Inter group P-value=	0.002*				0.002*				0.002*					
Marginal integrity	Alpha	100%	(28)	100%	(28)	100%	(28)	92.9%	(26)	92.9%	(26)	89.3%	(25)	0.135ns	0.097ns
	Bravo	0%	(0)	0%	(0)	0%	(0)	7.1%	(2)	3.6%	(1)	10.7%	(3)		
	Charlie	0%	(0)	0%	(0)	0%	(0)	0%	(0)	3.6%	(1)	0%	(0)		
	Inter group P-value=	1ns				0.154ns				0.679ns					
Cavo-surface marginal discoloration	Alpha	100%	(28)	100%	(28)	96.4%	(27)	92.9%	(26)	96.4%	(27)	92.9%	(26)	0.368ns	0.135ns
	Bravo	0%	(0)	0%	(0)	3.6%	(1)	7.1%	(2)	3.6%	(1)	7.1%	(2)		
	Charlie	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)		
	Inter group P-value=	1ns				0.556ns				0.556ns					
	Inter group P-value=	——				——				——					

P value *; significant (p ≤ 0.05) ns; non-significant (p>0.05).

Results-Table No. 3

Fifty six participants were enrolled in the study. Fisher's exact test showed no significant difference in gender distribution between participants of both groups (p=0.789). Independent t-test showed that there was no significant difference in age between participants of both groups (p=0.956).

For the intragroup comparison among the different follow-up periods, Wilcoxon signed rank test showed that there was no significant difference in the distribution of gross fracture, color match, marginal integrity and marginal discoloration scores within SFRC group and the microhybrid resin composite group. For the inter-group comparison, there was no statistically significant difference between both tested materials for all USPHS criteria except for color match favoring the microhybrid resin composite restorations as there was a significant difference of scores at all different follow-up periods.

Discussion

Restoration of endodontically treated teeth is a challenge in restorative dentistry[8] due to chemical–physical alterations (dehydration of dentin and mutation of collagen) and bio-mechanical alterations (loss of tooth structure and reduction of proprioception), all these alterations inflict a negative impact on the long-term prognosis of endodontically treated teeth increase the incidence of their dental fracture.[22] The fracture resistance of the endodontically treated molars was mainly affected by the number of remaining walls[25]. Since the mechanical response of the endodontically treated teeth depends mainly on the amount of remaining tooth structure. It is very important to maintain as much as possible of the remaining tooth tissues. The major goal of modern restorative dentistry is preservation of sound tooth structure.[26]

Among the current treatment options for restoration of endodontically treated posterior tooth include direct resin composite, crown, and post, core and crown. The decision of restorative technique would depend mainly on remaining tooth structure and amount of occlusal stress on the tooth to assure function and prevent fracture. In case of tooth with minimum to moderate loss of tooth structure can be restored successfully by direct adhesive resin composite restorations[27] while crown is recommended in case of tooth which weakened by a massive loss of sound tooth structure.[22] A post is indicated if retention is required for the restoration.[6]

SFRC is one of the recent advances in resin composite technology that elevated the fracture strength of endodontically treated teeth[16] also SFRC has sufficient polymerization properties in terms of degree of conversion, polymerization shrinkage, and shrinkage stress.[12] SFRC is composed of a cross linked resin matrix, short E-glass fibers, and inorganic fillers. SFRC also contains CQ and N, N-dimethylaminoethyl methacrylate (photoinitiator) that together with the E-glass fibers conduct and scatter light over a long distance also the translucent color of the material allowing adequate polymerization at 4-mm depth, so it can be applied in bulk safely.[11]SFRC was covered by microhybrid resin composite (Gænial Posterior) following manufacturer recommendations talso to maintain the same chemical integration between the materials. This bilayered configuration is similar to that of a natural tooth (biomimetic restoration) that improved mechanical properties by utilizing the inherent strengths of each material: a bottom layer forming the supporting bulkand a top layer with high wear resistance.

Microhybrid resin composite is a conventional resin composite provide adequate mechanical, physical properties and proper polishing properties.[21] Microhybrid resin composite is characterized by a trimodal technology with a combination of inorganic fillers and pre-polymerized organic (resin) fillers that reduce the polymerization shrinkage and shrinkage stress.[1]The comparator group was selected to be restored with direct microhybrid resin composite (Gænial Posterior) for preservation of sound tooth structure and also to reduce the effect of the restorative material confounder between the two groups so mainly the clinical performance of SFRC could be evaluated.

Regarding the results of gross fracture, no statistically significant difference between the two groups. This could be due to short period of observation (one year), both types of composites are characterized by having adequate mechanical properties: the fibers embedded in SFRC mimic the fibrous nature of dentin behaving as crack stoppers and transferring stress from the polymer matrix to stronger fibersin addition the linear chains of PMMA in the cross-linked matrix together with the fibers plasticize the matrix to some extent lead to increasing in fracture toughness, deflecting crack propagation as well as decreasing shrinkage strain values and improving flexural strength[11], also due to that the survival rate against fracture is mainly affected by the number of remaining walls this in accordance with

Suksaphar et al. 2017[27], and in addition to excluding patients with bruxism that is in accordance with Opdam et al. 2014[19] who reported that in their systematic review that bruxism is one of the patient risk factors influencing on survival of posterior restorations causing restoration fracture. The short-term fracture of one microhybrid resin composite restoration might occur due to inadequate high impact force applied to the restoration, improper cavity preparation or presence of voids in the restoration.

While regarding the results of color match, there was a statistically significant difference between the two groups favoring the microhybrid resin composite restorations. These results in agree with ElAziz et al. 2020[7] who reported that a grey color mismatch of SFRC restorations in teeth with dark sclerotic dentin present at the base of the cavity was due to the SFRC is highly translucent material, so the 1-2 mm remaining thickness of the covering microhybrid resin composite layer could not conceal the discolored dentin. Regarding the results of our study in cases of remaining deep stain at the base of the cavity, it is recommended touse an underlying opaquer under SFRC or increase the thickness of overlaying microhybrid resin composite more than 2 mm unlike the manufacturer recommendation that SFRC should be covered by 1-2 m. In contrast to our findings, Guney & Yazici 2020[12] who found that only one SFRC restoration at baseline and 6 months follow up, and two SFRC restorations at 12, 18, and 24 months follow up periods received a score of bravo. These might be attributed to no discolored underlined dentin left in the cavity.

For the results of the marginal integrity. There was no significant difference between both groups in agreement with Guney & Yazici 2020.[12] This could be attributed to that both types of composites are characterized by having low polymerization shrinkage and shrinkage stress which are the predisposing factors to marginal adaptation failure.[29] The microhybrid resin composite with inorganic fillers and prepolymerized fillers reduce the polymerization shrinkage and shrinkage stress by increasing the available sites for composite flow due to reduction of coupling agents.[1] SFRC contains short Eglass fibers and the linear chains of PMMA in the cross-linked matrix decreasing the shrinkage strain values.[11] Also, short E-glass fiber fillers that may absorb polymerization stress and increase stress relieving capacity improving adaptation.[12] Reduction in shrinkage stress at the interface between the restorations and teeth lowers the risk of cuspal deflection and dentin fractures.[28]

The Slight lack of adaptation might occur due to the high viscosity of G-ænial Posterior (inmicrohybrid resin composite group and also SFRC group that covered by microhybrid resin composite), masticatory stresses and temperature changes in the oral cavity. Teeth and resin composite materials have different coefficient of thermal expansion, so temperature changes which take place in the oral cavity lead to stress in the adhesive interface leading to breakage of hybridization bonding.[9]

Concerning the results of cavo surface marginal discoloration, there was no statistically significant difference that was in accordance with Tanner et al. 2018[28] and Guney & Yazici 2020.[12] This might also be attributed to both types of composites are characterized by having low polymerization shrinkage and shrinkage stress improving adaptation thus reduce marginal discoloration.[12] Marginal discoloration usually results from defects that present between restorations and cavity margins[15] that associated with deposition of food and beverage stains and bacterial biofilm into irregularities of the margin.[17] Marginal discoloration is influenced by the material, the operator, or factors related to the patient such as eating and oral hygiene habits.[13] Minor degree of discoloration in both groups might be due to the slight lack of adaptation that might occur due to the high viscosity of G-ænial Posterior, the masticatory stresses and temperature changes in the oral cavity, patients' diet and oral hygiene habits.

According to the guidelines of American Dental Association for adhesive resin composites that released in 2001,[2] resin composite restorations were considered to be clinical acceptable when there was no more than 5% of the restorations were lost and did not show critical microleakage at the sixth months follow up. Based on our findings, both types of resin composite restorations were clinical acceptable functional restorations at one year. The alternative hypothesiswas rejected.

Limitations of the Study:

1. Short follow up period but more follow up visits are scheduled for longer follow up.

2. Operator blinding could not be applied because of different restorative techniques.

Clinical Recommendations:

1. Longer follow up period is highly recommended for confirming the present results of this trial.

2. Further randomized clinical trials evaluating general

performance of fiber reinforced resin composite restorations in various clinical situations are recommended e.g. to be compared to indirect crown restorations in endodontically treated teeth or to be used in patients with high occlusal stresses.

Conclusion

Both fiber reinforced resin composite and conventional resin composite restorations in endodontically treated molars with moderate amount of remaining tooth restoration have an acceptable clinical performance over one year follow-up period.

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Assessment of Stress and its Determinants among Indian Medical Undergraduate Students of North India

Shiv Kumar Yadav[1], Dheeraj Gupta[2], A.R. Piyush[3], Bhola Nath[4]

[1]Assistant Professor, [2]Associate Professor, Community Medicine, [3]Assistant Professor, Pathology, Govt. Doon Medical College, Dehradun, [4]Additional Professor, Department of Community and Family Medicine, AIIMS Bathinda

Abstract

Background: Medical Education curriculum is considered to be one of the toughest across the world. The long duration of course along with frequent assessments done make it stressful journey for medical students. Assessment of stress and its determinants among medical students is of utmost importance so that correctable actions can be taken.

Objective: Assessment of stress and its underlying causes among Indian Medical Undergraduate Students.

Material and Method: A descriptive cross-sectional study carried among 380 MBBS (Undergraduate) students of Government Medical College of North India to explore various stress determinants (Stressors) which were categorized into 6 domains viz. Academic Related Stressors (ARS), Intrapersonal and Interpersonal Related Stressors (IRS),Teaching and Learning-Related Stressors (TLRS), Social Related Stressors (SRS), Drive and Desire Related Stressors (DRS) and Group Activities Related Stressors (GARS). Data collection was carried out for a period of 3 month and self-administrated validated MSSQ questionnaire was used as a Data tool. Data entered and analyzed with SPSS software.

Result: 31% medical students suffers from Severe and 56% medical students suffers from moderate Academic Stress. 40% medical students have documented that Teaching and Learning Method as a source of Moderate stress. Academic related stress and Social related Stress has significant association among both gender when compared with 1st, 3rd and 5th Semester curriculum. Father's Education status of a Female Student and their Residence has significant association with Academic related stress. Mother occupation and 1st, 3rd and 5th Semester Curriculum has significant association with Teaching Related stress.

Conclusion: Stress exists in various domains and with variable intensity during whole MBBS course.

***Keyword:** Stress, Medical Students, Determinants.*

Introduction

Medical education training period is considered to be a highly stressful period for the students all over the world.[1,2] Various Studies have shown prevalence of stress among medical students ranging from 30% to 50%.[3,4] Two studies conducted among Malaysian government university students reported presence of emotional stress ranging from 29.1 % to 41.9% among medical students[2,3] and another study conducted among Malaysian private medical school reported it to be 46.2% [1] as measured by General Health Questionnaire (GHQ-12).[5] 57% medical students have emotional disorders as measured by GHQ compared with law students who were having 47.3% emotional disorders.[6]

These studies elicit presence of elevated psychological pressure on medical students. Stressful conditions adversely affect emotional, mental and

Corresponding Author:
Dr. Dheeraj Gupta
Associate Professor, Community Medicine, Govt. Doon Medical College, Dehradun
e-mail: itsdheeraj@gmail.com

physical well-being of students. Various studies have shown that persistent stressful conditions were associated with mental and physical health problems in medical students at various stages of their training.[1,2,3,4,8,9] Studies have also documented that excessive stress level leads to lowered self-esteem[10,11], anxiety and depression[12,13] difficulties in solving interpersonal conflicts[14], sleeping disorders[15,16], increased alcohol and drug consumption[17-19], cynicism, decreased attention, reduced concentration and academic dishonesty[20] among medical students and when stress becomes unbearable among medical student it leads to suicide.[21] Thus It is very important to work for early diagnosis as well as effective intervention programmes to prevent possible future mental illnesses among medical students.[1,7]

A Stressor is a personal or environmental event that causes stress.[22,23] Various studies have grouped stress among medical students into six categories; Academic Related Stressors (ARS), Intrapersonal and Interpersonal Related Stressors (IRS), Teaching and Learning-Related Stressors (TLRS), Social Related Stressors (SRS), Drive and Desire Related Stressors (DRS), and Group Activities Related Stressors (GARS).[24] Various Studies have documented that Medical training, especially Academic matters are most common stressors affecting medical students' well-being[2,7,24-27]. Students Personal problems and its relation with student psychological morbidity and academic success is still unclear.[2,20] So this study is planned to assess the presence of stress and its various determinants among Indian Medical Undergraduate Students so that intervention can be planned to reduce the stress among Medical Undergraduates.

Aims and Objective:

1. Assessment of Presence of Stress among Indian Medical Undergraduate Students.

2. Exploration of underlying causes (Stressors) responsible for stress among Indian Medical Undergraduate Students.

Methodology

A Descriptive Cross-Sectional study was carried out among 380 Indian Medical Undergraduate Students of a Government Medical College of North India. Before enrolment, written informed consent was obtained from all study participants. Study participants were enrolled by using convenient sampling method. The study was conducted for a period of 3 months and Self-administered validated MSSQ[28] Questionnaire was used as data collection tool. Data was entered in MS Excel and analysed with SPSS Software. Means (±SD) were computed for Continuous Variables and Percentages were estimated for Categorical Variables. Chi square test, Student T test and Pearson Correlation were applied to look for any association between variables.

Data Tool: The Medical Student Stress Questionnaire (MSSQ) was developed to identify various stressors responsible for causing stress among medical students as well as measure the intensity of stress caused by the stressors. The six domains of stress measured by the MSSQ were developed based on various researches. 40 questions in MSSQ were answered on Likert scale from 0(No stress), 1(mild stress), 2 (moderate stress), 3 (severe stress) to 4 (very severe unbearable stress). The MSSQ grouped stressors into six domains, each based on a common underlying themes, I. Academic Related Stressors (ARS), II. Intrapersonal and Interpersonal Related Stressors (IRS), III. Teaching and Learning-Related Stressors (TLRS) IV. Social Related Stressors (SRS) V. Drive and Desire Related Stressors (DRS) VI. Group Activities Related Stressors (GARS). Each Question is categorised into one of 6 domains as mentioned in stress domain column in questionnaire attached so there are 13 question of domain I, 7 questions of domain II, and so on as mentioned below:

	I	II	III	IV	V	VI
Total						
Divided by Score	13	7	7	6	3	4

Responses given by participants were categorised in number as mentioned above from 0 to 4. Then added and divided by Denominator assigned to each domain for example there are 13 question which are related to academic related stressor so responses given by participants for these 13 question were added and divided by 13 and then whatever be score were assessed based on stress score criteria. 0 – 1.00 (mild stress), 1.01 – 2.00 (moderate stress), 2.01 – 4.00 (high stress). This way we calculated role of Different domains of stressor in causing stress among students.

Result

Among Study Participants, Male to Female ratio was approximately equal. Majority (68%) of students

were of age group 18-20 years. Approximately 74.5% were from urban background and 84.5% have done schooling from urban school while rest completed their studies from rural schoolsas shown in table 1.

Table 1: Profile of Study Participants

Sr No	Variables		Frequency (%) (n=380)
1	Gender	Male	186(48.9%)
		Female	194(51.1%)
2	Age Group	< 18 year	7(1.8%)
		18-20 years	260(68.4%)
		21-24 years	113(29.8%)
3	Residence	Rural	97(25.5%)
		Urban	283(74.5%)
4	Schooling	Rural	59(15.5%)
		Urban	321(84.5%)
6	Semester MBBS	1st	146(38.4%)
		3rd	103(27.1%)
		5th	131(34.5%)
7	Father Education	Upto Middle School	11(2.9%)
		High School	25(6.6%)
		Intermediate/Diploma	65(17.1%)
		Graduate	146(38.4%)
		Profession/Honours	133(35%)
8	Mother Education	Upto Middle School	38(10%)
		High School	37(9.7%)
		Intermediate/Diploma	76(20%)
		Graduate	118(31.1%)
		Profession/Honours	111(29.2%)
9	Decision to join Medical field	Self	313(82.4%)
		Parents	61(16.1%)
		Others	6(1.5%)
10	Father Occupation	Unskilled worker	13(3.4%)
		Skilled Worker	261(68.7%)
		Professional	106(27.9%)
11	Mother Occupation	Housewife	288(75.8%)
		Skilled Worker	25(6.6%)
		Professional	67(17.6%)

Distribution of Stress in Students as Per Stressors: Students experiences variable level of stress during the medical training period. Severe Stress is caused by 30.8% Academic Related Stressor,12.4% Group Activities Related Stressors, 10.3% Intra & Interpersonal related Stressors and 8.9% Teaching and Learning Related Stress. Moderate Stress is caused by 56.3% Academic Related Stressor,39.7% by Teaching and Learning Related Stressor, 37.9% Group Activities Related Stressors, 37.4% Intra & Interpersonal related Stressors,34.2% by Social related Stressors as shown in graph 1.

Graph 1: Distribution of Stress in Students as Per Stressors (n=380)
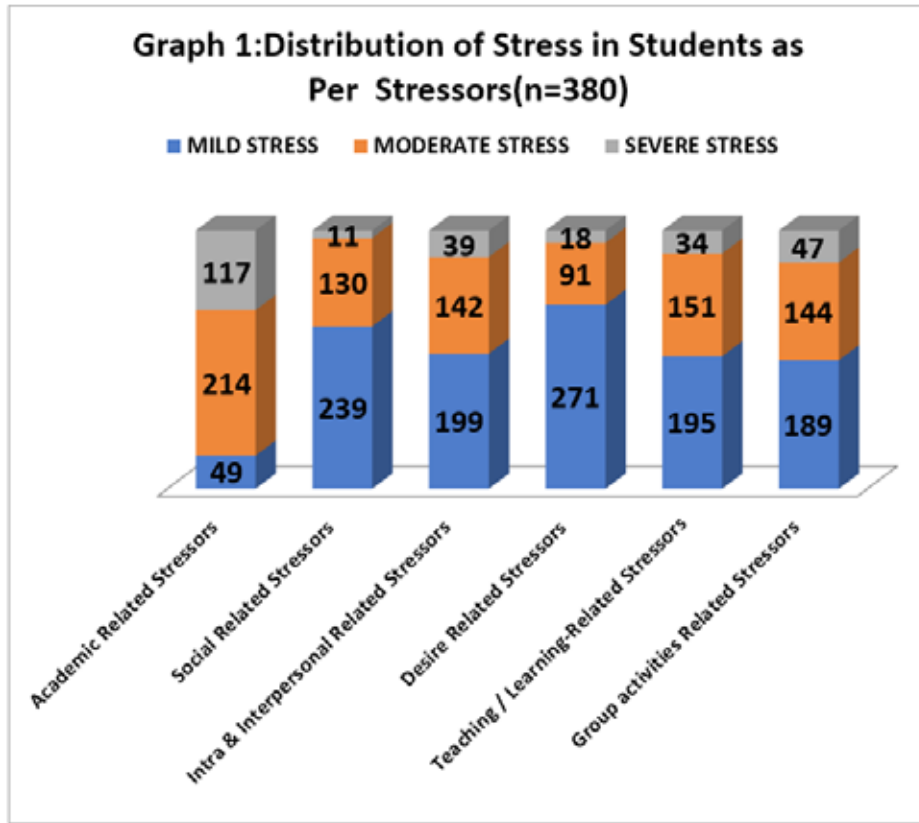
Academic Related Stressors (ARS): Academic Related Stressors like Syllabus, Test & Examination, Self-Expectation, Heavy Workload, failing behind in reading schedule, lack of skills, difficult understating, Less Time, Grading process etc. were used to assess the impact of these stressors in causation of stress among medical students. Both Male and Female Students showed significant association of ARS with different Semester and Female students have significant association of their place of residence in causation of Academic Related Stress as shown in Table 2.

Table 2: Relations of Academic Related Stressors with Gender

Sr.No.	Gender	Stress	Semester			Chi- Square (P Value)
			1st	3rd	5th	
1	Male	Mild	4	7	14	12.093 (0.0170
		Moderate	43	27	37	
		Severe	30	8	16	
	Female	Mild	8	7	9	10.597 (0.031)
		Moderate	32	31	44	
		Severe	29	23	11	
			Residence			
			Rural		Urban	
2	Male	Mild	7		18	0.691 (0.708)
		Moderate	29		78	
		Severe	18		36	
	Female	Mild	10		14	0.6496 (0.039)
		Moderate	19		88	
		Severe	14		49	

Social Related Stressors (SRS): Different Semesters contributes towards significant social related stress in both male and female students. Education status of Mother of male students was found to be significantly associated with Social related stress and whether decision to join medical profession was taken by self, parents, siblings was found to be significant Stressor among both male and Female students as shown in table 3.

Table 3: Relation of Social Related Stressors with Gender

Sr.No	Gender	Stress	Semester			Chi- Square (P value)
			1st	3rd	5th	
1	Male	Mild	52	16	39	12.987 (0.011)
		Moderate	25	24	24	
		Severe	0	2	4	
	Female	Mild	54	34	44	11.016 (0.026)
		Moderate	15	23	19	
		Severe	0	4	1	

Sr.No	Gender	Stress	Mother Education					Chi- Square (P value)
			Upto Middle School	High School	Intermediate	Graduate	Post-Graduation	
2	Male	Mild	13	14	26	35	19	Yate's CS 18.005 (0.0211)
		Moderate	12	7	19	7	28	
		Severe	0	2	0	3	1	
	Female	Mild	11	9	21	50	41	Yate'CS 2.982 (0.93)
		Moderate	2	4	8	21	22	
		Severe	0	1	2	2	0	

Sr.No	Gender	Stress	Decision to Join Medical field			Chi- Square (P value)
			Self	Parents	Siblings Relatives	
3	Male	Mild	90	14	3	Yate's CS 12.872 (0.011)
		Moderate	60	13	0	
		Severe	4	0	2	
	Female	Mild	112	19	1	Yate's CS 11.247 (0.02)
		Moderate	43	14	0	
		Severe	4	1	0	

Group Activity Related Stressors (GARS): Group activity stressor like participation in classroom, feeling of incompetence, peer pressure of performance was assessed to document their role in stress among students. Students when asked to work or prepare a project in group, this itself act as a stressor for them. Mother Education of male student and place of residence of male student showed significant effect of group activity related stressor on them as shown in Table 4.

Table 4: Relation of Group Activity Related Stressors with Gender

Sr.No	Gender	Stress	Mother Education					Chi- Square (P-value)
			Middle School	**High School**	**Intermediate**	**Graduate**	**Post-Graduation**	
1	Male	Mild	7	11	23	30	19	17.873 (0.02)
		Moderate	14	6	14	13	23	
		Severe	4	6	8	2	6	
	Female	Mild	5	6	19	36	33	7.94 (0.439)
		Moderate	7	4	9	29	25	
		Severe	1	4	3	8	5	
2			Residence					
			Rural		**Urban**			
	Male	Mild	17		73			8.708 (0.013)
		Moderate	27		43			
		Severe	10		16			
	Female	Mild	21		78			3.593 (0.166)
		Moderate	14		60			
		Severe	8		13			

Desire Related Stressor: Presence of desire related stressor among students were assessed like parental pressure to study well, Family Responsibility and unwillingness to study medicine among student and it was found that female student have more significant effect of desire related stress in relation with their semester, place of schooling and place of residence as shown in table 5.

Table 5: Relation of Desire Related Stressor with Gender

Sr.No	Gender	Stress	Semester			Chi- Sqaure (P value)
			1st	**3rd**	**5th**	
1	Male	Mild	59	29	45	2.787 (0.594)
		Moderate	15	11	16	
		Severe	3	2	6	
	Female	Mild	52	34	52	11.166 (0.025)
		Moderate	15	23	11	
		Severe	2	4	1	
2			Place of Residence			
			Rural		**Urban**	
	Male	Mild	33		100	4.264 (0.119)
		Moderate	16		26	
		Severe	5		6	
	Female	Mild	24		114	6.68 (0.035)
		Moderate	16		33	
		Severe	3		4	

			Place of Schooling		
			Rural	Urban	
3	Male	Mild	23	110	5.338 (0.069)
		Moderate	10	32	
		Severe	5	6	
	Female	Mild	11	127	9.213 (0.010)
		Moderate	7	42	
		Severe	3	4	

Discussion

This study provide significant information regarding existence of stress in various domains among medical students of India which is supported by various studies and showed the prevalence of stress among medical students ranging from 30% to 50%.[3,4] Two studies conducted previously showed presence of emotional stress ranging from 29.1 % to 41.9% among medical students[2,3] and another study conducted among Malaysian private medical school reported it to be 46.2%[1] as measured by General Health Questionnaire (GHQ-12).[5] 57% medical students have emotional disorders as measured by GHQ compared with law students who were having 47.3% emotional disorders.[6] Academic Related Stressor (ARS) contributes to significant stress among medical students. In this study Both Male and Female Students showed significant association of ARS with different Semester and Female students showed significant association of Residence with ARS. Academic Related Stress are responsible for causing 30.8% Severe Stress and 56.3% Moderate Stress among medical students which is similar to findings of various studies which have documented that medical training, especially academic matters are most common stressors affecting medical students well-being.[2,7,24-27] Academic Learning Related stress domain has maximum Correlation with Group activity which involves Student participation which suggest that student academic learning in group predisposes them to stress. Social Life Related Stressors (SRS) like interaction with patients, lack of time for family and friends, unable to answer patients doubts, facing death of patients, frequent interruption of work by others if not solved on time causes stressful student life. Different Semester contributes towards significant social related stress in both male and female students. Education status of Mother of male students was found to be significantly associated with Social related stress and

whether decision to join medical profession was taken by self, parents, siblings was found to be significant Stressor among both male and Female students. Social life Stressors are responsible for 2.9% Severe Stress and 46.4% Moderate Stress among medical students. Social Related Stress have maximum correlation with Intra and Inter personal relation stress which suggest conflicts in relationship are source of major stress.

Students when asked to work or prepare a project in group, this itself act as a stressor for them. Mother Education of male student and place of residence of male student showed significant effect of group activity related stressor on them. Group Activity related stressors are responsible for causing 12.4% severe Stress and 37.9% moderate stress. Presence of desire related stressor among students were assessed like parental pressure to study well, Family Responsibility and unwillingness to study medicine among student and it was found that female student have more significant effect of desire related stress in relation with their semester, place of schooling and place of residence. Desire related stressor is responsible for causing4.7% severe stress and 23.9% moderate stress. Desire related stress showed maximum correlation with Group Activity related stress .Students were assessed on whether lack of enough study material, lack of guidance from Teacher, incompetent Teachers, inappropriate Assignments, absence of feedback from teachers and lack of recognition from teachers contributes towards Teaching and learning related stressor among them it was found that female students showed significant association of TLRS with different semester . Teaching and learning stressors are responsible for causing 8.9% severe stress and 39.7% moderate stress. Intra and Interpersonal related stressor are responsible for causing 10.3% Severe stress and 37.4% Moderate Stress. however various other studies have been done so far but Students Personal problems

and its relation with student psychological morbidity and academic success is still unclear.[2,20] Inter and Intra Personal relationship showed maximum correlation with Teaching and Learning Stress which emphasizes the impact of emotional health on student's learning.

Conclusion

Medical Students of India are under lots of stress and there are various stressor as shown in this study apart from academics related stress in their life. Timely intervention dedicated on particular stressors will prover to be very significant in reducing their stress level.

Ethical Clearance: Taken from Institutional Ethics Committee of the Medical College.

Source of Funding: Self

Conflict of Interest -Nil

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Monitoring of Water Quality the Need of Present Day House Hold Water Management

Sindhu Kizhakkeppattu[1], D. Karaline Karunagari[2]

[1]PhD Scholar, [2]Professor, Rani Meyyammai College of Nursing, Annamalai University, Chidambaram, Tamil Nadu

Abstract

WHO 2019 report on drinking water says that In 2017, 71% of the global population (5.3 billion people) used a safely managed drinking-water service – that is, one located on premises, available when needed, and free from contamination.. Most countries, the proportions of piped and other-improved water supplies are faecally contaminated sources due to lack of basic sanitary protection against contamination. Contaminated water is an important contributor to water borne disease including hepatitis A,cholera, typhoid, and poliomyelitis.[1] For people with enough water supply can treat their water at home after testing water quality to ensure microbiological quality. Treating water at the household level or other point of use also reduces the risk of waterborne disease arising from recontamination during collection, transport, and use in the home. This article mainly focuses on need for water quality monitoring,water quality, types of water quality testing the importance of water quality monitoring and reviews related to water quality testing.

Keywords: *Water quality, drinking water, tests in monitoring water quality, water quality standards.*

Introduction

Water is a vital environmental factor to all forms of life. It has a major role to play in the social and economic life of an individual. Water is used for domestic, .agricultural, industrial and electrical purposes. Water used for drinking purpose must be safe and whole some. It must be free of microbiological, physical and chemical contamination.

Unsafe drinking water along with poor sanitation and hygiene accounts for nearly 10% of the total burden of the disease worldwide .Today 2.2 billion people around the world lack safe drinking water.[2] It includes estimated 4 billion cases of diarrhea disease annually causing 1.8 million deaths mostly among children under 5 years of age. Around 884 million people lack access to good water supplies drawing their water from lakes and rivers unprotected wells and springs and other

sources that are highly contaminated with water borne pathogens.[3,1] Globally at least 2 billion people use a drinking water source contaminated with faeces. People relay on improved water sources that are nevertheless subjected to frequent and extensive microbial contamination.[4] Tap water supplied to urban dwellers in major cities in the developing countries is of uncertain microbiological quality because of inadequate treatment or may be due to microbial contamination due to failures in the distribution system. Providing disinfected piped water to each house hold is the best solution to water borne diseases; due to resources constraints which is not available in most of the developing world .[5]

The provision of safe drinking water was one of the eight essential component of primary health care at Alma Atta Declaration 1978.[6] Millennium Development Goals focus on halving the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015. The proposed sustainable Development Goals declared in 2015 is to achieve universal and equitable access to safe and affordable drinking water for all by 2030.[7] As per Gov. of India annual report of department of water and sanitation 2018 -2019,the Ministry had launched the National Water Quality Sub-Mission on 22nd March, 2017 under

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Correspondence Author:
Sindhu Kizhakkeppattu
PhD Scholar, Rani Meyyammai College of Nursing, Annamalai University, Chidambaram, Tamil Nadu
e-mail: kizhakkeppattusind@gmail.com

NRDWP to provide safe drinking water to about 28,000 arsenic/fluoride affected habitations over a span of 4 years, subject to availability of funds.[8]

In India as per the statistics 85% of the rural households have access to drinking water within or near to their premises. 70% of India's improved household water sources were polluted with sewage effluents.[9]

Water borne disease account for 10% of total burden of disease and at affect about 50 million people every year in India and claim about 5million lives, of which 1.5 million are children.[10]

Previously considered key factors for the prevention of water borne disease are sanitation, personal hygiene and availability of good quality drinking water. Recently quality of water also got equal or greater importance with attributable risk reduction of 39%.[11, 12]

According to a survey by CWRDM, there are 67lakh opens wells in Kerala. 80% of population in Kerala is estimated to depend on ground water for different uses.[13] A study conducted by CWRDM indicate that 70% of drinking water wells in Kerala have facial contamination.[14]

Contamination of wells can happen from both above and below the surface. It can be from failing septic tank system, manure and fertilizer applications mining and other land uses. Sources of microbial contamination of ground water include agricultural runoff,effluents from septic tank,sewage discharges and infiltration of dissolved wild animal fecal matter. Poor well maintenance and construction can increase the risk of bacteria and other microorganisms. The contamination source depend on the type of settlement, population density sanitation arrangements and sanitation behavior[15, 16]

Water Quality: In today's world analysis of water is becoming increasingly important in order to monitor the water and waste water quality. Physical chemical biological and microbiological analysis of water is essential to assess the quality of to provide pure water to the public for drinking and other domestic purpose

Different tests in monitoring water quality:

Sensory Examination: This is the basic test for water it includes testing of clarity, odour, taste and color. Taste water for any abnormal taste and colour. Taste water for any abnormal taste. Color can be tested by usual comparison of the sample with known concentration of coloured solution. Colour is expressed in Hazaenunit. Temperature is recorded in Celsius scale. Warm waterholds less oxygen than cold water

Dissolved oxygen: Healthy water have high levels of dissolved oxygen

pH: Water pH is usually between 6.50 and 8.50

Turbidity: Turbidity measure the clarity of water. It is measured by Nephelo Turbidity meter

Hardness: The amount of dissolved calcium and magnesium in water determine its hardness.0-50mg/L: soft water.

Testing for coliform Bacteria: Coliform bacteria live in the gastro intestinal tract of animals, soil or vegetation, coliforms enter water supplies from the direct disposal of waste water into streams or lakes or from runoff from wooded areas, septic tanks and sewage plants in to streams or ground water. Coliforms are not a single type of bacteria that includes many strains such as E.Coli. Measurements of total coliform gives an overall picture of microbial contamination. Presence of E.Coli in water indicate fecal contamination of water. As per report on WHO/UNICEF joint monitoring programme for water supply, sanitation and hygiene no E. coli (or alternatively thermotolerant coliforms) detected in a 100 mL sample.[17]

Drinking water standard gives the recommended level of constituents that are acceptable in drinking water. According BIS standards the desirable limit of the drinking.[18]

Water Quality Standards:

Parameters	Desirable limits
Colour (Hazen unit)	5.00
Turbidity (NTU)	5.00
pH	6.50-8.50
Total Hardness	300meq/l
Iron mg/L	.30
Chloride	250mg/l
Total dissolvat solids	500.00
Sulphate (mg/L)	200
Nitrate(mg/ml)	45.00
Calcium(mg/ml)	75.00
Total coliform (MPN/100ml)	10.00
EColi	Absent

An investigation was done on bacteriological contamination of ground water and its causative factors in selected areas of Kozhikode district in Kerala state. Multiple tube fermentation technique was used to find out the total coliforms, faecal coliforms and E.coli. 55% of water sample was contaminated due to unscientific construction of latrines 11.1% by an animal source and 33.3% had a mixed source. One of the identified organism was Bacillus cereus from human faeces .Results showed that there was a significant influence between the distance of the latrine from the well and the presence of E.coli.[13]

Study on Sanitation mapping of groundwater contamination in a rural village of India found that poor planning, design of the wells and improper siting of wells from latrines which were found to be the possible reasons of groundwater contamination A moderate negative correlation (r = –0.593, r = –0.470) was ensued between the distance from latrine and coliform count.[16]

A study conducted on relation of sanitary condition of water source and water borne diseases in rural households of South India. In order to assess the sanitary condition of the household drinking water sources and hygienic practices of the community and incidence of waterborne diseases. During the 12 months study period 72 episodes of water borne diseases was reported with an incidence rate of 49/1000 persons/year .Major source of household water supply were dug wells and 30% water source had E.coli and more than 60% of water source contain faecal coliforms more than 10 MPN/100ml in all seasons .Stagnant water in the premises was found to be associated with waterborne diseases.[19]

In a study conducted to assess the microbial quality of drinking water and prevalence of water-related diseases in Kenya,samples of drinking water were collected from water sources (boreholes, rivers, and wells) and at the point of use (households) and analyzed for Escherichia coli and total coliform (TC) bacteria using the most probable number method. The prevalence rates of some of the water-related diseases assessed using clinical health records. Findings showed that Typhoid was the most prevalent water-related disease during the dry season (10%), whereas diarrhea (3%) was the most prevalent during the wet season. All drinking water at abstraction and point of use were microbiologically contaminated and therefore pose serious health risks to consumers of such water. Thus, there is need for public health awareness campaigns on household water management to curb incidences of water-related diseases.[20]

In a study to assess the sanitary condition and water quality of household wells and to depict it spatially, using Geographic Information System (GIS) in an urban area of, Kerala, community-based cross-sectional census-type study was conducted among households (n = 449) residing in a 1.05 km^2 area .Structured questionnaire and Differential Global Positioning System (DGPS) device were used for data collection. Water samples taken were analyzed in an accredited laboratory. Most of the wells were in an intermediate-high contamination risk state, with more than 77% of wells having a septic tank within 7.5 m radius. Coliform contamination was prevalent in 73% of wells, and the groundwater was predominantly acidic with a mean of 5.4, rendering it unfit for drinking. The well chlorination and cleaning practices were inadequate, which were significantly associated with coliform contamination apart from a closely located septic tank. However, water purification practices like boiling were practiced widely in the area.[21]

In a review to investigate the prevalence of E. coli O157:H7 in water sources especially used for drinking and to develop the diagnostic method for its early detection,describes traditional cultural method, immunological techniques, and polymerase chain reaction (PCR)–based method for detection of this bacterium in water sources. The current PCR-based techniques such as real-time PCR are more specific and sensitive and require less detection time (<3 hours). These can be applied for regular water monitoring and proper management of water sources to prevent waterborne diseases due to E. coli O157:H7.[22]

In a study among 400 households at Salyan district, Nepal Household survey, Spot observations, Physical parameters, and Microbial contamination (E. coli), of PoU drinking water were assessed. Physical parameters were within the limit value of National Drinking Water Quality Standards (NDWQS), 2005. Microbial contamination (E. coli) was laboratory confirmed in 191 PoU samples. Uncovered storage vessels possessed twice much as odds risk (OR=2.24; CI=1.208-4.166) of contamination than that of covered ones. Households with water in the dwelling had of greater risk of contamination. Technical and Behavioral factors were evidenced to be associated with microbial contamination in study sample. The study indicates that, if water is from safe distribution point and stored in a covered vessel

which is easily cleanable, PoU drinking water shall be microbiologically safe.[23]

The supporting literature high lights the importance of regular testing of water quality.

Regular testing is important:

- To identify existing problems.

- Ensure water is suitable for the intended use especially if used for drinking by humans

- Track changes overtime.

- Determine the effectiveness of a treatment system.

Conclusion

Water whether for a public municipality, water facility or business/home must be tested regularly to keep the source safe and free of potential health/ environmental hazards. The house hold wells needs to be tested and treated to safe guard water against harmful contaminants that may present in the well certain chemical contaminants that are sometimes found in a water source can cause long term health problem that take years to develop. Frequent water testing will identify unsafe water and ensure that the treatment system is treating the water to a satisfactory level. Private well water should be tested minimum of once per year. Drinking water supplies obtained from shallow wells and surface water source should be tested more frequently (ie seasonally) as they are more susceptible to contamination.

Ethical Clearance: Ethical clearance was taken from Institutional Ethics Committee,Government College of Nursing, Medical College PO, Kozhikode, Kerala.

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Dengue Fever Awareness among Patient Presenting to Tertiary Care Hospital, Gurugram (India)

Sonu Kumar Singla[1], Mahima Rao[1], Rajpal Verma[2], Shikha Verma[3], Vikram Sahoo[4]

[1]Post Graduate Student, SGT Medical College, Hospital & Research Institute, [2]Professor, SGT Medical College, Hospital & Research Institute, [3]Medical Officer,357 FD Hospital Leimakhong, [4]Post Graduate Student, SGT Medical College, Hospital & Research Institute

Abstract

Background: Dengue fever is widespread in India. Environmental changes and lack of awareness increase spread and increase dengue outbreaks. This study was conducted at SGT Medical College Hospital & Research Institute, Budhera, Gurugram, (India), to build knowledge of dengue infection and dengue prevention activities among patients.

Method: A cross-sectional survey was performed in SGT Medical College Hospital & Research Institute, Budhera, Gurugram, India. Study took place among 224 participants from May to October 2020. Organized patients sampling followed. A pre-tested, semi-structured questionnaire. Difference was calculated using Chi square test (qualitative variables). P was assumed to be $p<0.05$.

Results: 210 (93.7%) of participants understood dengue. Dengue fever symptoms responded 50% of participants correctly. 89% correctly claimed Aedes mosquito transmits dengue. About 40 % of participants had correct knowledge about Aedes mosquito's breeding habitat and biting habit. In addition to avoiding mosquito bite, researchers use diverse strategies-mosquito spirals (53.7%), mosquito nets (14.7%). No mosquito bites prevention strategy followed by 15.1%.

Conclusions: While most of the sample participants knew of dengue and dengue fever transmission mosquito signs, under half were conscious and 25% did not observe any mosquito bite avoidance procedure. Conclusions: Group consciousness plays an important part in improvising practices to avoid dengue.

Keywords: *Sensitivity, Dengue fever, Experience, Activities.*

Introduction

The number of dengue cases reported annually increased from 0.4 million to 1.3 million in the decade 1996-2005, and the WHO reported annually. Over the past 50 years, symptomatic cases have grown 30-fold with increased geographic expansion to new nations and from urban to rural areas in the present decade. The annual incidence of symptomatic cases has been reported at about 50 million - 100 million, mostly in Asia, and thenin Latin America and Africa.[1]

During the 1996 Dengue epidemic, India recorded 16,517 cases and 545 deaths, accompanied by upheaval since 2010 to 2015. Cases exceeding those registered in 2014 were registered. Due to substantial undeclared dengue in healthcare systems, Haryana reported 2.5% of the national burden in 2015. Due to the seriousness of the disease, steps to prevent dengue spread were mandatory for an hour. Essentially, this relies on population recognition and involvement, which relies on dengue understanding and prevention. In this context, SGT Medical College Hospital & Research Institute, Budhera, Gurugram, India, conducted an assessment to assess susceptibility to dengue and its prevention among patients.[2]

Corresponding Author:
Dr. Sonu Kumar Singla
Post Graduate, Department of Medicine, SGT Medical College
e-mail: s.k.singla24@gmail.com
Mobile No.: 9876033265

Due to the existence of favorable dengue vector breeding sites, the epidemic has been mostly confined to urban and semi-urban areas of the world. However, owing to urbanization, industrialization, large-scale construction activities and rapid transport, there has been a paradigm change in the pattern of dengue occurrence from urban to rural areas over time, rendering rural areas attractive for dengue vector breeding. These trends also culminated in recurrent dengue outbreaks in the country's rural areas. Increased spread of the disease resulting in rapid population development, lack of adequate awareness of dengue infection and prevention steps, environmental improvements and increased breeding of Aedes in living premises.[3]

Given the seriousness of the epidemic, it has become important to take prevention and control steps to avoid dengue transmission within an hour. This, in essence, relies on the recognition and involvement of the population, which again depends on the understanding of dengue and its prevention in the environment. In this sense, the study was conducted at SGT Medical College Hospital & Research Center, Budhera, Gurugram (India), to ascertain the knowledge of dengue and its prevention among patients.

Material and Method

This hospital based descriptive cross-sectional study was conducted on patients attending the outpatient department (OPD) of SGT Medical College Hospital & Research Institute, Budhera, Gurugram, India, after obtaining ethical approval by the Ethical review committee of Faculty of medicine. The study was conducted from May to October 2020 by Dr. Sonu Singla physician working at the outpatient department of the SGT Medical College Hospital & Research Institute. Data collection was done using a self-administered pretested data collection form (questionnaire) which composed of standard questions to assess knowledge and attitude on dengue fever as well as its prevention. The questionnaire was in both English and Hindi languages. Determination of sample size: Assuming that Dengue Fever and its avoidance are well informed of the incidence as 50 percent and that the absolute accuracy is 7 percent, and the non-response rate 10 percent, the sample size arrived at was 224. Population of sampling and study: the population of the study consists of patients of SGT Medical College Hospital & Research Institute.

Patients between 18-60 years of age attending the OPD were included while patients who were mentally subnormal or who needed immediate hospital admission were excluded. Every 12th patient who was eligible for the study was recruited for the questionnaire survey after obtaining the informed written consent. Tool for research: a three-section research tool.

- **Section I** contained socio-demographic specifics, for example, old age, gender, schooling, jobs.

- **Section II** dealt with views of society in particular of mosquito-borne illness and dengue. This includes detail on moustache transmitted illness, mosquito-borne diseases, prior exposure to dengue, the explanation for and spread of dengue, vector bionomics and its life cycle, awareness on dengue and dengue fever symptoms.

- **Section III** deals with awareness about Dengue prevention, i.e. the subjective opinion of dengue prevention, the prevention of mouse breeding, the personal defense against mosquito bite and the Government's policies and policies for the prevention and control of dengue.

Outcome variables: Outcome variables include those that determine the perception of dengue fever signs, mosquito propagation and reproductive and biting behaviours and preference to treatment. Statistical analysis: Microsoft Excel Spread Sheet has entered data. The completeness and correctness of the research questionnaire is checked before entering the worksheet. Data tests for data entered in the worksheet of MS Excel have been carried out at a daily period. Data were analyzed in version 21.0 of the Social Science Statistical Package (SPSS IBM). Qualitative variables are described as quantities. The mean, range and standard deviations are known as quantitative variables. After applying unique significance tests, the results were checked for normality. Differences in proportions (qualitative variables) were significant Using chi square test decided. The p value was calculated to be $p<0.05$.

Results

Research was performed with a 100% answer rate among 224 participants. About 19 and 64 years of age, averaging 35(±12.7) for participants. 20.5% the populace was illiterate and 67.4% belonged to the nuclear family.

210 (93.7%) of the participants knew dengue fever. Information was collected from TV (33.9%), with healthcare services (18.7%) and newspapers (14.7%). 11% Study participants replied correctly to

mosquito-borne diseases. 89% Correctly claimed Aedes mosquito transmits dengue. 4(1.8%) have also become dengue-affected before. 20% of analytical participants. Historically, dengue infection was of friends,neighbors, and families. About 40 % of participants had correct knowledge about Aedes mosquito's breeding habitat and biting habit. Around 56 percent of participants said Aedes breeds mosquito in dirty water. 71 % of participants correctly identified dengue fever symptoms. Student majority (60.7%) prefers public health over dengue fever treatment.

Many (53.7%) at home use mosquito buckles to deter mosquito bites. Mosquito bed nets use just 14.7%, while no mosquito-bite control approaches use 15.1%. Just 6.69% use insecticide-treated bednets. Participants regard chemical interventions including sprays, mosquito repellents, coils and repellents as the most successful approach to prevent spawning and biting of mosquitoes (Table).

Table: Practice of prevention of dengue

Practice of Dengue Prevention	(%)
Using personal protective measures	
Mosquito coils	53.7
Bed nets	14.7
Insecticide treated bed nets	6.67
Repellant cream	6.25
Repellant spray	3.6
Nothing	15.1
Most effective measure	
Chemical	52.7
Environmental	29
Biological	8
Integrated	4
Don't know	6.2

Unlike analphabets and primary education, Aedes mosquito's proportion of higher education participants was more forgiving of breeding and biting behaviours. This was considered potentially important. (P=1,000). Those in the nuclear family recognized Aedes' breeding and biting behaviour. (P=0.043) However, at least one member of the joint family is known as a nuclear family mitigation (p=0.01).

Discussion

This study investigates understanding and behaviours of Dengue infection in SGT Medical College Hospital & Research Institute, Budhera, Gurugram, India. In this study, we find that in those with higher qualifications, biting and breeding expertise is far higher. The finding is consistent with the study performed by Dr. Sonu Singla. There was no difference in sex in breeding knowledge and mitigating measures. During the new study, 93.7% heard about dengue fever. Another study conducted in urban settlements in southern Delhi suggests that 90% are conscious in dengue (78%) in a study conducted in Brazil, while Thailand's dengue consciousness (67%) is 15–17. Malhotra Getal's urban population report. 89% Symptoms right. Gupta et al's study, which reported 92 percent of fever followed by headache as a dengue symptom, was reported in Degallier N et al and Benthem et al papers, whereas most studies find dengue-specific rash and bleeding to separate dengue-specific from other diseases[4].

About 40% of participants in this study had correct knowledge on Aedes mosquito breeding habitat and biting habit. In a Matta et al study, 79.8 percent of respondents knew about mosquito breeding areas. Aedes' correct knowledge of breeding habits and biting practices in our study has a huge gap. This subject needs to be targeted and disseminated, and neighborhood information about preventive dengue prevention measures. Some researchers (63.4%) carry mosquito coils, bed nets (14.7%) insecticide-treated bed nets (11.2%) and other preventive measures at home. It was determined that the majority of respondents were aware of measures such as window screening, mosquito pad, spooling/fluid vaporising/repelling cream, network use, fan use, smokes in particular in rural and slum areas. Correctly reported that Aedes mosquito transmitted dengue in this report. 72.62% of respondents identified mosquito bite as a cause of dengue near a survey in Brazil1 Swaddiwudhipong et.al. In our study, 50% registered signs of dengue fever correctly. Gupta et al's study, which reported 92 percent of fever followed by headache as a dengue symptom, was reported in Degallier N et al and Benthem et al papers, whereas most studies find dengue-specific rash and bleeding to separate dengue-specific from other diseases. Secondary education, higher childhood, the finding is consistent with the study performed by Kohli C et. al. and Sharma AK et al. There was no difference in sex in breeding knowledge andmitigating measures[7].

Conclusion

Our results indicate that although most participants were conscious of dengue symptoms and dengue fever mosquito transmission, fewer than half were conscious of Aedes mosquito reproductive habits[8] and 25% did not practice mosquito bites. Public health and educational initiatives are also proposed to be more aggressive and preventive in the future. Health education can be offered by many ways, including mainstream coverage and use of audiovisual assistance in healthcare camps. Therefore, these systems can ensure that the information learned is implemented.

Ethical Clearance: Taken from ethical committee of institution

Source of Funding: Self

Conflict of Interest: Nil

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Ameliorative Effect of *Taraxacum officinale* Leaves on Hormonal Status of Hyperglycemic Rats

Reham, A. Mostafa[1], Doaa R. Negm[1], Eslam A. Header[2], Wafaa F. Abusudah[1], Wedad F. Azhar[1]

[1]*Assistant Professor in Department of Clinical Nutrition, Faculty of Applied Medical Sciences, Umm Al Qura University, Makkah, Kingdom of Saudi Arabia, [2]Professor in Department of Clinical Nutrition, Faculty of Applied Medical Sciences, Umm Al Qura University, Makkah, Kingdom of Saudi Arabia & Department of Nutrition and Food Science, Faculty of Home Economics, Menofia University, Egypt*

Abstract

Acute or chronic side effects of hyperglycemia may affect all systems and organs, such as sexual glands. Approximately 90 percent of diabetic patients suffer from sexual dysfunction, including libido and fertility. This study is designed to investigate the effect of diabetes on the sex hormones levels ad to evaluate the ameliorative effect of dandelion leaves powder (DLP) on diabetes-induced changes of gonadal hormones and glucose serum levels in male rats. Experimental diabetes mellitus was induced by subcutaneous injection with 65mg streptozotocin STZ/kg body weight. DLP was given in pelleted food at ratio of 5% for 28 days. DLP was effective in lowering Follicle-stimulating hormone (FSH) serum level in dandelion-treated rats compared to controls in diabetic group. DLP was also able to reverse the progesterone lowering effect of diabetes. In all of the classes, the estrogen level did not show any noticeable difference. It is suggested that DLP can have a regulatory effect in male rats on diabetes-induced changes in gonadal hormone levels, especially progesterone. Our research has shown that long-term administration of DLP in the diabetes experimental model could be used as a good candidate for reproductive hormone deficiency therapy.

Keywords: *Sex hormone - Dandelion (Taraxacum official) - Diabetes-Glucose - Rats.*

Introduction

Diabetes mellitus (DM) is metabolic disorder currently affecting over 350 million peoples worldwide. It costs about 1,200 billion USD to diagnose and treatments. The left untreated, DM can lead to a variety of diseases and long-term complications that lead to death afterwards.[1] As well as, heart disease, stroke, renal failure, foot ulcers and eye damage may be severe long-term complications caused by DM.[2] DM is either because the pancreas does not produce enough insulin, or the body's cells do not respond correctly to the insulin released.[3] DM has become the third greatest "killer" after cancer and cardio-/cerebro-vascular diseases.[4] It is estimated that 5% of the world's deaths are due to diabetes, a figure that will grow by 50 percent in the next 10 years.[5] Increasing evidence shows that the excess generation of reactive oxygen species (ROS) in diabetes causing oxidative stress may contribute entirely or partially to the development of complications in a variety of tissues.[6,7]

Hyperglycemia caused by diabetes mellitus induces acute or chronic side effects that can affect all processes and organs, such as sexual glands.[8] Around 90% of diabetic patients suffer from deficiency in sexual function including libido and fertility.[9] In experimental model, DM induced reproductive dysfunction, but did not compromise the capacity of sperm fertilisation in the cauda epididymis.[10] In addition, DM is accompanied by hyperglycemia and hyperlipidemia. In hyperglycemia and hypercholesterolemia, one of the problem mechanisms for DM is oxidative stress that has consequences that contribute to destruction and dysfunction.[11]

As DM regulation without side effects is a challenge, plant-based drugs may play an important role in DM treatment.[12] For the prevention and treatment of different diseases/pathologies, including cancers, heart disease, diabetes mellitus and high blood pressure, natural products isolated from medicinal plant sources have been used.[13,14] More than 800 species have

been investigated and their hypoglycemic effects were reported.[15]

Experimental studies express evidences about the effect of Dandelion *(Taraxacum officinale)* leaves powder on the gonadal hormones and sexual behaviors. Studies show that some increases in hypophysial gonadotropins are caused by DLP, followed by an increase in sperm in male rats and foliclagenesis in immature female rats. [16] Therefore, the present study aimed to evaluate the effect of DLM on hormonal status for hyperglycemic rats.

Materials and Method

Material

Dandelion Leaves: dandelion leaves was provided from local marketand was identified by Institute of food technology, Giza, Egypt. All chemicals used in this experiment were of analytical grade. Biodiagnostic Co., Dokki, Giza, Egypt, has purchased kits used to quantitatively evaluate the various parameters.

Experimental Animals: A total of thirty two adult male Albino rats of Sprague Dawley strain weighing (200±10g) obtained from Research Institute of Ophthalmology, Medical Analysis Department, Giza, Egypt. The animals were kept under observation for 1 week before experiment and fed on standard diet according to **Reeves** *et al.*,**(1993)**[17], and water *ad libitum.*

Method

Preparation of dandelion Powder: Dandelion were washed with running tap water and dried. The dried plant was ground into fine powder.

Chemical composition of dandelion: Dandelion was chemically analyzed to determine its protein, fat, carbohydrate, fiber and ash content according to **A.O.A.C. (2005).**[18]

Diabetes Mellitus Induction (DM): Diabetes mellitus was induced in overnight fasted rats by a single intraperitoneal (i.p.) Streptocytocin (STZ) injection (65 mg/kg b.w.).[17] The rats were given 5% glucose solution in feeding bottles for the next 24 h to prevent hypoglycemia after STZ injection. After 72 hours of the injection, Using a retro-orbital approach to estimate fasting serum glucose, fasting blood samples were collected. Rats were considered diabetic with fasting serum glucose of more than 180 mg/dL and were used for the experiment.**[19]**

Experimental Design: After 1 week, The rats were divided into four equal groups in each group (8 rats) as follows: the first group was fed with a basal diet and kept negative as a control, The 2nd group was left as a control positive and fed on basal diet + DLP (the non-diabetic dandelion-treated group), the 3rd group (diabetic rats) was fed on basal diet only, the 4th group was (diabetic group treated with DLP) fed on basal diet + DLP for 4 weeks.

Hormonal Assay: To assess the sexual hormone levels, blood samples from all rats were collected from their hearts at the end of the experimental period. The serum levels of estrogen, progesterone, FSH, LH and testosterone were determined by radioimmuno-method according to the procedures of **AOAC (2003)** provided in the kits. In addition, the serum levels of glucose was also measured in all groups according to the procedures provided in kits.[20]

Histopathological Examination: In 10 percent neutral buffered formal in, testis specimens were mounted. The set tissues were then trimmed, washed with ice saline and dehydrated in ascending grades of isopropyl alcohol and cleared in xylene. Using the same grade wax, the wax impregnated tissues were embedded in paraffin blocks and the paraffin blocks were cut with a 3-5μ thickness of rotary microtome. The pieces were floating at 40 ° C on a tissue float bath and taken on glass slides. The sections were then melted in an incubator at 60°C and after 5 min. they were allowed to cool and stained with Hematoxylen and Eosin according to **Bancroft and Cook, (1998),**[21] and examined microscopically.

Statistical Analysis: Statistical analysis of the findings was carried out using statistical package for social science (SPSS), version 20. The results were expressed as mean ± standard deviation (SD).One way analysis of variances (ANOVA) were used to compare the parameters between controls positive group and diabetic rats groups. A *P*-value less than 0.05 was considered statistically significant.

Results

Chemical analysis of dandelion/100 g: Data in table (1) showed the chemical analysis of dry dandelion powder (g/100g), protein (18.19%), fat (1.0%), ash (20.46%), fiber (10.86%), carbohydrates (48.00%), and total phenols (2.49%).

Table 1. Chemical composition of dry powder Dandelion (g/100g).

Components	Protein	Fat	Ash	Fiber	Total Carbohydrate	Total Phenols
Value %	18.19	1.0	20.46	10.86	48.00	2.49

Effect of sex hormones: A comparison of sexual hormone levels between control and dandelion -treated group in animal samples indicated that there was no significant difference in the estrogen level between treated and non-treated groups (table 2). In the non-diabetic dandelion -treated group, serum levels of progesterone, testosterone and LH have significantly increased compared to the control group (as it is shown in table 2). On the other hand, in the dandelion - treated group, serum level of FSH has been significantly decreased. Statistical analysis of sexual hormone levels in diabetic animals indicated that there was no significant difference in the estrogen level between treated and non-treated diabetic groups (table 2). Furthermore, in dandelion -treated diabetic group, compared to diabetic group, serum levels of progesterone, testosterone and LH have significantly increased. On the other hand, in dandelion -treated group compared to diabetic group, serum level of FSH has been significantly decreased.

Data also showed that the serum levels of gonadal hormones in control and diabetic control groups were totally different. In this regard, progesterone (table 2) and FSH levels in diabetic groups compared to control group were significantly decreased ($P<0.05$). However, testosterone level in diabetic group showed significant increment. In addition, the level of LH in the diabetic group was markedly higher than that of the control group. There was no significant difference in the estrogen level between control and diabetic groups.

Table 2. Serum FSH, LH, testosterone, estrogen and progesterone levels of control, diabetic, and DLP– treated rats.

Groups	FSH (mlu/ml)	LH (mlu/ml)	Testosterone (ng/ml)	Estrogen (pg/ml)	Progesterone (ng/ml)
Control	0.32±0.001[a]	0.20±0.001[d]	1.21±0.01[d]	68.12±4.01[a]	7.02±1.25[b]
Control + DLP 5%	0.25±0.003[bc]	0.57±0.003[a]	1.75±0.04[c]	67.54±3.17[a]	8.16±2.65[a]
Diabetes	0.29±0.013[b]	0.41±0.002[c]	2.83±0.07[b]	66.24±2.49[c]	3.04±0.98[d]
Diabetes + DLP 5%	0.17±0.001[d]	0.54±0.006[ab]	3.74±0.09[a]	66.71±4.65[cd]	4.17±1.04[c]

Values are expressed as mean ± SD.A P-value <0.05 was reflected significant. Values which don't share the same letter in each column are significantly different. FSH: Follicle-stimulating hormone. LH: Luteinizing hormone. DLP: DLP.

Effect on serum glucose level: Untreated and dandelion -treated diabetic rats had elevated serum glucose level over those of control rats. However, in both control and diabetic groups, dandelion did not induce any significant change in serum glucose levels (Table 4).

Table 3. Serum Glucose (mg/dl) levels of control, diabetic, and DLP – treated rats.

Groups	Control	Control + DLP 5%	Diabetes	Diabetes + DLP 5%
Glucose	128.6 ± 25.6[c]	123.4 ± 12.1[dc]	381.6 ± 39.2[a]	344.8 ± 63.4[ab]

Values are expressed as mean ± SD. A P-value <0.05 was reflected significant. Values which don't share the same letter in each column are significantly different.

Histopathological examination of testes: The normal histological structure of the seminiferous tubule with normal spermatogoneal cells and complete spermatogenesis was revealed microscopically by rat control experiments. (Fig. 1). However, testes of rats from group control & dandelion treated revealed no histopathological changes (Fig. 2).

In contrary, testes of rats from diabetes group revealed degeneration and necrosis of spermatogoneal cells lining seminiferous tubules with interstitial edema (Figs. 3 & 4).
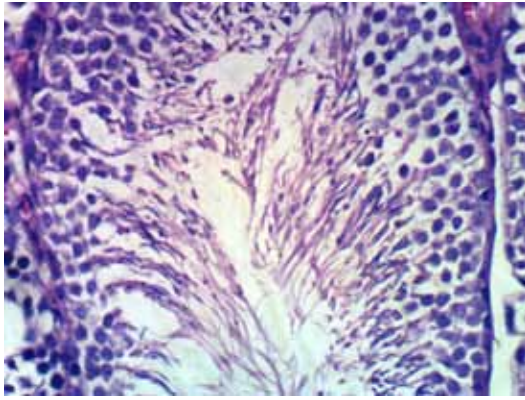
Fig. (1): Testis section from control (-) rats showing the normal histological structure of seminiferous tubule with normal spermatogoneal cells and complete spermatogenesis (H & E X 400).
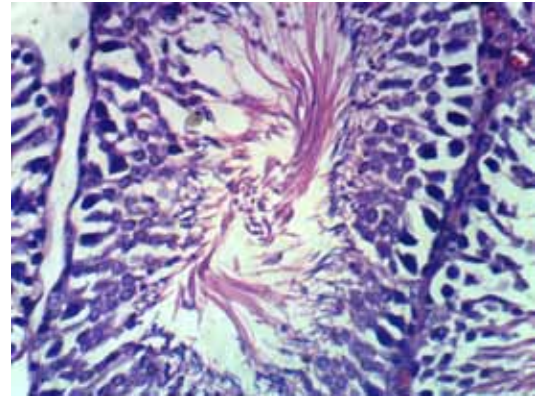
Fig. (2): Testis section from control & dandelion treat-rats showing no histopathological changes (H & E X 400).
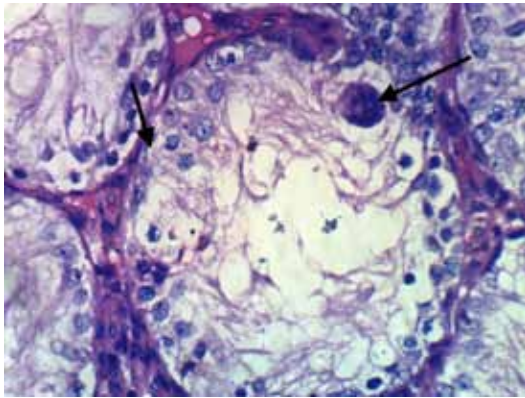
Fig. (3): Testis section from diabetic rats showing degeneration of spermatogoneal cells lining seminiferous tubules with formation of spermatid giant cells (H & E X 400).
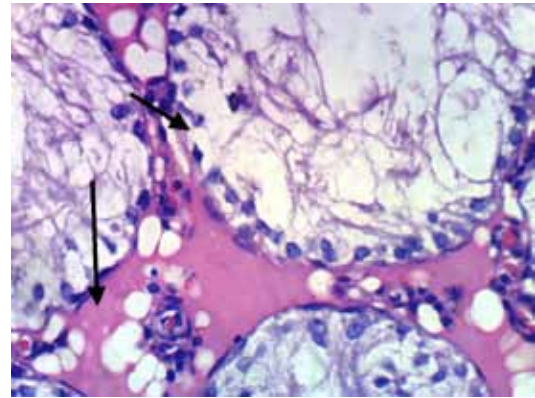
Fig. (4): Testis section from diabetic rats showing necrosis of spermatogoneal cells lining seminiferous tubules with interstitial oedema (H & E X 400).
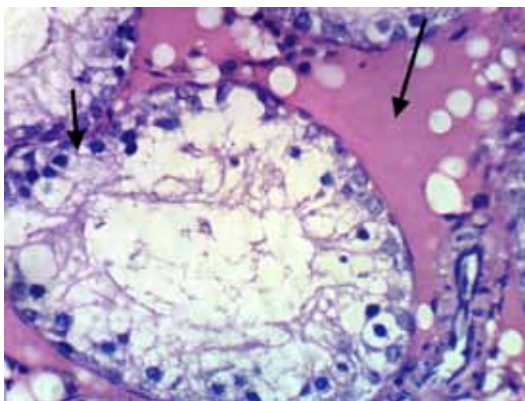
Fig. (5): Testis section from diabetic & dandelion– treated rats showing degeneration and necrosis of spermatogoneal cells lining seminiferous tubules with interstitial oedema (H & E X 400).
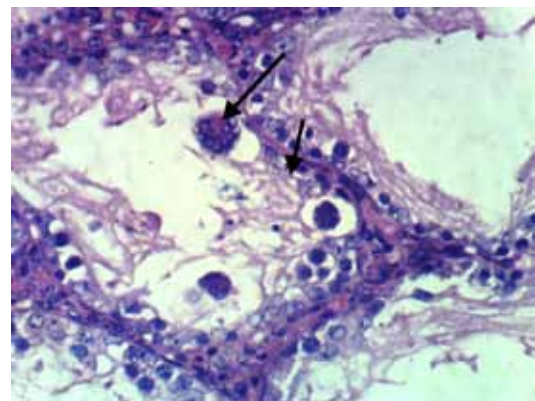
Fig. (6): Testis section from diabetic & dandelion– treated rats showing degeneration and necrosis of spermatogoneal cells lining seminiferous tubules with formation of spermatid giant cells (H & E X 400).
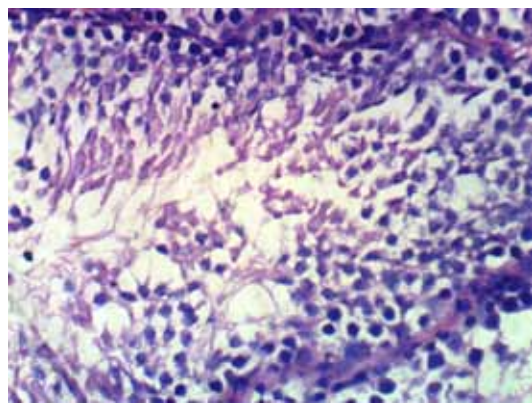
Fig. (7): Testis section diabetic & dandelion – treated rats showing no histopathological changes (H & E X 400).

Most of the examined segments of the diabetic & dandelion treatment community demonstrated degeneration and necrosis of spermatogoneal cells lining seminiferous tubules with spermatid giant cell formation. (Fig. 5). Moreover, some examined cases from diabetic & dandelion treated with showed degeneration and necrosis of spermatogoneal cells lining seminiferous tubules with interstitial oedema (Fig. 6), whereas, other sections revealed no histopathological changes (Fig. 7).

Discussion

Our study has indicated that serum levels of progesterone, testosterone and LH have significantly increased for dandelion-treated diabetic group, compared to diabetic group, on the other hand, in dandelion -treated group compared to diabetic group, serum level of FSH has been significantly decreased. Our result revealed that agree with **Wang et al., (2018)** they demonstrated that progesteon, estogediol and progesterone levels increased with the increasing dandelion extract concentration. [22]

Tahtamouni et al., (2016) who reported that a substantial decrease in testis and seminal vesicle weight, a decrease in serum testosterone concentration, damaged sperm parameters, and a decrease in pregnancy parameters have been caused by oral administration of dandelion (whole plant and leaf aqueous extract). Structural changes such as germ cell hypoplasia, reduced germ epithelium thickness, spermatogenesis arrest at the spermatid stage (late maturation arrest) and decreased Leydig cell count have been shown in the testicular histology of treated rats.[23]

The findings of the current study concerning the effect of dandelion on reducing FSH and raising the level of LH plasma are in line with previous work by **Abdel-Magied et al., (2001),**[10].Dandelion may have inhibitory and exhibitory effects on FSH and LH gonadotrophs, respectively, due to the effect of dandelion on FSH and LH levels. Regarding the fact that ovulation and gestation are regulated by the LH/progesterone system, at least in the early stages in women,[24] one may conclude that dandelion has a positive effect on reproduction by increasing LH and progesterone.

The effect of dandelion on testosterone level in this research is not in accordance with previous study by **Abdel-Magied et al., (2001)** in which a reduction has been shown in the testosterone level of dandelion -treated rats. This discrepancy might be related to the type of dandelion administration (in food in our experiment and in water and stomach tube in their experiment).[10]On the other hand, we have treated the rats for four weeks, whereas in the previous study rats have been treated for six days. It is notable that dandelion contains a steroidal lactone (withaferin A).[25]From this study and the presence of steroidal compound in dandelion, it appears that Ashwagandh is mimicking the steroidal hormones.

Untreated and dandelion -treated diabetic rats had elevated serum glucose level over those of control rats, these results agree with **Davaatseren et al., (2013)** they indicate that dandelion leaf extract significantly suppressed lipid accumulation in the liver and reduced insulin resistance.[26]

Conclusion

Our study has indicated that long time administration of DLP in experimental model of diabetes, could be used as a good candidate in the treatment of reproductive hormones deficiency.

Ethical Clearance: All procedures performed on animals were in accordance with ethical standards of the institution at which the study was conducted.

Source of Funding: Self-funding.

Conflict of Interest: Nil.

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Post Traumatic Orbital Decompression: Our Experience

Sumati Goyal[1], Danish Guram[1], Pulkit[1], Nishai Goyal[1], Harsimrat Singh[2]

[1]Post Graduate, [2]Senior Resident, Department of Ent, Adesh Institute of Medical Sciences And Research, Bathinda, Punjab

Abstract

This study is an analysis of five cases of orbital trauma causing proptosis, paralysis of extraocular muscles with or without associated visual failure. All the cases were treated by a ENT and Neurosurgical team. Either a frontal craniotomy or a lateral orbitotomy was performed. Plain X-rays of the skull and Computerised Tomography (C.T. Scanning) were the main investigations. Results were encouraging both functionally and cosmetically. Early diagnosis and an aggressive approach to orbital decompression can achieve good results.

Keywords: *Head Injury, Proptosis, Head injury complications, Post traumatic blindness.*

Introduction

The exact incidence of orbital trauma remains unknown. Most of the cases are associated with concomitant head trauma. The incidence being less than 1%. The commonest cause is a frontal impact or a lateral blow to the orbital rim. Ecchymosis, swollen eyelids commonly follows head trauma, more so with orbital injury, thus an inability to perform a complete neuro-ophthalmological examination, especially in a patient who is obtunded following head injury are the two common reasons why these cases are usually diagnosed late. A complete neuro-ophthalmological, neurological examination and a thorough palpation of the orbital rims in all patient with ecchymosis and proptosis is mandatory. Plain X-rays of the skull, orbits and optic foramina along with C.T scanning in both coronal and axial sections gives adequate information as to the cause of proptosis and helps in selecting the operative technique if required.

Material and Method

Five cases of orbital trauma are discussed. SUMMARY : 1) Proptosis: 5/5 2) Paresis of extra ocular

Corresponding Author:
Dr. Danish Guram
Post Graduate, Department of ENT, Adesh Institute of Medical Sciences
e-mail: danishguram@gmail.com
Mobile: 8091917251

muscles: 5/5 3) Visual failure: 2/5 Plain X-rays of the skull, orbits and optic foramina were performed in all cases. Plain C.T Scans of the brain with axial cuts of the orbits and optic canals were performed in all five cases. Three cases were operated by a lateral orbitotomy (Kronlien's approach)[1]sub . The lateral wall of the orbit was excised followed by opening of the periorbita. The lateral orbital rim was preserved and re-approximated. Two patients underwent a frontal craniotomy and decompression of the orbital roof followed by opening of the periorbita to provide orbital decompression (Housepian's approach)[2] sub. Oneamong these two also underwent a de-roofing of the optic canal.

Result

The result were encouraging with hundred percent recovery.

DISCUSSION

Nature has protected both the eyes by providing the bony sockets (the orbits). Following trauma there is edema of the retro-ocular tissues which results in congestion of the veins which in turn increases the edema still further. The orbital walls with the eye ball and septum in the front result in a closed cavity. Edema and venous congestion push the eyeball forwards, this results in a stretch on the extraocular muscles and the nerves (hence the proptosis and ophthalmoplegia). This further compresses the draining veins. Once the limit of stretch is reached an abnormal intra-orbital pressure builds up which gradually occludes the retinal veins and later the

retinal artery resulting in visual failure. The sequence of events is accelerated if there is a depressed fractures of the orbital wall and rim which has entered into the retro-ocular space. The accepted indications of emergency orbital surgery following orbital trauma are as follows: 1. Progressive visual failure : (Immediate loss of vision is considered to be due to vascular insufficiency and is not supposed to benefit by surgical decompression)[3] 2. Progressive proptosis : Either due to an expanding intra-orbital retro-ocular haematqma or due to progressive swelling of the retro-ocular tissues. 3. Radiologically demonstrated bony spicule pressing on the optic nerve in the canal. All the above indications give priority to visual failure. However, visual failure is not the only problem in orbital trauma. Acute proptosis also causes stretching of the nerves supplying the extra-ocular muscles and results in their paresis or palsy. Therefore relief of the raised intra-orbital pressure should also be treated on a priority basis. A paralysed eye with intact vision can be troublesome if not useless. In three of our cases a depressed fracture of the lateral orbital rim and wall was the cause of the proptosis and restriction of the extra-ocular movements. One amongst these three also had decreased visual acuity . Repositioning of the rim and provision of orbital decompression by (a) Excising that part of the greater wing of the sphenoid which forms the lateral wall of the orbit and (b) dividing the periorbita, resulted in an immediate improvement. The operation is not very major nor technically very demanding. The cosmetic results were also good. Two patients had a depressed fragment of the superior orbital rim and the roof of the orbit entering into the retro-ocular space, pushing the eyeball forwards and downwards and resulting in an inability to move the eyeball upwards. One patient also had visual failure. His vision had decreased to just perception of light. Both the patients were operated by the superior route (Housepian's approach). Following the operation, both the patients had immediate relief of the proptosis and upward gaze weakness. The vision returned dramatically following the operation in the patient who underwent optic nerve decompression for visual failure in addition to the orbital decompression. The superior orbital rim was preserved and re-approximated in both cases. We feel that this route should be chosen when a. orbital decompression is to be combined with a decompression of the optic canal, because no other approach gives such an excellent exposure and access to the optic canal. b. When there is a depressed fracture of the superior orbital rim along with the bones of the roof of the orbit. In such cases

there may be associated injury of the frontal sinus. This results in a compound fracture even if the overlying skin is intact. Such fractures may be associated with a tear in the dura of the anterior cranial fossa. These cases are best dealt by the superior route. c. When there is an intra-orbital retro-ocular haematoma, as this approach gives a complete view and ability to control any unexpected bleeding vessel within the orbit. Before embarking on emergency orbital surgery a thorough ophthalmologic assessment is mandatory to exclude intra ocular causes of visual failure. In unconscious patients the pupillary reaction to light (both direct and consensual) gives a rough idea of the integrity of the second and third nerves. The dolls eye movement helps in assessing the extent of the extra-ocular movements (this manoeuvre should be done only after confirming that there is no associated cervical spine injury). C.T scanning of the orbit and cranium is mandatory before embarking on emergency orbital surgery. As thus the scan reveal the orbital anatomy in detail but also gives the opportunity to rule out any associated intracranial haematoma which may alter the surgical plan. We did not encounter cases with fractures of the floor or medial wall of the orbit. However, we feel that as these bones are relatively thin (apart from the rim) injuries will usually result in blow-out type of fractures resulting in enophthalmos rather than proptosis[4]. Visual failure as a result of raised intra-ocular pressure would be less likely due to the increased intra-orbital space. Visual failure if present would be either due to direct injury to the eyeball, or, vascular injury to the optic nerve. Restriction of extra-ocular movement due to the entrapment of the inferior oblique, inferior rectus and medial rectus muscles is possible. Such cases can be dealt with on an elective basis, the treatment of which has been discussed in great detail by Mustarde J.C.[5]

Conclusion

The incidence of orbital trauma requiring emergency surgery is negligible. We encountered only five cases in 2,000 consecutive cases of head trauma in a metropolitan hospital over a 2 year period. All the patients were males, reemphasising the increased incidence of head trauma in this sex. The indications for emergency orbital surgery following trauma should be: 1. Progressive visual failure. 2. Progressive proptosis a) due to edema of retroocular tissues. b) due to an expanding intra-orbital hernatoma 3. Radiologically demonstrated bony spicule pressing on the optic nerve. 4. Restriction of extra-ocular movements due to depressed bone fragment. All

the above problems may exist either singly or in various combinations. The main incriminating factor being, raised intra-orbital pressure. Plain X-rays of the orbits, optic canals and C.T scanning of the orbits and cranium are mandatory before embarking on emergency orbital surgery. Proper selection and early operation seem to be the keys to success.

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Knowledge and Attitude Regarding Sex Education among Adolescents of Kolhapur

Supriya Altekar[1], Milind Sanade[1], Shubam Gavandi[1], Janaki Shinde[2]

[1]*Final Year PG Students,* [2]*Professor and HOD, Dept. of Child Health Nursing, D.Y. Patil College of Nursing, D.Y. Patil Education Society, (Institution Deemed to be University), Kolhapur*

Abstract

Background: During adolescence knowledge regarding puberty, reproduction, pregnancy and sexual health is very limited. The lack of knowledge and being sexually active during this phase increases the risk of or sexually transmitted diseases and unwanted pregnancies.

Objectives: To assess the knowledge and attitude regarding sex education, to determine its association with demographic variables and also to assess the correlation between the knowledge and attitude regarding sex education among the adolescents of Kolhapur.

Methodology: A total of 109 adolescent students from two randomly selected junior college were enrolled for this quantitative survey research. The students of any stream within the age group of 16-19 years and willing to participate were involved. Questionnaire was used to collect data regarding demographic data, knowledge and attitude regarding sex education. Answers given by participants were evaluated and analysed. Descriptive analysis was done in MS Excel(2016). Chi square test was used to assess the associations in R software (version 3.6.1).

Results: Twenty-eight percent participants had adequate knowledge. Most participants either given incorrect answers (35%) or responded as they don't know the answer (37%). Majority of participants held uncertain attitude (66%) Knowledge of the participants were significantly associated with education (P=4.11E-08), stream of education (P=1.54E-05) and their residential area (P=7.93E-06). Attitude was not significantly associated with any of the demographic variables (P<0.05). No significant correlation was found between knowledge and attitude towards the sex education (r= -0.0224; P=0.8250).

Conclusion: There was a considerable lacunae in knowledge and the attitude towards sex education. Therefore, there is need to increase awareness about sex education among the adolescents.

Keywords: *Adolescent, Pregnancy, Sex education.*

Introduction

Adolescence is the period when the body undergoes lot of physical, emotional, behavioural and psychological changes.[1] During this phase, huge amount of doubts and questions related to sexual health arises which gives rise to anxieties and worries.[2] The mixture of this anxieties, inadequate knowledge, negative messages received from social media and peers increases the misconception about contraception use and STIs and leads unprotected sex,unwanted pregnancies, sexually transmitted infections and damage relationships.[1,2]

In India, these problems are considered as taboo subjects and are seldomly discussed.[3] Due to this, the high prevalence of unprotected sex and STIs is seen in India of which adolescents makes a huge figure.[4-8] Hence, there is necessity to have an appropriate knowledge

Corresponding Author:
Janaki Shinde
Professor and HOD, Dept of Child health Nursing,
D.Y. Patil College of Nursing, D.Y. Patil Education
Society, (Institution Deemed to be University),
Kolhapur
Contact No.: 9665254672
e-mail: janakishinde2011@gmail.com

regarding the changes that occurs during this phase, sexuality, sexually transmitted disease (its transmission mode and preventive measures), prevention of unwanted pregnancies and maintaining safe and healthy sexual life among the adolescence.[1]

Health and sex education plays vital role in providing adequate knowledge and creating an awareness regarding maintaining health, sexual activities, precautionary measures, and also it increases the self esteem.[1,9] Hence, the study was designed to assess the knowledge and attitude regarding sex education, to determine its association with demographic variables and alsoto assess the correlation between the knowledge and attitude regarding sex education among the adolescents of Kolhapur.

Methodology

Study design and sampling: The Quantitative survey Research was conducted in two randomly selected junior colleges at Kolhapur in September to December 2019. The purpose and details of method used in the study were explained to all the students. A written informed consent was obtained prior to the study. Students between 16-19 years studying any stream and willing to participate were included. The students who were absent and not willing to participate were excluded. A total of 109 adolescent students of both the colleges following inclusion criteria were randomly selected.

Data collection and analysis: A structured questionnaire comprised of questions related to socio demographics along with multiple choice questions to assess knowledge and attitude was used to collect data. The participants answered the questions in complete anonymity. The answers provided by the participants were evaluated and the collected data was subjected to descriptive analysis in MS Excel (2016).

Results

The questionnaire was divided into three sections i.e. Section A, B and C. Section A comprised of socio demographic proforma which included demographic variables such as age, gender, residential area,education, stream, parent's education & occupation, family type, family income, number of siblings along with source of information, sexual experiences and known Contraception method.

Section B, knowledge questionnaire, comprising of 27 questions (Table 1). Section C, fivepoint Likert scale to assess attitude comprised of 12 statements (three positive and nine negative).

Table 1: Distribution of questions (n=27)

Content	No of Questions
Physiological changes	08
Contraception method	13
STD and prevention	06

STD- sexually transmitted diseases

Response rate of the study was 91.74% (n=100). Average time taken to fill the questionnaire was 20 minutes. Average age of the participants was 16.84±0.744 years. Demographic distribution of sample size is given in table 2.

Distribution of sample size with respect to their sexual knowledge and experience is given in table 3.

Table 2: Distribution of sample size with respect to their sexual knowledge and experience (n=100)

Variable	Frequency
Source of Information Regarding Sexuality	
Friends	39
Parents	09
Social media	24
Teacher	28
Sexual Experiences	
Masturbation	
Yes	06
No	94
Heterosexuality	
Yes	02
No	98
Homosexuality	
Yes	01
No	99
Known Contraception Method	
Condom	49
Contraceptive Pill	03
Diaphragm	02
Intrauterine Device	03
Spermicide	03
Withdrawal Method	01
Others	02
None	37
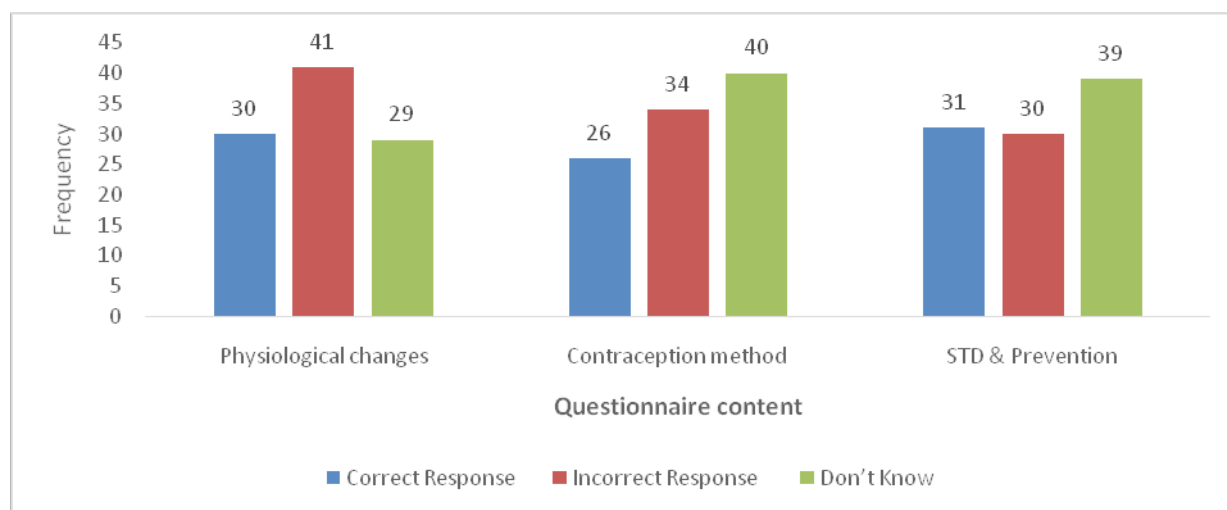
Figure 1: Knowledge regarding physiological changes, contraception method and STD & prevention (n=100)

Correct responses regarding physiological changes, contraception method and STD & prevention were obtained only by 30%, 26% and 31% adolescents respectively (Figure 1).
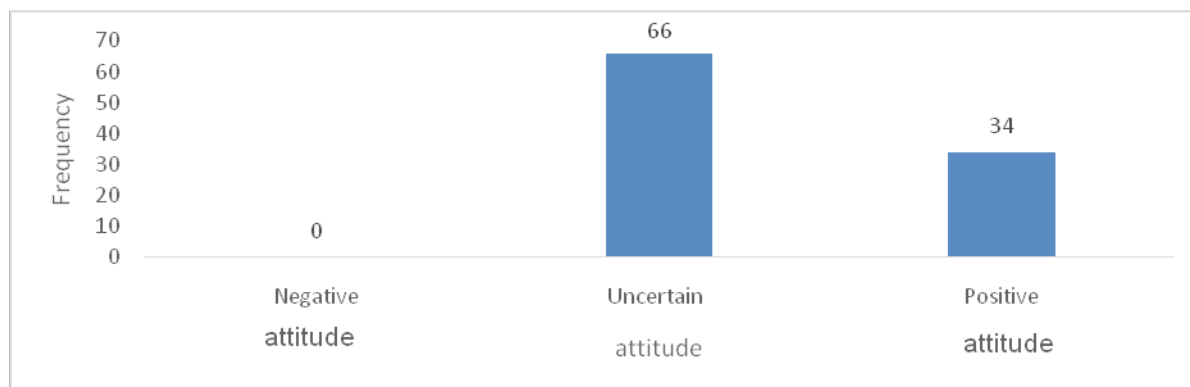
Figure 2: Attitude of adolescents towards sex education (n=100)

Majority of adolescents held uncertain attitude (66%) towards sex education (figure 1).

Knowledge of the participants was significantly associated with the demographic variables such as education (P=4.11E-08), stream of education (P=1.54E-05) and their residential area (P=7.93E-06). However, the attitude was not significantly associated with any of the demographic variable (P>0.05). Also there was no significant correlation found between knowledge and the attitude towards the sex education (r= -0.0224; P=0.8250).

Discussion

The evidence of benefits offered by sex education is shadowed by the lack of knowledge and attitude towards the sex education.[10] Adequate knowledge about sex education and a favourable attitude towards it, plays a major role in accepting it as a part of academics. The demographic distribution of the sample size is comparable to similar studies.[1] Sex as a topic is taboo in India and sex education at school level has gained strong opposition from the society, including parents, teachers, and political leaders. Six states in India including Maharashtra have banned sex education at school level which must have contributed towards low awareness about sex education among the adolescents[11] Government reports suggest that adolescents account for a huge proportion of new STI cases. This highlights the need for sex education among this demography.[12]

A high number of participants received the information from their friends as against family members in spite of majority of participants having literate parents, belonging to joint family and 50% being

science students. This indicates a lack of discussion on sex education in the family. This is comparable with similar studies.[13-14]

Majority of students did not have any sexual experience- masturbation/homosexual/heterosexual and attraction towards same or opposite sex. This highlights the level of taboo and the fact that they may not be comfortable talking about sex. In a similar study by Sathe A *et al*[15] nearly half of the boys had indulged in masturbation. However, 1 homosexual encounter and 2 heterosexual encounters were observed which can be solely due to the hormonal and developmental changes in the adolescent phase of life. To have sexual encounters of either kind without appropriate knowledge and protection is risky behaviour. This again shows the importance of the necessity of sex education to prevent transmissible sexual diseases that are already increasing and to avoid unwanted pregnancies.

Thirty-seven percent of the participants were unaware of the contraceptive method contrasting to previous studies where the numbers were much higher.[4] Unawareness of contraceptive method and lack of knowledge among the young adults is an issue that must be dealt with if we want to maintain the health of our country. Young adults and adolescents may not be aware of an existing STI. This can negatively impact their reproductive health and further spread of the infection. [12]

Majority of the participants either gave wrong answers (35%) or responded as they don't know the answer (37%).Only 28% had adequate knowledge which clearly indicates that the participants have inadequate knowledge. This is comparable to study done by Ajibade BL *et al*.[16]

An uncertain attitude towards sex education was seen in 66% of participants and is contradictory to the findings of Myeza NP. [17] This can solely be attributed to society for considering sex as a taboo subject and also to the source through which the knowledge was obtained. This is something that should be changed.

Knowledge was significantly associated with education, stream of education and the residential area concurrent with previous findings.[18] Also, no significant correlation was found between knowledge and attitude towards sex education. This contradicts previous reports where liberal attitude towards sex education was attributed to high knowledge.[19,20]

The findings of the study highlight the need for sex education at this level in Kolhapur. An uncertain attitude towards sex and the lack of knowledge on the topic itself is alarming. Sex education will prevent the spread of sexually transmitted disease, tackling it on a large scale. Sex education for adolescents should be implemented by all schools and an initiative should be taken by the government.

Limitation: The study population was the primary limitation. Hence, similar study with large population size could provide better insight on knowledge and attitude regarding sex education among adolescents.

Conclusion

There was a considerable lacunae in knowledge and the attitude towards the sex education. Hence, need of sex education among the adolescents is felt.

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Time Dependent Oral Microflora Changes in Removable Partial Denture Wearers

Tanaya[1], Pankaj Dhawan[2], Piyush Tandan[3], Pankaj Madhukar[3], Shakila Mahesh[4], Meena Jain[5]

[1]Post Graduate Student, [2]Professor and Head, [3]Professor, Department of Prosthodontics, [4]Head, Department of Microbiology, [5]Associate Professor and Head, Department of Public Health Dentistry, Manav Rachna Dental College, MRIIRS, Faridabad

Abstract

Background: Denture prostheses are significant interventions in oral environment for restoring lost form and function due to tooth loss. Little is known about change in microflora in removable partial denture wearers with age and time since denture delivery. Therefore, the present study was conducted to evaluate and compare the oral microbial flora pre and post insertion of removable partial denture at different time intervals and age groups.

Materials and Method: A sample of 60 patients wearing removable partial denture was included in the study, 30 of age group 40-50 years (Group 1) and 30 of age group 50-60 years (Group 2).Sample of unstimulated saliva was collected from the patient's mouth from the distal most edentulous area using three sterile cotton swabs by one investigator. Colony count and identification of microorganisms was done.

Results: The difference among mean colony counts between group 1 and 2 were not statistically significant at any of the three timeintervals. A statistically significant difference in colony counts was seen between baseline, 1 month and 3 months in whole sample as well as both the age groups. Among various aerobic microorganisms, Streptococcus mitis, Diphtheroids and Candida Albicanswere the most prevailing aerobic micro organism after 3 months of denture use, while among anaerobic organisms, Prophyromonasgingivalis was the most prevalent microorganism after three months.

Conclusion: A significant difference in colony count as well as colonizing microorganisms has been found in the present study. This difference according to time is an important component in the affect of removable partial denture on oral health of denture wearers. Age group was not a significant factor affecting microbial health in RPD wearers.

Keywords: *Oral Microflora, Denture Stomatitis, Removable Partial Denture, Oral candidiasis.*

Introduction

Oral micro-flora plays an important role in both oral health and disease. The diversity of oral micro-flora and its role has been evident since the time when Antonie van Leeuwenhoek first examined the microbiome of dental plaque in 1700s[1]. Since then, the importance of oral

micro-flora in oral cavity has been a matter of research. There has been a renewed emphasis on this study lately in wake of an evident and intricate connection of oral micro-flora with general health. At the same time, new frontiers are being reached everyday with role of oral micro-flora in its various aspects on oral health itself.

Oral micro-flora inhabits a unique ecosystem of oral cavity[2]. It may be present either in a suspended form in saliva or attached on the tissue surfaces of the oral cavity, either on mucosal surfaces or on the dental hard tissues[3]. Various areas of oral cavity are influenced by environmental factors differently, giving rise to different

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Corresponding Author:
Tanaya
Post Graduate Student, Department of Prosthodontics, Manav Rachna Dental College, MRIIRS, Faridabad

micro-floral combinations in different parts of mouth. Hence, dental micro-flora is different from the micro-flora found on the palate, gingival crevicular fluid or on tongue[3]. The combination of microbes found in each individual are reported to have interpersonal variations, so much so that some authors have described this uniqueness as being akin to that of fingerprints[3]. In-spite of this variation and diversity, normal micro-flora of the mouth has been determined in the past studies[4]. This has, in part, been possible as certain bacteria have been more commonly related to presence of a disease than others. Therefore, the number and types of microbes in oral cavity change with the presence of oral or systemic disease.

Salivary micro-flora may be an indicator of oral disease, but the mucosal micro-flora, more commonly on teeth and gingiva is more commonly associated with oral health and disease. Microbial flora of plaque biofilm has been found to have a causal relationship with dental caries[5] and periodontal disease[6]. Similarly, microorganisms associated with dental calculus are responsible for development of periodontal disease. Similarly, micro-flora present on denture prosthesis may indicate oral health and disease.

Denture prosthesis are significant interventions in oral environment for restoring lost form and function due to tooth loss. Change in oral environment owing to dentures may trigger a change in oral microflora, both quantitatively as well as qualitatively [7]. Certain types of bacteria have been shown to be associated with denture health and disease. Also, oral micro-flora on denture and teeth surfaces both has been found to be similar in both healthy and diseased oral cavity. Therefore, microbial changes associated with dentures are not only indicative of mucosal health, but may also lead to development of dental disease in remaining teeth[8]. Increase in microbial count has been seen after denture insertion. A recent study has shown that pathogenicity of Staphylococcus aureus increased post denture delivery as phagocytic efficiency against Staphylococcus aureus was demonstrably lesser against the strains present in plaque than in normal mouth.

Ecological change in oral cavity because of removable prosthesis is said to be disadvantageous. Investigations[8, 9,10,11] gives the idea that the physical presence of a denture brings a microbiological change, in localized region. Increased occurrence of caries and periodontal disease increases plaque formation caused by the denture in patients treated with removable partial prosthesis. This makes the person more prone to caries and periodontal disease.[5,6] Further, changes in oral micro-flora has also been demonstrated with age.

An estimated 21.4% prosthesis use has been observed in individuals aged 15 to 74 years. In 55 to 64 year-old group, 22. 2% were found to wear removable partial denture. Patients using removable partial dentures has been high in the past and is expected to continue in the future.[9] Therefore, prosthesis use among geriatric population remains high. This coupled with changing micro-flora and reducing immunity may make an more susceptible to oral disease. However, little has been known about change in micro-flora in removable partial denture wearers with age and time since denture delivery[12,13,14,15]. Understanding this relationship may be helpful in instating measures for preventing oral disease is geriatric removable partial denture users. Therefore there is a need to study and get clarity on changes in oral microbial flora with and without removable partial dentures in different age groups. Therefore, the present study was conducted to evaluate and compare the oral microbial flora pre and post insertion of removable partial denture at different time intervals and age groups.

Material and Method

Study design and setting

The present study was conducted among 60 patients who needed removable partial dentures as a part of their prosthetic treatment at department of prosthodontics in a teaching hospital in northern India. Ethical approval was taken from the institutional ethics committee (IEC letter no. MRDC/2017/IEC/12).

Selection Criteria: Inclusion criteria- Patients within age range from 40 to 60 years who required removable partial dentures for at least five missing teeth were included in the study.

Exclusion Criteria: Those who had systemic disease such as Diabetes Mellitus, Hyperthyroidism, Osteoporosis or who had consumed antibiotics at any time in six months preceding screening were excluded from the study.

Method of collection of data: Sample size- A sample of 60 patients wearing removable partial denture was included in the study. 30 were between age group 40-

50 years (Group 1) and remaining 30 were between age group 50-60 years (Group 2). The participation in study was voluntary and an informed consent was obtained before recruiting patient into the study. The participant was provided an information sheet explaining the aim of the study.

Study Procedure: The swab method was employed for collecting salivary samples [16]. Sample of unstimulated saliva was collected from the patient's mouth from the distal most edentulous area using three sterile cotton swabs by one investigator. Unstimulated saliva samples were collected from the patients at three time intervals-

T0 -At the time of denture insertion

T1 -After one month of use of denture

T2- After three months of use of denture.

The collected swab was shaken manually to permit the uniform distribution of microorganisms. The culture media used were blood agar, Sabouraud's dextrose agar (SDA) medium, mitis salivarius, brain heart infusion (BHI) broth andthioglycollate broth. First swab was inoculated in blood agar plate for the purpose of colony count using spread plate technique[11]. Inoculation was done using a sterilized spreader (bent glass rod). Second swab was inoculated in BHI broth for isolation and identification of aerobic microbes and third swab was inoculated in Thioglycollate Broth for isolation and identification of anaerobic bacteria. In the incubator, the culture plates were incubated at 37°C for 24 hours.

Colony count & Identification of Micro organisms

The bacterial colonies in blood agar were seen and counted using Digital Colony Counter: After 24 hours of incubation the saliva sample from BHI broth was inoculated in Mitis salivarius agar medium and dextrose agar (SDA) medium for identification of aerobic microbes and from thioglyccollate broth to blood agar for identification of anaerobic bacteria. The blood agar plates were put for incubation in an Mckintosh and Filde's anaerobic jar with anaerobic pouch for one week at 37°C.

Depending upon the colony morphology, different types of colonies were marked in the culture plates. Gram staining, preliminary tests and conventional biochemical tests were performed on the marked colonies taken from the culture plates for identification of the microbe.

Gram positive and gram negative microbes were identified. Catalase test was done as preliminary test for identification of microbes. Conventional biochemical tests for microbial identification were also performed. These were Methyl Red and Voges-Proskauer test, Methyl red test, Voges-Proskauer test, Urease test, Bile esculin test, Sugar fermentation test, Germ tube test for identification of Candida albicans and Coagulase Slide and tube test.

Each of these tests was performed on the salivary samples obtained from the patients at three different intervals. Quantitative outcome measures used for comparison among age and time groups were colony counts, and percentage of Streptococcus mitis, Streptococcus mutans, Streptococcus salivarius, Enterococcus faecalis, Staphylococcus aureus,non pathogenic Staphylococcus,non pathogenicdiptheroids, Candida albicans and candida sp. for aerobes. For anaerobes, percentages for Actinomyces, Lactobacillus and Porphyromonas were determined.

The data was compiled in Microsoft Excel and analysed using SPPS software Version 23 (IBM Inc., Chicago). The Data was subjected to statistical analysis for calculations of mean, standard deviation and percentages. ANOVA was used to find the interaction effect between the age groups and time intervals. To find the significance of study parameters, t-tests and chi-square test were used to compare the mean values in different age groups and at different time intervals. P-value less than 0.05 considered as significant at 95% confidence level.

Results

The present study recruited 60 removable partial denture patients, 30 patients each in the age group of 40 to 50 years (Group 1) and 50 to 60 years (Group 2). The mean age of group 1 patients was 45.77+2.47 and 55.73+2.20 years for group 2 patients. The average age for all the study participants was 50.75+5.53.

Colony counts were performed for different aerobic and anaerobic microbes present in saliva. Mean colony count at baseline was 125.03+15.12 for 40 to 50 years age group and 126.57+19.69 for 50 to 60 yearsgroup . At first month, it was 220.00+32.44 for age group 1 and 215.67+28.70 for age group 2, while at three months, the colony count for group 1 was 288.00+25.48 and for group 2 was 281.17+21.64 (Table 1).

Table 1. Differences in Baseline, 1 month and 3 month colony count among age groups

	Mean Colony Count Group 1	Mean Colony Count Group2	T value	P value
Baseline	125.03	126.57	-0.388	0.736
1 month	220.83	215.67	1.307	0.196
3 month	288.00	281.17	1.120	0.268

The difference among mean colony counts between group 1 and 2 were not statistically significant at any of the three timeintervals. A Statistically significant difference in colony counts was seen between baseline, 1 month and 3 months in whole sample as well as both the age groups. The mean colony count was found to be higher in Group 1 as compared to group 2 except at the first month (Table 2).

Table 2. Colony Counts at baseline, 1 month and 3 months.

Total Sample						
		N	Mean	Std. Deviation	t-value	p-value
Colony Counts	Baseline	60	125.80	17.42	20.548	<0.001
	1 Month	60	220.83	30.81		
	1 Month	60	220.83	30.81	26.062	<0.001
	3 Months	60	284.58	23.69		
	Baseline	60	125.80	17.42	45.143	<0.001
	3 Months	60	284.58	23.69		
Group 1						
		N	Mean	Std. Deviation	t-value	p-value
Colony Counts	Baseline	30	125.03	15.12	15.056	<0.001
	1 Month	30	226.00	32.44		
	1 Month	30	226.00	32.44	18.445	<0.001
	3 Months	30	288.00	25.48		
	Baseline	30	125.03	15.12	31.807	<0.001
	3 Months	30	288.00	25.48		
Group 2						
		N	Mean	Std. Deviation	t-value	p-value
Colony Counts	Baseline	30	126.57	19.69	14.153	<0.001
	1 Month	30	215.67	28.70		
	1 Month	30	215.67	28.70	18.282	<0.001
	3 Months	30	281.17	21.64		
	Baseline	30	126.57	19.69	32.319	<0.001
	3 Months	30	281.17	21.64		

Among various aerobic microorganisms, Streptococcus mitis, Diphtheroids and Candida Albicanswere the most prevailing aerobic micro organism with 9% of prevalence, after 3 months of using denture. On the other hand among anaerobic organisms, Prophyromonasgingivalis was the most prevalent microorganism after three months. Tables 3 and 4 showed the number of colonies at three time intervals among two age groups for aerobic and anaerobic journals respectively.

Table 3. Number of aerobic colonies according to age groups and time since denture insertion

	Group 1 (N)	Group 2 (N)	Total (N)
Streptococcus Mitis1	16	19	35
Streptococcus Mitis2	18	15	33
Streptococcus Mitis3	27	25	52
Streptococcus Mutans1	10	11	21
Streptococcus Mutans2	11	14	25
Streptococcus Mutans3	10	17	27
Streptococcus Salivarius1	0	1	1
Streptococcus Salivarius2	1	1	2
Streptococcus Salivarius3	0	2	2
Enterococcus Faecalis1	0	1	1
Enterococcus Faecalis2	1	2	3
Enterococcus Faecalis3	2	2	4
Staphylococcus aureus1	8	3	11
Staphylococcus aureus2	2	5	7
Staphylococcus aureus3	3	5	8
CoNS1	20	15	35
CoNS2	17	15	32
CoNS3	10	15	25
Diphtheroids1	11	17	28
Diphtheroids2	15	17	32
Diphtheroids3	25	22	47
Candida Albicans 1	16	20	36
Candida Albicans. 2	18	19	37
Candida Albicans 3	28	26	54
Candida1	14	10	24
Candida2	12	11	23
Candida3	2	3	5

Table 4. Number of anaerobic colonies according to age groups and time since denture insertion

	Group 1 (N)	Group 2 (N)	Total (N)
Actino1	2	3	5
Actino2	9	11	20
Actino3	18	19	37
Lacto1	7	11	18
Lacto2	11	15	26
Lacto3	14	14	28
Porphyro1	18	18	36
Porphyro2	16	21	37
Porphyro3	26	25	51

Discussion

The present study is first of its kind that compares the oral micro-flora among RPD wearers of two age groups at three different time intervals. A significant difference in colony counts was observed in this study at all the three time intervals. The reason for this difference may be the presence of spaces between the prosthesis and tissue surface where and saliva accumulation may cause an increased microbial count. In this study, the number of colony forming units increased from pre insertion to 1 month and 3 months after denture insertion in both the groups. The colony counts in the total sample increased with time. The increase was greater from baseline to the first month as compared to increase from first to third month. The reason may be the balancing of oral micro-flora into a more stable environment as compared to an initial growth phase. Tales et al (2012) have observed in their study that redevelopment of microbial biofilm on both natural as well as denture teeth is faster after cleansing. The faster initial development phase may be connected to this phenomena[17]. The increase in colony count was highest in both the groups from baseline to the first month. However, among group 1 and group 2, the increase in colony count was lesser in group 2 as compared to group 1 from baseline to the first month. Increase was greater in group 2 as compared to group 1 from first month to third month post denture insertion. In contrast, a randomized controlled trial was conducted by Valentini et al. (2015), which concluded that time period did not cause a change in micro-flora associated with denture liners[18]. This indicates that there is a difference in growth of micro-flora on prosthesis according to difference in materials used.

Complete and removable partial dentures are the most common dental prosthesis given worldwide to rehabilitate missing teeth in form and function. Replacement of missing teeth is crucial for various physiological functions like chewing food, speaking, pronouncing words, swallowing food[19]. It is also important aesthetically as well as affects self-esteem of an individual. Whereas removable partial denture prosthesis has been found as an adequate treatment option for partially edentulous patients, these patients, being mostly geriatric need to be assessed for general health and other features while making a decision for removable partial denture prosthesis to be provided to them[20, 21, 22]. Geriatric patients have a greater tendency to changes in quantity, quality as well as flow rate of saliva[23,24]. Factors such as reduced immune responses,

susceptibility to infections and impaired host-defense mechanism should be considered before the prognosis of removable partial denture prosthesis is decided.

In partially edentulous mouths, the amount and type of microbes present and affect of denture on their quantity and quality should, therefore, be studied. The study by Tanaka et al (2010), determined that there was an increase in lactobaccilus count in saliva with increased number of missing teeth among geriatric RPD wearers[25]. Therefore, there a connection between RPD wear and change in oral micro-flora seems inevitable. However, there may be different aspects to it. O'Donnell et al (2015) also state that there is a difference in oral micro-flora in denture wearers according to the location of denture[26]. According to this study, *Bacilli and Actinobacteria* were the species that more commonly inhabited oral cavity in denture wearers. Moreover, the presence of natural teeth has a significant impact on the overall microbial composition, when compared to the fully edentulous. Furthermore, increasing levels of Candida spp. positively correlated with Lactobacillus spp. In the present study, increase was more prominently seen in *Porphyromonas* and *Actinobacteria* among anaerobic, and S.*mitis,* diptheroids and *Candida albicans*. This indicates that some microorganisms grow faster than others in a RPD environment. A study of microbiota at implant surface by Eick et al (2016) showed an increased number of Tannerella forsythia, Parvimonas micra, Fusobacterium nucleatum/necrophorum, and Campylobacter rectus on implant surface. These organisms were not found associated with RPD in the present study, therefore may be associated with growth of microorganisms associated with implant- gingival interface[27]. Also, a study conducted by Derafshi et al. (2017) observed that in addition to oral bacteria, certain non-pathogenic non oral bacteria were present in patients using removable dentures. These were Enterobacter cloacae, Raoultellaornithinolytica, Raoultellaplanticola, Kluyvera spp., and Enterobacter aerogenes[28]. Another study by Ella et al (2013) compares difference in predominance of oral streptococcus species in saliva of dentulous, edentulous, partial and complete denture wearers. The result of this study showed preponderance of Streptococcus milleri in removable partial denture group[29]. Therefore, a wide variety of pathogenic and non pathogenic microorganisms have been found to be associated with use of removable partial denture.

There is a lack of literature on affect of time on oral micro-flora of removable partial denture wearers.

Effect of age on micro-flora of the oral cavity has been previously studied[30], however the effect of time since an individual has been wearing removable partial denture prosthesis is not known. The present study has been able to show that there is a significant difference in colony counts and microbial predominance with time. Further studies are recommended to study this aspect.

Conclusion

Health of teeth as well as oral soft and hard tissues has an inevitable association with oral micro-flora. Any change in micro-flora is bound to affect oral health. A significant difference in colony count as well as colonizing microorganisms has been found in the present study. This difference according to time may be an important component in the affect of removable partial denture on oral health of denture wearers and should be considered in cases with denture stomatitis and other infections of oral cavity associated with RPD wear.

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Determinants of Early Refractive Error on School-Going Children (10-12 Years) in Dhaka City, Bangladesh

Tanjina Rahman[1], Sumaiya Chowdhury[2], Foyjunnaher Sultana[2], Mohammad Asadul Habib[3], Akibul Islam Chowdhury[3], Mohammad RahanurAlam[1], Tazul Islam[1]

[1]Assistant Professor, [2]Student, Department of Public Health, North South University, Bangladesh, [3]Student, Department of Food Technology and Nutrition Science, Noakhali Science and Technology University, Noakhali-3814, Bangladesh

Abstract

Background: Refractive Error is a common health issues among young school-aged children in Bangladesh. Present study focused on determinants of refractive error among school-going children (class II-V) and the associated factors.

Method: Data were collected from 200 school-going children and their parents in a cross-sectional study using purposive sampling from Cambrian School, Dhaka city. A semi-structured questionnaire was administered to collect socio-demographic, behavioral and clinical information related to prevalence of refractive error at this age of children.

Results: Study revealed that, among 200 participants, 54.5% children had refractive error and the younger a child is, the more there was possibility of having this issue. A positive association was found between meal intake, duration of using computer games or watching television and genetic factor (parents' wearing spectacles) with the occurrence of having this error in children (p<0.05).

Conclusion: Findings of this study revealed, unhealthy life-styles and physical inactivity at this age may lead to refractive error among school aged children and early detection with medical advice as well as life-style modification might play a significant role not only in improving children's learning ability but also in reducing the incidence of refractive error in this age group in Bangladesh.

Keywords: *Refractive Error, Nutritional deficiency,School-going children.*

Introduction

Eyes are the reflection of the spirit and the body's window to the rest of the world. The target of learning starts in youth and the exactness of a kid's vision can massively influence or adjust his/her learning limit. School going years are considered as miracle years in an individual's life just as the early stages that decide one's physical, scholarly, and personal conduct standard. Any issue in vision during early stages can hamper the scholarly turn of events, development, and execution of an individual in future life.[1] Refractive error (RE) is an important component of the priority disease "childhood blindness" (CB) within the vision 2020' initiative to eliminate avoidable blindness.[2] The World Health Organization (WHO) has internationally assessed that there are roughly 314 million individuals living with vision hindrance. The World Health Organization has prescribed to its part nations to screen grade school going youngsters with the goal that refractive mistake could be distinguished and overseen successfully.[3] Refractive blunder could be considered as an avoidable condition among different conditions prompting visual inabilities

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Corresponding Author:
Akibul Islam Chowdhury
Department of Food Technology and Nutrition
Science, Noakhali Science and Technology University,
Noakhali-3814, Bangladesh
Contact No.: +8801521-331515
e-mail: akibul433@gmail.com

in kids. Subsequently the VISION 2020 activity to wipe out avoidable visual deficiency has given high need to revision of refractive mistake and includes set it inside the classification of "Childhood blindness".[4]

Prevalence of refractive error in school-aged children (RESC) in numerous investigations is exceptional as they utilize various definitions, diverse estimation techniques, distinctive announcing frameworks and affiliations utilizing diverse gathering of ages. Some compared age, gender and ethnicity, others associated it with socioeconomic status, geographic areas (urban, rural) and categorised them differently. Bangladesh has an estimated of 1.3 million blind children, more than any other country in the world.[5] Even though this represents a small fraction of the total blindness, the control of blindness in children is one of the priority areas of the World Health Organization's (WHO) "Vision 2020: the right to sight" program.[6] To estimate the prevalence of blindness in Bangladesh, a survey was conducted by the National Institute of Ophthalmology (NIO) in 2002 found that 40,000 children (about 8 per 10,000 children) were blind and 1.3 million children had refractive errors.[7] In 2002, another study was also conducted among children aged 5 to 15 years in Khulna district of Bangladesh, it was estimated that the prevalence of refractive error among male and female was to be 1.1% and 0.95% respectively and low vision was 0.15%. In the same study, it was shown that the prevalence of refractive error was to be 1.38% in 11 to 15 years group children compare with 0.62% in age group 5 to 10 years.[8]

Significance of early location and treatment of visual debilitation (Refractive Error) in youngsters is significant part of our screening program. Early recognition and rectification of refractive blunder bring about an abatement in the quantity of younger students with helpless sight.[9] Visual impairment due to myopia is the commonest type of refractive error in school going children and its timely and proper correction saves permanent ocular morbidity (POM).[10] Uncorrected refractive errors are the main cause of vision impairment in children ages 5-15 years group.[11] Correction of refractive errors including provisions of spectacles even in low prevalence of reduced vision in school-age children is to be considered a public health perspective.[12]

Major causes of childhood blindness are easy to detect and approximately 40% are preventable. School children are a captive audience and can be reached more easily in comparison to general population.[13, 14] Genetic factor is the main cause of refractive error on children. Other causes of refractive error among school going children are urbanization, visual experience, life style and diet.[15] Children eating habits are important factor for developing refractive error and it is found that myopes are significantly associated eating less fresh fruits, vegetables and whole grains in their daily diet.[16] Eating processed foods tend to have low food intake of protein, fat, vitamins and minerals and increase the consumption of high content of carbohydrates, starches or sugars that favour the development of myopia.[17, 18]

Other possible reasons related to developing myopia among school going children are hectic educational schedule[19], hours of sleeping[20], spendingmore time in watching television, playing video games and computer games.[21] Children with these types of behaviours are experiencing a variety of ocular symptoms including eyestrain, tired eyes, irritation, redness, blurred vision and double vision referred as computer vision syndrome.[21] Goh *et al* suggested that the prevalence of myopia was associated with older age, female gender and ethnicity.[22]

To our knowledge, a few numbers of studies on assessment on early refractive errors on school going children has been done in Bangladesh as well as in other countries all over the world. Hence, the present study was conducted to identify the factors influencing refractive error among the students (class 3 to 5) of Cambrian School of Dhaka city and to determine whether age and gender moderate the relationship between these factors and refractive errors.

Methodology

Study Design and Settings: A descriptive cross-sectional was conducted from September 2015 to January 2016 among students from class III to class V (elementary schools) at Cambrian School, Baridhara, Dhaka.

Sample Size: The target populations were 200 school-going children (60 students from class III, 70 from class IV and another 70 students from class V). All children (class III to class V) and their parents were included in the study. Students who did not bring back the questionnaire on the next day of delivering questionnaire were excluded from the study. Purposive sampling technique was used to choose the study participants.

Data Collection Tools: A semi-structured questionnaire was developed for collection of required information through face to face interviews. The interview schedule was pre-tested and necessary alteration and modification was made. All answered questions were checked for incompleteness (if any), correction (if required) and internal consistency to exclude missing or inconsistent data. The questionnaire was pretested before actual data collection and was modified accordingly. After data collection, 10% of the questionnaire was re-checked for the reliability and validity of the data. The purpose of the study was to identify the determinants of early refractive error on school going children in Dhaka city through describing the interaction between socio-demographic, behavioural, and clinical factors associated with early refractive error among young school-going children.

Statistical Analysis: The statistical analysis of the data was carried out by using software program SPSS version 20 and was done by the investigator. Data was coded, checked, cleaned, and edited properly before analysis. Chi-square test was performed to see the correlation of respondent's characteristics with refractive error. Multivariate logistic regression analysis was done to identify the factors associated with refractive error.

Results

The data comprised 200 school going children (class 3 to 5) in Dhaka city. The baseline characteristics of the participants, such as gender, mother's education, father's education, monthly income, expenditure on food, daily meal intake, using computer, duration of using computer/video games/watching television, sleeping hour, physical exercise/play outside, parents using spectacles, medication are described (Table 1).Among the 200 studied school going children, 109 (54.5%) have refractive error. Parents using spectacles, medication, meal intake, duration are found significant with refractive error considering 5% significance level.

Table 1: Baseline Characteristics of the Participants (n=200)

Variables	Categories	Refractive Error		Chi-square	P-value
		Yes	No		
Gender	Male	65	49	0.462	0.497
	Female	44	42		
Mother's education	<HSC	73	56	0.424	0.515
	>HSC	36	35		
Father's education	<HSC	49	37	0.219	0.64
	>HSC	60	54		
Monthly Income (BDT)	<50,000	52	55	2.741	0.098
	>50,000	57	36		
Expenditure on Food	<20,000	67	65	1.771	0.183
	>20,000	42	26		
Daily meal intake	3 times	45	54	7.302	0.026
	4 times	25	11		
	>4 times	39	26		
Using computer/Laptop	Yes	91	74	0.046	0.829
	No	18	17		
Duration of using computer, video games or watching television	<2 hours	37	22	13.01	0.001
	2 hours	44	59		
	>2 hours	28	10		
Sleeping hour	6 hours	8	7	4.464	0.107
	7 hours	16	5		
	≥ 8 hours	85	79		

Variables	Categories	Refractive Error		Chi-square	P-value
		Yes	**No**		
Physical exercise/play outside	Yes	79	66	1.4041	1.00
	No	30	25		
Parents using spectacles	Yes	89	19	71.313	<0.001
	No	20	72		
Medication	Yes	58	18	22.129	<0.001
	No	51	73		

Data were collected from 200 school-going children (60 students from class III, 70 from class IV and another 70 students from class V) from Cambrian School, Dhaka.
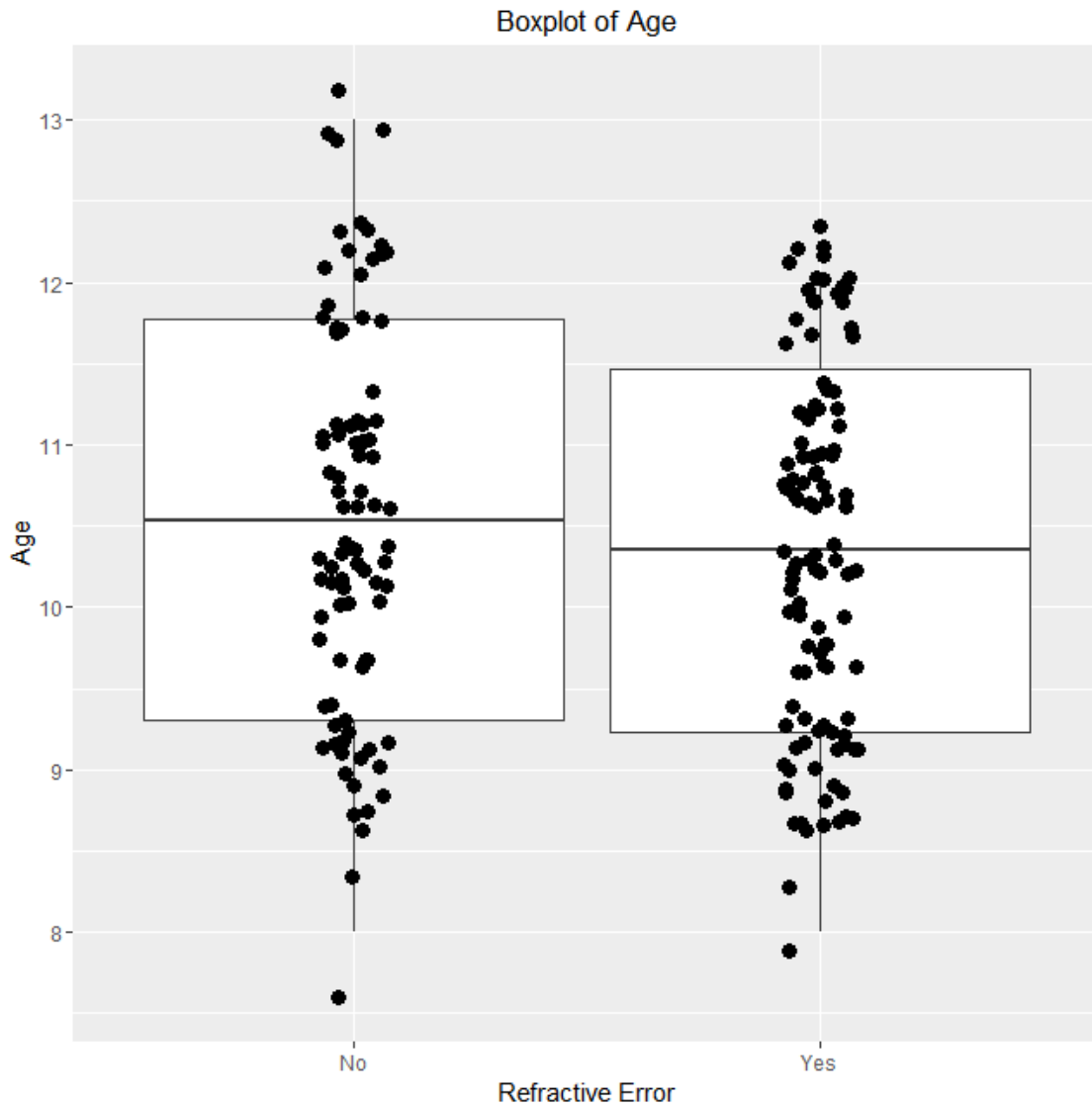
Figure 1: Interaction between age with Refractive Error

The age is considered as continuous variables and the box plots for age corresponding to refractive error are given in Figure 1. It appears from the figure 1 (boxplots for age) that younger school going children are more suffering from refractive error compared to older school going children.

Table 2: Association of Refractive Error with significant factors identified by Multivariate Logistic Regression

Significant Factors associated with Refractive Error	References	OR	LCL	UCL	P-value
Meal intake	4 times	4.879	1.28	20.549	0.024
	>4 times	0.268	0.062	1.098	0.046
Duration of using computer, video games or watching television	2 hours	0.336	0.111	0.947	0.044
Parents using spectacles	Yes	0.024	0.007	0.066	<0.001
Medication	Yes	0.067	0.019	0.196	<0.001

Data were collected from 200 school-going children (60 students from class III, 70 from class IV and another 70 students from class V) from Cambrian School, Dhaka

We fit a multivariate logistic regression model with refractive error (RE) after adjusting all the risk factors. The adjusted odds ratios (OR) for RE group is given in the Table 2. It appears that 95% confidence interval parents using spectacles (OR=0.024, CI=0.007, 0.066) is significant variable. In fact, the p-value is found <0.001 which indicates a significant relationship between parents using spectacles and RE at 5% significance level (Table 2). Again, the odds ratio explains that the odds of being RE is 0.024 times more for the parents those are using spectacles compared to the parents those are not using spectacles.

In addition, medication (0R=0.067, CI=0.019, 0.196, p-value <0.001) is significant variable. The odds ratio explains that the odds of being RE is 0.067 times more for the students having medication compared to the students not having medication. The meal intake (OR=0.268, CI=0.062, 1,098, p-value =0.046) and duration (OR=0.336, CI=0.111, 0.947, p-value =0.044) are found significant.

Discussion

The present study evaluated the prevalence of presenting refractive error among school going children and common possible factors associated with developing refractive error. In our study, refractive error among male were higher compared with female although the result was not significant. A cross-sectional descriptive study carried out among 2000 students in Bhaktapur and Lalitpur districts of Kathmandu valley examined that the prevalence of refractive error was 8.60% where the prevalence was significantly higher in female students than the male students (OR = 1.58 [95% CI 1.14-2.19]).[23]Another cross-sectional study conducted among children between 12-17 years of age in India found that 8.8% of the study population had refractive error (boys 51% and girls 49%). Myopia (7.17%) was the most common refractive error followed by astigmatism (2.17%) and hypermetropia (1.50%). This study showed that myopia is the most common refractive error (7.17%) followed by astigmatism (2.17%) and hypermetropia (1.50%)[24] although we did not measure myopia among students.

The present study did not show any significant relation between refractive error and parental education, sleep hours, expenditure on food, monthly income and using laptop/TV. Medicine use, parents using spectacles and duration of using laptop or watching TV showed significant correlation (p<0.05). Logistic regression analysis showed that parents using spectacles (OR=0.024, CI=0.007, 0.066, *P*<0.001) is one of the risk factors for refractive error. Previous studies showed that myopic parents can be the cause of myopia to their children.[25]

In this study, it was observed that, medication (0R=0.067, CI=0.019, 0.196, p-value <0.001) was a significant variable associated with childhood refractive error. Zhao JL, Pan XJreported that higher protein intake (OR: 0.94; 95%CI: 0.90, 0.99) and duration (OR=0.93, CI=0.89, 0.97) are significantly associated with refractive errors.[26]In our study, we had also found a positive association of refractive error with both the meal intake (OR=0.268, CI=0.062, 1,098, p-value =0.046) and duration of using computer or watching television (OR=0.336, CI=0.111, 0.947, p-value =0.044). Interestingly, prevalence and amount of myopia was associated with the self-reported intake of proteins such as milk, egg, beans and meat. This finding may be parallel to the results of study by Lim and colleagues[27], who examined 851 Chinese schoolchildren from Singapore and found that axial length was longest in the most noteworthy quartile gathering of complete cholesterol admission contrasted and the least (P=0.03)

and was longest in the most noteworthy quartile gathering of immersed fat admission contrasted and the most minimal (P=0.04).None of the nutrients, however, was associated with refractive error or a diagnosis of myopia. While the data from Lim's study may suggest that children with a higher cholesterol intake may have larger globes, potentially associated with a taller body height[28, 29], the finding of our study leads us to raise the question whether the association between meal intake and refractive error may be just another expression of the association between refractive error and educational and socioeconomic background of the parents.

In addition, It confirms recent studies by Rose et al. who found that a lower prevalence of myopia in Chinese children raised in Sydney as compared to Chinese children living in Singapore was associated with increased hours of outdoor activities[30, 31]. This group was the first to separate the effects of being outdoors and being physically active on the association with myopia. In this study, physical exercise or playing outside (p-value =1) was not significant, may be because there is limited place for physical activity in Dhaka city for this age group and our study was a cross-sectional one, rather an intervention study where majority of our participants were already having refractive error.

In our study, we found that, children with parents using spectacles were significantly more prone to have this issue in Dhaka city. Medication was also found as a significant factor associated with refractive error for the school-going children. It is not a pleasure to see children with spectacles at the age of three years and above. Out of twelve independent variables (such as gender, mother's education, father's education, monthly income, expenditure on food, daily meal intake, using computer, duration of using computer/video games/ watching television, sleeping hour, physical exercise/ play outside, parents using spectacles, medication), only four variables namely (parents using spectacles, medication, meal intake, duration of using computer/ video games/watching television) were found significantly associated with the refractive error in the study cohort. Additionally, when it comes to gender, male children are more dependent on machine-oriented activities than female children. The meal intake was also found to be significant in association with refractive errors. Therefore, we do have some limitation of this study, which may includes mall sample size, use of take-away questionnaire, lack of training among parents who filled up the questionnaire on behalf of their children, impact of missing data and time restrictions.

Conclusion

To avoid unhealthy lifestyle among children, parents may encourage their children to plan their daily time which will enable them to complete their daily task. They should take physical exercise or go outside for playing. It will help them to reduce the duration of using electronic devices. It will be also helpful for good sleep. Based on the important findings, the following recommendations are made, such as- children should take their meal properly to avoid the nutrition deficiency, duration of using computer, video games or watching television should be lessened with proper monitoring of the parents, social medias may also play a role to understand the behavioural factors and how these factors associated with early refractive errors to build up public awareness. Further study should be conducted in a larger scale in order tofind out the risk factors and draw generalization.

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Awareness and Utilization of Primary Health Centre Services among Rural Population: A Review Based on Available Literature

Tarun Dhyani[1], Nageshwar V.[2], Amrita Singh[3]

[1]M.Sc. Nsg. 2nd Year Student, [2]Assistant Professor, Department of Mental Health Nursing, [3]Assistant Professor, Department of Community Health Nursing, Teerthanker Mahaveer College of Nursing, TMU, Moradabad, U.P.

Abstract

Introduction: Health is the best condition for happiness and progress in the life of an individual as well as a community. Primary Health Centre (PHC) is the most essential constituent of Community Health Care System as it is the first point of connection between civilian and the Community Health System. This paper aims to assess the awareness and utilization of PHC services among rural population.

Method: A comprehensive systematic session of published literature and journal articles from Pub-Med and EBSCOHOST databases was done that are focusing from 2010 to 2017. Search strategy specific to each databases was used.

Result: Out of seven articles, four research studies revealed that the majority of respondents were aware about the presence of PHC services in their area, one research study found that there was lack of awareness about PHC services, five research studies found that there was low utilization of PHC services, one research study revealed that utilization of PHC services is better for preventive and promotive care and one research study finding revealed that the utilization of PHCs service was adequate.

Conclusion: The study concluded that there is an imperative need to raise awareness amongst the rural population regarding health services provided by PHC through IEC activities to enhance the service utilization by the community through their participation.

Keywords: *Awareness, Utilization, Primary Health Centre (PHC), Services and Rural Population.*

Introduction

Primary Health Care is defined as "Essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation, and at a cost that community and country can afford" has been suggested as a set of health services that can conformed the challenges of a dynamic world. Primary Health Care is the first level of connection between the individuals, the family and the community with the community health system, which brings health care as close as accessible to the common people where they live and work. In the modern time, the base for organization of health services in India through Primary Health Care was established by the suggestions of the Bhore committee in 1946. Later, based on the recommendations of first integrated all round development programme (the community development programme) PHC were established for each community development block. In India, the PHCs play the key role in delivering health care to rural people. The PHCs are assumed to provide preventive, promotive and curative health care to the public.[1-2] Equity, along with inter-sectoral co-ordination, community participation and appropriate technology has been described as the

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Corresponding Author:
Mr. Tarun Dhyani
Teerthanker Mahaveer College of Nursing, Teerthanker Mahaveer University, Moradabad (U.P); Pin Code–244001
e-mail: tarundhyani17@gmail.com
Mobile No.: 9917854402

principles and pillars of Primary Health Care.[3] The utilization of services by the community alters from place to place at PHCs and transforms over the time based on the accessibility of quality of services. It is also needed to assess the utilization trend of PHC services by the public.[4]

In most developing countries such as India, where the utilization of primary health services has remained low however there has been growing public and private investment on the provision of sophisticated health care.

The awareness of the community about health programs and their involvement in organizing for health services, influence their level of participation and utilization of linked health facilities. Majority of people living in most developing countries of the world, including Africa, have a poor perceptive of their national health systems and programs and thus do not lay the health facilities into appropriate and maximum use.[6]

Data has shown that abundant number of women in rural areas of Bangladesh meet serious problems all the while pregnancy and childbirth. Frequently, the women do not recognize about health care services existent for their usage, although under-utilization of healthcare services can result in maternal morbidity and mortality.

Universally, research indicates that approach to and utilization of Primary Health Care Services can been different in countries between urban and rural (and nomadic) community, with concluding having the poorest approach to and utilization of PHC services.

Hence, it was found necessary to design a narrative review to find the available literature for identifying the awareness and utilization of PHC services among rural people.

Aim: The aim of this review is to identify the awareness and utilization of PHC services among rural population.

Objectives: To determine the awareness and utilization of PHC services among rural population.

Methodology

Search Strategy: An electronic search of articles published in various journals till 2017 (September) was conducted. Search was restricted to only English language. The database search done was Pub-Med and EBSCOHOST. Articles containing following key search terms were retrieve.

"Awareness" [MeSH Terms] OR awareness [Text Word] AND "utilization" [Subheading] OR utilization [Text Word] AND primary [All Fields] AND "health" [MeSH Terms] OR HEALTH [Text Word] AND centre [All Fields] AND services [All Fields] AND "rural population" [MeSH Terms] OR rural population [Text Word]

Types of Study: Community based cross-sectional, comparative, survey and descriptive study.

Types of Participant: Rural people including women aged 15 to 49 years, patients, families, household and adults.

Settings: Villages, rural community and semi-urban community.

Outcome: Awareness and utilization of PHC services among rural population.

Result

The systematic search was conducted by framing the terms individually and in combination with all synonyms, also according to the database. In addition to this, a manual Pub-Med search was undertaken using the keywords and search synonyms from already found articles. Additions of seven articles were found. Initial search retrieved 48641 articles over which 23598 articles were selected manually. Duplicates were removed and reviewed 398 articles for eligibility, 23200 articles were excluded because of duplications in two databases, 353 studies were excluded due to unavailability of full text. Hence seven articles were screened which includes quantitative study.

Detail description of study: Rajpurohit AC., Srivastava AK. et al. conducted a Cross sectional study in the year of in the year of 2013 on utilization of primary health centre services amongst rural population of northern India- some socio-demographic correlates.585 household were selected by Stratified random sampling. Data was obtained by using predesigned and pre-tested interview schedule. Findings revealed that majority (76.2%) of the subjects was aware about the PHC services in their area and found to be low (36.3%) utilization of its services.

N. Thimmaiah and C.V. Anitha conducted a Comparative study in the year of 2013 on utilization of primary health centre services in rural and urban areas: a comparative study in Mysore Taluk. 240 household

were selected by Simple random sampling technique. Data was obtained by using self administered structured questionnaire. The study found that the utilization of PHC services was too low both in rural and urban areas, 21.7% and 20% respectively.

Rushender Rajan, Balaji Ramraj et.al conducted a Descriptive study in the year of 2016 on effective utilization of health care services provided by Primary Health Centre and Sub- Centre in rural Tamil Nadu, India. 3220 household were selected by Simple random sampling technique. Data was obtained by using structured interview schedule. The finding revealed that majority of respondents were aware of Primary Health Centre health care services and the utilization of primary level services (PHC and Sub-centres) is better for preventive and promotive care but is poor for treatment of acute illness, intra-natal care and family welfare services, special investigation services.

K N Prasad,V Suchi et al. conducted a Cross-sectional study in the year of 2015 on utilization of health facilities at Primary Health Centre by rural community of Pondicherry. 300 families were selected by simple random sampling technique. Data was obtained by interview using questionnaire. The finding suggests that majority of subjects were utilizing PHCs services.

B.E. Egbewale, O.O. Odu conducted a Cross-sectional study in the year of 2013 on perception and utilization of primary health care services in a semi-urban community in South-Western Nigeria. 395 adults were selected by multistage sampling technique. Data was obtained by interview conducted using semi-structured pre-tested questionnaire. The result shows that majority (71.1%) of participants were aware about the presence of a PHC facility within their health districts and (44.1%) participants had ever-utilized PHC facility within their health districts.

Yaya Sanni, Shah Vaibhav et.al conducted a Cross-sectional study in the year of 2017 on awareness and utilization of community clinic services among women in rural areas in Bangladesh. 11,673 women aged 15 to 49 years were selected by Systematic sampling. Data was obtained by using questionnaire. The study finding revealed that lack of awareness and low utilization of community clinics among women of reproductive age group.

Alfaqeeh Ghadah, Cook Erica J conducted a Comparative study in the year of 2016 on access and utilisation of primary health care services comparing urban and rural areas of Riyadh Providence Kingdom of Saudi Arabia. 880 patients aged 18 years or older were selected by classification of the population density of the governorates. Data was obtained by using questionnaire survey. This study highlights that there are high levels of satisfaction among patients of all primary health care services. The utilization of primary health care services is quite low in rural population.

Summary and Findings: The available literature refined to get seven quantitative study. Out of seven articles, four research studies revealed that the majority of respondents were aware about the presence of Primary Health Centre services in their area, one research study finding is showing lack of awareness about Primary Health Centre services, five research studies found that there was low utilization of Primary Health Centre services, one research study finding is showing that the utilization of PHC services is better for preventive and promotive care but is poor for treatment of acute illness, intra-natal care and family welfare services, special investigations services and one research study finding revealed that the utilization of PHCs service was adequate.

Importance in Community: Primary health care (PHC) is the frontline of the health care system. Primary Health Care plays an important part of keeping community healthy. Each ofPrimary Health Care centres has a multidisciplinary health care team that renders extent of services in a one place. This interconnected access to health care delivery assures that clients obtain the appropriate care by the appropriate provider, when and where they require it.

A strong, approachable PHC structure decreases burden on hospitals by aiding people to deal their health problems in the community. A society is constituted by various strata including people of below, average and high income groups. . Their needs differ and not each person is in a situation to manage the desirable health care services. Primary Health Care is a comprehensive health care system where in each person of a country can approach medical facilities regardless of his/her economic status and race.

Future Significance: The review helps to understand the perception and usage of PHC services among rural population. With more than 70% population of India living in rural areas where the condition of

medical facilities is deplorable. The major confront in the health care sector are lack of quality of care, poor responsibility, lack of awareness and confined approach to facilities. Hence, it is necessary to create awareness among rural people, as the mortality rates are high due to diseases. So, rural people will utilize the primary health centre services.

Limitation:

• Database search was limited

• Search strategy was refined to awareness and utilization of Primary health centre among rural population only.

• Seven articles were included only.

• Was limited to only in rural populations.

Conclusion

• Cooperative endeavour healthcare providers and local leaders is required to raise awareness and enhanced approach of healthcare services through PHC services. Stakeholders in health should provide adequate system to endorse awareness and utilization of health facilities in rural areas.

• In accession, orientation programs admire the advantages of the PHCs facilities to correct false beliefs about PHC between local communities and formation of positive approach passages that connect primary health centres to the communities should be the priority of the administrator of PHC to improve the utilization of services.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Ethical permission was taken.

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Coping Strategies Used by Tax-paying Male Bankers During COVID-19 Induced Lockdown-A Bangladeshi and Pakistani Perspective

Tasdidaa Shamsi[1], Zaheed Husein Mohammad Al-Din[2], Muhammad Sarfraz[2]

[1]Doctor of Public Health Year 3 Student, University of Malaya,
[2]PhD Student, AHIBS, Universiti Teknologi Malaysia

Abstract

The main way to deal with COVID-19 is social distancing. As a result, the governments of different countries imposed lockdowns. Bangladesh Government directed shutdown of offices and public transport on 26th March, 2020 opening everything on limited scale from 31st May, 2020. Pakistan government ordered lockdown in the middle of March, 2020 easing to restore economic activities on 10th August 2020. The current cross-sectional study aims to look at how and what type of coping strategies were taken by tax-paying male bankers in patriarchal countries of Bangladesh and Pakistan when they were faced with lockdown at home due to COVID-19 with data collected by Coping Strategy Indicator. The men were seen to have more emotion based coping due to a different sort of exposure which is unlike of men. This is the first study to assess the effect of lockdown of COVID-19 on coping of highly paid tax-paying bankers in Bangladesh and Pakistan.

Keywords: *COVID-19, tax-paying men, coping, lockdown.*

Introduction

Many unexplained cases of pneumonia were reported in Wuhan, Hubei Province, China on the month of December, 2019. The causative agent was found to be a novel corona virus (2019-nCoV) causing COVID-19, the name given by WHO.[1] The main way the disease can be dealt with is social distancing. As a result, the governments of different countries imposed lockdowns.[2] Bangladesh registered the first case on 8th March, 2020 and the Government directed shutdown of offices and public transport on 26th March, 2020 opening everything on limited scale from 31st May, 2020.[3] Pakistan government closed all schools, banned public gatherings and transport links, locked the national economy, sealed land borders and limited international flights in the middle of March, 2020. Restrictions on certain sectors have since been gradually eased to restore economic activities on 10th August 2020. [4]

Corresponding Author:
Tasdidaa Shamsi
Doctor of Public Health Year 3 Student, University of Malaya

According to the Cambridge dictionary, in a patriarchal society, men hold the primary power. The man is responsible for bringing up and rearing the family. This gender is considered stronger than women. This society is very prevalent in Bangladesh and Pakistan.[5]

As of 2019, according to Bangladesh Bank, the central bank of Bangladesh, only 18 percent of individuals working in banks were women. The rest 82 percent are all men.[6] When the lockdown was imposed due to COVID-19, the all the bankers had to adapt to working from home. Another study stated how much stress bankers face at work in a developing country like Bangladesh. The study stated that around 19 per cent of the bankers suffer from dangerous level of stress while the stress for 35 per cent is severe, 33 per cent moderate and 12 per cent fairly low amount of stress.[7] When working from homes, this stress had to be balanced with work-life balance. Tabassum et al in their study found that male bankers are more leaned towards work compared to females as females have to give more time at home due to dual gender roles.[8] The lockdown in COVID-19 caused a peculiar unbalance to this situation as males now had to take part in more house-work.

A Pakistani study on the other hand stated that male bankers were happier at work because due to gender roles, they are believed to be more satisfied at work, thus a new dimension could be seen regarding these male bankers as well due to the COVID-19 induced lockdown. The study revealed that the relationship between Job Satisfaction (JS) and Gender shown that; male bankers are more satisfied and can work properly, efficiently and effectively in different Organizational Climate as compared to female bankers at workplace management. The reasons found were males are more dedicated to their work, work effectively and efficiently, can manage their tasks well with higher level of confidence, they are risk takers than risk averse, responsibilities oriented, targets oriented, more decisive and less emotional than females.[9] The findings prompted the conducting of the current study to see how the male bankers coped when the problem type is different.

It was foreseen that the outbreak of COVID-19 will cause the public psychological reactions such as tension, anxiety, stress and which can lead to various different and changes in coping strategies. [10] The current study aims to look at how and what type of coping strategies were taken by tax-paying male bankers in patriarchal countries of Bangladesh and Pakistan when they were faced with lockdown at home due to COVID-19 outbreak in these two countries.

Method

The study conducted is cross-sectional. The validated Coping Strategy Indicator was used to collect data through online survey among random male bankers in Bangladesh and Pakistan. The data was collected from 18th to 30th May 2020. A consent form preceded the questionnaire stating that no name or e-mail address was required as the identity of the individuals were not required to be known.

The study was conducted during the COVID-19 lock-down period involving the two different countries. Thus, institutional review board permission was not feasible in countries like Bangladesh and Pakistan as all boards were closed. Notably, we firmly believe ethical approval would be an ideal step to follow. However, there was a strong possibility that this study would not be conducted during this emergency period if we tried to get ethical approval. During the emergency period of this COVID-19 the ethical clearance is a challenging issue and could be modified. We felt as researchers to address the social issue that is affecting each and everyone in the society-both males and females. Confidentiality of participants have been maintained, the rights of participants to drop out from the survey any time they wish, informed consent that no harm to them would occur were all ensured.

Data cleaning was done by one of the investigators and it was cross-checked by a second investigator. Data analysis was carried out using IBM SPSS version 26.

Results

A total of 166 responses were analyzed from the respondents of the two countries (Bangladesh and Pakistan). The background characteristics of the study population are shown in Table 1. Most of the respondents were in the age range of 35-45 years, married, with more than three family members staying with them, with earning member staying with them, and highest level education being a postgraduate degree. 76.54% were now participating in household work after the lockdown was imposed. Men with children and more earning members other than themselves are at higher odds to cope emotionally.

Table 1

Variables	Frequency	Percentage
Age Bracket		
Up to 25 years	12	7.23
More than 25 years and up to 35 years	56	33.73
More than 35 years and up to 45 years	78	46.99
More than 45 years and up to 55 years	18	10.84
More than 55 years	2	1.20
	166	100

Variables	Frequency	Percentage
Marital Status		
Single with no partner	28	16.87
Single with partnet	4	2.41
Married	130	78.31
Divorced	4	2.41
	166	100
Number of Children		
0	56	33.73
1	40	24.10
2	54	32.53
>2	16	9.64
	166	100
Number of Family Members Staying with You		
1	4	2.41
2	8	4.82
3	34	20.48
>3	120	72.29
	166	100
Number of Earning Family Members Staying with You		
1	70	42.17
2	66	39.76
3	16	9.64
>3	14	8.43
	166	100
Highest Educational Level		
H.Sc.	2	1.20
Bachelors	26	15.66
Post Graduate	138	83.13
	166	100
Salary Brackets of Respondents (Bangladesh)		
BDT 250,001 - BDT 650,000	14	13.46
BDT 650,001 - BDT 1,150,000	10	9.62
BDT 1,150,001 - BDT 1,750,000	42	40.38
BDT 1,750,001 - BDT 4,750,000	28	26.92
Above BDT 4,750,000	10	9.62
	104	100.00
Salary Brackets of Respondents (Pakistan)		
Rs 300000 - Rs 600000	18	32.14
Rs 600001 - Rs 900000	10	17.86
Rs 900001 - Rs 1200000	0	0.00
Rs 1200001 - Rs 1500000	12	21.43
Above Rs 1500000	16	28.57
	56	100.00

Variables	Frequency	Percentage
Weekly Hours of Household Work		
0 to 20 hours	124	76.54
More than 20 hours upto 40 hours	30	18.52
More than 40 hours upto 60 hours	4	2.47
More than 60 hours upto 80 hours	2	1.23
More than 80 hours upto 100 hours	0	0.00
More than 100 hours upto 120 hours	0	0.00
More than 120 hours upto 140 hours	2	1.23
	162	100
Weekly Hours of Work from Home		
0 to 20 hours	86	53.75
More than 20 hours upto 40 hours	44	27.50
More than 40 hours upto 60 hours	28	17.50
More than 60 hours upto 80 hours	0	0.00
More than 80 hours upto 100 hours	2	1.25
	160	100

Respondent's coping related statistics are presented in Table 2. The values of Problem-Focused Coping (PFC), Emotion-Focused Coping (EFC) and the Measuring Coping Response (MCR) have been calculated by using the Carver's Cope Inventory Scale (Carver, 1989)[11]. According to this concept, the responses to the questions from the participants were segregated into the above three measures. For each question, a scale of 1-4 was used where 1 stands for 'I usually don't do this at all', 2 for 'I usually do this a little bit', 3 for 'I usually do this a medium amount' and 4 for 'I usually do this a lot'. The average score was calculated for each respondent for each category i.e. PFC, EFC and MCR. Based on the socio-demographic characteristics of the participants the above three coping measures were measured. There has been an almost equal measurement for both problem focused coping and emotion focused coping. Men with higher number of family members have higher emotion focused coping. Higher educated men also have higher emotion focused coping. More the earning members more the decision makers so it becomes difficult to cope if the member becomes more than 3. Higher the number of hours spent in household work, better the coping up to a certain level. Higher the number of hours spent in work from home, more or less higher is the Problem Focused Coping.

Table 2

Marital Status	PFC	EFC	MCR
Divorced	2.25	2.35	1.81
Married	2.56	2.60	2.09
Single, with a partner	2.10	2.75	2.08
Single, with no partner	2.58	2.48	2.18
Overall	2.54	2.58	2.10
Age Bracket	**PFC**	**EFC**	**MCR**
Up to 25 years	2.27	2.13	1.76
More that 25 years and up to 35 years	2.61	2.66	2.35
More than 35 years and up to 45 years	2.54	2.58	2.01

Marital Status	PFC	EFC	MCR
More than 45 years and up to 55 years	2.50	2.50	2.07
More than 55 years	2.90	3.50	1.17
Overall	2.54	2.58	2.10
No. of Children	**PFC**	**EFC**	**MCR**
0.00	2.54	2.52	2.26
1.00	2.49	2.57	2.02
2.00	2.54	2.60	1.94
>2	2.74	2.74	2.47
Overall	2.54	2.58	2.10
No. of Family Members	**PFC**	**EFC**	**MCR**
1.00	1.80	2.00	1.53
2.00	2.73	2.43	2.19
3.00	2.49	2.56	2.01
>3	2.57	2.61	2.14
Overall	2.54	2.58	2.10
No. of Earning Family Members	**PFC**	**EFC**	**MCR**
1.00	2.42	2.49	1.87
2.00	2.58	2.51	2.14
3.00	2.81	3.00	2.40
>3	2.69	2.84	2.75
Overall	2.54	2.58	2.10
Education Level	**PFC**	**EFC**	**MCR**
H.Sc.	2.00	1.80	1.17
Bachelors	2.33	2.28	1.87
Post Graduate	2.59	2.64	2.16
Overall	2.54	2.58	2.10
Hours Spent in Household Work	**PFC**	**EFC**	**MCR**
0 to 20 hours	2.51	2.62	2.15
More than 20 hours upto 40 hours	2.49	2.56	1.93
More than 40 hours upto 60 hours	2.62	2.49	2.12
More than 60 hours	2.70	1.60	2.17
Overall	2.54	2.58	2.10
Work from Home	**PFC**	**EFC**	**MCR**
0 to 20 hours	2.51	2.62	2.15
More than 20 hours upto 40 hours	2.49	2.56	1.93
More than 40 hours upto 60 hours	2.62	2.49	2.12
More than 60 hours	2.70	1.60	2.17
Overall	2.54	2.58	2.10

With the outcome measure in this higher strata workforce was taken as learning to live with the situation(a component of emotion-focused coping) of COVID-19, the R values in Table 3 has been generated when regression analysis was run. The higher values show that irrespective of number of earning members, total number of family members, number of children, marital status or age, they have learned to live with COVID-19.

Table 3

Regression Analysis against Coping Strategy					
	No. of earning family members	**No. of Total Family Members**	**No. of children**	**Marital Status**	**Age**
Multiple R	0.8782	0.9235	0.7663	0.9514	0.9471
R Square	0.7712	0.8528	0.5872	0.9051	0.8970
Adjusted R Square	0.7651	0.8467	0.5811	0.8990	0.8909

Table 4

Univariate regression of socio-economic factors of tax-paying to outcome measure of coping with COVID-19			
	OR	**CI**	**p-value**
Age	0.275	0.66-0.75	0
Number of children	5.875	1.32-1.72	0
Marital status	0.343	0.76-0.84	0
Earning family members	1.542	1.28-1.515	0

When the men are at a higher age range of >45, they are at lower odds of just 0.275 to emotional based coping. When the men have children, they are almost 6 odds of having emotional based coping. When these men have more earning members in their family, other than only themselves, they are more at odds to emotional based coping. Married men were at 0.3 odds to emotion-based coping.

Discussion

The current study was aimed to see the effects of lockdown of COVID-19 on the coping of the tax-paying male bankers from Bangladesh and Pakistan. The participants of this study have at least taxable income for a male in both countries at it co-relates with their high education.

Literature review shows that there are two types of coping strategies - problem-focused and emotion-focused coping. [12] Problem-focused coping, including planning and active coping, has been defined as behavioral and cognitive efforts to alter or eliminate a stressor. On the other hand, emotion-focused coping, which is generally considered to be less effective than problem-focused coping, is aimed at changing emotional responses to the stressor. Examples of emotion-focused coping include venting, positive reappraisal, rumination, and self-blame. Though emotion-focused coping is often described as less effective than problem-focused coping, under certain circumstances, emotion-focused coping may be more productive than active coping responses (e.g., when a stressor cannot be changed). One example of an adaptive emotion-focused self-regulatory strategy is positive reappraisal, which is associated with lower levels of negative affect.[13]

Quite a few studies have shown that women tend to use coping strategies that are aimed at changing their emotional responses to a stressful situation, whereas men use more problem-focused or instrumental method of handling stressful experiences.[13] Our study shows that these high paid working males resorted to emotion based coping due to a different sort of exposure of lockdown induced due to COVID-19. The finding maybe due to confinement with other half and other family members for a long period of time. They also had to participate in more household work and take part in more feminine activities like cooking, washing, looking after children

to ease load on their other halves. It should be noted that most of these households have part-time domestic helps who had to be released from their duties due to the social distancing required combatting COVID-19.

Another similar study found that emotional bonding increased in lockdown due to improvement of sex life and spending more time with family.[14]

Conclusion

The major strength of this study is the sample from two similar patriarchal South Asian countries. For the future reference, this study can serve as a foundation of the research base in the area of men's health. This study could further be strengthened if more data could be collected, but was not possible due to the type of the situation.

This is the first study to assess the effect of lockdown of COVID-19 on coping of highly paid tax-paying bankers, one of the highest socio-economic classes in the societies of South Asia involving the respondents of two countries- Bangladesh and Pakistan which revealed lockdown substantially influenced the coping strategies of men given the different sort of exposure due to COVID-19.

Author Statement:

Ethical Approval: The study was conducted during the COVID-19 lock-down period involving the two different countries.

Thus, institutional review board permission was not feasible in countries like Bangladesh and Pakistan as all boards were closed. Notably, we firmly believe ethical approval would be an ideal step to follow. However, there was a strong possibility that this study would not be conducted during this emergency period if we tried to get ethical approval. During the emergency period of this COVID19 the ethical clearance is a challenging issue and could be modified. We felt as researchers to address the social issue that is affecting each and everyone in the society-both males and females. Confidentiality of participants have been maintained, the rights of participants to drop out from the survey any time they wish, informed consent that no harm to them would occur were all ensured.

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Nutritional Status and Health Risk Assessment: A Study among the Angami Tribal Adults of Kohima, Nagaland

Tepuhoto Khieya[1], J.W. Dkhar[2]

[1]Post Graduate, [2]Assistant Professor, Department of Anthropology, NEHU, Shillong, Meghalaya

Abstract

Background: Recent developmental activities with increasing urbanization has brought about immense changes in the lifestyles of tribal populations in India. But their impact on the health and nutritional status remained poorly explored.

Objectives: This study explored the nutritional and health status of the Angami tribal adults, and the influence of income, alcohol and tobacco use.

Method: Cross-sectional data of 565 individuals from the age of 21–60 years were collected for this study. Nutritional and health status was assessed using BMI, WHR and WHtR.

Results: Underweight was more prevalent in the females (12.7%),whereas, overweight (19.7%) and obese (23.1%) were more prevalent in the males. Risk for cardiovascular disease and metabolic abnormalities based on WHR and WHtR are higher in the females. Chi-square analysis showed significant difference in the nutritional and health status between sex and age groups.

Conclusion: Nutritional status according to BMI showed that males have a better status of nutrition. There is an increasing prevalence of overweight and obesity along with increased risk of for cardiovascular disease and metabolic abnormalities with increasing age. Income, alcohol and tobacco use did not correlate with significantly with nutritional status and health risk in females.

Keywords: *Nutritional status, undernutrition, overweight, obese, cardio-metabolic abnormalities.*

Introduction

There is a consensus that the health status of the tribal populations is very poor owing to their remoteness and alienation from developmental processes.[1]The tribal populations in India form a heterogeneous group and remain at the lowest stratum of the society due to geographical and cultural isolation, low literacy and poverty. As such, their health status also remains unsatisfactory.[2] However, modern developmental activities in the recent past have influenced changes in various aspects of the tribal populations. Nonetheless, the impacts of such changes on the nutritional status and health remains an area of research which is poorly explored. Furthermore, much of the studies carried out in India especially in the North-East region are focused on the growth and nutritional status of children and adolescents, with very limited studies reported among the adult population.[3][4][5][6][7][8] In order to improve the health status of tribal populations, it is imperative to carry out relevant research in these areas to identify the problems and work towards the development of appropriate solutions. However, till date, no studies have been carried out on the adult Angami population of Nagaland. Thus, we carried out this study with the aim to fulfill the following objectives:

i.   To assess the nutritional status and the status of health risk based on BMI, WHR and WHtR.

ii. To assess the differences in the distribution of BMI, WHR and WHtR with respect to age groups and their correlation with income, alcohol and tobacco use.

Materials and Method

This research was based on anthropometric data which were collected randomly by cross-sectional

method from among the Angami tribe inhabiting the southern part of Kohima district in Nagaland during June 2017 to May 2018. A total of 565 individuals (320 males and 245 females) from the age of 21 to 60 years were considered for the purpose of this research. All individuals participated voluntarily, and written consent was also obtained.

The anthropometric measurements such as height, weight, hip circumference and waist circumference were obtained using relevant method and guidelines. With minimal clothing and without footwear the measurements were recorded using the Harpenden anthropometer, standard weighing machine and a measuring tape respectively. Height, hip circumference and waist circumference were recorded to the nearest 0.1 cm, and weight was recorded to the nearest 0.1 kg. BMI was derived using the formula 'weight (in kg) ÷ height^2 (in m)', WHR was derived as 'waist circumference ÷ hip circumference', while WHtR was derived as 'waist circumference ÷ height'. Nutritional status was assessed using BMI, and according to the cut-off points of Asia-Pacific guidelines.[9] WHR (≥0.94 cm in males and ≥0.88 cm in females) was used to assess the risk for CVD.[10] WHtR (≥0.50 in both the males and females) was used to assess the risk for metabolic abnormalities.[11]

Socioeconomic data such as household income-per-month and total family members were also obtained. The household income was divided among the total family members to acquire the income-per-head. The frequency of the use of alcohol and tobacco (chewing and smoking) per-week were also recorded.

Data entry and analysis were done using SPSS (Statistical Package for Social Sciences) software (Version 25.0; IBM Corporation). Chi-square analysis was performed to determine the statistical significance between groups (at p<0.05). A level p<0.01 and p<0.05 were considered to determine the statistical significance in the Pearson correlation analysis between the derived variables (BMI, WHR and WHtR) with income, alcohol and tobacco use.

Results

Assessment of the nutritional status and health risk are shown in Table 1 to Table 3. The results show that underweight was more prevalent in the females (12.7%),whereas, overweight (19.7%) and obese (23.1%) were more prevalent in the males. In both the sex, individuals from the age group 21 – 30 years have a better status of nutrition. Health risk assessment according to WHR and WHtR show thatthe prevalence of high risk wasmore in the females, and it also increases with increasing age groups. In the males, high WHR and WHtR risk was most prevalent in the age group 51 – 60 years, whereas in the females, high WHR and WHtR risk were most prevalent in the age group 51 – 60 years and 41 – 50 years respectively. Chi-square analysis shows that nutritional status, WHR and WHtR risks were significantly different betweenthe sex and age groups. However, BMI was not significantly different between the age groupsin the males.

Table 1: Nutritional status and health risk assessment

Parameters	Males (n=320) (n) %	Females (n=245) (n) %	Chi-square
Nutritional Status			
Underweight	(15) 4.7	(31) 12.7	$\chi^2 = 13.27$, df = 3, p = 0.004
Normal	(168) 52.5	(124) 50.6	
Overweight	(63) 19.7	(35) 14.3	
Obese	(74) 23.1	(55) 22.4	
WHR			
Low risk	(222) 69.4	(89) 36.3	$\chi^2 = 61.25$, df = 1, p = 0.000
High risk	(98) 30.6	(156) 63.7	
WHtR			
Low risk	(208) 65	(120) 49	$\chi^2 = 14.62$, df = 1, p = 0.000
High risk	(112) 35	(125) 51	

Table 2: Distribution of nutritional status in different age groups

Age groups	Underweight (n) %	Normal (n) %	Overweight (n) %	Obese (n) %	Chi-square
Males (n=320)					
21 – 30	(9) 5.1	(101) 57.4	(35) 19.9	(31) 17.6	$\chi^2 = 10.98$ df = 9 p = 0.277
31 – 40	(4) 5.1	(35) 44.9	(15) 19.2	(24) 30.8	
41 – 50	-	(19) 51.4	(9) 24.3	(9) 24.3	
51 – 60	(2) 6.9	(13) 44.8	(4) 13.8	(10) 34.5	
Females (n=245)					
21 – 30	(26) 21.7	(77) 64.2	(8) 6.7	(9) 7.5	$\chi^2 = 65.64$ df = 9 p = 0.000
31 – 40	(3) 4.8	(29) 46.8	(12) 19.4	(18) 29	
41 – 50	(2) 4.1	(12) 24.5	(11) 22.4	(24) 49	
51 – 60	-	(6) 42.9	(4) 28.6	(4) 28.6	

Table 3: Distribution of WHR and WHtR risk in different age groups

Age groups	WHR		WHtR	
	Low risk (n) %	High risk (n) %	Low risk (n) %	High risk (n) %
Males (n=320)				
21 – 30	(154) 87.5	(22) 12.5	(136) 77.3	(40) 22.7
31 – 40	(39) 50	(39) 50	(43) 55.1	(35) 44.9
41 – 50	(19) 51.4	(18) 48.6	(18) 48.6	(19) 51.4
51 – 60	(10) 34.5	(19) 65.5	(11) 37.9	(18) 62.1
Chi-square	$\chi^2 = 63.27$, df = 3, p = 0.000		$\chi^2 = 28.68$, df = 3, p = 0.000	
Females (n=245)				
21 – 30	(64) 53.3	(56) 46.7	(81) 67.5	(39) 32.5
31 – 40	(14) 22.6	(48) 77.4	(26) 41.9	(36) 58.1
41 – 50	(10) 20.4	(39) 79.6	(10) 20.4	(39) 79.6
51 – 60	(1) 7.1	(13) 92.9	(3) 21.4	(11) 78.6
Chi-square	$\chi^2 = 30.59$, df = 3, p = 0.005		$\chi^2 = 37.96$, df = 3, p = 0.000	

Correlation analysis of BMI, WHR and WHtR with income, alcohol and tobacco use are presented in Table 4. In the males BMI was positively correlated with income and inversely correlated with tobacco use. WHR was positively correlated with alcohol, and these results were statistically significant. WHtR did not show any significant correlation with income, alcohol and tobacco use. In the females, no statistical significance was observed in any of the correlation.

Table 4: Correlation of BMI, WHR and WHtR with income, alcohol and tobacco use

Variables	Males (n=320)		Females (n=245)	
	r	p	r	p
Income				
BMI	0.2**	0.000	-0.011	0.868
WHR	-0.059	0.292	-0.065	0.314
WHtR	0.075	0.181	-0.041	0.527

Variables	Males (n=320)		Females (n=245)	
	r	p	r	p
Alcohol use				
BMI	0.009	0.869	0.012	0.847
WHR	0.139*	0.013	0.025	0.703
WHtR	0.096	0.088	-0.003	0.969
Tobacco use				
BMI	-0.117*	0.036	0.015	0.815
WHR	0.064	0.252	0.123	0.055
WHtR	-0.05	0.373	0.037	0.564

**p<0.001, *p<0.05

Discussion

Our study has demonstrated that the males have a better nutritional status than the females,which is similar to the findings reported among the Meiteis of Assam.[7] But, the higher prevalence of overweight and obesity in the Angami population is in contrast to the findings of other tribal populations.[4],[8],[7] The increasing prevalence of overweight and obesity with increasing age groups may well suggest that with ageing the physical activity level and metabolic rate reduces but the caloric intake is not much affected which results in fat deposition and is mainly the reason for increase in body weight and fatness.[12] Perhaps, the higher prevalence of overweight and obesity among the Angami adults could be due to a number of complex but positive socioeconomic factors and increasing sedentary lifestyles affecting the population.

In our study, increase in the prevalence of overweight and obesity corresponds to the increase in the prevalence of high WHR and WHtR risk from the age group 41 – 50 years and 51 – 60 years. There is a clear significant sex difference, and in which the females have a higher prevalence for high risk across all age groups. Our study gives a similar result to that of Dobbelsteynet al. in terms of the increasing prevalence of high risk with increasing age, and to that of De Koning et al. in terms of the higher prevalence of risk in the females.[13],[14] Li et al. reported that the risk of CVD in the females increased with increasing WHR irrespective of BMI category, and in the males it was associated with increased incidence of CVD in those with normal weight.[15] This could be because females have increased waist circumference with increasing age which could suggest the increased abdominal adiposity, resulting in an increase in high

risk for CVD.[16] Groups with healthy BMI and WHtR equal or greater than 0.5 are also found to have some significantly higher cardio-metabolic risk compared to the groups with healthy BMI but WHtR below 0.5.[17] Even among children, individuals with healthy BMI exhibited raised cardio-metabolic risk factors if their WHtR was above 0.5.[18] Some studies have shown that, even after adjustment was made for age and BMI, WHR and WHtR still have a strong association with CVD and metabolic abnormalities independently, indicating their independence in predicting risks.[17],[19],[20]

Education, income and occupation are the three generally accepted parameter which are used terms to define the socioeconomic status of a population. Higher BMI among the high income groups has been reported by Pelin et al., however, their results indicated that parental education was significantly stronger than the effects of income.[21] Similar studies points to education showing stronger association with BMI and health risk factors.[7],[22] These findings on education may well point to its interaction with income, because higher income means access to higher and/or better education. In this regard, our study also shows a positive interaction of income with BMI and WHtR in the males, though it was significant only for BMI. In the females there was an inverse relationship but no significance in any of the correlation. In regard to alcohol consumption, our study gives a similar inverse relationship similar to that of Kleiner et al. particularly for the females, though it was not significant.[23] The frequency of alcohol consumption is known to have a very small positive and marginally statistically significant effect on BMI in the males, and with no effect on the females.[24] Studies have often showed inconsistencies in the relationship between

alcohol usage and health risk, and although many factors can explain the conflicting findings, nevertheless, it is reasonable to say that alcohol intake may be a risk factor for obesity.[25] In terms of tobacco use, our study is consistent with findings of Li et al. who reported an inverse relationship between BMI and tobacco in the males.[15] All forms of tobacco use are found to be independent risk factor for low BMI and independent of age or education.[26] However, because smoking is a major CVD risk factor that is more prevalent in subjects with normal weight, this tends to reduce the relationships between obesity and CVD.[15]

Conclusion

The results of our study indicated a significant sex and age differences in the nutritional status and health risks. Higher prevalence of overweight and obesity is observed among the males, while higher prevalence of underweight and high risk for cardio-metabolic abnormalities is observed among the females. There is an increasing prevalence of overweight and obesity, and high risk for cardio-metabolic disease with increase in age. While the magnitude of the correlation differed between the sexes, with the females showing no significance in any of the correlation, chi-square analysis has shown that age was significantly associated with BMI, WHR and WHtR. The changing lifestyles and decreasing level of physical activity may be a risk factor to increasing incidence of non-communicable diseases such as obesity and other cardio-metabolic diseases in the Angami population. However, the influence of physical study is a topic of further research.

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The Effect of Family Income on Stunting Incident in Preschool Children at Bogor City During COVID-19 Pandemic

Tisna Yanti[1], DiahAdni Fauziah[2]

[1]Lecturer and Researcher, [2]Lecturer and Researcher, School of Public Health, Wijaya Husada Health Institute, Bogor, Indonesia

Abstract

Background: The global COVID-19 pandemic has increased the risk of malnutrition in young children, including stunting,especially those under five years old. Stunting incident was often found in low income families who were unable to afford nutritious food. During COVID-19 pandemic, certain types of food might not be available and affordable for some families. The stunting incident could be increased due to decline in family income, change in food availability and disruption to health and social services.

Objective: To determine the effect of family income during COVID-19 pandemic on the incidence of stunting in preschool children at PuspaBangsa Kindergarten, Bogor City.

Method: This type of research was analytical survey with cross sectional approach. The total sample was 35 families who had their children studied at PuspaBangsa Kindergarten. The instrument in this study was filling out a questionnaire using Google Form on family income and weight of preschool children to determine the incidence of stunting in preschool children.

Conclusion: 7 participants (20%) were found with family income less than the Regional Minimum Wage. The results of univariate analysis for stunting incident variables were as followed: normal height category 23 (65.7%) and very short height category 4 (11.4%). The statistical analysis obtained p-value = 0.02, which means there was significant relationship between family income and the incidence of stunting at Puspa Bangsa Kindergarten, Bogor City.

Keywords: *COVID-19, Family income, Preschool children, Stunting.*

Introduction

Child stunting is still considered as important public health issue especially in developing countries. Stunting can be found in both urban and rural areas. Stunting is a form of malnutrition caused by poor nutrition during pregnancy or early childhood. Indeed, Indonesia even ranked the fifth among countries with the highest burden of stunted children.[14]

Corresponding Author :
Tisna Yanti, MPH
School of Nursing, Wijaya Husada Health Institute,
Jl. Letjen Ibrahim Adjie No. 180, Bogor, West Java,
Indonesia
e-mail: wijayahusada@gmail.com

Child stunting can happen in the first 1000 days after conception and is related to many factors, including socioeconomic status,[15] dietary intake, infections, maternal nutritional status, infectious diseases, micronutrient deficiencies and the environment.[10,11] Stunting has long-term effects on individuals and societies, including: diminished cognitive and physical development. Based on the results of Basic Health Research conducted by the Ministry of Health (2018), the prevalence of stunting in Indonesia for children under fiveyears old reached 30.8%, while for West Java Province was 29.2% .[1]

According to Özaltin et.al,stunting is one of the nutritional problems that adversely affect the quality life of children in achieving optimal growth and development appropiate genetic potential.[2]

Black (2013) also stated that stunting was a well-established risk marker of poor children development. Stunting before the age of 2 years predicts poorer cognitive and educational outcomes in late childhood.[3] Childhood period is an important stage of growth that will influence and determine the development of golden age.

The COVID-19 pandemic is undermining nutrition across the world, particularly in low-income and middle-income countries.[16] The most noticeably effects will be found in children, especially those under five years old. The government imposed strict measurements to halt the spread COVID-19, such as: physical distancing, school closures, limiting the operational hours of certain stores and local lockdown. These actions will indirectly lead to mass unemployment, unhealthy lifestyle, increased domestic violence, restriction in social and healthcare access, disturbance in production, transportation and trade of nutritious and affordable food. For certain families who face sudden unemployment or payroll deductions, the COVID-19 pandemic also forced them to choose the nutrient-poor food as alternatives. At the same time, more children are becoming malnourished due to the deteriorating quality of their diets, interruptions in nutrition and other essential services, and the socioeconomic shocks created by the COVID-19 pandemic in low income countries.[17]

The purpose of this study was to determine the relationship between family income during the Covid 19 pandemic and the incidence of stunting in preschool children at Puspa Bangsa Kindergarten, Bogor City.

Methodology

This research used descriptive quantitative data. Quantitative data was measurable and can be expressed in numerical form. The sample in this study was 35 families who sent their children to Puspa Bangsa Kindergarten, Bogor City. Inclusion criteria: Parents of children who consented to participate in the study. Exclusion criteria: Parents who were not willing to participate. Parents of preschool children were asked to fill out the questionnaire using the Google Form. The independent variable in this study was family income and the dependent variable was the incidence of stunting. The child was categorized as stunted if the height was less than the national average age to height ratio determined by the Ministry of Health. Kendall Tau statistical test was used to measure the data.

Research Result

a. Univariate Analysis Results

Table 1. The Frequency Distribution of Family Income at Puspa Bangsa Kindergarten, Bogor City in 2020 (Minimum Regional Wage: IDR 4.189.078)

Income	Frequency	Percentage (%)
<Minimum Regional Wage/Month	7	20
>Minimum Regional Wage/Month	28	80
Total	**35**	**100**

From the table 1 above, it can be seen that most of the participants whose family income during the COVID-19 pandemic was in the category of more than the Regional Minimum Wage per month, which involved 28 participants (80%).

Table 2. Distribution of Frequency of Stunting in Pre-School Children at Puspa Bangsa Kindergarten, Bogor City in 2020

Stunting	Frequency	Percentage (%)
Very short	4	11.4
Short	6	17.1
Normal	23	65.7
High	2	5.7
Total	**35**	**100**

Based on table 2, most of the preschool children whose height was in the normal category were 23 children (65.7%), in the very short category(stunting) were 4 children (30%).

b. Bivariate Analysis Results

Table 3: The Relationship between Family Income during the COVID-19 Pandemic and Stunting Incidencent at Puspa Bangsa Kindergarten, Bogor City

	STUNTING EVENTS								Total		P Value
INCOME	**LOW**		**MIDDLE**		**NORMAL**		**HIGH**				
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
< 4.189.708 million/mo unth	3	8.6	3	8.6	1	4.3	0	0	7	20	0.002
>4.189.708 million/mo unth	1	2.9	3	8.6	22	62.9	2	57	28	80	
Total	4	11.4	6	17.1	23	65.7	2	5.7	35	100	

Based on table 3, 28 families whose family income was more than minimum regional wage per month had 22 normal height children and 1 very short height child, while 7 families with less than minimum regional wage per month had 1 normal height child and 3 very short height children. The result of further analysis obtained p-value = 0.002. and there was significant relationship between family income and incidence of stunting in preschool children at Puspa Bangsa Kindergarten, Bogor City.

Discussion

a. Family income during COVID-19 pandemic: Family income was drastically impacted due to COVID-19 pandemic. Physical distancing, local lockdown and school closure were enforced as safety precautions against the COVID-19 spread. In some industries, there were reduction or closure of business activities and some workers were experiencing reduction or delay in salaries and many others had to face lay-off from their companies.

During this tough economic situation, almost all families had to change their lifestyles. Many families had to rearrange their shopping priorities. People will buy their essential needs only and sometimes choose lower quality items. This condition will also affect the decision of families in selecting the nutritious food for their children's growth and development.

According toresearch conducted by Fikadu et al. (2014) in South Ethiopia,the high risks of stunting population was infants who were not exclusively breastfed during the first 6 months. In addition, parental education, family income and knowledge of nutrition can be associated to stunting events.[4]

In this study,most participants(28 families) had family income in the category more than the Regional Minimum Wage and 7 families had lower income than the Regional Minimum Wage.

The COVID-19 pandemic has already disrupted families, institutions, increasing risks for children to exposure malnutrition.[5]

The result of this study is also in line with the research that was conducted by Izah et al. (2020) which showed that most stunting children cases were found in families with income that was lower than regional minimum wage.[6] Family income is one of the indicators that determines economic status, where high family income can meet family needs, especially diverse food needs so that food intake for children under five is fulfilled. This condition will have an effect on increasing the quality of food consumption for family members and be considered as an overview of good nutritional assessment.[7]

b. Stunting Incidents: Globally in 2016, 22.9% or 154.8 million children under 5 years of age suffered from child stunting, defined by a low height-for-age [12.] Stunting is measured by a height-for-age z-score of more than 2 standard deviations below the World Health Organization (WHO) Child Growth Standardsmedian[9], showing a restriction of a child's potential growth [10].

The results of univariate analysis for the variable incidence of stunting obtained data with a total of

23 (65.7%) normal height children. Mercedes, et al. (2016) described that stunting is the highest prevalent of child malnutrition and reached 161 million children worldwide.[8] Another research conducted by Dwi Ernawati (2018) also found 26.9% stunting incidence and 73.1% normal height from the total sample.[19]

The further consequences of stunting in toddlers can result in disruption of physical growth, mental development and health status in children. In addition, Ty Beal, et., al (2018) stated that community and societal factors particularly, poor access to health care and living rural areas have been already associated with child stunting.[20]

Children who are stunted are more likely to develop into unhealthy and poor adults. Stunting in children is also associated with an increase in children's susceptibility to diseases, both infectious and non-communicable diseases and an increased risk of overweight and obesity. Long-term overweight and obesity can increase the risk of degenerative diseases. Stunting cases in children can be used as a predictor of the low quality of a country's human resources. The state of stunting causes poor cognitive abilities, low productivity, and an increased risk of disease resulting in long-term losses to the Indonesian economy.[21]

c. **Bivariate Analysis:** The COVID-19 pandemic has influenced many people in different ways. The pandemic has changed how the society view the new normal era. Many families are struggling to raise their children while maintaining the family income, including how to provide nutritious food, set up online school at home and afford healthy entertainment for children.

Some of the strategies to respond to COVID-19— including physical distancing, school closures, trade restrictions, and country lockdowns—are impacting food systems by disrupting the production, transportation, and sale of nutritious, fresh, and affordable foods, forcing millions of families to rely on nutrient-poor alternatives. Strained health systems and interruptions in humanitarian response are eroding access to essential and often life-saving nutrition services.[23]

The results of bivariate analysis showed that from 7 families whose income was less than minimum regional wage per month had only 1 normal height child and 3 short height children and 3 very short height children. The result of further analysis obtained a p-value of 0.002, which means there was significant relationship between family income and the incidence of stunting in preschool children. The lower the income, the higher stunting incidence of preschool children found in this study. During COVID-19 pandemic, some families experiencing economic crisis will choose cheaper food with less nutrition in order to survive. This condition will create further malnutrition in young children especially stunting due to unavailability of nutritious food.

The result of this study is in line with research conducted by Cipriano (2017) who investigated the incidence of stunting in toddler aged 24-59 months, which achieved p-value of 0.08 and found significant relationship between family income and the incidence of stunting.[13]

According to Izah et al. (2020), the purchasing power of families for nutritious food is influenced by family income because in determining the type of food to be purchased depends on the level of income. Household food purchasing power follows the level of family income. With a high income, it is possible to fulfill the food needs of all family members. On the other hand, the low level of family income results in low household food purchasing power.[6] The low purchasing power of food products results in inadequate fulfillment of the nutritional needs of children under five.[22]

Conclusion

This study suggests the influence of the family on the nutritional status of children under two years of age living in extreme poverty areas. Factors associated with stunting were different in rural and urban communities.

Therefore, developing and implementing health programs to tackle malnutrition should take into account such differences that are consequence of the social, economic, and cultural contexts in which the family live

This study suggests the influence of the family on the nutritional status of children under two years of age living in extreme poverty areas. Factors associated with stunting were different in rural and urban communities.

Therefore, developing and implementing health pro-grams to tackle malnutrition should take into account such differences that are consequence of the social, eco-nomic, and cultural contexts in which the family live. This study concluded that there was a significant relationship between family income and

stunting incidence in preschool children at Puspa Bangsa Kindergarten, Bogor City. Therefore, the COVID-19 pandemic recovery process should include certain strategies to stabilize income, increase nutritious food availability and improve health services.

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Development and Validation of Non-Verbal Social Skill Rating Scale for Mentally Ill

Twinkle S. Monica[1], T. Jegadeesan[2], R. Renuchitra[3]

[1]*Occupational Therapist, Department of Occupational Therapy, JKK Munirajah Medical Research Foundation,* [2]*Principal, JKK Munirajah Medical Research Foundation, B. Komarapalaym, Namakkal, Tamilnadu, India, Pin-638183,* [3]*Professor, Department of Occupational Therapy, JKK Munirajah Medical Research Foundation*

Abstract

Aim: The aim of this study is to develop and validate the Non-verbal Social Skill Rating Scale for Mentally Ill.

Objectives:

- To generate the scale items through focus group discussion.

- To identify the appropriateness and relevance of items through subject matter expert rating.

- To establish the psychometric properties of developed scale.

- To develop norms for developed scale.

Methodology: Formulation of 48 statements was done with focus group discussion. The statements were sent to 26 experts in the field of Occupational therapy, Psychiatrist Psychologist and Psychiatric Social Worker for validating the items. Total of 48 items are validated by the experts. A total of 100 samples including Bipolar disorder, Schizophrenia, Depression, Anxiety, Schizoaffective disorder and acute psychosis were selected for the field trial or main study those who were residing in psychiatric homes at Tamil Nadu. Samples were selected by using convenient sampling method. Socio demographic data sheet prepared by investigators were used for collecting baseline information.

Conclusion: This research shows the assessment tool has good internal consistency and reliability. The expert validation was done and got good relevance. Hence, Non-verbal Social Skill Rating Scale for Mentally Ill indicated that the scale is a reliable and valid measure of Non-verbal social skills, which is used to identify the level of Non-verbal Social Skill of Mentally Ill.

Keywords: *Non-verbal social skill, Mentally ill, Reliability and Validity, Occupational Therapy.*

Introduction

Social skill is a process in which people convey their feelings, thoughts and attitudes towards the recipient through verbal or non-verbal skills.

Corresponding Author:
T. Jegadeesan
Principal, JKK Munirajah Medical Research Foundation, B. Komarapalaym, Namakkal, Tamilnadu, India. Pin-638183
e-mail: jagadeesan@jkkm.net

Non-verbal social skills are as important as verbal skills in interpersonal relationship. Non-verbal cues were more likely to influence observer's judgement than verbal. Non-verbal communication represents the feelings, expression, information and behaviour without using any language. The elements of non-verbal social skills are eye contact, facial expression, vocal expression, kinesics, proxemics and haptics.

The Non-verbal Immediacy Scale (NIS) was developed by Richmond[1]. This scale includes 26 items for the purpose of measuring the non-verbal immediacy of teachers and students by self reported method. The

scale is used to measure non-verbal immediacy in the contexts sometimes have been problematic in their reliability estimates. It is a self reported assessment tool which is not suitable to assess the non-verbal social skills among mentally ill.

Social Skill Inventory (SSI) was developed by Ronald E. Riggio in 1992.[2,3,4,5]. It includes 90 items, self monitoring scale that used to measure basic skills in verbal as well as non-verbal/emotional communication. Cronbach's alpha coefficients ranging from .65 to .88 of 549 employed adults. Alpha coefficient ranging from .64 to .89 of 389 undergraduate students. But this scale is does not suit our culture.

The Profile of Non-verbal Sensitivity (PONS) was developed by R. Rosenthal[6]. This test consists of 220 items and it runs for 47 minutes. It is used to measure one's ability to decode non-verbal cues. The test is large-scale effort to evaluate individual differences in ability to decode non-verbal behaviour. This scale has also been criticized for its lack of realism. This scale is too time consuming as it contains many items.

Non-verbal Communication Skills of School Administrator Scale (NCSSAS) was developed by Tevfik Uzun[7]. This scale consists of 29 items under seven sub dimensions. This scale is used to assess only the non-verbal social skills of school administrator. Sebastian Walther[8] et al.,conducted a study to investigate whether gesture deficits in schizophrenia were related to non-verbal social perception, gesture knowledge, or actual tool use. The study confirmed a generalized non verbal communication deficit in schizophrenia. Jeffry M. Girard[9] et al.,conducted a study to investigate the relationship between non-verbal behaviour and severity of depression by following depressed participants over the course of treatment and video recording a series of clinical interview.

Sigan L. Hartley[10] conducted a study to examine the non-verbal social skills of 18 adults with mild Intellectual Disability diagnosed with depression and match the samples of adults with mild Intellectual Disability without depression. A semi-structured videotaped interview was used to observe the nonverbal social skills of the participants.

Tucker, Joan S[11] et al.,conducted a study to identify the sex difference in non-verbal expressiveness: Emotional expression, personality and impressions.

They administered a comprehensive set of emotion-relevant personality measures to 40 female and 39 male undergraduates, who were also videotaped in 3 situations.

In recent years there has been increased attention to defining and assessing individual differences in social abilities and interpersonal skills. Occupational therapist are playing vital role in the management of social skills of children and adults. But no research study has been found to assess the non-verbal social skills of mentally ill.

Very few scales are available in search engine without psychometric properties. Hence this study is initiated to develop and validate Non-verbal Social Skill Rating Scale for Mentally Ill in Tamilnadu.

Aim: The aim of this study is to develop and validate the Non-verbal Social Skill Rating Scale for Mentally Ill.

Objectives:

- To generate the scale items through focus group discussion.

- To identify the appropriateness and relevance of items through subject matter expert rating.

- To establish the psychometric properties of developed scale.

- To develop norms for developed scale.

Materials and Method

A total of 100 samples (Bipolar disorder, Schizophrenia, Depression, Anxiety, Schizoaffective disorder and acute psychosis) were selected for the present study those who were the age range above 17 years residing in psychiatric homes at Tamil Nadu. Samples were selected by using convenient sampling method. Socio-demographic data sheet prepared by investigator were used for collecting information regarding name of the client, age, gender, diagnosis, duration of illness, rural/urban, educational qualification, occupation, marital status and IP/OP.

Inclusion Criteria:

- People with mental illness.

- Both genders were selected.

- People age range above 17 years.

Exclusion Criteria:

- People with organic mental disorders.

- Alcoholic patients.

- Personality disorder.

- Child psychiatry patients.

Tools:

- Socio-demographic data sheet

- Non-verbal Social Skill Rating Scale for Mentally Ill

Procedure

The present study was conducted in two phase are as follows:

Phase 1: Focus Group Discussion and Item Generation: In this phase, potential items were generated for clinician assessment of non-verbal social skill. For the scale development, items were pooled through available tools/review of literature as well as through Focus Group Discussion with 5 experts. Then 26 experts were asked to provide the item relevance and appropriateness. The experts are those who are working or having experience related to Mental Health Professionals and professional from Occupational therapy were included.

Phase 2: Scale Validation:

Step 1: Face Validation and Expert Rating: The instrument with developed items was given to 26 professionals (Occupational Therapist, Psychiatrist, Psychologist and Psychiatric Social Worker), in order to arrive at a set of items to be included in the scale. Experts rating was solicited for content appropriateness, difficulty level items on a scale and addition or deletion of items were considered.

Step 2: Data Collection: The developed scale was administered on 100 mentally ill subjects. The data obtained from convenient sample was subjected for item analysis of the test items.

100 subjects of both genders meeting the inclusion and exclusion criteria were selected after obtaining the informed consent from them and as well as from their registered clinic Navaneeth Mental and De-Addiction Centre, Vivekanandha Health Care, HCA mental health care center and Natchiyar Mind Care. Written informed consent was obtained after the detailed explanation about the study from the samples. So, socio-demographic data

and Non-verbal Social Skill Rating Scale for Mentally Ill was administered on 100 samples.

Table 1 Demographic characteristics of study participants

	Frequency
Age range	
18-20	1
21-30	24
31-40	23
41-50	22
51-60	20
61-70	8
71-76	2
Gender	
Male	46
Female	54
Diagnosis	
Acute psychosis	1
Anxiety	23
Bipolar disorder	9
Depression	30
Schizoaffective disorder	5
Schizophrenia	32
Rural/Urban	
Rural	54
Urban	46
Educational qualification	
Primary school grade	21
Secondary school grade	36
UG	27
PG or other advanced graduates	7
Uneducated	9
Occupation	
Business	14
Employed	44
Housewife	27
Student	1
Unemployed	14

Table 2 Reliability statistics

Cronbach's Alpha	No. of items
.932	23

Step 3: Data Analysis: SPSS - 23 was used for statistical analysis, descriptive statistics such as mean, standard deviation, frequency and percentage. They were used to examine the items and also in final face content validity was established for the developed instrument.

Ethical Consideration:

* Written informed consent was sought from each participant/Caretaker.

* Participant had an option to leave the study at any point of time, if they wish to.

* Confidentially and anonymity of the participants was assured and maintained.

Table 3 Item-Total statistics

	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Q.1	42.11	232.644	.619	.919
Q.2	41.41	228.265	.598	.919
Q.3	43.25	223.220	.731	.916
Q.4	42.72	220.123	.736	.916
Q.5	42.26	226.800	.466	.922
Q.6	42.56	220.491	.696	.917
Q.7	43.06	231.249	.615	.919
Q.8	42.49	225.162	.767	.916
Q.9	42.93	231.439	.409	.922
Q.10	43.01	216.818	.861	.913
Q.11	41.70	230.091	.436	.922
Q.12	42.80	233.192	.383	.923
Q.13	43.06	227.087	.588	.919
Q.14	42.88	228.309	.621	.918
Q.15	42.67	229.496	.526	.920
Q.16	43.14	236.566	.413	.922
Q.17	43.14	232.930	.434	.922
Q.18	41.81	231.570	.390	.923
Q.19	42.91	222.386	.697	.917
Q.20	43.06	214.602	.776	.915
Q.21	43.20	230.141	.428	.922
Q.22	42.15	233.967	.424	.922
Q.23	41.34	236.328	.452	.921

Table 4 Component Matrix

	Component						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Q.1	.653						
Q.2	.649						
Q.3	.770						

	Component						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Q.4	.749						
Q.5		.624					
Q.6	.734						
Q.7	.674						
Q.8	.817						
Q.9		.689					
Q.10	.884						
Q.11				.557			
Q.12		.675					
Q.13	.619						
Q.14	.696						
Q.15	.572						
Q.16						.514	
Q.17	.515						
Q.18							.728
Q.19	.744						
Q.20	.810						
Q.21			.651				
Q.22					.540		
Q.23				.611			
Total	.941						

Table 5 Inter rater correlation

	Mean	**S.D**	**Pearson correlation**
Rater 1	43.48	15.29	.932(0.01)
Rater 2	46.85	13.32	

Table 6 Shows norms for the developed scale.

Range	**Interpretation**
1– 23	Very poor
24–46	Poor
47–69	Fair
70–92	Good
93 and above	Very good

Results and Discussion

The aim of the study is to develop and validate the psychometric properties of Non-verbal Social Skill Rating Scale for Mentally Ill. Initially, formulation of 48 statements was done with focus group discussion. The statements were sent to 26 experts in the field of

Occupational therapy, Psychiatrist, Psychologist and Psychiatric Social Worker for expert rating. The 26 experts evaluated the item relevance and item difficulty by using a 5 point likert scale (0-Very poor, 1-Poor, 2-Acceptable, 3-Good, 4-Excellent). Score for item relevance given by the experts are listed. It shows that all 48 items are scored more than 50% of average. Hence entire 48 items are selected for the main study or data collection. Selected 48 items in the scale are taken for data collection. Data collection was done with 100 samples (Bipolar disorder, Schizophrenia, Depression, Anxiety, Schizoaffective disorder and acute psychosis) ranging from age 17 years residing in psychiatric homes in Tamilnadu They were selected for the field trial or main study. Samples were selected by using convenient sampling method.

Socio demographic data sheet prepared by investigators were used for collecting information regarding name of the client, age, gender, diagnosis, duration of illness, rural/urban, educational qualification, occupation, marital status and IP/OP along with the scale. Of the 100 participants who completed the scale, 46 were male and 54 were females. A total of 54 were from rural and 46 belonged to urban. As for the educational qualification, 21 were primary school graded, 36 were secondary school graded, 27 were UG graduates, 7 were PG graduates and 9 were uneducated.

Reliability was assessed through measurement of internal consistency and inter-rater reliability. The individual item effect on scale reliability was conducted. More specifically, Cronbach's alpha was computed with each item deleted to examine the item quality. Based on the Cronbach's alpha estimates, items that weakened the reliability of the scale were removed.

The internal consistency of Non-verbal Social Skill Rating Scale for Mentally Ill was measured using Cronbach's alpha coefficient. In first phase; out of 48 items, 16 items (Q.2, Q.9, Q.17, Q.19, Q.29, Q.30, Q.33, Q.37, Q.38, Q.39, Q.40, Q.42, Q.43, Q.45, Q.46 and Q.47) has got higher than overall Cronbach's alpha (α= .745) value. So these items have been deleted for next phase. In second phase; out of 31 items, 5 items (Q.31, Q.32, Q.34, Q.35 and Q.41) has got higher than overall Cronbach's alpha (α= .907) value. So these items have been deleted for next phase. In third phase; out of 26 items, 3 items (Q.8, Q.27 and Q.36) has got higher than overall Cronbach's alpha (α= .918) value. So these items have been deleted for next phase. In fourth phase, the overall Cronbach's alpha (α=.923) value which resulted in 23 items scale is shown in Table 2 and Table 3.

The construct validity of Non-verbal Social Skill Rating Scale for Mentally Ill was analyzed as follows. Construct validity was examined via principal component analysis with varimax rotation to determine the factor structure of Non-verbal Social Skill Rating Scale for Mentally Ill. The factor analysis of Non-verbal Social Skill Rating Scale for Mentally Ill identified 7 factors which are shown in Table 4. The total extraction factor value is .938.

To assess inter-rater reliability, rater 1 and rater 2 used 23 items scale to examine the mentally ill patient's responses. Inter-rater reliability was calculated between two Occupational Therapist using Mean, S.D and Pearson correlation coefficient. The mean value of rater 1 and rater 2 are 43.48 and 46.85, S.D value of both raters is 15.29 and 13.32 and Pearson correlation coefficient is .932 is shown in Table 5. Data were analysed using SPSS 23.

Finally, Table 6 shows the norms of the developed scale of Non-verbal Social Skill Rating Scale for Mentally Ill. The range 1 - 23 indicates very poor non-verbal social skill; the range 24 - 46 indicates poor non-verbal social skill; the range 47 - 69 indicates fair non-verbal social skill; the range 70 - 92 indicates good non-verbal social skill; 93 and above indicates very good non-verbal social skill. Hence it concludes that all 23 items of Non-verbal Social Skill Rating Scale are valid and reliable.

Summary:

- All the 48 statements were generated through focus group discussion.

- Identifying the appropriateness and relevance of the statements through expert rating.

- Total 26 experts were rated the 48 statements, the statements rated 1-5 (5 point rating scale).

- Initial data collection has been conducted for 100 mentally ill.

- After factor analysis all the statements were extracted or have consistence with each statement rating from .515 to .884, and overall Cronbach's α value is .932 indicates the scale has good internal consistency.

- Norms were created for the developed scale.

Conclusion

From the statistical analysis the assessment's Cronbach's alpha value is $\alpha = .915$ to $.923$ which shows the assessment tool has good internal consistency and reliability. The expert validation was done and got good relevance with the content validity for the scale item. Hence, Non-verbal Social Skill Rating Scale for Mentally Ill can be used to identify the level of non-verbal social skill in mentally ill.

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A Systematic Review on Hazard Analysis and Critical Control Points (HACCP) in Southeast Asia Countries

Umi Raihanah[1], Norazmir, M.N.[2]

[1]Researcher, Centre of Nutrition and Dietetics Studies, [2]Associate Professor, Mother, Infant & Young Child Nutrition (MiChild) Research Group, Faculty of Health Sciences, Universiti Teknologi MARA, 42300 Puncak Alam, Malaysia

Abstract

Hazard Analysis and Critical Control Point (HACCP) is a food safety management system which has been recognised as an essential tool in securing food safety. This systematic review aims to assess the current situation and compliance of HACCP system in Southeast Asia as well as the challenges that influence the compliance of the system. Three electronic databases were used for search, which is Science Direct, Scopus and Web of Science. The terms used in the search include food safety, Hazard Analysis Critical Control Point (HACCP), hazard analysis, critical control point and food industry. Fifteen articles met the criteria for inclusion in the review. Five studies were conducted in Thailand, three in Malaysia and Indonesia, and two in the Philippines and Vietnam. This review found that there are certain motives for the application of HACCP, and most of the reviewed studies comply with the HACCP principle accordingly.

Keywords: *Food safety; HACCP; Hazard Analysis Critical Control Point; Food industry.*

Introduction

Foodborne disease and illness have been identified as one of the most widespread public health problems and remains uncontrolled in both developed and developing countries. The increasing of the foodborne disease reflects that the food safety management in the food industries was poor. There are many foodborne hazards can be found at each stage of the food manufacturing process. For the global estimates, the foodborne hazards caused 600 million foodborne disease and 420,000 deaths in 2010[1].

A food safety management system such as Hazard Analysis Critical Control Point (HACCP) should be implemented in combating the increasing of the foodborne disease. The HACCP system can be considered a useful tool for both the food industries and health authorities in preventing the foodborne disease.

This system prevents the occurrence of foodborne hazards from production through manufacturing, storage and distribution of a food product in food manufacturing operations. Several reports indicated that the HACCP implementation resulted in improved safety and quality of the food products[2,3].

The success and effectiveness of the system in preventing foodborne disease and reducing food safety risk to an acceptable level depending on the correct application and implementation of the HACCP system[4,5]. These findings also being supported by Panisello and Quantick that cite that the success in implementing and maintaining a HACCP program depends on the commitment, education and training, availability of resources and external pressure in a company[6].

Therefore, efforts must be made to strictly comply with hygiene and safety measures based on the HACCP principle. According to Bas, Ersun, and Kivanc proper food safety practices and pre-requisite food safety programs for HACCP were often not being followed in many food businesses[7]. Thus, this review study focuses on food and beverages industries to determine the current situation of food safety management systems of HACCP focusing in Southeast Asia countries and further study to

Corresponding Author:
Norazmir, M.N.
Associate Professor
Telephone Number: +603-32584510; +6019-6664534
e-mail: azmir2790@uitm.edu.my

assess the compliance as well as its challenges of these food safety management systems.

Materials and Method

A systematic search strategy performs to discover studies regarding HACCP in the food industry in South East Asia. The databases used for searching are Science Direct, Scopus, and Web of Science. The terms used in the search included Hazard Analysis and Critical Control Point, HACCP, hazard analysis, critical control point, food industry, food business and food and beverages industry. This combination of keywords with the boolean operators "or" and "and" used to narrowing the searching. The search is also carried out by a hand search in Google Scholar and the reference lists of the included studies.

Full-text articles were reviewed and included for analysis based on following eligibility criteria: (1) studies on Hazard Analysis of Critical Control Point (HACCP) including 7 principles, (2) studies must be selected from the food industry in Southeast Asia countries, (3) studies that published in English. Studies were excluded based on following criteria: (1) studies that are not related to the keywords such as studies on food toxicology, food microbiology, food chemistry and food environmental, (2) studies in quality assurance, quality control and quality management system, (3) studies assessing the knowledge, attitude and practices and (4) previous review articles from others.

In assessing the quality of the included studies in this systematic review, the checklist from Strengthening the Reporting of Observational Studies in Epidemiology (Strobe-statement) is used. The data will be extracted from each selected article that meet the eligibility criteria. At the initial review, the extracted data, including the type of study design, the purpose of the study, population, assessing the reliability, and study outcomes. The retrieved data were then being analysed to answer the primary research and sub-questions.

Result and Discussion

Overview of Included Studies: A total of 960 records were identified through electronic databases (n=953) and other sources (n=7). After removing duplicates, 686 titles were screened. Of these articles, 618 were excluded after the title and abstract analysis revealed they did not meet the inclusion criteria outlined in the method. The remaining 68 full-text articles were then screened and assessed for eligibility. Fifty-four articles were excluded. The remaining fifteen articles were found to meet all inclusion criteria and were included in the analysis. The location of the studies had five that conducted in Thailand, three each respectively in Malaysia and Indonesia, and two each in the Philippines and Vietnam. In total, this systematic review examined the findings from fifteen articles assessing the application of HACCP in the food industry, the challenges in the HACCP implementation as well as provide an in-depth exploration of the current application of this food safety management system.

Hazard Analysis and Critical Control Point (HACCP) Implementation: In implementing the HACCP system, the first step is determining the HACCP team. This team will usually make up of people with specific knowledge and expertise regarding the food production process. They will be the one responsible for setting the HACCP plan.

A HACCP team then will start by applying the first principle, which is the hazard analysis. To do this, they will construct a flow chart of the food production flow step by step, starting from primary production until to the point of distribution or consumption. From each of the process steps identified, the HACCP team will assess whether there are any food safety hazards to be a concern[8]. After that then analysis of hazard is conducted. From the analysis, possible hazards likely to happen can be determined.

For example, a study by Damayanti et al. (2017) in the production process of oyster mushroom chips in SME in Indonesia, has started their HACCP with the process of assembling the team, describing their products, identify intended use and constructing the food production flow chart. Then the HACCP team conduct the hazard analysis. The analysis was done at every stage dealing with the production process from the fresh oyster mushrooms until the mushroom chip packaging process. This analysis was done at every step, so the hazard identified could be avoided and controlled.

As for study by Edmunds et al. in poultry trade chain in Vietnam, the flow chart of the poultry trade is developed before the hazard analysis[9]. The flow chart of food processing is prepared before the hazard analysis, and the HACCP team will verify the accuracy of the flow chart. The flow chart then is presented to the experts for critical analysis, thus determining the CCPs. It was done

to assess where the possible process within the poultry trade, which providing high risk of highly pathogenic avian influenza (HPAI)-H5N1 viruses. In contrast to the same study involving poultry which is live bird market in Indonesia, the CCPs are identified from the finding from a survey assessing the poultry workflow, facilities, practices and H5N1 contamination in the market, and also the capacity of the pre-requisite programs (PRP). The findings of the survey and the synthesis of PRP capacity then formed the basis for identification of the CCPs[10].

A study by Thao et al. has identified potential hazards in the cassava production at SME level in Vietnam[11]. From the hazard analysis conducted, the potential hazards recognised at each processing stages of cassava starch processing were classified into three groups which are biological hazards, chemical hazards, and physical hazards. Hazard analysis will provide a basis for determining the CCPs[12]. If this first step is done inappropriately and the control measures are not being identified, the plan will not be effective despite how well it is being followed. Therefore, the HACCP team needs to know possible biological, chemical and physical hazards associated with the processes of evaluation.

After identifying the potential hazard during the hazard analysis, the HACCP team will determine the steps in the production process which are essential to prevent food safety hazard, eliminate food safety hazard or reduce food safety hazards to acceptable levels. The information from the hazard analysis should enable the HACCP team in identifying which steps in the production process are CCPs by using tools such as decision tree[13,14]. Determination of the CCP is crucial as it notifies production the step or procedure that need better treatment to maintain the products' safety and quality[15].

In the application of HACCP in cultured carp in controlling of Opisthorchis has identified four CCPs by the HACCP team[16]. The critical limit and monitoring procedure for each CCP has been established. However, no validation or documentation process is being stated. The implementation of HACCP in cultured carp brings positive contribution as it can control the infection.

From the study conducted by Nazir et al., in palm oil processing, they have identified 20 hazards point in different stages of the crude palm oil process[17]. Besides the 20 hazards point that was pointed out, the corresponding control measure for each of the issue to enhance the quality of crude palm oil also being discussed. However, there is no critical control point to establish. This might be because the hazard that was identified in a process step could be eliminated in the next step. It is also being supported by Wallace and Williams, as they mentioned that the CCP must be realistic, that the number of CCP is not too much to the extent that does not make sense[18]. Number of CCP will affect the food safety system and essential in ensuring the effectiveness of the HACCP system for daily practice.

In the production of canned sardine, Herdiana has identified two CCPs which are the receiving and double seaming process[19]. The control measure and monitoring procedure concerning on what, how, when and who responsible regarding the monitoring procedure also been stated.

In assessing the salmonella reduction in Thailand commercial frozen broiler processing, four CCPs has been established, which is washing, chilling, deboning and packing[20]. From the findings of skin swabs of frozen broiler chicken at each CCP, it was found that three CCPs which are chilling, deboning, and packing were failed to meet the standards of minimal 20% allowed for salmonella positive. Thus, intervention for the corrective action has been established at CCP of chilling and resulting all values were below the 20% critical limit. It shows that the company complies with the HACCP plan as they take action to correct the CCP.

The motives of HACCP implementation: According to the studies done in Malaysia, Thailand, and the Philippines, shows that there are a few motives and factors that influence the HACCP implementation[21-24]. The reasons for adopting HACCP system among food industry due to the customer requirement, to improve operational efficiency, for the expected gain of social legitimacy and company's perception of good practice, for the expected growth of economic competitiveness, quality improvement and sales increase in the both domestic and international market.

The findings are also consistent with a previous study of the food industry in India that identified the improvement in product quality, improving control of production process, meeting the requirements of major customers, and the company's perception of good practice as the motivating factors for HACCP implementation[25]. Besides, some researchers claim

that the main aims of the HACCP system are for the identification, assessment, and the control of foodborne safety hazards [26, 27, 28, 28]

The customer requirement can be defined as the 'true motivator' for the food industries to implement HACCP, especially for the companies that export their food products. This will therefore give the expected gain of export sales. The expectation of new markets and new customers also one of the reasons to initially adopt HACCP. Similar finding from the study by Maldonado-Siman, Bai, Ramírez-Valverde, Gong, & Rodríguez-de Lara, where it was found that the first motivation for Mexican meat enterprises to implement HACCP is for access to new foreign markets[30]. Kingphadung & Choothian did mention that for food products to be export to other countries, it requires food safety certifications, such as HACCP and ISO 22000[31].

The Challenge towards Effective HACCP Implementation and Compliance: In implementing the HACCP system, some companies in the food industry might face common challenges or barrier. The significant challenges include the lack of awareness and understanding to HACCP guidelines, lack of technical expertise, limited sources available regarding HACCP information, lack of employee engagement and budget constraint[32].

Lack of employees who aware and understand the HACCP system were perceived as a significant challenge. Findings from other studies also show the same as most of the employees in the food production companies lack knowledge of the HACCP system[33,34]. Lack of employee commitment and engagement in HACCP implementation is the most concerned as the barrier[23,31]. According to HACCP requirements, companies must develop guidelines for all processes and must control all the productions processes to meet the HACCP requirements. Besides, all employees who operate in those processes must pay attention to these guidelines. The developed guidelines might change the way that employees used to work before or might add more tasks to their jobs, such as recording or reporting data. The overwhelming number of changes and complicated workloads on their job could result in the resistance of employees on the HACCP implementation thus leads to a negative attitude towards the HACCP system. Employees might not be motivated to comply with the HACCP implementation. Without employee engagement, it will be challenging to implement HACCP

successfully[5].

Findings found from studies by Gilling et al. also similarly found that the main barriers to the effective HACCP implementation are due to HACCP being considered as problematic, burdensome and unnecessary[35]. Other researchers also noted that HACCP is not implemented correctly was due to time-related constraints and mostly due to a large amount of documentation required[6].

Besides, budget constraints related to the cost of development and operation of the HACCP system also the main possible limitation in adopting HACCP system. According to Yapp and Fairman, the value of the HACCP implementation is the main challenge faced by companies in many countries concerning in terms of investment in structure, equipment and staff training[34]. From the study by Kingphadung and Choothian in agricultural food companies in Thailand, the respondents stated that the implementation of HACCP needs a significant investment which is a challenge towards the HACCP implementation[31].

Most companies need to spend a large amount of money on consultants, equipment, facilities, training, auditing and process improvement to meet the HACCP requirements[24,30]. Some companies might have to adjust their building and facilities suitable for the HACCP implementation. This to ensure all processes can run under control and produce food product regarding HACCP requirement. Similar findings were found in Maldonado-Siman et al. study. Maldonado et al. in their study on the implementation of HACCP in Mexican and Chinese meat industry also found the same as both meat industry concerns related to costs of implementing the HACCP system[30].

According to a study conducted by Ragasa et al. in the Philippines, it was found that only 38% of firms remained certified, and 62% of the initially certified firms abandoned certification[23]. Both certified and de-certified firms cited budget constraints as their most significant challenge in continuation adoption of the HACCP system. The de-certified firm has stated that compliance requirements became stricter. Same as challenges expressed by the respondent in the studies done by Zulkifly et al. as there is a manager that considered the strictness level of HACCP as an obstacle during the HACCP implementation[24].

Conclusion

In conclusion, the application and the challenges that food industries might face during the HACCP implementation could assist companies in creating plans to respond to the challenge for the successful functioning of HACCP.

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Factors Influencing the Quality of Primary Healthcare Services in Southern Senatorial District of Cross River State, Nigeria

**Uzomba Amalachukwu E.[1], Ndep Antor O.[2], Uzomba Chigozie I.[3],
Ekpenyong Bernadine N.[4], Edom Awara E.[5]**

*[1]Research Scholar, Department of Public Health, [2]Senior Lecturer/Researcher, Department of Public Health,
Faculty of Allied Medical Sciences, College of Medicine, [3]Lecturer/Researcher, Department of Paediatrics,
Faculty of Medicine, College of Medicine, [4]Senior Lecturer/Researcher, Department of Public Health, Faculty of
Allied Medical Sciences, College of Medicine, [5]Research Scholar, Department of Paediatrics, Faculty of Medicine,
College of Medicine, University of Calabar, Calabar, Nigeria*

Abstract

Background: The aim of this study is to determine the factors influencing the quality of primary healthcare services in southern senatorial district of Cross River State, Nigeria.

Materials and Method: A cross sectional descriptive study design with both qualitative and quantitative method of data collection was used. Donabedian's structure, process and outcome model guided the research protocol. Ethical clearance for the study was obtained from Cross River State Ministry of Health Ethics Committee. Two semi-structured questionnaires and a Focus Group Discussion Guide were used for data collection. Four hundred and eighty clients and 144 healthcare providers from 12 primary healthcare centres in the study area were selected by simple random sampling method. Statistical package for social sciences version 20.0 was used to analyze the quantitative data while thematic coding was used to analyse the qualitative data.

Results: The major structure factors mitigating the quality of care as observed by the healthcare providers include insufficient manpower 58(40.28%), lack of basic amenities (light, water supply and good road) 58(40.28%), insufficient equipment 26(18.06%), insecurity and communal crises 22(15.28%). The perceptions of the clients were similar to that of the healthcare providers. In terms of process factors; poor attitude of some healthcare providers and clients was the main response of healthcare professionals. The qualitative results were similar to that of quantitative. All the basic primary health care services (including health education, health promotion, environmental sanitation, immunization, reproductive health, nutrition, HIV/AIDS and oral care) were provided in the selected health centres except mental health.

Conclusions: The quality of healthcare services in the southern senatorial district,Cross River State, Nigeria, is affected by structure and process factors of the Donabedian's model.

Keywords: *Caregivers, Clients, Quality, Primary Healthcare.*

Corresponding Author:
Dr. Uzomba CI
Department of Paediatrics, Faculty of Medicine,
College of Medical Sciences, University of Calabar,
PMB 1115, Calabar, Nigeria
Contact No.: +2348037344688
e-mail: chizomba@unical.edu.ng

Introduction

World Health Organization (WHO), defines Quality of Care as the extent to which healthcare services provided to individuals and patient populations improve desired health outcomes,hence, healthcare must be safe, effective, timely, efficient, equitable, and people centered.[1] Health care and quality are inextricable, therefore to provide health care services without concern for quality is unprofessional and potentially

deadly.[2] Quality improvement is a key function of health managers who lead the process at every level of the health system.

Improving quality through improving structures and processes leads to a reduction of waste of resources (human, material and finance), delays (long waiting time by clients before being attended to at the health facilities), lower costs and enhances positive image of the organization.[3,4]

In an Iranian study by Mosadeghrad,[5] factors influencing the quality of care were identified as patients' socio-demographic variables, patients' co-operation with care, provider socio-demographic variables, provider motivation and satisfaction, provider-competence, resources and facilities. Bradly et al,[6] suggested that any effort to strengthen health systems in Africa must incorporate strategy to improve access and quality of health care services particularly in rural areas.

WHO,[7] stated that although Nigeria constituted less than 1% of the total world's population, she accounts for about 19% of the global maternal deaths, with a maternal mortality ratio of 814 per 100,000 live births. In Nigeria, approximately 2,300 under-five-year-olds and 145 women of childbearing age die daily, these deaths are mostly preventable.[8] These increased mortality rates are linked to delays and poor quality of care in the health system of the country as observed by Oyekale.[9] Babatunde et al,[10] in their study in north central Nigeria, suggested the need to train Primary Health Care providers on improvement of quality of care. Utilization of maternity care in 2013 was low and only about 36% of births occurred in health facilities with 38% being assisted by skilled personnel.[11] This shows that Nigeria is still far from achieving the universal health coverage and quality health care for all. Hence, the need to assess the factors influencing the quality of primary healthcare services which is the foundation of the health system in order to improve the quality of care and also, improve the health status of the people which is an indicator of development of any nation.

Materials and Method

The study was carried out in the Southern Senatorial District of Cross River State, Nigeria from September, 2018 to August, 2019. Southern Senatorial District is made up of seven Local Government Areas (LGAs) namely: Akamkpa, Akpabuyo, Bakassi, Biase, Calabar Municipality, Calabar South, and Odukpani.[12] It has a population projected at 1,590,200 in 2016 from the 2006 national population census and land mass of 9,731 square kilometres, and is bounded by Akwa Ibom State to the South, Yakuur Local Government Area to the North, Abi Local Government Areas, Cross River state to the West and the Republic of Cameroon to the East where the Atlantic Ocean lies.[13-15] It has the largest forest area in the state with a very fertile land and the people are mostly subsistent farmers.[13]

This is a cross sectional descriptive study, both qualitative and quantitative method of data collection were used. Four Local Government Areas (Akpabuyo, Calabar Municipality, Calabar South and Odukpani) were selected using simple random sampling method through balloting with replacement out of the seven Local Government Areas in the study area. Three primary healthcare (PHC) facilities were randomly selected from each of the selected LGAs, making a total of twelve. Ethical clearance for the study was obtained from the Health Research Ethics Committee, Ministry of Health, Cross River State, Nigeria. Donabedian's structure, process and outcome model guided the research protocol. Two semi-structured questionnaires and a Focus Group Discussion (FGD) Guide were the instruments for data collection.

The study population comprises health care professionals and clients aged 18 years and above, who work in and/or utilize PHC facilities in Southern senatorial district of Cross River state, Nigeria. Sample size for the clients was 480 obtained using Cochran's formula[16] while that of health care professionals were 144 using simple percentage of the population of the desired category of healthcare professionals in the PHCs in the selected Local Government Areas,[17] as recommended by Ejifugha.[18]

Four hundred and eighty clients and one hundred and forty four healthcare providers from the 12 Primary healthcare centres were selected by simple random sampling method. Five field assistants were trained to assist the researcher in data collection. The questionnaires were administered to the health professionals and each client on exit, having received care, after obtaining his or her verbal informed consent. The respondents filled the questionnaire but where the client had limited ability in reading and writing English language, the researcher and the trained field assistants explained the hard to read terms in consistent Pidgin English and he/she is assisted to tick the appropriate response.

Focus Group Discussion (FGD) was conducted to explore the clients' perception of the quality of care. One session of the FGD was done in one of the selected PHCs in each of the four selected Local Government Areas. The four sessions of the FGD conducted comprised 8 participants per session with the researcher as the facilitator, two trained field assistants as the note taker and the observer. Participants were recruited using purposive sampling method. The focus group discussion was guided by a set of protocol with questions that sought to explore the experiences of the clients in the selected PHCs and their perceptions of the factors influencing the quality of care using Donabedian's model for measuring quality of care.

The quantitative data obtained from the study was entered, coded, cleaned and analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0. Thematic analysis was used to analyze the qualitative data generated from FGD.

Results

Out of the four hundred and eighty clients,18(3.8%) were males, 462 (96.3%) were females giving a M:F ratio of 1:26, aged 18 to 57 years. Majority were married 395(82.3%), while others were single 78(16.3%), widow/widower 5(1%) and separated 2(0.4%). Most completed secondary education 273(56%) but 13(2.7%) had no formal education, 125(26%) had tertiary education and 69 had primary education. However,one hundred and forty-four healthcare providers were recruited for the study, 11(7.6%) were males and 133(92.4%) were females giving a M:F ratio of 1:12. The healthcare providers were mainly Community Health Extension Workers (CHEWs) 95(66%) while most had Ordinary National Diploma (OND) level of education 64(44.4%).

All the basic primary health care services (including health education, health promotion, environmental sanitation, immunization, reproductive health, nutrition, HIV/AIDS and oral care) were provided except mental illness.

Table 1: Healthcare professionals' perception of the factors influencing the quality of care

Factors	Frequency (N)	Percentage (%)
Structure		
Insufficient manpower	58	40.3
Lack of basic amenities (light, water supply and good road)	58	40.3
Insufficient equipment	26	18.1
Poor security services and communal crises	22	15.3
Lack of functioning fans and Air conditioners	20	13.9
Poor infrastructure	17	11.8
Insufficient offices and poor ventilation	15	10.4
Inadequate essential drug supply	14	9.7
Lack of in-service training for workers	11	7.6
Poor incentives and irregularity in salaries of workers	12	8.3
Poor management system	4	2.8
Lack of good accommodation for workers	9	6.3
Lack of good cold chain system	5	3.5
Poor waste management and environmental sanitation	4	2.8
Socio-cultural factors e.g. language barrier	5	3.5
Socioeconomic status of clients e.g. poverty and illiteracy	6	4.2
Lack of Gardeners/ Cleaners	3	2.1
Long distance of residence from the PHC	5	3.5
Process		
Poor attitude of clients	18	12.5
Poor attitude of the healthcare workers to their job	18	12.5

*Multiple responses

Table 2: Client's perception of the factors influencing the quality of care at the PHCs

Response	Frequency (N)	Percentage (%)
Structure		
Poor building facilities	137	28.5
Lack of constant Electricity supply	67	14.0
Lack of comfortable chairs	48	10.0
Cost of treatment and lack of free drugs	43	9.0
Non functioning fans	30	6.3
Inadequate health providers	29	6.0
Insufficient beds	27	5.6
Inadequate water supply	26	5.4
Lack of good toilet facilities	20	4.2
Poor environmental sanitation	19	4.0
Insufficient equipment for workers	12	2.5
Lack of audiovisual aids and T.V	8	1.7
Distance of PHC from home	4	0.8
Inadequate security and protectors	1	0.2
Process		
Poor time management by health providers	7	1.5
Poor attitude of healthcare providers	1	0.2
Strike action	1	0.2

*Multiple responses

Discussion

The healthcare providers' perception of the factors influencing the quality of care in this study is in keeping with the Donabedian's model.[19] The major structure factors as observed by the healthcare providers include insufficient manpower, lack of basic amenities (light, water supply and good road), insufficient equipment, insecurity, communal crises, poor infrastructure, inadequate essential drug supply, poor incentives and irregularity in payment of salary of workers(Table 1). These findings are in keeping with the study carried out in Kenya by Wanjau et al.[20] Other structure factors mentioned includes lack of in-service training for workers, lack of accommodation for workers, socio-cultural factors like language barrier, lack of good cold chain and poor management system.

In terms of process factors, poor attitude of some healthcare providers and clients were the main response of healthcare professionals. This is similar to the findings of Mosadeghrad,[21] in Iran. Hence, when a patient behaves well, caregivers unintentionally provide better services but if the patient is grumpy, the healthcare provider will not be motivated for further care, thereby reducing the quality of care.

Clients' perception of the factors influencing the quality of care revealed that lack of expansion and renovation of the building, lack of adequate light and water supply, lack of comfortable chairs, beds and functioning fans, high cost of treatment and lack of good toilet facilities werethe major structure factors identified in this study (Table 2). This agrees with the study carried out in Lagos, Nigeria by Ogunnowo et al.[22]Other findings include; long distance of the PHC from home, inadequate security and protectors, inadequate health care providers, poor environmental sanitation, lack of audiovisual aids and television. These findings were similar to those of Alzaied and Alshammari.[23]

Concerning process factors as perceived by the clients, poor time management by the healthcare providers, strike actions by workers and poor attitude of healthcare providers were identified to influence the quality of care in this study (Table 2). This is similar to the findings of Mosadeghrad[21] and Ogunnowo et al.[22] The qualitative results from the focused group discussion were similar to that of quantitative.

Majority of the clients in this study were females (96.3%), married (82.3%) and had at least secondary education (82.9%). These findings were similar to those

of Ihaji et al,[24] Babatunde et al [10] and Khan et al.[25] Female education is important in decision making in relation to their health, children and family members thereby influencing the quality of care.

Healthcare providers in this study were mainly females (92.4%). Majority of them were Community Health Extension Workers (CHEWs) and Junior Community Health Extension Workers (JCHEWs) (72.3%) and Nurses (22.3%). This is similar to the findings of Kadiri-Eneh et al.[26] This female dominated occupation in Nigeria was also observed by Campbell and Ebuehi.[27] This difference may have policy implications for recruitment of more males to serve in difficult and hard to reach areas. Also, few doctors (1.4%) were observed in this study, hence majority of the healthcare providers belong to the low cadre (CHEWS and JCHEWS) across the PHCs in the Southern Senatorial District of Cross River State. The caliber of personnel employed at the PHCs also influences the quality of care.

Majority of the services provided at the selected primary health centres (PHCs) in this study include provision of health education, health promotion, environmental sanitation, immunization, reproductive health, nutrition, HIV/AIDS and oral care. This agrees with the study by Obembe, et al[28] carried out in Abuja, Nigeria; where similar services were provided. The services provided in this study were adequate in all components of PHCs except mental health. This may be due to the presence of Federal Neuropsychiatric hospital in the District where most mental cases may present.

Conclusion

The healthcare providers' perception of the factors influencing the quality of care were insufficient manpower, insufficient equipment to communal crises while clients' perception of the factors influencing the quality of care revealed mainlypoor infrastructure, lack of basic amenities, high cost of treatment and lack of free drugs and inadequate health care providers,and poor time management by the healthcare providers among others. These findings show that PHCs in Southern Senatorial District are affected by structure, process and outcome factors which should be addressed to enhancethe quality of care.

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Predictive Factors Associated with Ovarian Hyperstimulation Syndrome in Indonesian Women Undergoing IVF

Valerie Afiyah Marzuki[1], Zakiyatuh Faizah[2], R. Haryanto Aswin[2], Ashon Sa'adi[3]

[1]Final Year Student, Faculty of Medicine, Universitas Airlangga, [2]Lecturer, Department of Biomedical Science, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia, [3]Lecturer, Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Hospital, Surabaya, Indonesia

Abstract

Background: In line with the increasing practice of in-vitro fertilization, it is crucial to pay attention on its complications. The most common iatrogenic complication of assisted reproductive technologies (ART) is ovarian hyperstimulation syndrome (OHSS). Several characteristics are useful in identifying high-risk patients in order to prevent OHSS.

Method: This study analysed characteristics of age, body mass index (BMI), antral follicle count (AFC), estradiol levels, and the number of oocytes between two unpaired groups of 20 women with OHSS and 19 women, who did not experience OHSS.

Results: The characteristics of AFC (p = 0.012), estradiol levels (p <0.001), and the number of oocytes (p <0.001) showed were significantly different between the two groups. Women with higher AFC were more likely to have OHSS, with OR of 3.33 (95% CI 0.77–14.31). Additionally, women with higher levels of estradiol and number of oocytes were also more likely to have OHSS, OR 76.5 (95% CI 9.66–605.67) and 81 (95% CI 4.2–1561.6), respectively. Other patient's characteristics did not differ significantly (p> 0.05).

Conclusions: Women with AFC above ten follicles, estradiol levels above 3000 pg/ml, and oocytes count of more than 12 were more likely to develop OHSS.

Keywords: *OHSS, IVF, prediction, prevention, risk factors.*

Introduction

A continued increase of clinics and treatment cycles of assisted reproductive technology (ART) has been globally reported by the International Committee Monitoring Assisted Reproductive Technologies (ICMART) [1] An ART's procedure, which is known as controlled ovarian stimulation (COS), induces multiple follicular selection, codominance, and ovulation by deliberately administering pharmacological therapy.[2]

Corresponding Author:
Ashon Sa'adi
Lecturer, Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Hospital, Surabaya, Indonesia
e-mail: ashonanti@gmail.com

The procedure may lead to a potentially life-threatening complication of ovarian hyperstimulation, namely ovarian hyperstimulation syndrome (OHSS).[3] The clinical manifestations of OHSS are a consequence of an increase in vascular permeability, which results in the accumulation of fluid in the abdomen and other body cavities, haemoconcentration, and reduced blood perfusion.[4] Ovarian hyperstimulation syndrome often occurs during in-vitro fertilization (IVF) cycle and believes to be closely related to the administration of hCG.[5] It is hypothesized that hCG induces the release of a potent mediator that is responsible for the pathophysiology and clinical consequences of OHSS by directly affecting the vascular system.[4] This iatrogenic complication is considered a rare condition with a reported frequency of 1.2% of all cycles. [1]

Some studies reported several characteristics were

determined as risk factors or OHSS prediction factors. According to Humaidan et al.,[6] risk factors/predictive factors are divided into primary and secondary factors. The primary factors are patient-related, such as young age, high basal anti-Müllerian hormone (AMH), previous history of OHSS, high antral follicles (antral follicle count or AFC), and PCOS (polycystic ovaries syndrome) or isolated PCOS. The secondary factors are associated with the ovarian response, including the number of follicles (on the day of hCG), increased levels of estradiol, vascular endothelial growth factor (VEGF), and inhibin-B. These factors were then adapted in another review, with the addition of more variables; a high oocytes count, hCG administration in the luteal phase support, and pregnancy as secondary predictive factors of OHSS. [3] Some studies also described a positive correlation of an asthenic habitus or a low BMI (body mass index) to have a high risk of developing OHSS. [2,7]

To date, OHSS has no definitive therapy, therefore prevention is a crucial step in the management of women with OHSS. Risk factors/predictive factors are expected to help in identifying high-risk patients, so that prevention of OHSS can be done as early as possible. Given so, the aims of this study are to determine the risk factors of OHSS. This study reviewed OHSS cases visiting the first referral hospital in East Java, the Dr. Soetomo General Hospital Surabaya. The characteristics of this group were then compared with women who did not develop OHSS of women undergoing IVF over a two-year study period.

Method

Data were collected from medical records of women who underwent IVF in the Graha Amerta Fertility Clinic Dr. Soetomo General Hospital from June 2017 to June 2019. Women who experienced OHSS were all included in this study as the case (OHSS) group, while women, who did not develop OHSS during the study period were included as the control (non-OHSS) group. The subjects' data on age, BMI, AFC, the clinical onset of OHSS, estradiol levels when hCG was administered, and the number of oocytes were obtained and analyzed. In addition, this study also compared the pregnancy outcome of the two groups. Ethical clearance was granted by the Health Research Ethics Committee Faculty of Medicine Universitas Airlangga. (1472/KEPK/Ix/2019)

Using the Kolmogorov-Smirnov normality test, most of the data were not normally distributed. Thus, to compare the two groups, the Chi-square Test, Fisher's Exact Test, and the nonparametric Mann-Whitney U Test were performed, when appropriate. Statistical significance were determined if $p < 0,05$.

Results

During the study period, there were 440 medical records and 39 of them were eligible for the study. Then the subjects were sorted into two groups, which were OHSS and non-OHSS groups, which included 20 and 19 subjects, respectively. In the OHSS group, there were 9 subjects who experienced early OHSS (60%), and 6 subjects experienced late OHSS (40%). In this study, early OHSS was defined if the onset of symptoms were within 9 days after hCG injection and late OHSS if symptoms occurred more than 9 days. Concerning the severity of the symptoms, most of the subjects (16 subjects, 84.2%) experienced mild OHSS. Only one subject had moderate OHSS manifesting as ascites and 2 subjects had severe OHSS of a pleural effusion. To determine the severity of OHSS, this study employed the classification adapted by Pfeifer et al. [7]

Table I presents data concerning pregnancy outcomes from both groups. Most subjects in the OHSS experienced a clinical and single pregnancy, 12 and 7 subjects, respectively. However, this result did not show a significant difference between the two groups. Clinical pregnancy was determined by the level of ß-hCG results exceeding 25 IU.

Table I. Pregnancy Outcomes

Characteristics	OHSS group (n = 20)		Non-OHSS group (n =19)		P value
	n	%	n	%	
Clinical Pregnancy					0.175
Pregnant	12	66.7%	6	37.5%	
Pregnancy Outcome					0,486
Single	7	77.8%	6	100%	
Triplets	2	22.2%	0	0%	

We found that a high AFC (> 10), estradiol level (> 3000), and oocyte count (>12) were significantly different between the two groups (Table II). The data also shows that these variables were associated with an increased risk of OHSS (Table III).

Table II. Characteristics associated with the development of OHSS

Characteristics	OHSS group (n = 20)		Non-OHSS group (n =19		P value
	n	%	n	%	
Age (years)	31.85 ± 3.52		34.47 ± 4.07		0.117
< 30	6	30%	4	21,1%	
30 – 35	12	60%	8	42.1%	
> 35	2	10%	7	36.8%	
BMI (kg/m2)	24.05 (19.5 – 37.5)		24 ± 3.11		0.168
18.7 – 24.9	7	50%	13	68.4%	
25 – 29.9	3	21.4%	5	26.3%	
≥ 30	4	28.6%	1	5.3%	
AFC	10 (6 – 20)		7.42 ± 4.05		0.012
< 5	0	0%	7	36.8%	
5 – 10	9	52.9%	8	42.1%	
> 10	8	47.1%	4	21.1%	
E2 on the day of hCG (pg/ml)					<0.001
< 2000	2	10%	9	47.4%	
2000 – 3000	0	0%	8	42.1%	
> 3000	18	90%	2	10.5%	
Number of Oocytes	14 (4 – 28)		4 (2 – 12)		< 0.001
< 8	3	15.8%	14	73.7%	
8 – 12	3	15.8%	5	26.3%	
> 12	13	68.4%	0	0%	

BMI : Body Mass Index; E2: Estradiol; AFC : Antral Follicle Count.

Table III. Odds ratio analysis of characteristics with an increased risk of OHSS

Characteristics	OHSS group (n = 20)		Non-OHSS group (n = 20)		OR	95% CI
	n	%	n	%		
AFC					3.33	(0.77–14.31)
<10	9	52.9%	15	78.9%		
>10	8	47.1%	4	21.1%		
E2 on the day of hCG (pg/ml)					76.5	(9.66–605.67)
<3.000 pg/ml	2	10%	17	89.5%		
>3.000 pg/ml	18	90%	2	51.3%		
Number of Oocyte						
< 12	6	31.6%	19	100%	81	(4.2-1561.6)
> 12	13	68.4%	0	0%		

OR : Odds Ratio; E2: Estradiol; AFC : Antral Follicle Count.

Discussion

According to an article by Pfeifer et al, [7] fair evidence was described concerning several patients' characteristics which were associated with an increased risk of OHSS. But there were still cut points that require validation; respectively the AMH values >3.4 ng/ml, development of ≥ 25 follicles, estradiol levels > 3500 pg/ml, and ≥ 24 oocytes. This article also mentioned contradictory reports on the predictive ability of a lower BMI to be associated with OHSS. Studies focused on the demographics of women who experienced OHSS may prove as an important tool to identify high-risk patients. Although several reports have been conducted in Asian countries, [8–10] studies in Indonesia are still very much needed. Considering risk factors of OHSS may differ in Asian women, due to environmental factors, genetics, and drug-use behaviors. [9]

Most of the women in the OHSS group experienced mild symptoms of OHSS. Which is in accordance with a report which states mild OHSS is the most frequent complication of ART in Indonesia[11] Most of the women with OHSS had 5 – 10 antral follicles, which was similar to a study in Scandinavia by Kahnberg et al. [12] most of the subjects had an AFC of 5 – 10 follicles, 54% in women that were admitted for OHSS and 53% in the non-OHSS group. Our data reports a significant difference in the AFC of the two study groups. Women with higher AFC were more likely to have OHSS than women lower AFC. These results are also in agreement with a case-control study by Shields et al. [5] that shows a higher follicle count was associated with a significant relevance ratio (RR) for OHSS (RR 1.4,p< 0.001(95% CI 1.29-1.52)). Antral follicles are oocytes surrounded by granulosa cells. The growth of the antral follicles is indicated by an increased volume of the oocyte, granulosa cell proliferation, and expansion from the antral space. This process can take up to 6 months and is affected by local factors and FSH levels, and not affected by the hormonal cycle. This may suggest that a high AFC may indicate a shorter period of follicles maturation, and a higher response of the ovarium to the stimulation. [13]

Our data suggested that the increased concentration of estradiol over 3000 pg/ml on the day of hCG administration, increases the risk of OHSS. This is in line with the previous report by Tarlatzi et al., [14] that showed estradiol levels on the day of hCG were associated with an increased risk of OHSS, OR 1.8 (CI 95% 1.5–2.15) for moderate OHSS and OR 2.8 (CI 95% 1.8–4.37) for severe OHSS. However, a study conducted in Thailand suggested that estradiol alone cannot predict OHSS. [9] According to a review by Mascarenhas et al., [15] the role of high estradiol levels in the pathology of OHSS still remains inconclusive. This review discussed that high levels of estradiol is merely a causative factor in the pathogenesis of OHSS. It is hypothesized a high ovarian response causes the increase in estradiol levels and triggers other vasoactive mediators such as VEGF, which ultimately leads to an increase in vascular permeability. Another opinion is that high estradiol levels are considered to actually be capable of triggering inflammation and protein release from the vascular space, yet do not enhance the inflammation. In addition, according to Shields et al. [5] increased levels of estradiol are a predisposing factor for thromboembolism in women with OHSS. Although the exact pathology of OHSS is still not fully understood, the hCG is suggested to play a part in inducing VEGF release and together with cytokines causes clinical manifestations of OHSS. [16]

Most of the women in the OHSS group had an oocyte count of more than 12 oocytes. Comparing this result with the non-OHSS group, in which most had lower than 8 oocytes and none had oocyte count higher than 12 oocytes. Thus, our data also showed a significant difference in the oocyte count between the two groups. Several studies also demonstrated similar results to our findings. [12,14] Our data also revealed that an oocyte count of more than 12 oocytes increased the risk of OHSS. A similar result was reported by a study conducted by Lee et al. [8] which described the oocyte count with cut off value of ≥ 11 oocytes had a sensitivity of 90.5% and specificity 66% may lead to the diagnosis of OHSS. The number of oocytes is believed to be the most direct measurement of ovarian response. However, it is still important to consider other possible factors, which may affect the accuracy of the oocyte count. Oocyte aspiration may be affected by problems in the final stimulation and aspiration process.[13]

In both groups, subjects' age and BMI were not significantly different. These results were in agreement with previous reports, a study in China also did not describe a significant difference for age in the two groups ($p = 0,871$), with an average age of 32 ± 4 years in the OHSS group and 32 ± 3.8 years in the non-OHSS group. [10] As well as a study by Shields et al. [5] reports that a lower BMI was not associated with an increased risk of OHSS RR 1.1 $p = 0.19$ (CI 95% 0.96–1.26). Whereas contrarily to a study in the United States by Luke et al.

which reported a significant difference for age $p< 0.001$, with an average of 35.6 ±4.6 years in the control group and 33 ± 4.3 years in women with moderate OHSS. [17] The previous study was conducted with a much bigger study population of over 1777 fertility clinics and 214,213 ART cycles of a 3 year period. Results also differ from a prospective study in Bangkok by Aramwit et al.,[9] reported a significant difference in BMI between the two groups ($p < 0.01$). Their data showed the BMI in 14 women with OHSS was lower with an average of 17.5 ± 6.9 (15.8–22.6) kg/m2, in comparison to 115 women who did not experience OHSS had an average BMI of 23.3 ± 7.6 (16.9–30.5) kg/m^2. Subsequently, these data raised a question of why some women with high ovarian response develop OHSS, while others do not. An interesting study on soluble protein, which binds to VEGF may explain this phenomenon. For example, the soluble vascular endothelial growth factor receptor 1 (sVEGFR-1) which acts as a regulator of bioactivity, binds to VEGF to inhibit VP21 and prevents OHSS. This was achieved due to the ability of sVEGFR-1 to compete with VEGFR2 that binds with VEGF. [4] This theory is supported by the findings of Gomez and colleagues, which reported that women, showing a normal or excessive response of the ovaries and did not develop OHSS, had high levels of plasma sVEGFR-1 antagonists. Whereas the group which experienced hyperstimulation had lower sVEGFR-1 and higher free/bound VEGF levels. Furthermore, according to another study which evaluated the cut-off value of OHSS risk factors, the sensitivity of age and BMI were not as good as other characteristics. The cut-off for age was 33 years old (sensitivity 76.2% and specificity 56%) and BMI was 18.66 kg/m^2 (sensitivity 33.3% and specificity 90.3%). Other predictive variables with better sensitivity assessed in the previous study were; estradiol levels on hCG injection day, AMH levels, number of follicles ≥ 10 mm on hCG injection day, and the oocyte count.[8]

This study has several limitations. Our data indicate a high odds ratio value for estradiol levels and the number of oocytes. This may be explained by the small sample size. Moreover, this is a cross-sectional study and as such missing data on medical records commonly occur. Protocols of ovarian stimulation and preventive measures for OHSS were not assessed in this study.

To the best of our knowledge, this is the first study that analyzed the risk factor of OHSS in Indonesia. Considering the life-threatening consequences of OHSS and the increasing number of its occurrence in Indonesia

it is important to advocate more reports on OHSS as well as its preventive strategies. The current study provides an insight into which factors can be accounted for as a measure of a high ovarian response. Therefore, clinicians and fertility clinics practicing IVF procedures can provide appropriate preventive measures to reduce the risk of OHSS.

Conclusion

Women, who underwent IVF and developed OHSS had a higher antral follicle count, higher estradiol levels, and higher number of oocytes in compaison to women who did not experience OHSS. Women with AFC above 10 follicles, estradiol levels above 3000 pg/ml, and oocytes count of more than 12 were more likely to develop OHSS. This study adds informative data, which should help clinicians practicing IVF to establish preventive measures and develop protocols in order to prevent OHSS in high-risk patients.

Conflict of Interest: Nil, the authors declares that there is no conflict of interest

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Effectiveness of Structured Teaching Programme on Knowledge Regarding Blood Components Transfusion and its Complications among Staff Nurses

Varesh G. Chilapur[1], R.S. Patil[1], Shriharsha C.[2], Deelip S. Natekar[2]

[1]Professor and HOD, Department of Medical Surgical Nursing, Shri B.V.V. Sangha's Sajjalashree Institute of Nursing Sciences, Navanagar, Bagalkot, Nursing Officer, District Govt. Hospital, Vijayapura, [2]Professor and HOD, Department of Psychiatric Nursing, Shri B.V.V. Sangha's Sajjalashree Institute of Nursing Sciences, Navanagar, Bagalkot, [2]Principal, Shri B.V.V. Sangha's Sajjalashree Institute of Nursing Sciences, Navanagar, Bagalkot

Abstract

Blood components transfusion, commonly referred to as blood transfusion in general term for the transfusion of red blood cells, platelets, fresh frozen plasma, cryoprecipitate, or white blood cells directly into patients circulation. This study aims to assist the staff nurses in safe and effective administration of blood components and prevention of complications.

Methodology: An evaluative approach with pre-experimental one group pre-test post-test design was used for the study. A structured interview schedule was used to collect the data. The sample includes 50 staff nurses from selected hospitals of Bagalkot District was selected with simple random sampling technique. The data collected before and after the administration of STP were analyzed using descriptive and inferential statistics.

Results: The mean percentage of knowledge scores of the staff nurses in the pre-test was 60.91% with mean and SD (17.9±3.53), whereas the mean percentage of knowledge scores in post-test was 84.39% with mean and SD (25.42±3.07).. Significance of difference between the pre-test and post-test knowledge scores was found to be highly significant [t= 16.64, p<0.05]. There was a significant association found between pre-test knowledge scores of the staff nurses and socio demographic variable like training in blood components transfusion (χ^2 = 5.0585; P<0.05).

Conclusion: The study proved that structured teaching programme was effectiveness in improving the knowledge of staff nurses on blood components transfusion and its complications.

Keywords: *Effectiveness, Structured Teaching Programme, Knowledge, Blood Components, Transfusion, Complications, Staff Nurses.*

Introduction

Life begins not at the time of fertilization or conception but when blood first appears in the embryo,

Corresponding Author:
Mr. Varesh G. Chilapur
Professor and HOD, Department of Medical Surgical Nursing, Shri B.V.V. Sangha's Sajjalashree Institute of Nursing Sciences, Navanagar, Bagalkot
e-mail: varesh.chilapur@gmail.com
Cell No.: 9945765177

at about 20 days following conception. A person can experience a relatively minor injury, and suffer the total process of exsanguinations the complete loss of blood. Their body may appear almost entirely intact and yet the person would lie dead in a pool of their own blood. Ancient people would have noticed this. Blood would come to be viewed as the life force, or as a fluid that contains the life force.[1]

Blood components are an important and precious health resource. Transfusion of blood components is an important therapeutic modality and can be life saving

in certain circumstances. However, the decision to transfuse blood components is also important as there are significant dangers associated with it.[2]

India faced a 10 per cent shortage in its estimated blood requirement in 2015-16. The estimated requirement is around 1.2 crore units per annum. Blood collection through various sources, including blood donation camps, was 1.1 crore units, a shortage of 11.5 lakh units, according to data released by the Ministry of Health and family welfare.[3]

Blood transfusion is saves life, if any error occur during blood transfusion, at the same time, takes life of patient or person. Nurses are being responsible for the final bedside check before transfusion, have the final opportunity to prevent a mis-transfusion. An understanding and knowledge of the pathophysiology of transfusion reactions, symptoms and treatment is essential to safely administer and monitor transfusion. So researcher has come across many nurses negligence in blood transfusion which leads to increased in morbidity and mortality.[4]

Hence, the investigator felt the need to assess the effectiveness of structured teaching programme on blood components transfusion and its complications among staff nurses working in selected hospitals of Bagalkot.

Statement of the Problem: "A study to assess the effectiveness of structured teaching programme on knowledge regarding blood components transfusion and its complications among staff nurses working in selected hospitals of bagalkot."

Objective of the Study:

- To assess the existing knowledge of staff nurses regarding blood components transfusion and its complications through pre-test knowledge score.

- To evaluate the effectiveness of structured teaching programme on knowledge regarding blood components transfusion and its complications by post-test knowledge score.

- To find out the association between Pre test knowledge scores of staff nurses regarding blood components transfusion and its complications with their selected socio demographic variables.

Methodology

Research Approach: An evaluative approach was used for the present study.

Research Design: Pre-experimental one group pre-test, post-test design.

Variables under the Study:

Dependent Variable: Knowledge of staff nurses regarding blood components transfusion and its complications.

Independent Variable: Structured teaching programme on knowledge regarding blood components transfusion and its complications among staff nurses.

Socio-demographic Variables: age, gender, religion, Educational qualification, training in blood transfusion skills, years of experience, area of work,working in blood bank.

Setting of the Study: The present study was conducted at B.V.V. Sangha's Hanagal Shri Kumareshwar Hospital and Research Centre Bagalkot and District Govt. Hospital, Bagalkot.

Population: The population for this study was Nurses of selected hospitals of Bagalkot.

Sample size: The sample for the present study composed of 50 Nurses of selected hospitals of Bagalkot.

Criteria for Selection of Sample:

Inclusive Criteria: The study includes the staff nurses;

1.   Staff Nurses who are willing to participate in study.

2.   Registered staff nurses who are working in selected hospitals of bagalkot.

3.   Staff Nurses who all are able to co-operate to the study.

Exclusive Criteria: The study excludes the staff nurses;

1.   Staff Nurses who are not interested to participate in study.

2.   Staff Nurses who are not present at the time of study.

3.   Staff Nurses who are ill at the time of study and unable to provide data.

Sampling Technique: Simple random sampling technique.

Description of the final Tool: The Self administered knowledge Questionnaire was used for this study which consists of two parts:

- **Part I:** Items related to socio-demographic data of staff nurses.

- **Part II:** Self administered knowledge Questionnaire regarding Blood components transfusion and its complications. it further divided into 4 sections

- **Section A:** General items related to blood and its components.

- **Section B:** Items related to blood components transfusion

- **Section C:** Items related to complications of Blood components transfusion. Section-D: Items related to prevention of complications of components transfusion.

Scoring of the Items: The maximum obtainable scores were 30. To find out the association between the selected socio-demographic variables and knowledge scores, respondents are categorized in to five groups.

Category	Score
Very good	25-30
Good	19-24
Average	13-18
Poor	7-12
Very poor	0-6

Data collection procedure: Pretest was administered on day one. Then STP was administered on the same day after one hour of pre-test. On the 8th day after the administration of STP the post test was conducted using the same interview schedule.

Plan of Data Analysis: The data obtained was analyzed in terms of achieving the objectives of the study using descriptive and inferential statistics.

Results

Part I: Level of pre-test knowledge of the staff nurses regarding blood components transfusion and its complications.

Table 1: Percentage wise distribution of study subjects according to levels of knowledge in pre test. N=50

Level of knowledge	Range of scores	Number of respondents	Percentage (%)
Very poor	0-6	00	0.0
Poor	7-12	05	10
Average	13-18	27	54%
Good	19-24	16	32%
Very good	25-30	02	4%
Total	0-30	50	100

Assessment of the level of knowledge of the Staff nurses reveals that majority (54%) of the Staff nurses had average knowledge**.**

Part II: Significance of the difference between the pre-test and post-test knowledge scores of the staff nurses.

Table 2: Significance of the difference between the pre-test and post-test knowledge scores of the staff nurses.

Knowledge area	Test	Mean	SD	Paired t-value
Blood components transfusion and its complications	Pre test	17.9	3.53	
	Post test	5.42	07	**16.638***

*Significant (p<0.05)

Findings reveal that the difference between mean pre-test (17.9±3.5) and post-test (25.42±3.07) knowledge scores of staff nurses found to be statistically significant at 0.05 level of significance [t= 16.638, p<0.05].

Part III: Association between the pre-test knowledge scores of staff nurses regarding Blood components transfusion and its complications and selected socio - demographic variables.

Table 3: Association between the pre-test knowledge scores of staff nurses regarding Blood components transfusion and its complications and selected socio-demographic variables.

Sl.No.	Socio-demographic variables	Df	Chi-square value	Table value	Level of significance	
1.	Age	2	1.914	5.99	P>0.05	NS
2.	Gender	1	2.991	3.84	P>0.05	NS
3.	Religion	1	0.415	3.84	P>0.05	NS
4.	Educational Qualification	1	2.880	3.84	P>0.05	NS
5.	Year of experience in ward	1	0.930	3.84	P>0.05	NS
6.	Area of work	1	0.349	3.84	P>0.05	NS
7.	Training in blood components transfusion and its complications	1	5.0585	3.84	P>0.05	S
8	Working in blood bank	1	0.1488	3.84	P>0.05	NS
9	Assisted in blood components transfusion.	1	0.0707	3.84L	P>0.05NS	

Df–Degree of freedom, *Significant, NS–Not significant

Findings of the study revealed that there is significant association found between pre-test knowledge scores of the nurses with selected socio demographic variables such as Training in blood components transfusion(5,058:p<0.05) but there was no significant association found between other demographic variables like age, gender, religion, Educational qualification experience Area of work, and experience.

Discussion

The findings of the study were discussed according to the objectives which were stated. The present study has showed that the difference between mean pre-test (17.9±3.5) and post-test (25.42±3.07) knowledge scores of staff nurses found to be statistically significant at 0.05 level of significance [t= 16.638, p<0.05].

These findings were supported, by the study conducted to find the effectiveness of structured teaching program on knowledge regarding blood transfusion among 50 student nurses in Raichur, where the overall pretest mean knowledge score was 23.45(sd=5.76), post test mean score was (sd=6.48) with paired t-value of 49.57.[5]

Conclusion

From the present study it was found that STP was very effective teaching method. The investigator as a nurse felt the need that student nurses should be educated well before they are posted to wards, so that they could act responsibly to practice the blood components transfusion meticulously to prevent complications.

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Characteristics of Patients with Type 2 Diabetes Mellitus

Winnie Tunggal Mutika[1,2], Krisnawati Bantas[3], Ratna Djuwita[4], Yunita[5]

[1]*Doctoral Student of Public Health, Faculty of Public Health, University of Indonesia,* [2]*Lecturer at Program Study of Midwifery, Gunadarma University,* [3]*Lecturer,* [4]*Professor and Lecturer, Department of Epidemiology, Faculty of Public Health,University of Indonesia,* [5]*Research Assistantat Program Study of Midwifery, Gunadarma University*

Abstract

Diabetes Mellitus (DM) is one of the non-communicable diseases that has the most prevalence of diseases globally. This study aimed to determine the characteristics of patients type 2 diabetes mellitus (T2DM) in regional hospital, East Jakarta. The study's characteristics were age, sex, education, occupation, Body Mass Index (BMI), history of diabetes mellitus, history of hypertension, and blood pressure. The study design uses descriptive studies. The study population was all people with diabetes mellitus in regional hospital, East Jakarta. This study sample was people with type 2 diabetes mellitus in January to March 2019 in the regional hospital, 170 patients. The sampling technique is by using *non-random sampling.* The results showed that people with type 2 diabetes mellitus aged over 45 years 86%, male sex 52%, higher education 78.82%, not working 55%, normal BMI 48%, had a history of DM 54%, have a history of hypertension 57%, and normal blood pressure 65%. The study population's conclusions were all people with diabetes mellitus in the regional hospital, East Jakarta, aged over 45 years, male sex, higher education, not working, normal BMI, had a history of DM, have a history of hypertension, and normal blood pressure.

Keywords: *Type 2 Diabetes Mellitus, characteristics of T2DM, East Jakarta.*

Introduction

Various global studies say that DM is a significant health problem. This is due to an increase in the number of diabetics from year to year. In 2015, approximately 415 million adults had diabetes, a four-fold increase from 108 million in the 1980s. If there are no precautions, this number will continue to increase without decreasing. It is estimated that in 2040 it will increase to 642 million sufferers[1].

Both the prevalence and incidence of type 2 diabetes are increasing worldwide, particularly in developing countries,in conjunction with increased obesity rates and westernization of lifestyle. The attendant economic burden for healthcare systems is skyrocketing, owing to the costs associated with treatment and diabetes complications[2].

Most diabetes in the world is accounted for by "common" T2DM, which has multifactorial pathogenesis caused by alterations in several gene products. The disease's medical and socioeconomic burden is caused by the associated complications,which impose enormous strains on health care systems. The incremental costs of patients with type 2 diabetes arise not only when the diagnosis is established but at least 8 years earlier[3]. Indonesia is a country in the 7th rank with 8.5 million DM sufferers after China, India, the United States, Brazil, Russia, and Mexico. The lowest prevalence of DM based on doctor's diagnosis and age $\geq$ 15 years was lowest in NTT, namely 0.8%, while the highest DM prevalence was in DKI Jakarta Province at 3.4%[4].

Although often thought of as a disease of glycemic regulation, the nature of type 2 diabetes mellitus (T2DM) is more in keeping with a progressive disease characterized by premature cardiovascular morbidity and mortality. In order to arrest this progression, there is clear

Corresponding Author:
Winnie Tunggal Mutika
Doctoral Student of Public Health, Faculty of Public Health, University of Indonesia
e-mail: winnie_mutika@staff.gunadarma.ac.id

evidence to support early initiation and intensification of therapy to reduce the risk of de novo or worsening of micro- and macro-vascular complications[5]. Maintaining simultaneous control of hypertension, dyslipidemia and hyperglycemia is the cornerstone of diabetes care, which requires a holistic approach and the psychosocial aspects of the disease[6].

Treating and strict adherence to glycemic targets have become ingrained in the culture of diabetes management, occupying a central role in the standards of medical care for persons with diabetes. National and international guidelines have adopted a stepwise approachtotreat people with diabetes as their disease progresses. The first step in diabetes treatment should always include education and advice on nutrition and exercise. The latest American Diabetes Association and European Association for the Study of Diabetes (ADA/EASD) guidelines also recommend initiation of a first-line oral anti-diabetic drugs (OAD) at initial diagnosis[2], while International Diabetes Federation (IDF) Global Guideline for Type 2 Diabetes and national guidelines in some countries such as Japan and Spain do not necessarily recommend to use of any OADs at the time of diagnosis[2,7-8].

Diabetes mellitus, if not handled properly, can lead to various complications. There are two complications in DM, namely acute complications and chronic complications. Chronic complications consist of macro-vascular complications and micro-vascular complications. Coronary heart disease, cerebral vascular disease, and peripheral vascular disease are types of macro-vascular complications, retinopathy, nephropathy, and neuropathy are types of micro-vascular complications [9].

Research Question: What are the characteristics of patients with T2DMin regional hospital, East Jakarta?

Objectives:

To discover the characteristics of patients with T2DM in regional hospital, East Jakarta:

1. Determine the age distribution of T2DM in regional hospital, East Jakarta

2. Determine the gender distribution of T2DM in regional hospital, East Jakarta

3. Determine the education distribution of T2DM in regional hospital, East Jakarta

4. Determine the occupation distribution of T2DM in regional hospital, East Jakarta

5. Determine the BMI distribution of T2DM in regional hospital, East Jakarta

6. Determine the history of diabetes mellitus distribution of T2DM in regional hospital, East Jakarta

7. Determine the history of hypertension distribution of T2DM in regional hospital, East Jakarta

8. Determine the blood pressure distribution of T2DM in regional hospital, East Jakarta

Method

Study Setting: The location of the study was conducted in regional hospital, East Jakarta on January-March 2019.

Study Design: The study design used in this study was descriptive study design, a study conducted with the aim of know the characteristics or description of T2DM.

Population and Samples: The population of this study was patients with T2DM in Regional hospital, East Jakarta. The sample of this study were people with T2DM from January to March 2019, there were 170 respondents in regional hospital, East Jakarta.

Variable: The variables used in this study were the characteristics of patients with T2DM. This study used secondary data from the medical records of regional hospital, East Jakarta.

Data Collection: Data collection from medical records in Regional hospital contains complete information about age, gender, education, occupation, BMI, history of T2DM, history of hypertension, and blood pressure. The medical records collected from January to March 2019 were 170 medical records.

Data Analysis: Quantitave data will later be entered in a computer database using SPSS version 22 to see the frequency distribution of the characteristics of the respondents.

Result

The data processed is secondary data taken from the hospital's medical the data were taken from July 24-29th 2019. The population in this study were all patients with T2DM, the sample used in this study were T2DM

from January to March 2019 at regional hospital, East Jakarta. The data obtained were accordance with the characteristics, age, sex, education, occupation, BMI, family history of T2DM, history of hypertension, and blood pressure. The results showed that of the patients with T2DM, 86% were more than 45 years old (143 patients) and 14% were between 15 to 45 years old (23 patients). Based on the gender showed that patients with T2DM, 52% were male (88 patients) and 48% female (82 patients). Based on the education patients with T2DM, 78.8% were highly educated (134 patients), 20% had secondary education (34 patients), and 1.2% did not attend school (2 patients). Based on the occupation that in patients with T2DM, 55% worked (94 patients) and 45% did not work (76 patients). Based on the category of BMI that patients with T2DM, 48% were in the normal BMI category (82 patients), 28% were obese (48 patients), 19% were overweight (32 patients), and 5% were underweight (8 patient). Based on the history of T2DM that patients with T2DM, 54% with a history of T2DM (91 patients) and 46% had no history of the disease (79 patients). Based on the history of hypertension that patients with T2DM, 57% with a history of hypertension (97 patients) and 43% had no history of hypertension (73 patients). Based on the category of blood pressure that patients with type-2 diabetes mellitus, 65% had normal blood pressure (111 patients), 33% with hypertension (56 patients), and 2% with hypotension (3 patients).

Discussion

Older adults (>65–70 years) often have a higher atherosclerotic disease burden, reduced renal function, and more comorbidities. Many are at risk for adverse events from the use of multiple medications and maybe both socially and economically disadvantaged. Life expectancy is reduced, especially in the presence of long-term complications. They are also more likely to be compromised by hypoglycemia; for example, unsteadiness may result in falls and fractures, and a tenuous cardiac status may deteriorate into catastrophic events. It follows that glycemic targets for elderly with long-standing or more complicated diseases should be less ambitious than for the younger, healthier individuals[2].Gender and age identify risk factors for diabetes mellitus globally. A greater number of diabetic subjects studied (57.2%) were females. It was similar to the finding in the Nigeria Diabetic Care study 35 but differed from the findings of other Nigerian studies that showed a male preponderance[10].

The result of this study showed that 70% from some college or college graduate (28 patients) and 30% from high school or less (12 patients)[11]. The result in this study showed that 36% employed (5465 patients), 28% not working (4216 patients), 22.2% retired (3337 patients), 12.6% entrepreneur (1893 patients), 0.5% disabled (82 patients), 0.4% other (67 patients), and missing data is 932[12].There was a significant relationship between family function and social support and glycemic control among type2 diabetic patients attending the general outpatient clinic in the National Hospital, Abuja, Nigeria[10].

The majority of individuals with type 2 diabetes are overweight or obese (>80%). In these, intensive lifestyle intervention can improve fitness, glycemic control, and cardiovascular risk factors for relatively small body weight changes. Although insulin resistance is considered as the predominate driver of diabetes in obese patients, they have a similar degree of islet dysfunction to leaner patients. Perhaps the obese may be more likely to require combination drug therapy [2]. The result in this study showed that 58% category of BMI is obesity (532 patients), 33% with overweight (303 patients), and 9% with normal BMI (82 patients) [13]. The prevalence of diabetes in the mother, father, and other relatives was 25.5, 6.5, and 21.2, respectively. No difference in the clinical characteristics was found in patients with diabetes in the mother, or father. The data do not indicate a different influence of maternal and paternal diabetes on the clinical characteristics of Type 2 diabetic patients, while there is evidence that parental diabetes brings to an earlier onset the disease and higher Low-Density Lipoprotein (LDL-cholesterol) values, the presence of diabetes in relative other than parents constituted a small risk for the early manifestation of the disease[14].

Although lifestyle and overeating seem to be the triggering pathogenic factors, genetic elements are also involved in type 2 diabetes's pathogenesis. Positive family history confers a fold increased risk for T2DM. 15–25% of first-degree relatives of patients with T2DM develop impaired glucose tolerance or diabetes. The lifetime risk (at age 80 years) for T2DM has been calculated to be 38% if one parent had T2DM. If both parents are affected, the prevalence of T2DM in the offspring is estimated approach 60% by the age of 60 years[3].Multivariate linear regression analysis showed a significant association between a family history of hypertension and younger age at the time of the diagnosis

of T2DM, independent of a family history of diabetes mellitus and male sex, suggesting that a positive family history of hypertension might be associated with the accelerated onset of type 2 diabetes[15].

Family history and hypertension are more significant risk factors of T2DM than BMI and gender in the Trinidadian population, with age being the most significant factor. High-risk groups (of T2DM) were found to be participants with: a family history of T2DM, Indo-Trinidadian ethnicity, hypertension (with risk increasing with severity), abdominal obesity, and elderly age. Systolic blood pressure was found to be a better indicator of risk than diastolic blood pressure. Blood pressure monitoring, knowledge ofthe family history of T2DM, and healthier lifestyle habits should be more encouraged in society to reduce the incidence of T2DM in Trinidad[16].

Hypertension proportions were higher in women ($p = 0.001$), older, more obese, and those who had longer diabetes duration, lower education levels, higher frequency of hypoglycemic events (all $p < 0.001$) and higher triglyceride levels ($p = 0.003$). Our findings indicate that two-thirds (67.5%) of adult patients with T2DM have hypertension. The co-existence of hypertension increases the frequency of macro and micro-vascular diabetic complications in these patients. Despite the critical role of hypertension in morbidity and mortality, only half of the patients have favorable Arterial Blood Pressure (ABP) levels. Masked hypertension seems to be another important issue in this population[17].

Conclusion

Patients with type 2 diabetes mellitus in Regional hospital, East Jakarta had the characteristics of 86% who were over 45 years old, 52% are male, 78.82% with higher education, 55% have a job, 48% have normal BMI, 54% have a history of T2DM, 57% have a history of hypertension, and 65% have typical of blood pressure. The characteristics of T2DM need to be identified early to improve the patient's quality of life and prevent the occurrence of the disease.

Abbreviations: DM: Diabetes Mellitus, BMI: Body Mass Index, T2DM: Type 2 Diabetes Mellitus, ADA: American Diabetes Association, EASD: European Association for the Study of Diabetes, OAD: Oral Anti-diabetic Drug, IDF: International Diabetes Federation, LDL: Low Density Lipoprotein, ABP: Arterial Blood Pressure.

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Evaluation of the Effect of Platelet Rich Fibrin Membrane on the Neurosensory Function Following Inferior Alveolar Nerve Lateralization for Implant Placement

Eman S. Shalaby[1], Salah Yassin[2], Ann Ali Abd-Alkader[3], Abdelmoez Elsharkawy[4]

[1]Assistant Lecturer, Oral and Maxillofacial Surgery Department Faculty of Dentistry Cairo University in Egypt., [2]Professor, Oral and Maxillofacial Surgery-Cairo University, [3]Professor of Neurophysiology-Faculty of Medicine-Cairo University, [4]Lecturer of Oral and Maxillofacial Surgery Department Faculty of Dentistry, Cairo University in Egypt

Abstract

Aim: The aim of this study was to evaluate the effect of PRF membrane on the neurosensory disturbance of the inferior alveolar nerve following IAN lateralization surgery for immediate implant placement.

Methodology: The study was conducted on six patients underwent IAN lateralization surgery for immediate implant placement and the nerve was surrounded by PRF membrane. The neurosensory disturbance was evaluated using visual analogue scale preoperatively and postoperative at 1 week, 2 weeks,1 month,3 month and 6 month.

Results: At 1 week post-operative 100% of the patients had recorded complete absence of sensations in the lip and chin region. At 6 month post-operative (66.6%) of the patients has recorded score 4 and (33.3 %) of the patients have recorded score 5.

The mean and median value significantly decreased at one week post-operatively, then gradually increased in the subsequent observations. Friedman test revealed a significant difference between observations (p=0.00).

Conclusions: The PRF membrane resulted in no immediate postoperative improvement of the neurosensory disturbance of the inferior alveolar nerve following IAN lateralization surgery for immediate implant placement and the nerve recovery followed the normal course.

Keywords: *Inferior alveolar nerve lateralization, inferior alveolar nerve repositioning, posterior atrophic mandible, inferior alveolar nerve neurosensory disturbance, platelet rich fibrin membrane.*

Introduction

Rehabilitation of the posterior atrophic mandible with dental implant placement is complicated by the critical amount of residual bone above the mandibular canal.[1]

Inferior alveolar nerve repositioning has been used in cases of severely resorbed posterior edentulous atrophic mandibles when the bone height above IAN is less than 4 to 8 mms for immediate implant placement depending on the mandible native bone with high success and survival rates.[1,2]

There are two main techniques for IAN repositioning: IAN lateralization and IAN transposition. In the lateralization technique, a corticotomy is done to expose the IAN and then the nerve is retracted laterally during implant placement. Then the nerve is left to fall back into position, against the implants surface. In the transposition technique, another corticotomy is done

Corresponding Author:
Eman Sayed Ahmed Shalaby
Address: 84 Elmahatta Elgharby Street, El-marg, Cairo, Egypt.
e-mail: emmoshalaby@gmail.com
Telephone Number: +201004762274

around the mental foramen and the incisive nerve is transacted to allow transposition of both mental and inferior alveolar nerve. [3]

IAN repositioning surgery has the advantage of permitting insertion of long implants (>10 mms) depending on the mandibular available bone without the need for augmentation procedures.[4] The use of long implants provides good survival and success rates in comparison with short implants due to better stress distribution of occlusal forces and better crown root ratio. [5]

The major complication of IAN repositioning is the neurosensory disturbance following the procedure.[2,6]. Nerve damage can occur at any step during the surgery including the osteotomy, releasing of the nerve from the canal, retraction of the nerve outside the canal during drilling of the implant site and implant insertion. These surgical maneuvers cause mechanical trauma to the neurovascular bundle, also the postoperative ischemic edema and probable hematoma or chronic compression or irritation after surgery.[7,8]

Platelet rich concentrates such as Platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) have been administered as adjuvant therapies for nerve regeneration.[9,10]

The growth factors released from PRF may play an important role in nerve regeneration such as platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), fibroblast growth factor, epidermal growth factor, transforming growth factor-b1 (TGF-b1).[11,12]

The aim of this study is to assess the effect of PRF membrane on the healing of postoperative neurosensory disturbance following inferior alveolar nerve lateralization.

Materials and Method

This study was conducted on six patients selected from the oral and maxillofacial surgery outpatient clinic of the academic hospital of the Faculty of Dentistry - Cairo University.

The eligible sides underwent Inferior alveolar nerve (IAN) lateralization with simultaneous dental implant placement, the IAN was wrapped with PRF membranes to insulate it from implant and bone interface.

Eligibility Criteria: Adult patients with vertically atrophied posterior mandibular region, less than 8mm of bone above the mandibular canal requiring oral rehabilitation with dental implants. Patients should be free from any systemic conditions that may affect normal healing. Absence of any pathological conditions involving mandibular bones.

Preoperative patient assessment: All patients underwent CBCT examination for assessment of the IAN position. Patients with bone height less than 8mm of bone above the IAN were included in the study.

Surgical Protocol:

- All the surgical procedures were performed under general anesthesia.

Preparation of Platelet rich Fibrin: 60 ml of venous blood samples were collected in vacutainer tubes. The tubes were immediately centrifuged at 3000 rpm for 15 minutes. The fibrin clot was gently extracted from the tube and separated from the surrounding layers by scissors. The PRF was then pressed in a special PRF box to produce the PRF membranes.

Surgical Procedures:

- An intraoral crestal incision was performed beginning from retromolar area and ending with a releasing incision mesial to the location of the mental foramen. A full thickness mucoperiosteal flap was then reflected.

- For the exposure of the inferior alveolar neurovascular bundle, a bony window was cut using bone discs mounted on a low speed contra-angled headpiece according to the following parameters: (fig. 1).

  - The anterior border was cut 3-4 mm distal to the mental foramen.

  - The posterior border was cut 4-5 mm distal to the site of the most distal implant.

  - The upper and lower borders were cut 2-3mm above and below the mandibular canal respectively.

Fig (1): The bony window for nerve exposure.

- The neurovascular bundle was then completely released from the canal. Then a rectangular piece of sterile gloves was passed medial to it and used to retract the nerve laterally during implant drilling and placement.

- The PRF membrane was passed medial to the nerve to insulate the IAN from the implant surface and then was fully wrapped around the nerve to form a tubule around it. Fig (2).

- Tension free soft tissue closure of the flap was achieved using 4-0 resorbable sutures.

Fig (2): Showing placement of the PRF membrane.

Outcome: Subjective evaluation of the neurosensory function of the inferior alveolar nerve using visual analogue scale was performed **preoperative** as a base line then *postoperative* at time intervals (one week, two weeks, one month, three months and six months) to describe the alteration in sensation in the lower lip.

Using a visual analogue scale (VAS) 10 cm, 5 degree visual analogue scale with divisions at 2.5 cm intervals, the divisions on the VAS was:

1. Complete absence of sensations.

2. Almost no sensation.

3. Reduced sensation.

4. Almost normal sensation.

5. Fully normal sensation.

Patients were asked to mark "x" on the line at each testing session that represent their opinion about sensation of the lower lip and chin region.

Statistical Analysis:: Data management and statistical analysis were performed using the Statistical Package for Social Sciences (SPSS) version 18. Numerical data were summarized using means, standard deviations, median and range. Data were explored for normality by checking the data distribution and using Kolmogorov-Smirnov and Shapiro-Wilk tests. Comparison of different observations within the group was performed by paired t test. None normally distributed numeric variables were compared by Mann-Whitney test. Comparisons over time regarding numeric variables were done by Friedman test and pairwise difference were detected by the Wilcoxon Signed rank test. Qualitative variables were expressed as number and percentages and were compared using Chi square test. P-values ≤0.05 were considered significant.

Results

This study was conducted on six patients with residual bone height above the mandibular canal ranging from 4mm to7mm. Five female patients and one male patient with age range 39-59 years.

Subjective examination Results: Preoperatively all the patients had a normal sensation on the lip and chin region in the indicated sides of surgeries and all of them had recorded VAS score 5.

At 1weeks post-operative all the patients (100%) had recorded complete absence of sensations in the lip and chin region (VAS1).

At 2 weeks post-operative 3 patients recorded sore 1 (50%) while the other 3 patients recorded score 2 (50 %).

At 1 month postoperative 3 patients recorded score 3 (50%), 2 patients recorded sore 2 (33.3%) and 1 patient recorded score 4 (16.7 %),

At 3 month postoperative 2 patients recorded score 3 (33.3%), 3 patients has score 4 (50%) and one patient has recorded score 5 (16.7%),

At 6 month post-operative 4 patients (66.6%) has recorded score 4 and 2 patients have recorded score 5 (33.3%).

The mean and median value significantly decreased at one week post-operatively, then gradually increased in the subsequent observations. Friedman test revealed a significant difference between observations (p=0.00). Wilcoxon signed Rank test revealed no significant difference between Week 1 and week 2. Moreover, 3 and 6 months were not significantly different. (Table 1, Fig. 3).

Table (1): Descriptive statistics of visual analogue scale, comparison of different observations over time (Friedman test)

		Pre	Week1	Week2	1 Month	3 Month	6 Month	P (by time)
Group I	Mean±SD	5±0	1±0	1.5±0.55	2.83±0.75	3.83±0.75	4.33±0+.52	0.00*
	Median (range)	5 (5)	1 (1)	1.5(1 to 2)	3 (2 to 4)	4 (3 to5)	4 (4 to 5)	

Significance level p≤0.05, *significant, ns=non-significant

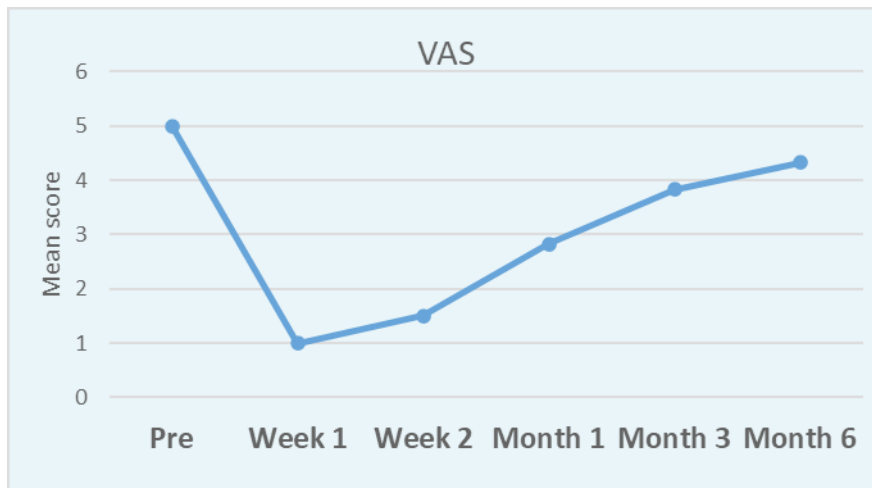**Fig. (3): Bar chart illustrating mean value of visual analogue scale at different observation times.**

Discussion

Inferior alveolar nerve repositioning techniques are used for rehabilitation of edentulous posterior atrophic mandible where the use of standard dental implants or short dental implants is problematic without augmentation procedures to avoid injury of inferior alveolar nerve. Despite the great advantages offered by these techniques the postoperative neurosensory dysfunction in the lower lip and chin region is considered as a major complication which may lead to long term discomfort in some patients.

Some authors recommended the use of intervening material such as bone graft or resorbable membranes to act as a biological barrier between the threaded implant surface and the IAN to prevent nerve irritation subsequently decrease the NSD.[8,13]

The presence of a resorbable membrane as a barrier between the nerve and implant surface will allow presence of a larger distance between them and formation of a soft tissue zone thus serve to decrease the postoperative neurosensory dysfunction at least prevent thermal conduction via the implant. (14)

PRF membrane showed a good results when used as adjuvant agent in experimental and clinical studies for acceleration and promotion of nerve regeneration capacity and the nerve functional recovery.[9,15]

The results of subjective evaluation in this study showed presence of high percentage of the NSD following inferior alveolar nerve lateralization, this percentage reach to 100% of the patients. These results confirmed that the surgery of IAN lateralization carries an inherent risk of postoperative neurosensory disturbances in the

lip and chin region. These results are in line with many previous studies and systematic reviews. [2,6]

The results of this study showed that the PRF membrane has no significant effect on the immediate initial postoperative NSD following the surgery and the presence of the PRF membrane did not prevent the initial postoperative symptoms. Also the results showed that the patients returned to almost normal (VAS 4) or completely normal sensation (VAS 5) at 6 months postoperatively which indicate that the PRF membrane has no significant effect on decreasing the period of nerve healing.

The results of the current study are in contrast to the results of many experimental and clinical studies which showed that the PRF membrane can promote the histological and the functional recovery of the nerve healing.

The experimental study on segmental defect of the sciatic nerve of rats by Roth *et al.*, showed that PRF produce outcomes similar to the autogenous graft regarding functional recovery, and advocated the use of vein conduits filled with PRF as a favourable alternative treatment to nerve grafts. [16]

Also the experimental study by Torul *et al.*, on the Crush-type injury model on the sciatic nerves of rats, the results showed that PRF improved the functional recovery and axonal regeneration. [17]

The results of the current study are in agreement with the result of the experimental study by Senses *et al.*, on the sciatic nerve regeneration after segmental defect which concluded that PRF decreases functional recovery in sciatic nerve injury and histopathologic examination revealed that it may have negative effect on nerve regeneration. [18]

Also our results are in agreement with the study by which study the tubulisation effect of the PRF on the crush injury model. The results showed no improvement in the functional recovery of peripheral nerve crush injury model also there was no improvement of the axonal density. [19]

The results of the current study may be explained by that the PRF membrane tubulisation effect is not reliable and not effective as stated by Bayram et al., or because most of the studies which showed positive effects of the PRF membrane on nerve healing was related to actual nerve cutting which not resembling the injury type in the current study.

Conclusion: The results of this study showed that the PRF membrane has no significant effect on the immediate initial postoperative NSD following the surgery and the presence of the PRF membrane did not prevent the initial postoperative symptoms. Also the results showed that the patients returned to almost normal or normal sensation at 6 months postoperatively which indicate that the PRF membrane has no significant effect on decreasing the period of nerve healing.

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Semen Pathology in Infertile Men: Correlation between Abnormal Sperm Morphology with Motility and Count

Aiad Abdullah Abdulrazak

Assistant Professor of Pathology, Department of Pathology, Tikrit College of Medicine, University of Tikrit, Iraq

Abstract

Introduction: About 50% of infertility is attributed to male factor. Semen analysis is the cornerstone of the diagnosis, and treatment of male infertility. The quality of semen varies from country to country. The present study was undertaken to evaluate semen abnormality of infertile Iraqi men as compared to other countries and to determine whether these parameters are correlated to each other.

Patients and Method: The seminal fluid profile was classified according to the WHO manual (2010). Briefly, asthenozoospermia (i.e. progressive motility of spermatozoa below 32%), oligozoospermia (i.e. spermatozoa concentration below 15×10^6 per ml), teratozoospermia (i.e. morphologically normal spermatozoa below 4%), asthenoteratozoospermia, oligoasthenozoospermia, oligoasthenoteratozoospermia, oligoteratozoospermia, and azoospermia (absence of spermatozoa in the ejaculate)

Results: The most striking abnormality is the high percentage of patients withabnormally low morphology score (72.09%). The majority of cases have isolated abnormality (teratozoospermia; 48.84%). Asthenoteratozoospermia (ATZ) was found in 10.47% and oligoasthenozoospermia (OAZ) and oligoteratozoospermia (OTZ) in 8.14% of cases. The least common pattern was necroteratozoospermia (NTZ) and oligonecroteratozoospermia (ONTZ) 1% each. Azoospermia was encountered in 3.49% of cases.

Conclusion: Abnormalsperm morphology is the best indicator of infertility and teratozoosperma is the most common finding in abnormal spermiogram.

Keyword: *Semen parameters, sperm, morphology, motility, count.*

Introduction

More than 70 million couples suffer from infertility worldwide, the majority being residents of developing countries. Infertility is defined as the failure of a couple to conceive following 12 months of unprotected sexual intercourse. About 50% of infertility is attributed to male factor.[1]

The fertility potential of any male can be predicted through the evaluation of his semen, thus, Semen analysis is the cornerstone of the work up, diagnosis, and treatment of male infertility.[3] Male infertility is diagnosed in laboratory through descriptive semen analyses (count, motility, and morphology). Fertility is negatively affected if these parameters reduce to a level below a predictive threshold [2-4]

The quality of semen reportedly varies from country to country, suggesting the role of the geographic factors in male infertility. In order to establish evidence-based reference values for semen analysis, the World Health Organization (W.H.O) 2010 manual describes the values obtained in eight countries from 1953 men who became fathers with a time to pregnancy of <12 months. [5,6]

Regional differences in semen quality have been reported in the USA (Fisch et al.[7]), Europe (Jørgensen et al.[8,9]), Japan (Iwamoto et al. [10]), India (Adiga et al.[11]), China (Gao et al.[12]), and Tunisia (Feki et al).[13]

Corresponding Author:
Aiad Abdullah Abdulrazak
Assistant Professor of Pathology, Department of Pathology, Tikrit College of Medicine, University of Tikrit, Iraq
e-mail: aiadalkhalidi@gmail.com
Mobile: 00964-7710651794

The major causes of male infertility can be treatable and preventable. The root cause of this can be one or a combination of the following: low sperm concentration, poor sperm motility, or abnormal morphology. Therefore, understanding these conditions is foremost.[14] Examining the correlation between these parameters may help us understand the mechanism that controls these parameters.

The present study was undertaken to evaluate the pattern of anomalies in the semen of male partners of couples presenting with infertility, to determine whether these parameters were correlated to each other, and to determine the parameters that behave in a different or similar manner to currently reported figures worldwide.

Patients and Method

A retrospective study includes a total of 86 infertile men visiting a fertility clinic for the period from 15 October 2018-15 November 2018.

The medical records of infertile couples were reviewed and the data were retrieved. Information which was extracted from the records included semen analysis results (sperm count, volume, pH, viscosity, morphology, motility and vitality).

The seminal fluid profile was classified according to the WHO manual (2010). Briefly, asthenozoospermia (i.e. progressive motility of spermatozoa below 32%), oligozoospermia (i.e. spermatozoa concentration below 15×10^6 per ml), teratozoospermia (i.e. morphologically normal spermatozoa below 4%), asthenoteratozoospermia, oligoasthenozoospermia, oligoasthenoteratozoospermia, oligoteratozoospermia, and azoospermia (absence of spermatozoa in the ejaculate)[5]

Statistics: Correlation between some sperm parameters: count (millions/ml, total motility (%), Grade A motility (%) and normal sperm morphology (%) were assessed. The values were given as mean ±SD. The relation between the values was evaluated by correlation analysis. Medcalc® version 11.6.1 software and SSP (Smith statistical package) version 2.8 were used for the statistical analysis. The results were evaluated in 95% confidence interval and the statistical significance was defined as p<0.05

Results and Discussion

The incidence of male infertility differs significantly from one part of the world to another due to several underlying etiological factors, including social habits, genetic causes and environmental conditions such as underlying infections, chemicals, radiation, exposure to heat and frequency of intercourse.[26]

Although conventional semen analysis has been criticized as not a true test of sperm function based on its poor prediction of fertility when compared to more sophisticated tests such as sperm penetration, capacitation, acrosome reaction and, more recently, sperm chromatin structure assay (SCSA) for the detection of DNA integrity, [27] it provides clues to structural or hormonal dysfunction and it remains the basis of important decisions concerning appropriate treatment.[3]

Table (1) shows the mean and standard deviation of basic semen parameters (semen volume, sperm count, motility, and morphology). The dominant abnormality is the very low percentage of morphologically normal spermatozoa (2.03 ± 1.36).

We have found that the majority of cases have isolated abnormality (teratozoospermia; 48.84%). Asthenoteratozoospermia (ATZ) was found in 10.47% and oligoasthenozoospermia (OAZ) and oligoteratozoospermia (OTZ) in 8.14% of cases. The least common pattern was necroteratozoospermia (NTZ) and oligonecroteratozoospermia (ONTZ) 1% each. Azoospermia was encountered in 3.49% of cases.

Teratozoospermia is the most common single sperm abnormality (48.84) that could cause infertility in patients studied. This is in agree with Alenzi[28], Altken[29], and MacLeod [30], but much higher than figures reported in other studies Alesiea[19], Taha et al [21], Kumurga et al [22], Peter et al [23], Owolabi et al [24], Aulia et al [14], Karabulut et al [15], and Elhussein et al [25] .

The above discrepancy could be explained by the fact that each author has his specific way of defining abnormal spermatozoa. For the sperm morphology study and the classification of abnormal sperm forms we have followed the guide-lines of the W.H.O. Moreover, sperm morphology is affected by smearing technique, fixation, staining, mounting and the optics and the illumination used i.e. the quality of the microscope. Even the small artifacts [31]

Among the sperm characteristics, sperm morphology has usually played a key role in determining fertility potential.[32,33]

It has been well documented that morphology of spermatozoa used for injection is an indicator of the competence of sperm and therefore directly related to ICSI outcome including fertilization and pregnancy rates. [34]

Bartoov and colleagues introduced a new technique called motile sperm organelle morphology examination (MSOME).Combination of this technique with routine ICSI gave rise to a new technique called intracytoplasmic morphologically selected sperm injection (IMSI), which enabled the selection of morphologically 'perfect' sperm during microinjection. [35]

In our study, 22.09 % of patients have sperm count below the WHO2010 threshold (i.e., < 15 million/ml). Isolated sperm count reduction (oligospermia) was found in 2.33% of cases, in agreement with Taha et al [21], Alesiea[19], and AlEnizi[28], but less than figures reported by Peter [23], and Owolabi[24]. The total absence of spermatozoa in seminal fluid (azoospermia) was encountered in (3.49%) of cases, comparable with figures reported by Peter [23], and Owolabi[24], but much lower than figures reported by Razzak[36], Alesiea[19], Aulia[14], and Elhussein[25].Combined low sperm count with other abnormalities of seminal fluid was found in 19.76% of cases in accord with Razzak[36], but disagree with Alesiea[19], Peter [23] and Aulia[14].

The mean sperm count in our current study was 42.86 ± 33.24 that is above the WHO2010 threshold (i.e, 15 million/ml). This is in greement with Najam[17], Karabulut[15], Gowri[16], Alemanji[18], Alesiea[19], Feki[13], and Guzik[6], but disagree with Lackner[20].

The difference between present results and other researchers' reports is probably due to different exposure to the above risk factors and of course different genetic, racial and environmental backgrounds, Moreover, some cases of male infertility that were attributed to the low number of spermatozoa could be due the female factor[17].

About one fifth of our patients (20.93%) has low total sperm motility (i.e< 40%, WHO2010 threshold). The mean of percentages of Grade A (progressive motility) was 31.42 ± 14.8 which is slightly below the WHO2010 threshold (i.e., < 32%). Our results are comparable to Taha et al [21], Aulia[14], and Karabulut[15] but, lower than those reported by Alesiea[19] and Peter.[23]

This difference is due to the subjectively evaluated motility in some studies, which is overestimated by 15-20% compared with objectively assessedmotility.

Correlation coefficient and p values of the semen parameters including count (million/ml), total motility (%), Grade A motility (%), and normal morphology (%) rates with each other is shown in table 3. There is a statistically significant positive correlation of each semen parameter with other parameters. The strongest correlation observed was between total motility (%) and grade A (progressive) motility (%).

This is in agreement with Vaidya etal1996 who found a positive relationships between a falling sperm count, and decrease in motility and total motile counts. Also, they found that abnormal morphology increased with lower sperm counts.[37]

Hellstrom et al 2006 found that sperm motility and sperm morphology were associated with each other and with higher sperm concentrations. Total sperm count was positively correlated with semen volume, sperm concentration, sperm motility, and sperm morphology.[38] This in agreement with previous reports.[39,40]

- Our average of abnormal forms is higher as compared with those in other studies. This may be attributed to the way in which normal and abnormal spermatozoa are defined, which is specific to each author.

- Correlation between sperm concentration and percent of motility found by us is similar to that found by Rehan et al. [41]

In conclusion:Abnormalsperm morphology is the best indicator of infertility and teratozoosperma is the most common finding in abnormal spermiogram.

We hope that this study will inspire further studies that include larger number of patients recruited for longer period of time from multiple infertility clinics and preferably compared to fertile men.

Table 1; Basic semen parameters

Parameter	Mean ± SD
Semen volume (mL)	2.25 ± 0.96
Sperm count (million/mL)	42.86 ± 33.24
Total sperm motility (%)	40.32 ± 17.58
Grade A (progressive) sperm motility (%)	31.42 ± 14.8
Normal sperm morphology (%)	2.03 ± 1.36

Table 2: Seminal fluid abnormalities

Semen parameter	WHO 2010 threshold	Semen abnormality in this study			No; (%)		Total
Count	15 million/ml	Low sperm count	Isolated oligospermia		2 (2.33%)		19 (22.09%)
			Combined	OAZ	7 (8.14%)	17 (19.76%)	
				OATZ	2 (2.32%)		
				ONTZ	1 (1.16)		
				OTZ	7 (8.14%)		
			Azospermia		3 (3.49%)		-
Motility (total)	40%	Low sperm motility	Isolated asthenozoospermia		0		18 (20.93%)
			Combined	OAZ	7 (8.14%)	18 (20.93%)	
				OATZ	2 (2.32%)		
				ATZ	9 (10.47%)		
Morphology	4% (normal morphology)	Abnormal sperm morphology	Isolated teratozoospermia		42 (48.84%)		62 (72.09%)
			Combined	NTZ	1 (1.16%)	20 (23.25%)	
				OATZ	2 (2.32%)		
				ONTZ	1 (1.16)		
				OTZ	7 (8.14%)		
				ATZ	9 (10.47)		

AZ (azoospermia); NTZ (necroteratozoospermia); OAT (oligoasthenozoospermia); OATZ (oligoasthenozoospermia); ONTZ (oligonecroteratozoospermia); OTZ (oligoteratozoospermia; ATZ (asthrnoteratozoospermia); OZ (oligozoospermia; TZ (teratozoospermia

Table 3: Correlation between semen parameters

	Total motility (%)	Normal morphology (%)	Grade A motility (%)
Count (million/ml)	r = 0.3766 p = 0.0004	r = 0.4401 P < 0.0001	r = 0.3390 P = 0.0014
Total motility (%)		r = 0.4196 P = 0.0001	r = 0.9176 P < 0.0001
Normal morphology (%)			r = 0.4338 P < 0.0001

Table 4: Comparison of semen parameters in different studies

Author	Country	No;	Age (year)	Mean Semen Volume (ml)	Mean sperm count x 10^6/ml	Motility %	Normal sperm Morphology %
Present study, 2020	Iraq	86	-	2.25±0.96	42.86±33.24	40.32±17.58	2.03±1.36
Karabulut et al[15] (2017)	Turkey	1404	-	-	78.67±81.39	66.1±19.85	2.3±2.46
Gowri et al[16] (2010)	Oman	67 (Primary infertility)	32.72±8.08	2.54±1.4	32.05±59.19	30.62±26.74	73.49
		31 (secondary infertility)	36.71±10.09	3.39±4.12	27.66±37.61	32.71±19.83	60.77
Najam[17] (2012)	Iraq	50	30.56±5.41	2.25±0.42	51.75±8.5	35±5.4	58.88±6.5
Alemanji et al [18] (2000)	Nigeria	100	100	2.26	57.05	62.02	65.2
Aleisa[19] (2012)	KSA	160	35.65±8.67	2.97±1.61	39.38±49.54	39.28±19.58	29
Adiga et al. [11] (2008)	India	1610	-	2.64	26.61	47.14	19.75
Guzick et al. [6] (2001)	USA	765	34.7±4.9	-	52±42	49±15	11±6
Lackner et al. [20] (2005)	Austria	7,780	31.6	-	10.25	21	15
Feki et al. [13] (2009)	Tunisia	2940	36.0±6.9	3.2±1.6	96.1±88.2	44.2±12.7	25.0±16.5

Table 5: Comparison of semen profile in different studies

Study	Country	Oligozoospermia (%)	Asthenospermia (%)	Oligoasthenospermia (%)	Teratozoospermia (%)	Azoospermia (%)
Present study, 2020	Iraq	2.33	-	8.14	48.84	3.49
Alesiea, [19] (2012)	Saudi Arabia	5.7	35.5	21.5	-	26
Taha et al, [21] (2011)	Iraq	1.35	10.81	2.16	2.43	11.62
Kumurya et al,[22] (2018)	Nigeria	11.7	52.3	10.8	55	14.4
Peter et al, [23] (2016)	Nigeria	34.9	26.6	14.2	6.5	3.5
Owolabi et al, [24] (2013)	Nigeria	25.6	11.5	3.2	18.5	6.2
Aulia et al, [14] (2017)	Indonesia	39.7	5.9	17.8	2.6	24.4
Karabulut et al, [15] (2017)	Turkey	14.3	13.4	9.4	9.1	-
Elhussein et al,[25] (2019)	Sudan	15.85	17.96	-	5.28	26.41

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Impact of Age and Residence on Ideal Body Image of Manipuri Women

Keisam Nomita[1], MC Arun[2]

[1]Research Scholar, [2]Professor, Department of Anthropology, Manipur University, Canchipur, Imphal, Manipur

Abstract

Background: The people have been bestowing importance on body shape and its mould of beauty from the ancient times. However, it varies within and between societies according to their perceptions, socio-cultural milieus, biological and mental predispositions, environmental causes, etc. Such human fancy on their ideal body image is still being differed between sexes, person to person, urban to rural, young to old, etc.

Aims and Objective: To identify the impact of age and residence of women on their ideal body image in terms of multidimensional body-self relation scores of Manipuri women, India.

Method: The present study is based on a primary sample of 388 Manipuri women and its size was estimated on the prior information i.e.,mean±SD = 2.67±26.81 of body image with an allowable error of 2.7 at 95% degree of precision. A well-validated Multidimensional Body-Self Relations Questionnaire (MBSRQ), developed by Brown A, Cash, Mikulka (1990) is administered as tool of the study and its scores are ascribed by the two important predictor's viz., age and residence.

Results: It is found that all the means of multidimensional body-self relation scores are very highly significantly varied (P< 0.01) over the four age groups except for health evaluation scores (P=0.057). Urban women have better scores in nine body-self relation (appearance evaluation score, appearance orientation score, fitness evaluation score, fitness orientation score, health orientation score, illness orientation score, BASS score, self-classified score, and perceived dating partner score) out of the ten relations considered than that of their counterpart rural women while it is just reverse in health evaluation score.

Conclusion: The result highlights that age of the woman as well as her residence have definitely certain role towards the regulation of their multidimensional body-self relations.

Keywords: *Body image, Multidimensional body-self relation scores, Age, Residence.*

Introduction

Throughout history societies have focused on beauty and body shape.[1] In past researchers have studied the social and cultural factors that contribute to the formation of an ideal body image. Many researchers[1] agreed that western society has created and apostle of thin ideal body image. Thin ideal body image is often appeared in beauty and fashion magazines, in mass media and television shows, on internet sites, etc., in modern times. Indeed, body image is a person's perception of the aesthetics or sexual attractiveness of their own body.[2] It consists of mainly two components: body image evaluation (comprises the evaluative thoughts and beliefs that an individual may have about

his or her appearance and body satisfaction), and body image investment (extent to which an individual focuses on his or her physical appearance and engages in body-altering behaviours).[2]

Body image has received increasing empirical and clinical attention[3,4] in part because of the high prevalence of body-image concerns especially among females in Western societies.[5,6] A negative body image can result in adverse psychosocial consequences for both sexes, including disordered eating,[7] social anxiety,[8] impaired sexual functioning,[9] poor self-esteem,[10]and diminished quality of life[11]. Quite a number of researchers equates these terms with "body or body-image dissatisfaction" including any displeasure with one or more aspects of

one's body or one's overall physical attractiveness. On the other hand, especially female adolescents are more conscious to control the weight through dieting by doing rigorous physical exercise or by undergoing cosmetic treatment or surgery to enhance look and to improve self-esteem and self-acceptance. Thus the thin ideal is becoming a trend as it is mostly associated with happiness, success, youthfulness and social acceptability to overall improvement of their personal appearance. With the increase exposition in better environments like better standard of living, better expose in social media, availability of cosmetic surgery clinics and gyms facility, women feel societal pressure to fit the mould of beautiful and often feel insecure thus leading to low self-esteem, eating disorder, mental health problems and depression.

Such human fancy on their ideal body image is not exception in our country, India in general and Manipuri in particular. In Manipur, the body image is emerging a social issue, to some extent, as it is one of the most common and debilitating clinical problems encountered by adolescent and young women of Manipur as the society promotes and accepts the idea of ideal body image. Since body image is becoming an important aspect for women it turns out to be a nagging problem in the society as it is attributed with psychologically, biologically, and social milieu. Even though the task encompasses a lot of scientific explorations, no work has so far been taken up in this tiny state of Northeast of India. Hence forth the crux of the article is to investigate the perception of Manipuri women on their ideal body image based on only two important parameters viz., age and residence of them.

Materials and Methiod

The present study is based on a primary sample of 388 Manipuri females, encompasses 202 urban dwellers and 186 rural dwellers, who are within the age range of 15 to 55 years. The sample size is estimated on the prior information i.e., mean±SD = 2.67±26.81 of body image with an allowable error of 2.7 at 95% degree of precision. *Purposive Sampling* and hospital based *Cross-sectional Study* are adopted as the sampling technique and the type of study respectively. A well-validated Multidimensional Body-Self Relations Questionnaire (MBSRQ), developed by Brown A, Cash, Mikulka (1990) is administered as tool of the study. It consists of 10 subscales: appearance evaluation, appearance orientation, fitness orientation scale, fitness evaluation scale, health orientation scale, health evaluation scale, illness orientation scale, body area satisfaction scale, self-classified weight, and overweight preoccupation. The study subjects are those Manipuri women (both married and unmarried) from rural and urban areas of Manipur. As a survey technique, *Personal Interview Method* was administered, during 2017-2018., considering only those who have given their written consent.

After thorough scrutiny and diagnosing the data, statistical analysis was performed by using SPSS Statistics Version 21. For the comparison of two means scores for every subscale, *Independence Sample t-test*, commonly known as *unpaired t-test* is used while the comparison of more than two means scores, *ANOVA (Analysis of Variance)*, commonly known as *F-test* is applied. All comparisons are two-sided and the P-values < 0.05, < 0.01 and < 0.001 are taken as the cut off values for significant, highly significant and very highly significant respectively.

Results

There are 202 urban and 186 rural women considered in the present study, and maximum (42.5%) of them are within the age range of 26-35 years which is followed by 25.3% within the range of 16-25 years; 17.5% within 36-45 years; and least women (14.7%) pertains to the age range of 46-55 years.

Table 1: Mean±SD of multidimensional body-self relation scores with respect to age

Scores	Mean±SD					F-value	P-value
	16-25 yr. (98)	26-35 yr. (165)	36-45 yr. (68)	46-55 yr. (57)	Total (388)		
Appearance Evaluation	4.65±.75	4.90±.43	5.22±.40	4.66±.39	4.86±.56	19.108	<.001
Appearance Orientation	5.53±.57	5.25±.51	5.31±.25	5.11±.32	5.31±.49	11.420	<.001
Fitness Evaluation	5.42±.60	5.23±.67	5.75±.87	5.84±.56	5.46±.72	16.262	<.001
Fitness Orientation	6.10±.30	6.03±.22	5.90±.07	5.83±.20	6.00±.24	22.146	<.001

Scores	Mean±SD					F-value	P-value
	16-25 yr. (98)	26-35 yr. (165)	36-45 yr. (68)	46-55 yr. (57)	Total (388)		
Health Evaluation	6.30±.84	6.12±.37	6.16±.23	6.20±.32	6.18±.51	2.535	.057
Health Orientation	4.87±.46	5.00±.58	5.07±.29	4.72±.54	4.94±.52	6.237	<.001
Illness Orientation	6.16±1.02	5.93±.75	6.42±.75	6.17±.91	6.11±.86	5.765	.001
BASS	2.87±.51	2.91±.70	3.09±.51	2.77±.22	2.91±.58	3.333	.020
Self-Classified	2.92±1.19	2.98±.75	3.65±.65	3.39±1.34	3.14±1.00	10.594	<.001
Overweight Pre-occupation	2.55±.73	2.60±.81	2.95±.48	2.94±.74	2.70±.75	6.918	<.001

SD: standard deviation; F (variance ratio); df: degree of freedom; P-value: probability due to chance factor

As the highest (5.22) and the lowest (4.65) mean appearance evaluation score belong to those women of age groups of 36-45 years and 16-25 years respectively, that imply those who are in the age group of 36-45 years feel mostly positive and satisfied with their appearance whilst those who are in the age group of 16-25 years feel generally unhappiness with their physical appearance. For the appearance orientation score the highest (5.53) and the lowest (5.11) belong to the age groups of 16-25 years and 46-55 years respectively which means those who are in 16-25 years bestow more importance on how they look, pay attention to their appearance, and engage in extensive grooming behaviours while those who are in 46-45 years feel apathetic about their appearance, no importance to their looks, and no much effort to look good. Again, for the fitness evaluation score the highest mean scores (5.84) and the lowest scores (5.42) are found to be in the age groups of 46-55 years and 16-25 years correspondingly which further means those who are in 46-55 years regard themselves as physically fit in shape, or athletically active and competent, and they value fitness and more actively involved in activities to enhance or maintain their fitness, nevertheless those who are in 16-25 years believe themselves physically unfit, out of shape or athletically unskilled, don't value physical fitness and don't regularly incorporate exercise activities into their lifestyle. In case of the fitness orientation score the highest mean (6.10) and the lowest mean (5.83) go to the age groups of 16-25 years and 46-55 years respectively which specify the women of the age 16-45 years have value fitness and actively involved in activities to enhance or maintain their fitness and the women of the age 46-55 years don't value on physical fitness and don't regularly incorporate exercise activities into their lifestyle; and yet again, for the health evaluation score the highest mean (6.30) pertains to the age group of 16-25 years that means those who are in the age group have an opinion that their bodies are in good health while the lowest mean (6.12) is in the age group of 26-35 years indicates that those who are in the age group feel unhealthy and experience bodily symptoms of illness or vulnerability to illness. Similarly, the highest mean (5.07) for health orientation score is found to exist amongst those in the age group of 36-45 years which indicates they are health conscious and try to lead a healthy lifestyle while the lowest mean (4.72) is witnessed to exist in those who are in 46-55 years and they are more apathetic about their health correspondingly. And for illness orientation score the highest mean (6.42) belongs to the age group of 36-45 years which point to that this age group are alert to personal symptoms of physical illness and are apt to seek medical attention and those who within 26-35 years are not especially alert or reactive the physical symptoms of illness as the group has the lowest mean (5.93). Yet again, the age groups 36-45 years and 46-55 years maintained the highest and the lowest means of BASS scores i.e., 3.09 and 2.77 respectively and consequently the former indicates that who are in the age group are generally content with most areas of their body and the latter demonstrates that who are in the age group (46-55) are unhappy with the size or appearance of several areas. In the same way, the age groups 36-45 years and 16-25 years maintained highest mean (3.65) and lowest mean (2.92) of self-classified score respectively which indicate that the women of 36-45 years have better reflection on fat anxiety, weight vigilance, dieting, and eating restraint than that of those women of the age group 16-25 years. As same age group as the above i.e., age groups 36-45 years and 16-25 years uphold highest mean (2.95) and lowest mean (2.55) of overweight pre-occupation score which highlight that the women of the former group perceives and labels their

weight as underweight whilst the women of the latter age group perceives and labels their weight as overweight.

Further, F- test values with (3, 384) degree of freedom (df) each suggest that all the means of multidimensional body-self relation scores are very highly significantly varied (P< 0.01) over the four age groups except health evaluation score which is not significant (P=0.057). Again, BASS score which is also found to be varied significantly as its P-value is less than 0.05.

Table 2: Mean±SD of multidimensional body-self relation scores with respect to residence

Scores	Mean±SD			t-value	P-value
	Urban (202)	Rural (186)	Total (388)		
Appearance Evaluation	4.94±.54	4.77±.56	4.86±.56	3.031	.003
Appearance Orientation	5.37 ±.45	5.24 ±.51	5.34±.49	2.659	.008
Fitness Evaluation	5.52±.73	5.39±.70	5.46±.72	1.713	.088
Fitness Orientation	6.03±.25	5.96±.23	6.00±.24	2.725	.007
Health Evaluation	6.13±.58	6.24±.42	6.17±.54	-2.105	.036
Health Orientation	4.98±.48	4.89±.56	4.94±.52	1.648	.100
Illness Orientation	6.25±.78	5.96±.93	6.11±.86	3.310	.001
BASS	3.03±.53	2.78±.61	2.91±.58	4.343	<.001
Self-Classified	3.28±.95	2.99±1.04	3.14±1.00	2.857	.005
Overweight Pre-occupation	2.70±.86	2.70±.60	2.70±.75	-.082	.935

SD: standard deviation; t-value: independent samples t-test value; df: degree of freedom; P-value: probability due to chance factor

When multidimensional body-self relation scores is analysed with respect to residence of the woman, the scores of the eighth sub-scales viz., appearance evaluation score, appearance orientation score, fitness evaluation score, fitness orientation score, health orientation score, illness orientation score, bass score, and self-classified score are found higher in urban woman than that of her rural counterpart whilst for the health evaluation score the pattern is quite reverse. Besides, in case of the subscale of overweight pre-occupation score, both the urban and the rural dwellers have same mean score i.e., 2.70 each. Further t-test is applied to compare the variations between the two means, one for urban and another for rural, within eachsubscale with 386df.

Out of the 10 scores considered, seven are found to be significant statistically and the remaining 3 are insignificant even at 5% probability level. The significant score consists of appearance evaluation score, appearance orientation score, fitness orientation score, health evaluation score, illness orientation score, BASS score and self-classified score, while insignificant score comprises fitness evaluation score, health orientation score and overweight pre-occupation score. The overall findings recommend that urban women have better score

in appearance evaluation score, appearance orientation score, fitness evaluation score, fitness orientation score, health orientation score, illness orientation score, BASS score and self-classified score than that of their rural counterpart. On the contrary rural women have better score in health evaluation score than that of their counterpart urban women. In case of overweight pre-occupation score the means for urban and rural are found to be the same.

In other words, it might demonstrate that urban women feel mostly positive and satisfy with their appearance and give more importance on how they look, pay attention to their appearance, and engage in extensive grooming behaviours, regard themselves as physically fit in shape, or athletically active and competent, value fitness and actively involved in activities to enhance or maintain their fitness, value fitness and actively involved in activities to enhance or maintain their fitness, health conscious and try to lead a healthy lifestyle, alert to personal symptoms of physical illness and apt to seek medical attention, content with most areas of their body, one perceives and labels one's weight from very underweight. While rural women feel, their bodies are in good health but both urban and rural women are

preoccupied with fat anxiety, weight vigilance, dieting, and eating restraint.

Discussion

The results demonstrate that age of the woman has definitely certain role towards the regulation of her multidimensional body-self relation which is in agreement with the findings of the many scholars in the pasts.[12] In fact, body image is frequently shaped during late childhood and adolescence but body dissatisfaction can affect people of all ages but it is more prevalent in midlife, as young adulthood, of women.[13] As children enter adolescence, numerous developmental factors converge to shape individuals' perceptions of their physical personae. Rapid physical change in association with puberty, increased cognitive capacities, identity formation-processes, and onset of romantic and sexual interests further strengthen role played by physical appearance for individuals' self-perceptions. Consequently, a range of studies show that adolescence represents a stressful period in terms of these perceptions, and it has been reported that both girls and boys report exacerbated concern over their bodies during this time.[14] Girls, however, are particularly likely to develop body image concerns as they enter adolescence .[15] However, body image concerns become more evident as children grow older and move into adolescence.[16]

The perception and craving of the individuals particularly women on ideal body image is certainly link with their ageing process. Perhaps, it may be due to the strong association of body image with age as it develops throughout the lifespan because of individual experience, cultural norms and cues, physical appearance and changes in the body, and relationships with other parameters like maintaining beauty and youthfulness.[17] On average, older adults report feeling younger than their actual age[18,19, 20] and feeling younger than one's chronological age and feelings of satisfaction about age are thought to be positive reflections of the aging process.[21,22]

The outcomes of the current study on the association between body image and residence, reveal that the superior scores of multidimensional body-self relations being attributed with urban women than that of their rural counterpart. This is because urban women are having better chance to expose themselves in several confounding factors like congenital environment leading to better education and standard of living,

better expose in mass media, availability of cosmetic surgery and gyms facility, etc. Besides, they are often involved in various dietary activities to reduce body weight and they are more conscious for their body image. Even in India's society, where adolescents are more conscious for their body weight and body image in urban area due to high cultural reforms.[23] The reason for this could be that women in urban areas likely to be exposed to foreign images and ideals of thinness through in magazines and advertisements, on television and internet, etc.[24] Besides, in urban metropolitan cities many slimming clubs and gyms have sprung up and the clientele consist mostly of the rich and affluent families. The quest for slenderness seems to be stronger among young independent urban women.[25]

Conclusion

Concerns about body image it prevails in the society since decades. The socio-demographic, culture and tradition, social media, families, and peers have bombarded women regarding their acceptable beauty standards; and they might be feeling better about their body image than previous generations. Along these very sensitive human perceptions and insightful trend an effort is made in the present study on the impact of two important socio-demographic parameters – age and residence – of Manipuri women on their ideal body image using MBSRQ. The results reaffirm that age of the woman has significant role towards the regulation of her multidimensional body-self relation. It might be due to a strong association between long cherish aspiration of ideal body image along with the advancement of age. Indeed, woman usually wishes to maintain her beauty and youthfulness throughout her lifespan which is influenced by metal predispositions, cultural norms and cues, physiological changes, etc. At the same time, urban woman has higher scores of multidimensional body-self relations than that of their rural counterpart. This is owing to the fact that urban woman has time and again exposed in better environments like better education and standard of living, better expose in social media, availability of cosmetic treatment clinics and gyms facility, so and so forth. In brief, ideal body image of a woman is significantly inclined by her age as well as her residence i.e., urban or rural. The results arrived might be quite interesting and fascinating ones which may further feel the long gap information on the women's ideal body image of Manipur, a tiny state of Northeast India.

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The Risk Factors and Prediction Models of Preterm Birth: An Update Systematic Literature Review

Fika Minata Wathan[1], Kemal N. Siregar[2]

[1]Researcher, Faculty of Public Health, Universitas Indonesia, [2]Scientist, Departement of Biostatistics and Population Studies, Faculty of Public Health,Universitas Indonesia

Abstract

Background: Every year there is an increase in preterm births in the world, and for this condition, Indonesia occupies the highest position in ASEAN, with 15.5% of live births. The purpose of this study is to find for risk factors and prediction models to detect preterm birth.

Method: This study is conducted in multistage process following PRISMA guidelines with the inclusion criteria as follow, a) search for academic journals in the online database of ProQuest, Ebsco, PubMed, SpringerLink and Science Direct, b) publications in the last 10 years (2009-2019), c) articles in English, and d) the article contains outcome in the form of risk factors and prediction models for preterm birth e) the population is pregnant women suspected of having risk factors for preterm birth.

Results: From the 1767 articles found in 5 online databases, only 16 articles fall into the PICOS categories and are discussed in this paper. This study identified some of the most dominant risk factors for the incidence of preterm birth, including demographic and socioeconomic, behavioral characteristics/life style, maternal health/chronic conditions, current fetal conditions/pregnancy characteristics, pregnancy history/genetic characteristics, biological characteristics and others. This study concludes that maternal age and previous preterm birth are the factors that always used by the researchers. For the prediction of preterm birth, many researchers include cervical length as a predictor.

Conclusions: Previous researches were more still focused on risk factors and not much about prediction models. Therefore, this study suggests that the upcoming research should put more emphasis on risk prediction model for detecting preterm birth.

Keywords: *Preterm Birth, Preterm Delivery, Risk Factors, Determinant, Prediction Model.*

Introduction

Preterm birth is the main cause of morbidity and mortality during the perinatal period and an important problem to be solved[1][2][3]. This indicates that every year preterm birth continues to increase and affect the Infant Mortality Rate. About one-fifth of babies born under 32 weeks cannot survive in the first year compared

Corresponding Author:
Fika Minata Wathan
Researcher, Faculty of Public Health, Universitas Indonesia
e-mail: fikafkunsri07@gmail.com

to 1% of babies born at 33-36 weeks of age [4][5] and only about 0.3% of infant deaths if they are born at term. In order to achieve the new global targets for neonatal mortality of less than 10 deaths per 1000 live births by 2035[6][7].

At the world level the number of preterm births is estimated at 15 million each year, with an average in 65 countries experiencing an increase from 7.5% preterm births to 8.6%[8][9]. The incidence of preterm birth is different in each country. In developed countries, for example, the figure ranges from 5 to 11% in Europe, Australia 7% and the United States around 12%. The situation is worse in developing countries, for example in Sudan 31%, India 30%, and South Africa 15%, Uganda 13, 6%[7][9].

In the ASEAN level, Indonesia occupies the highest number of preterm birth, followed by the Philippines 14.9%, Myanmar 12.4% and Malaysia 10%. In 1983 the incidence of preterm in Indonesia was 18.5%, then dropped in 1995 to 14.2%. In 2009, preterm births in Indonesia ranged from 10-20% [9][10]. One year after, the figure was at 15.5% which made Indonesia ranked 9th highest out of 184 countries in the world. Indonesia is also ranked 7th out of 10 countries with a high number of premature infant mortality with 25,800 deaths[11][12].

The main reason of the high incidence of preterm birth could be due to lack of knowledge about antenatal factors that contribute to the incidence of preterm birth; the number of factors causing preterm birth; unclear pathophysiology, inadequate diagnostic facilities, and lack of knowledge about preterm birth prevention [13][14]. Various studies have been conducted to look for risk factors for preterm birth, but the presence of these risk factors does not always lead to preterm birth, even some preterm births that occur spontaneously do not have clear risk factors.

Indonesia needs to seriously handle the case of preterm birth since this issue will have a large and significant impact on health costs, both directly and indirectly[15][9]. The direct impacts of preterm birth include the depletion of health, financial, emotional and psychological resources for parents[10][16], whereas the indirect impact comprises of the burden on the community for long-term care for the sequelae of prematurity and mothers who experience preterm births and have premature babies must be unemployed due to loss of work due to having to care for their children[16][12][15].

Against this backdrop, this study aims to look for what has been studied and what has not been done about this topic by accessing 5 digital libraries in a period of 10 years. The results of this research will be utilized as a foundation to develop a prediction model of preterm birth with the basis of risk factor.

Method

This study used Systematic Literature Review, which was conducted in a multistage process following PRISMA guidelines, to identify all risk factors to predict the occurrence of preterm birth among pregnant women.

The inclusion criteria that used in this study are as follow, a) academic journals that searched on ProQuest, Ebsco, PubMed, SpringerLink and Science Direct online databases, b) publications in the last 10 years (2009-2019), c) English-language articles, d) articles containing outcome risk factors and prediction model of preterm birth, e) the population is pregnant women who are suspected of having risk factors for preterm birth. To search the related articles according to inclusion criteria, this study used some keywords, namely Preterm Birth OR Preterm Delivery AND Risk Factors OR Determinant AND Prediction Model AND Accuracy. From this process, there are 1,767 matched articles, consist of Proquest 474 articles, Ebsco 212 articles, Pubmed 16 articles, Springer 265 articles and Science Direct 800 articles.

References that have been found in line with the keywords are managed using Mendeley software. Since one article can be sourced from different database, a duplicate check needs to be performed afterwards, according to PICOS. After removing 60 duplicates and 1689 article that does not match with PICOS, it has resulted 18 articles. At the last stage, there are 2 additional articles that were excluded, thus the number of articles that match with the requirements are 16.

At the included stage, the selected articles are extracted and analyzed to obtain information: author, year of publication, data collection period, country, sample size, sampling method, data set used and research outcome. Data analysis is carried out thematically and arranged in accordance with the analysis of the theme and written narrative.

Results

Characteristics of Articles: For the past 10 years (2009-2019), there are 16 research articles that have been conducted on risk factors of preterm birth and prediction model. This systematic literature review limits access to academic journal searches to the ProQuest, Ebsco, PubMed, SpringerLink, Science Direct online databases and does not access other databases or gray material articles. Therefore, there are opportunities for risk factor service articles and prediction models for preterm births from other databases or gray materials but cannot be obtained from these online databases.

The latest article was published in 2019 while the oldest one was published in 2009. All of the study was conducted during the period of 2004 until 2017, in which most of them were conducted in the last five years.

In the context of geographical spread, the previous studies have covered all continents, including Sao Luis and Ribeirao Preto (two Brazilian cities)[1]; A French Caribbean (Guadeloupe) [17]; Auckland, New Zealand, and Adelaide, Australia [18]; Messina, Italia[19]; Kampala, Uganda [20]; Nairobi, Kenya [4]; Beijing, China[3]; Finland; Brazilian [5]; Sanandaj, Iran [21]; Lagos, Nigeria[22]; Eastern Slovakia [2]; Hubei Province, China [8]; Cuiaba, MT.[23]

Moreover, in terms of methodology, the selected articles used either cohort, cross-sectional or case-control. The numbers of research samples are varied from 296 up until 3,994,872 with a variation sampling method.

The Most Common Risk Factors: Predominantly, the risk factors of preterm birth are classified into several categories: demographic and socioeconomic, behavioral characteristics/life style, maternal health/ chronic conditions, fetal current conditions/pregnancy characteristics, pregnancy history/genetic characteristics, biological characteristics and others [26][27][28].

Firstly, demographic and socioeconomic category, which consists of maternal age [20][19][4][21], race/ethnicity[1][18][29], educational status [19][2][29], maternal status and socioeconomic status [20][17][22][30]. Specifically, the variables of this category cover the gestational age below 20 years or above 35 years, low maternal education, the status of women (married or divorced), and low socioeconomic status. These factors have been empirically proven to cause preterm birth 3x compared to those aged over 20 years old or under 35 years of education good (above high school or earned a degree), the mother who has support from family and socioeconomic status.

Secondly, behavioral characteristics/ life style category, which consists of alcohol[2][19][3][4], tobacco[2][31][20][5], recreational drugs[1][18][19], psychological and social stress [1][21][5][3]. Apart from it, there is one article that mentions the use of hormonal fertility treatment (excluding Clomiphene) and one article that said fertility-enhancing drug status can lead to preterm birth. However, the article is not explaining enough (name) that drugs can be the risk factors for preterm birth.

Thirdly, maternal health/chronic conditions category, which also become one of the most dominant factors that can cause of preterm birth. This category consists of Body Mass Index (BMI) [17][3][18], diabetes[17][3], hypertension [17][18][21], anemia [5], asthma [17] and thyroid disease. According to Body Mass Index (BMI), overweight or obese is one of the most frequent cause of preterm birth compared to those who have a normoweight BMI, while those who have underweight can cause low birth for their babies (LBW).

Fourth, current fetal condition/pregnancy characteristics category, which consists of multiple fetuses, infertility treatments, infant weight, and drugs used during pregnancy[18]. The discusses the use of marijuana pre-pregnancy which can lead to preterm births 16% compared with those who did not consume[31].

Fifth, pregnancy history/genetic characteristics category, which comprises of previous preterm birth[17][19][3][18][31], diabetes[17][19][3][18], hypertension [17][19][21][22], and obesity[17][3]. According to the articles, this category is also one of the most influential factors that causes of preterm birth.

Sixth, biological characteristics category, that consists of infection. The discussed variables in this category include bacterial vaginosis[1][19][4], urinary tract infection[1][17][19][4], and periodontis[1]. From all infections, urinary tract is an the most significant infection that highly associated with the risk of spontaneous preterm birth.

Lastly, other factors, that includes ultrasonography[20][22][2], insurance details, and cervical measurement[4][18][31][21]. The most discussed factor is obstetric maternal and prenatal care (ANC), where it is mentioned in four articles as factors associated with preterm birth.

Prediction Models: From the 16 selected articles, only 6 of them discusses the prediction models of preterm birth. The model explains that clinical prediction is looking directly at risk factors for preterm births, including psychosocial, genetic, infectious mechanism, history of preterm birth, short stature, living in rural areas, those who do not attend antenatal care, marital status, occupation, residential accommodation with shared sanitation facilities, absence of previous cesarian section, hypertensive disorders and antepartum hemorrhage as the predictor. Another predictor mentioned about cervical length and uterine artery examination of Doppler ultrasound measurement at 20 weeks. The prediction model works by looking at the value of the odd ratio, as well as the sensitivity and

specificity values seen from the value of the Receiver Operating Characteristic (ROC) curve and the Area Under Curve (AUC). The value used as a benchmark for measuring effective AUC and ROC is above 0.7[18][31].

Discussions

Characteristics of Articles: Publications about preterm birth are still very focused on risk factors. There are not many articles that discuss prediction models and the importance of research like this to develop efforts to prevent premature birth. Geographically, the results of research on preterm birth have been discussed on all continents, including America (A Fench Caribbean (Guadeloupe); Sao Luis and Ribeirao Preto; Cuiaba MT; and the United States), Europe (Messina, Italy; Finland; Eastern Slovakia), Australia (Auckland, New Zealand, Adelaide, Australia), Africa (Kampala, Uganda; Nairobi, Kenya; Langos, Nigeria) and Asia (Beijing, China; Sanandaj, Iran; Hubei Province, China; Jordan). However, there are no articles originating from Indonesia, even though Indonesia is the number one country in ASEAN and the ninth in the world with the highest premature birth rate.

The Most Common Risk Factors: From the 16 articles discussing risk factors, only 6 discussed the model predictions. Most articles only discuss risk factorsand have not discussed much about the use of these risk factors to build a model that can predict well premature births. Modeling that is able to predict well is very important as an effort to prevent neonatal deaths caused by preterm birth. As one of the countries with a high number of preterm births, Indonesia must have a number of studies relating to risk factors and even more so regarding the development of predictive models for preterm birth.

Factors related to preterm birth include mother's own prematurity, history of previous labor, prematurity in the first degree family members, history of dead children, premature rupture of membrane, multiple pregnancies, diabetes, hypertension, preeclampsia/eclampsia, infertility and cervical incompetence had significant relationship with preterm birth. However, in the result, he emphasised that only abnormal amniotic fluid, premature rupture of membrane (PROM), multiple pregnancies, hypertension, family history of premature birth, mothers age over 35 years and cervical incompetence have significant relationship with the preterm birth, thus some of these factors are not related to the cause of preterm birth.

Prediction Models: The results of Systematic Literature Review mention that of 16 articles, six of them discuss predictor of preterm birth. Prediction herein is not necessarily a screening test because there is no routine screening test yet for preterm birth, which separate from the history to look for risk factors such as history of a previous preterm birth. Correct prediction will provide an opportunity to intervene effectively.

One article mentioned that the reason behind the selection of psychosocial, genetic and infectious mechanisms are because of the indications that they play an expressive role in determining of preterm birth. Risk factors have been tested individually, with few protocols have been proposed like the present one, in which the factors are investigated using an integrated multidisciplinary approach and a hierarchical modeling based on data samples with contrasting socioeconomic profiles. Data will be analyzed by multiple binary logistic regression with the estimation of the odds ratio [28].

Nevertheless, all the results of research on preterm birth, either clinically or using physical and biological parameters, can only predict the occurrence of preterm birth until seven days after the examination before 37 weeks' gestation. However, to have predictability in preterm birth, doctors could intervene at the early stage thus the premature infants will be born better.

Conclusions

There are number of risk factors for preterm birth, where each researcher has a different set of risk factors. However, researchers basically have a group of risk factors, which include the following factors: demographic and socioeconomic, behavioral/lifestyle characteristics, maternal health/chronic conditions, current fetal condition/pregnancy characteristics, pregnancy history/genetic characteristics, and biological characteristics. Among all these risk factors, maternal age and previous history of preterm birth are factors that are always used by researchers.

To make predictions about preterm birth, many researchers include the length of the cervix as a predictor, where the level of accuracy obtained has reached 0.7. In the last 10 (ten) years, the number of research publications on prediction models based on risk factors for preterm birth is still limited. Rarely, research articles discuss at the same time about risk factors and models

that can predict premature birth. This study recommends that future research put more emphasis on risk prediction models for detecting preterm birth.

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Effect of Different Types of Occlusion on the Supporting Structures of Mandibular Overdenture Retained by Two Splinted Mini-Implants

Dawlat El Azab El Azab[1], Marwa Ezzat Sabet[2], Hebat Allah Tarek Mohamed[2]

[1]*Dental Director at Ministry of Health and Population of Egypt, Master Degree in Oral and Maxillofacial Prosthodontics,* [2]*Oral and Maxillofacial Prosthodontics Department, Faculty of Dentistry, Ain Shams University*

Abstract

Objective: To evaluate and compare the effect of lingualized occlusion and monoplane occlusion on the peri-implant bone level of mandibular overdenture retained by two splinted mini-implants using Cone Beam Computed Tomography(CBCT).

Methodology: Fourteen completely edentulous patients were divided randomly into two equal groups: Group I received splinted Mini-implant retaining mandibular overdentures with their occlusal scheme set according to the lingualized concept.Group II received splinted Mini-implant retaining mandibular overdentures with their occlusal scheme set according to the monoplane concept. The peri-implant marginal bone loss was evaluated at zero, six and twelve months from the time of loading using CBCT.

Findings: The crestal bone loss around mini-implants in Monoplane group is higher than Lingualized group with no significant difference.

Conclusion: In case of splinted mini-implants retaining mandibular overdenture,type of occlusion has no effect on the supporting structures.

Keywords: *Mandibular Overdenture - Mini-Implants-Occlusion.*

Introduction

Implant-retained overdentures are recommended for completely edentulous patients to create denture stability and to avoid problems with denture wearing as retention and satisfaction.[1]

Splinted mini-implants supporting a mandibular overdenture showed less marginal bone loss compared with nonsplinted mini-implants.[2]

Occlusion is one of the critical factors for implant longevity. [3]Two occlusal schemes were selected, the lingualized and the monoplane occlusion. These schemes decrease occlusal forces falling on the supporting structures, lingualized occlusion was considered as the choice for complete dentures as well as tooth supported overdentures. It provides mechanical freedom in centric which decrease horizontal (destructive) stresses and controls leverage induced by eccentric tooth contact.[4, 5]

Monoplane occlusion can adapt to the slight discrepancies between centric relation and centric occlusion that usually occur due to processing errors of the acrylic resin denture base and settling of the denture after wear. Elimination of cusps of posterior teeth decreases the horizontal forces transferred to the supporting structures. [4, 5]

Thus the objective was evaluation of peri-implant marginal bone loss of lingualized occlusion and

Corresponding Author:
Dawlat El Azab El Azab
Dental Director at Ministry of Health and Population of Egypt, Master Degree in Oral and Maxillofacial Prosthodontics
Phone No.: (+2) 01001888013
e-mail: dr.dawlat.elazab@gmail.com

monoplane occlusion in two splinted mini-implants retaining mandibular overdenture using CBCT.

Materials and Method

I-Patient Selection: Fourteen completely edentulous patients with age ranging between 50-65 years were selected randomly from the Outpatient Clinic, Faculty of Dentistry, Ain Shams University. Patients had residual bone and mucosa free from any pathological signs or bony undercuts with adequate interarch space and normal ridge relationship. The radiographic examination revealed adequate bone width and height in the interforaminal region to accept mini implants of 2.5mm diameters and 10mm lengths.

Patients were free from any systemic diseases that might affect healing, complicate surgical procedures or contribute to bone resorption. Patients with inadequate oral hygiene or with history of head and neck radiotherapy or chemotherapy were excluded.

All patients agreed to be a part of this study after being informed about the procedure and agreed to undergo a follow-up period for one year.

Grouping of the patients:

Patients were divided randomly into two equal groups (seven patients each): Both were rehabilited by a mucosa supported maxillary complete denture and mandibular overdenture retained by two splinted mini-implants with different occlusal schemes:

Group (I): Rehabilited with lingualized occlusion.

Group (II): Rehabilited with monoplane occlusion.

II-Complete Denture Construction: Primary alginate impressions were made then secondary impressions using zinc oxide-eugenol impression material to produce occlusion blocks.

For Group I Patients: A face bow record was made to mount the maxillary cast on a semi adjustable articulator.Centric occluding relation record was made to mount the mandibular cast in the correct vertical dimension following the check bite technique. Protrusive jaw relation record was used to adjust the horizontal condylar guidance of the articulator. The lateral condylar guidance was adjusted according to Hanau's formula (L= H/8+12).

Modified cross-linked acrylic teeth were arranged following the lingualized occlusion. Anterior teeth were arranged according to aesthetics, phonetics and lip support. Lingual cusps of mandibular posterior teeth were placed medial to the lines drawn from the tip of the canine to both sides of the retromolar pad. Mandibular posterior teeth were positioned with no transverse inclination. The interlocking transverse ridges of lower posterior teeth were removed. Compensating curve must be created in harmony with the incisal guidance anteriorly and the condylar guidance posteriorly. Maxillary posterior teeth were arranged with their lingual cusps occluding in the modified central fossae of the mandibular posterior teeth and the buccal cusps of maxillary posterior teeth were reduced about 1 mm to eliminate buccal cusp contact both in centric and working jaw positions.

For Group II Patients: A face bow record was made to mount the maxillary cast on a mean value articulator.Centric occluding relation was recorded at the predetermined vertical dimension of occlusion following the check bite technique. Upper and lower casts were mounted on mean value articulator.

Modified cross-linked acrylic teeth were used after flattening the cusps and arranged following the monoplane occlusion. Anterior teeth were arranged without any overlap. The teeth were flattened and arranged antroposteriorly so as to be parallel to the plane of the denture foundation. Mediolaterally,the teeth were positioned flat with no medial or lateral inclination. The lower second molar was kept out of occlusion to direct the forces to the bicuspid molar region.

For both groups, the waxed up dentures were then tried in the patient's mouth and then processed following the long curing cycle.

Laboratory remounting was carried out before finishing and polishing of the denture.Clinical remounting was done for final occlusal adjustments.

At the delivery appointment, final occlusal adjustment were done and dentures were delivered to the patients to get used to it and post insertion instructions were given to the patients.

Construction of surgical stent: Patient's lower denture was duplicated to produce radiographic stent. Estimation of bone width and height to reveal about 4mm width and 12mm height then the radiographic stent was converted to surgical stent by drilling channels in the planned mini-implant positions.

Surgical Procedures: Bilateral mental nerve block and Field block anesthesia were given.Crestal incision was done at the canine-premolar region and reflected. The surgical stent was seated in the patient's mouth, Initial penetration through the cortex of the bone was made by a Point Drill through the hole of the Surgical stent which represented the planned position of the implant. The pilot hole was widened with diameter 1.3 drill then with diameter 1.8 drill until a depth of 10mm was reached.

The screw- type square head (cement) mini implant was inserted to its full length with all the threads were placed into the bone using ratchet driver and torque ratchet wrench. The second mini-implant on the opposite side was placed with the same steps then the flaps were sutured.

The abutments of the square head mini-implants are marked at two different heights, the abutments of all patients were trimmed to the lowest mark as it allowed fixed abutment heights.

Steps of impression making for bar construction: Patients were recalled one week later. The plastic Transfer copings were placed over the abutments of the mini- implants in the patient mouth then rubber base impression was taken. Implant analogues were connected to the transfer copings in the impression material.

Steps of the Laboratory work for the construction of the bar: Stone cast was poured with implant analogue in its place representing the position of the mini-implants in patient's mouth.

Wax pattern copings were fabricated over the abutments of the implant analogue.

Prefabricated plastic pattern of the bar was trimmed to a suitable length to connect the copings.

The bar-coping pattern was removed from the abutments of the implant analogues and casted.

Steps of loading of the mini-implants: One week later, the bar was tried in the patient's mouth, any adjustments were done then it was cemented using Self –adhesive resin cement. The position of the bar was detected in the fitting surface of the lower denture and area marked by the bar removed using large round bur. The denture was inserted in the patient's mouth to ensure that it was fully seated. Two Plastic bar clips were attached to the bar. The undercuts were blocked out using a putty rubber base impression material**.**

Fig. (1): The clips were attached to the cemented bar.

The relieved denture must be tried again to ensure enough space for bar with the connected clips and the rubber base impression material which blocked out the undercuts.Self-cured acrylic resin (Dough stage) placed in the relieved area in the fitting surface of the lower denture. The denture was inserted in the patient mouth. The patient was asked to bite with the maximum intercuspation then the denture was removed with the clips picked-up in the fitting surface of the lower denture.

Final occlusal adjustments were done using T-Scan device to ensure accurate distribution of the forces on the teeth for each group and dentures were delivered to the patients with the clips picked-up in the fitting surface of the lower denture and post insertion instructions were given to the patients.

Follow up visits were scheduled six, twelve months after performing the needed clinical and radiographic evaluation of the mini-implants.

Radiographic Evaluation: CBCT was done at the time of the mini-implant loading as base line image (zero), six months, and twelve months after mini-implants loading.

The mini-implants were evaluated using the linear measurement system supplied by the cone beam computed tomography I CAT Vision
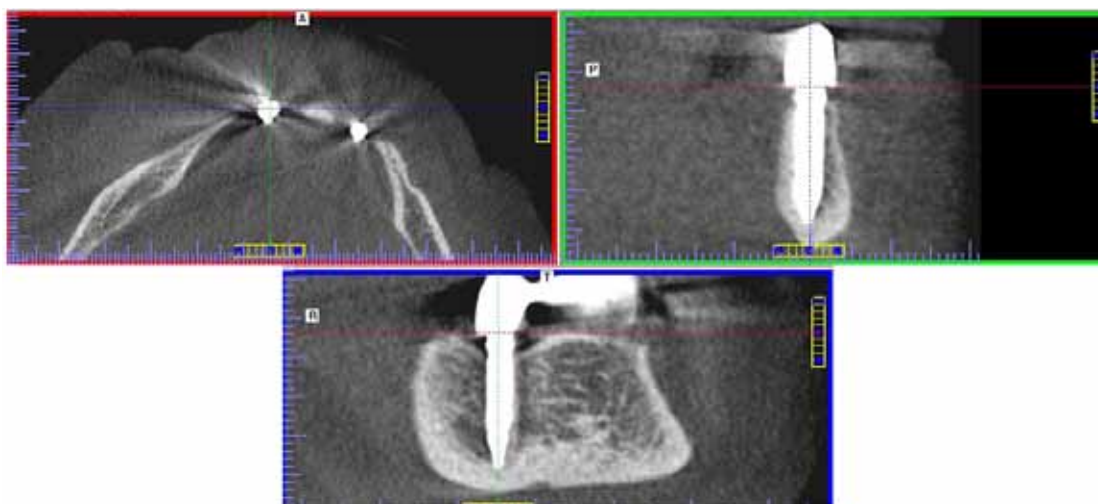
Fig. (2): The MPR screen showing the mini-implant appearing clearly in both coronal and sagittal planes.

All the linear measurements were measured at the MPR screen (Multi-Planar reconstruction).

The mean values of all aspects (buccal, lingual, mesial and distal) were calculated.

Results were collected, tabulated, and statistically analyzed using one-way ANOVA of repeated measures for intragroup comparisons followed by bonferroni post hoc test and independent t-test for Intergroup comparisons to evaluate effect of different types of occlusion on the marginal bone loss around two splinted mini-implants retaining manbibular overdenture.

The significance level was set at P ≤0.05 within all tests. Statistical analysis was performed with IBM SPSS Statistics Version 25 for Windows.

Findings:

Crestal Bone Loss:

A-Intragroup Comparison:

Table (1): Mean and Standard deviation (SD) and p- values for differences in crestal bone loss (mm) values at different time intervals in each groups

Intervals	Crestal bone loss	
	Lingualized occlusion	**Monoplane occlusion**
Baseline-6 months	0.64±0.13^B	0.72±0.09^B
6 months-12 months	0.20±0.03^C	0.22±0.05^C
Baseline-12 months	0.84±0.14^A	0.94±0.12^A
p-value	<0.001*	<0.001*

Different superscript letters indicate a statistically significant difference within the same vertical column *; significant ($p \leq 0.05$) ns; non-significant (p>0.05).

Table 1 showed that For both Lingualized and Monoplane occlusion groups,the results shows bone loss for each group. This decrease was statistically significant throughout the study period where the greatest decrease was found in baseline-12 months and the least was found in 6-12 months. However by using bonferroni post hoc test,there was a statistically significant difference between baseline-6 months and 6-12 months, between baseline-6 months and baseline-12 months, between 6-12 months and baseline-12 months.

B-Intergroup Comparison:

Table (2): Mean and Standard deviation (SD) and p- values for differences in crestal bone loss (mm) values at different time intervals between groups

Intervals	Crestal bone loss		p-value
	Lingualized occlusion	Monoplane occlusion	
Baseline-6 months	0.64±0.13	0.72±0.09	0.216ns
6 months-12 months	0.20±0.03	0.22±0.05	0.347ns
Baseline-12 months	0.84±0.14	0.94±0.12	0.182ns

*Significant ($p \leq 0.05$) ns; non-significant ($p > 0.05$)

Table 2 showed higher bone loss in group II (Monoplane occlusion groups) than group I(Lingualized occlusion group),However this difference was statistically insignificant throughout the study period.

Discussion

The patients were selected and examined to eliminate any factor or habit that may adversely affect the results. This was done using comprehensive medical history, clinical examination followed by the laboratory investigation. [6,7]

Mini-implant retained mandibular over-dentures present a simple and reliable solution for denture stability and retention problems.[8]

Two protective occlusal schemes were selected, the lingualized and the monoplane occlusion.,The lingualized occlusion provides mechanical freedom in centric which decrease horizontal (destructive) stresses and controls leverage induced by eccentric tooth contact. The second occlusal scheme was the monoplane occlusion, it can adapt to the slight discrepancies between centric relation and centric occlusion that usually occur due to processing errors of the acrylic resin denture base and settling of the denture after wear. [9]

Remounting techniques were carried out to assess and correct any occlusal discrepancies, which might lead to lateral forces on the implants.[10]

The selected implant was 2.5 mm in diameter, the width of the ridge in the proposed implant site was at least 4 mm measured by CBCT. From a biomechanical point of view, it is well documented that a residual plate that is less than 2 mm in thickness could have an adverse affect on bone stress levels and crestal bone maintenance. [11]

Bar attachment has been used to splint the two mini-implant in this study. Bar/Clip attachment helps with abutments splinting, offers high retention capacity and minimizes prosthesis movement during function. [12]

The linear measurements were done using a regular CBCT radiographic examination to evaluate the bone loss,the period of 6 months could be sufficient for a measurable bone loss around the mini- implants also, a whole period of 12 months could be used to evaluate the acceptable bone loss around the mini-implants. [13]

A significant decrease in the crestal bone height was observed during the follow-up periods around the mini-implants in both groups due to immediate bone reaction after insertion of the prosthesis beside healing process after the implant placement, progressive reduction of bone height till the end of the study period might be due to the cumulative effect of mechanical factors acting on the implants as loading and forces of mastication. [15]

The mean values of crestal bone loss in this study within the 12 months follow up period were in agreement with the success criteria within the accepted range to happen within the first year of implant placement.

The minimal bone loss values recorded in this study may be attributed to the type of occlusal schemes used (monoplane and lingualized) because they are both considered "non-traumatic protective" occlusal schemes.

The difference between the two groups was statistically insignificant due to the favorable force transmission offered by both occlusal schemes.

Both were considered successful in preserving the crestal bone around the mini-implants meanwhile at the end of the study period, The results show that the total bone loss was slightly higher in Monoplane group than in lingualized group.

This may be attributed to increased cutting efficiency and less number of strokes to smash food which decrease load on the underlying supporting structures in dentures of lingualized group.[16]

Conclusion

In case of splinted mini-implants retaining mandibular overdenture, type of occlusion has no effect on the supporting structures.

Conflict of Interest: Nil.

Source of Funding: Ain Shams University.

Ethical Clearance: Taken from Faculty of Dentistry Ain Shams University,Research Ethics Committee (FDASU-REC)

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Incidental Finding of Gall Bladder Carcinoma–
A Retrospective Study in a Tertiary Care Hospital of Eastern India, Westbengal

Santanu Acharyya[1], Partha Dasgupta[1], Souvik Ghosh[2], Sree Krishna Mandal[3]

[1]*Associate Professor,* [2]*Final Year MD PGT,* [3]*Professor Department of Radiotherapy RGKAR Medical College and Hospital, Kolkata, West Bengal India*

Abstract

Introduction: Gall bladder carcinoma is the most common biliary tract malignancy worldwide.[1]Aggressive biological nature of the tumor results in rapid spread of the tumor to adjoining vital structures since the GB is located in an anatomically busy area.[1]The tumor is thus, often unresectable at presentation.In this retrospective study we aimed to establish the overall rate of unsuspected gallbladder carcinoma in all cholecystectomy specimens in a tertiary care hospital in the eastern part of India.

Material and Method: In our study we have reviewed the clinical records of consecutive 731Cholecystectomy specimens during the last 5 Years (2014May-2019April) .A uniform procedure of history taking,physical examination, investigation and treatment adopted for all the patients.Diagnosis of Incidental gall bladder carcinoma was confirmed on microscopic examination.

Results: During the last 5 years, 731 cholecystectomies were performed in this tertiary care hospital. Out of them 65.43% was from female population whereas 34.57% were from male. Median age of the patient population is around 55± 9.34 years.Most of the approaches were laparotomy.Evaluation of the all pathologic specimen revealed 74 cases of gall bladder carcinoma which comprises 10.12% of all the cholecystectomies done in that aforesaid period.

Conclusions: The findings of Incidental gall bladder carcinoma is a clinical problematic scenario which often misses the eye of a radiologist and comes as a histopathological surprise. Microscopical examination of all cholecystectomy specimen should be done because it is not only the gold standard diagnostic method but also reveals the occult malignancy at the earliest.

Keywords: *Gall bladder carcinoma, Cholecystectomy, Incidental finding, Tertiary care hospital.*

Introduction

Gall bladder carcinoma is the most common biliary tract malignancy worldwide and manifests as either diffuse thickening of the GB wall or as a GB mass arising from the fundus, neck or body of the GB[1].

Corresponding Author:
Dr. Partha Dasgupta
Associate Professor Department of Radiotherapy
RGKar Medical College & Hospital, Kolkata (WB)
India
e-mail: drparthadasgupta@gmail.com

The incidence of this malignancy is characterized by marked geographical and ethnic variations[2]. North, East, Northeast and Central India are among the high incidence areas for gallbladder in contrast to South and West India[3].Its clinical presentation is often non-specific resulting in significant delay in diagnosis. It is either detected incidentally at the time of cholecystectomy or when it presents with complications due to local spread of the malignancy in the form of jaundice, hepatomegaly, ascites or duodenal obstruction[4]. Aggressive biological nature of the tumor results in rapid spread of the tumor to adjoining vital structures since the GB is located in an anatomically busy area[5]. The tumor is thus, often unresectable at presentation resulting in an overall dismal

prognosis in India[6]. The overall outcome of incidentally detected carcinoma gallbladder is a matter of debate in variousliteratures.

In this retrospective study we aimed to establish the overall rate of unsuspected gallbladder carcinoma in a tertiary care hospital in the eastern part of India. In our study we have evaluated all cholecystectomy specimens both from open & laparoscopic procedure in our hospital during the last 5 Years (2014-2019) and compared the data to those reported in literature.

Material and Method

In this retrospective study we have reviewed the clinical records of consecutive 731Cholecystectomy specimens during the last 5 Years (2014 May-2019 April). Data has been collected according to patients belonged to both sexes having acute and chronic cholecystitis with frequent cholelithiasis for whom the diagnosis was done based on clinical ground and supported by ultrasonography. A uniform procedure of history taking,physical examination, investigation and treatment adopted for all the patients. Both open and laparoscopic procedures were included. From the collected data we retrivedseventy four (74) patients with unexpected gall bladder carcinoma.

Results

During the last 5 years, 731 cholecystectomies were performed for benign gall bladder disease in R.G.Kar Medical College & Hospital.65.43% was female whereas 34.57% were male.

Most of the patients were in the age group of 50-60 years. Median age of the patient population is around 55± 9.34 years. Minimum age is 31 yrs where maximum age is 79 yrs with a range of 48yrs.

Most of the approaches were laparotomy followed by elective laparoscopic approach followed by emergency open cholecystectomy. Evaluation of the all pathologic specimen revealed 74 cases of gall bladder carcinoma which comprises 10.12% of all the cholecystectomies. All the malignant neoplasmwere unsuspected preoperatively both by clinical and radiological ground. 52 of the 74 patients diagnosed as having gallbladder carcinoma were female and the male: female ratio is 1:4.
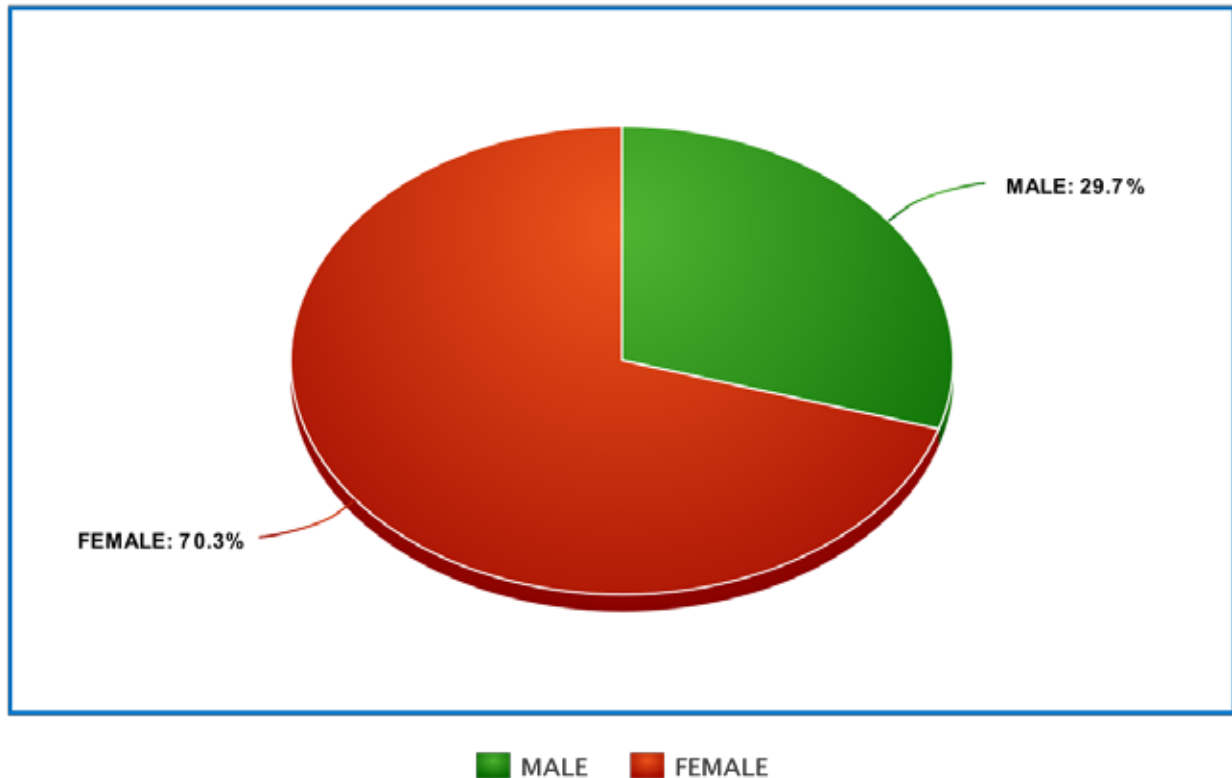

Figure 1: Showing Sex Distribution

Table 1: Shows Baseline Patient's Character

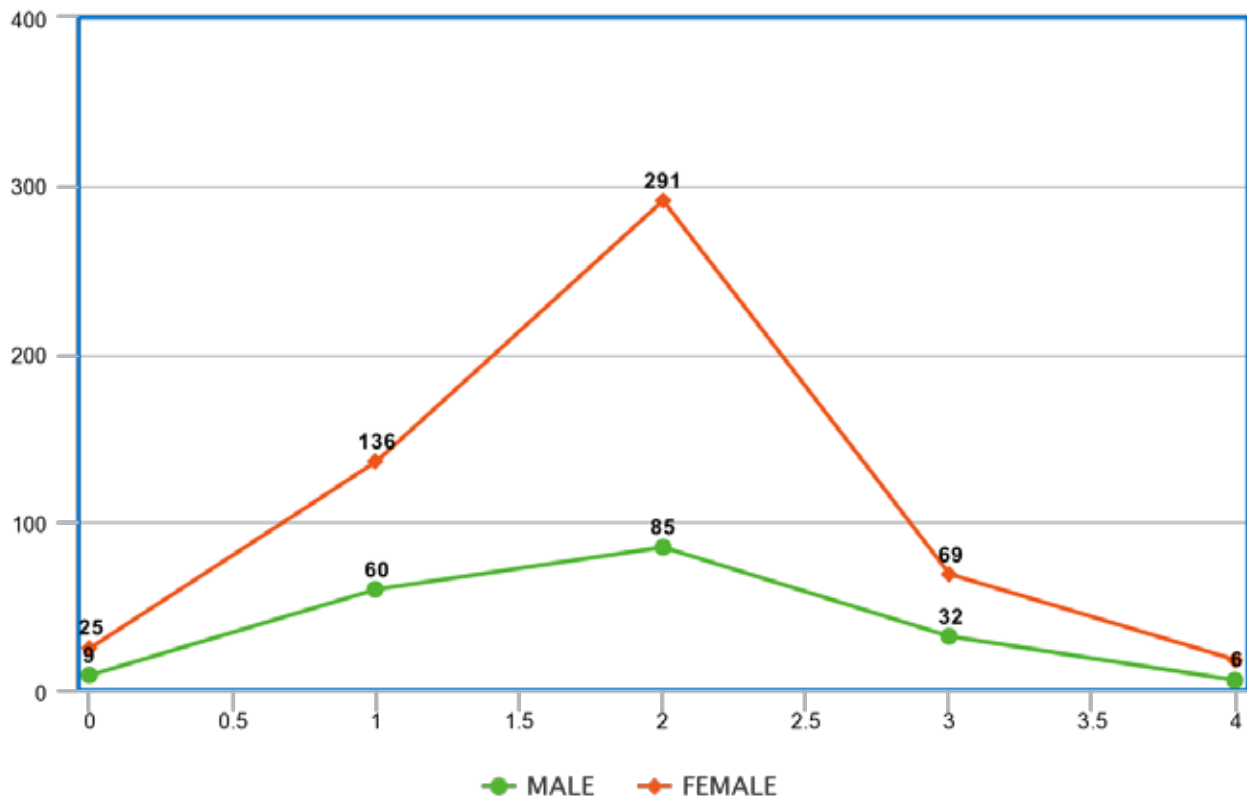| Variable	No. of Patients	Percentage
Gender		
Male	255	35%
Female	476	65%
Age Distribution		
<40 Years	34	4.65%
40-50 Years	196	26.81%
51-60 Years	376	51.43%
61-70 Years	101	13.81%
>70 Years	24	3.28%

Figure 2: Shows Male Female Distribution According to Age of All Patients at Baseline

Discussion

De stoll in 1771 the first to report gall bladder carcinoma. Although the entity is quite rare it is the most common billiary tract malignancy and usually discovered accidentally[6].

The overall prognosis of patients with gall bladder carcinoma is poor and fatal when it is unresectable. The concern whether routine histopathological examination is needed for all cholecystectomy specimens done for benign gallbladder diseases is still debatable. The Royal College of Pathologists suggests a histopathological examination of all cholecystectomy specimens as IGBC can be easily missed out[7].

Jha et al. shoed that out ofthe 4800 cholecystectomy specimens retrieved, diagnosis of Incidental gallbladder carcinoma was rendered in twenty cases (0.41%). Mean patient age was 50.65 years with a female preponderance[8].

Shrestha R et al. showed that there were 22 cases of primary gall bladder carcinoma out of 668

cholecystectomy cases in a span of 5 years with a incidence of 3.3% and was commonly found in female at 7th decade of their life[9].

Gall bladder carcinoma is diagnosed pathologically in 0.15-8% cholecystectomy specimens in different reported series. The prognosis of the patients in whom it is diagnosed preoperatively is very poor. Most of the patients were diagnosed microscopically in operated specimen. Theoretically this group carries best prognosis[10].

It is important to know preoperatively whether surgeon is dealing with gall bladder carcinoma, as this will lead to more radical preoperative evaluation and surgery. Endoscopic ultrasound might be of help. Suspicion of malignancy rises when sonography displays large polyps (45% risk of gallbladder carcinoma for a polyp>15 mm) or a porcelain gallbladder[11].

Over the past decade considerable progress has been made in several fields relating to the diagnosis and treatment of gall bladder cancer. The increase in the number of cholecystectomies being carried out has resulted in more carcinomas being discovered incidentally, and at an early and treatable stage[12].

In our retrospective study the frequency of gall bladder carcinoma is 10.12% which is higher than the western countries.

In our study the age of carcinoma gall bladder occurs commonly closes corresponds to the age group of different study.

In Indian population the median age at presentation is 51 years with a median range of 50-60 years.

In our study, Most of the patients were in the age group of 50-60 years. Median age of the patient population is around 55± 9.34 years. Minimum age is 31 yrs where maximum age is 69 yrs with a range of 38 yrs.

Gall bladder carcinoma is most common in female. According to Globocan 2018 the ASR per 1 lakh population for male is to female ratio is 1.6:2.5[15].

In our study the male, female ratio is 1:4 which is a bit higher but it is close to different international studies.

The gall bladder malignancy does not have typical clinical feature and it is usual presentation mimics that of benign gall bladder disease.

Pain is the most prevalent symptom as described by WaneboHJ (50%) and Koo (80%)[15].

In our study, Most of the patients present with pain (65%) and other symptoms are nausea and vomiting. The most common signs are tenderness in right hypocondrium, palpable mass and jaundice.

Ultrasonography performed the entire patients. The thickened gall bladder wall detected in 79 patients and dilated common bile duct found in 14 patients. None of the cases suspected for malignancy. So ultrasonography is not a good diagnostic tool for detecting gall bladder malignancy.

Laparotomy and biopsy is the good option and diagnostic accuracy is around 100%.

Conclusion

The unexpected incidental gall bladder carcinoma in our series is 10.12%. Pre operativeultra sonography missed the diagnosis often and laid the physician in a therapeutic dilemma.

Therefore, all the gall bladder specimens should be submitted for microscopic evaluation.

The increase in the number of cholecystectomies being carried out has resulted in more carcinomas being discovered incidentally, and at an early and treatable stage. For in-situ- and T1a-tumours a simple cholecystectomy can be performed resulting in favorable 10-year survival. For T1b- and T2-tumours an additional resection is indicated, resulting in 5-year survival rates of 55-90%. For T3-tumours, only those patients without metastatic disease will benefit from an additional resection[12].

Once the patient presents with symptoms of acute and chronic cholecystitis, should be encouraged to have laparotomy with cholecystectomy or radical cholecystectomy according to per operative view particularly in this demographic location and eventually gall bladder specimen should be sent for histopathological examination.

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An Evaluation of the Measles Rubella Mass Vaccination Program in Schools of Meerut Cantonment 2018 and Assessment of Parents KAP towards Program

HM Kasi Viswanath[1], Dennis Abraham[2], Vijay Kumar Uthakalla[3]

[1]Grades Specialist, Station Health Organization, Meerut Cantonment, [2]Senior Advisor, MD Community Medicine, Bareilly, [3]Professor of Community Medicine, Asram Medical College, Eluru-A.P.

Abstract

Background: Measles Rubella campaign is global effort to eliminate measles and control of rubella by vaccinating to children of 9 months to below 15 years of age group. The purpose of this study is to estimate the post campaign level of MR vaccination coverage carried out in Meerut cantonment (2018-19) and to study how the patterns of personal attitudes of mothers are linked to the decision making process for MR vaccination.

Methodology: Cross sectional study carried out in 27 schools with target population of 30950, initially consent for vaccination with few demographic details has been distributed to parents through school administration, based on responses classified three groups, group 1 positive attitude, group 2 fearful attitude and group 3 critical attitude further we used Latent class analysis and for the subgroups 5% of group 2 and group 3 participant groups multinomial logistic regression analysis used for finding the strength of association and descriptive statistics, mean, median and percentages are applied in the analysis.

Results: Target reached 89.9% and missed opportunity 10.10%, LCA Biggest group are with fearful attitude followed with positive and critical. Odds ratio of all variables calculated.

Conclusion: Media communication has to reach in population to all religion groups of people explaining to social media rumors and monitoring by doctors directly increase the acceptance and vaccination rates.

***Keywords:** MR- Measles Rubella, LCA-Latent Class Analysis, MDG 4-Millennium Development Goal, CRS-Congenital Rubella syndrome, MRV-Measles Rubella Vaccine.*

Introduction

Measles is a highly contagious viral disease. It remains an important cause of death among young children globally and congenital rubella syndrome (CRS) responsible for irreversible birth defects. After the success of making South East Asian Region (SEAR) polio-free, the World Health Organization (WHO) has geared up its focus toward elimination of other vaccine-preventable diseases like Measles and Rubella. Some of the important changes are replacing the two doses of measles vaccination with measles-rubella (MR) vaccination and mass immunization of children with the age group of 9 months to 15 years with MR vaccine.

Measles remains a significant cause of morbidity and mortality worldwide. Of the estimated 1,22,000 global measles deaths in 2012, 43% occurred in the South-East Asia Region and India alone accounted for 14%.. The importance of measles prevention and control to the achievement of MDG 4 (Millennium Development Goal) is reflected in the key indicator of measles immunization coverage as a measure of progress towards this MDG[(1)].

Corresponding Author:
Dr. HM. Kasi viswanath
Graded Specialist, Station Health Organization, Meerut Cantonment
e-mail: dr.kasiviswanath@gmail.com
Mobile No- 8555899357

Current and recently circulating measles genotypes appear to be primarily D5 in Myanmar and Thailand, D8 in Bangladesh, India and Nepal and D9 in Indonesia and Myanmar. In addition, D4 (commonly associated with Europe) has been identified in India and Nepal, D7 in India. G2 in Indonesia and Thailand and G3 in Indonesia. It is important to note that specimens for virus detection are collected rarely during measles and rubella outbreaks and the actual genotype distribution is therefore unknown. Although rubella is a mild disease, rubella infection during early pregnancy can severely affect the fetus, resulting in spontaneous abortion, stillbirth or an infant born with a combination of birth defects known as CRS (Congenital Rubella Syndrome). In 2010, an estimated number of 103 000 infants with CRS were born globally, of which 46% were in the South-East Asia Region. As for rubella, the number of reported rubella cases was 6670 in 2012 and 9405 in 2013. Most cases were reported from Bangladesh (3034), India (2568), Indonesia (2456), Nepal (755) and Thailand (539) in 2013. Rubella genotypes include 2B in Bangladesh, India, Nepal and Sri Lanka and 1E in Sri Lanka. Elimination of measles will contribute to achieving Sustainable Development Goal's target 3.2 which, among others, aims to end preventable deaths of newborns and children under five years of age by 2030[2].

The first phase of measles-rubella vaccination campaign has been successfully completed during February 2017 in five states, namely, Tamil Nadu, Karnataka, Goa, Lakshadweep and Puducherry. More than 3.3 crore children were vaccinated, reaching out to 97% of the intended age group. The campaign was carried out in schools, community centres and health facilities. The next round was taken up in 8 states/UTs (Andhra Pradesh, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Himachal Pradesh, Kerala, Telangana and Uttarakhand) during August 2017, aiming to cover 3.4 crore children. Since the launch in 2017, the MRV campaign has covered nearly 20 crore children in 30 states and Union Territories [3].

The Measles-Rubella campaign is a part of global efforts to reduce illness and deaths due to measles and rubella/CRS (congenital rubella syndrome) in the country. Measles immunization directly contributes to the reduction of under-five child mortality and in combination with rubella vaccine. It will control rubella and prevent CRS. A MR campaign refers to a mass vaccination campaign organized to introduce a MR vaccine. MR vaccination campaign targets a wide age group of children (9 months to <15 years). The target age group depends on the susceptibility profile of the population. During the introduction campaign, all children in the target age group receive an additional dose of the vaccine, regardless of previous vaccination status or history of illness[4].

There is no structured communications strategy at regional and country levels and vaccine hesitancy observed recently in India and Indonesia during wide-age MR campaigns posed unique challenges. Appropriate advocacy and program communication strategies and tools are critical to furthering MR efforts and prevent vaccine resistance and vaccine hesitancy issues[5]. In view of elimination of Measles and Rubella our study focused on hesitancy issues, which helps in future for mass campaigns supplementary immunization activities especially in schools.

Methodology

It is a population based cross sectional study conducted in Meerut cantonment. With total 27 schools with target population of 30950 school children from class nursery to 10th standard. Consent form has been distributed to mothers 20 days prior to the vaccination programme through schools. Consent form consists of demographic variables as mentioned in Table-1

Based on responses classified three groups, group 1 positive attitude (Parents submitted consent form in < 4 days), group 2 fearful attitude (Parents submitted consent form in 5 to 7 days) and group 3 critical attitude (Parents submitted consent form > 7 days) further we used Latent class analysis for the subgroups 5% of group 2 and group 3 participants. After 10 days, questionnaires have been distributed proportionately to 5% of group 2 (Fearful attitude) and group 3 (Critical attitude) groups to assess the knowledge on vaccination programme after consent for participation. Questionnaire consists of 6 set of questions asked on 5 point Likert scale. Group 1 positive attitude excluded to avoid bias. Microsoft Excel utilised for evaluation of vaccination programme and Statistical software SPSS 21.0 used for analysis the data. Multinomial Logistic Regression Analysis (MRA) and descriptive statistics applied to generalise logistic to multiclass variables. The outcome of analysis measure the participant's attitude with demographic variables. Participant groups coded as 1, 2 and 3 and critical attitude group i.e Code 3 took as reference category in multinomial logistic regression analysis to compare

with positive and fearful attitude. Odds ratios and 95% confidence interval (CI) are presented for all variables. To assess the Knowledge of respondents regarding to 5 Point Likert scale, Mean and Median calculated.

Results

Total target population in the cantonment 32054 (School children: 30950, Outreach areas: 795, Construction sites: 309), total children vaccinated 28904 (93.38%). Particularly numbers of school children alone immunized successfully with MR vaccine are 27824 out of 30950 (89.89%). The LCA presented three class of parents, the groups labelled as per there time based response. The highest group are those having fearful attitudes n= 12071 (39%), followed with positive attitude n=9904 (32%) and critical attitude n=8975 (29%).Fig 1

Analysis performed on 7 variables includes parental attitudes comparing each variable with all subgroups and there odds ratio. The knowledge pattern measured among 5% sample of Fearful and critical attitude group.
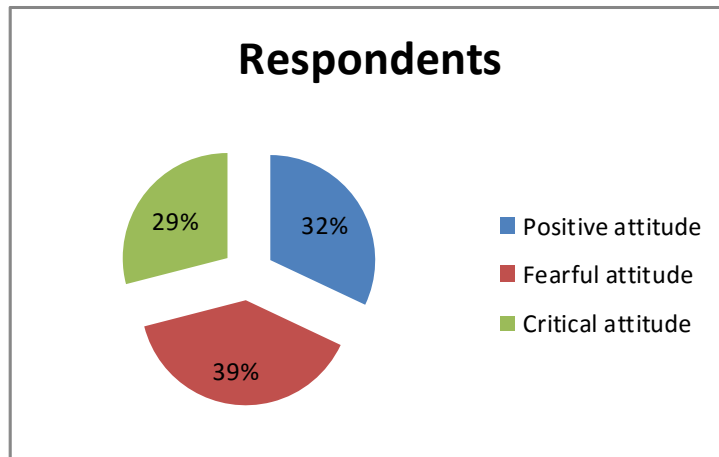
Fig 1. Participants Attitude towards Vaccination

Age Variable (Table - 1 and 2): Most of the age interval group to be 31-35 (46%),Fig 2 the age interval analysed and compared group wise taking critical group as reference and there Odds ratio also measured.
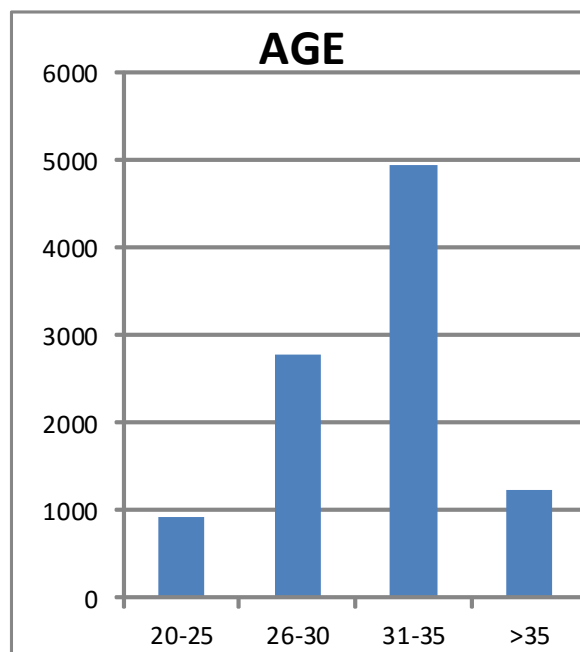
Fig 2. Age Distribution of the participants

Positive attitude group: P value is not significant and Odds ratio <1 which suggests as the age interval increases chances to be more in critical attitude group. **Fearful attitude group:** P value is not significant and Odds ratio>1 suggests as the age increases less like to be under Critical attitude group.

Religion variable (Table - 1 and 2): Most respondents belonging to Hindu (76.05%) followed with Muslim and Christian religion.

Positive attitude group: P value is not significant and Hindu religion less likely to be under critical attitude group. **Fearful attitude group:** P value is not significant and Hindu and Christian religion less likely fall under Critical attitude group.

No of Children in Family (Table - 1 and 2): The majority of the respondent families has single child in there family and odds ratio assessed with positive and fearful attitude. In both attitude groups P value not significant but Odds ratio suggests as no of children increases less likely to fall under critical attitude group.

Education (Table - 1 and 2): Majority of the education level of our respondents belongs to the below matriculation level. P Value is significant in both groups (Positive and Fearful) and Odds ratio suggests as low education level participants likely to fall under critical group.

Employment (Table - 1 and 2): 99.95% of respondents are belonging home maker compared with employed group. P value is significant but odds ratio suggests homemakers likely to fall under critical attitude.

Vaccination card status (Table - 1 and 2): 51.81% of the respondents doesn't have vaccination cards of the children's. P Value is not significant in both groups but Odds ratio suggests availability (maintenance) of vaccination card with parents less likely to fall under category of Critical attitude.

Source of information about immunization programme in the school (Table - 1 and 2): Majority of the source about immunization programme is received after consent form followed with other sources like media, family, friends, hospitals etc.,. P Value is not significant for both sources of information among fearful group but odds ratio of source of media shows very high number which suggests more the media awareness less likely to be critical attitude. P value of fearful group is significant for source of information through consent form and odds ratio for all source of information is <1 likely to be fall under critical attitude.

An assessment of Knowledge: (Table 3 and 4)

Fearful attitude: The mean values range from 2.15-4.77 and the median score ranged from 2-5

Critical attitude: The mean values range from 2.28-4.99 and the median score ranged from **2-5**

Respondents justified the delay due to fear of vaccine harm and non-availability of parents during injectable vaccination in schools. Whereas positive signs towards the Doctor monitoring for campaign having child best interest may have been increased acceptance rate and encouragement to government programmes for future generation.

Table 1: Attitudes towards vaccination

Characteristics of Respondents		Attitude				Odds ratio for Positive attitude and Critical attitude as reference			
		Group 1 Positive	Group 2 Fearful	Group 3 Critical	Total	β	P value	OR	95% CI
Age	20-25	928	1238	1548	3714	-1.204	0.288	0.3	0.33-2.763
	26-30	2785	4024	3714	10523	-.894	.360	.409	0.060-2.764
	31-35	4952	5881	3404	14237	-.223	.815	.800	0.123-5.202
	>35	1238	929	309	2476	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Religion	Hindu	8022	9053	6462	23537	.223	.831	1.250	0.162 - 9.674
	Muslim	1188	2293	1974	5455	-.405	.733	.667	0.065 - 6.871
	Christian	693	724	539	1956	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-

Characteristics of Respondents		Attitude				Odds ratio for Positive attitude and Critical attitude as reference			
		Group 1 Positive	Group 2 Fearful	Group 3 Critical	Total	β	P value	OR	95% CI
No Of Children	1	7329	8208	5959	21496	.875	.488	2.400	0.202- 28.451
	2	2179	3259	2369	7807	.693	.604	2.000	0.146- 27.447
	> or = 3	1.28%- 396	603	646	1645	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Education	Below the Matriculation	3863	7484	7001	18348	17.875	.000	0.001	0.001 - 0.001
	Matriculation	5546	4346	1930	11822	-16.13	.000	0.001	0.00 - 0.001
	Degree and Above	495	241	45	781	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Employment	Home Maker	9834	12024	8965	30823	-15.21	.991	0.0001	0.000-0.0001
	Employed	70	47	10	127	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Vaccination Card Status	Available	6339	5794	2782	14915	1.445	.008	4.242	1.451- 12.40
	Not Available	3565	6277	6193	16.35	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Source of Information about Immunization Program in School	Through this Consent Form	9607	11467	8706	29780	-.032	1.000	.969	0.001 - 0.002
	Media	198	483	178	859	16.292	.998	11897297	-
	Others (Friends, Neighbours, Hospitals)	99	121	90	310	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-

Table 2: Attitudes towards vaccination

Characteristics of Respondents		Attitude				Odds ratio for Fearful attitude and Critical attitude as reference			
		Group 1 Positive	Group 2 Fearful	Group 3 Critical	Total	β	P value	OR	95% CI
Age	20-25	928	1238	1548	3714	-.629	.58	.530	0.057- 4.91
	26-30	2785	4024	3714	10523	-.238	.812	.788	0.111-5.600
	31-35	4952	5881	3404	14237	.288	.772	1.333	0.191- 9.311
	>35	1238	929	309	2476	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Religion	Hindu	8022	9053	6462	23537	.438	.674	1.550	0.202-11.91
	Muslim	1188	2293	1974	5455	.288	.800	1.333	0.144-12.36
	Christian	693	724	539	1956	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
No Of Children	1	7329	8208	5959	21496	.262	.801	1.300	0.168-10.05
	2	2179	3259	2369	7807	.452	.684	1.571	0.178-13.86
	> or = 3	1.28% - 396	603	646	1645	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-

Characteristics of Respondents		Attitude				Odds ratio for Fearful attitude and Critical attitude as reference			
		Group 1 Positive	Group 2 Fearful	Group 3 Critical	Total	β	P value	OR	95% CI
Education	Below The Matriculation	3863	7484	7001	18348	-16.488	.000	0.0006	0.001-0.001
	Matriculation	5546	4346	1930	11822	-15.684	.000	0.001	0.001-0.001
	Degree And Above	495	241	45	781	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Employment	Home Maker	9834	12024	8965	30823	.000	.000	1	1.00- 1.00
	Employed	70	47	10	127	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Vaccination Card Status	Available	6339	5794	2782	14915	.747	.146	2.111	0.772- 5.77
	Not Available	3565	6277	6193	16.35	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Source of Information about Immunization Program in School	Through This Consent Form	9607	11467	8706	29780	-17.763	0	0.0001	0.001- .002
	Media	198	483	178	859	-.924	1.000	.397	0.001- .002
	Others (Friends, Neighbours, Hospitals)	99	121	90	310	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-

Table 3: 5% in Group 2 Fearful Attitude Participants Responses in Likert Point Scale

Items	Frequency (n=603)					F4+F5	Mean	Median
	1	2	3	4	5			
1. Does Measles and Rubella diseases lead to death	30(5%)	54(9%)	97(16%)	151(25%)	271(45%)	422(70%)	3.96	4
2. Does this vaccine gives protection against these diseases	30(5%)	48(8%)	121(20%)	205(34%)	199(33%)	404(67%)	3.82	4
3. Vaccine will not harm at any cost	175(29%)	253(42%)	109(18%)	42(7%)	24(4%)	66(11%)	2.15	2
4. Do you think parents not required beside children for vaccination programme in schools	181(30%)	271(45%)	24(4%)	91(15%)	36(6%)	127(21%)	2.22	2
5. Do you think SIA (School immunization activities) will encourage and support govt. to initiate many health related programmes for future generations	13(2%)	6(1%)	36(6%)	96(16%)	452(75%)	548(91%)	4.61	5
6. Do you think Doctors in charge of vaccinations have Childs best interest at heart	6(1%)	7(1%)	12(2%)	72(12%)	506(84%)	578(96%)	4.77	5

*f4+5: frequency (f4+5) of participants who selected agree or strongly agree regarding the 6 characteristics in Likert point scale.
*5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1=Strongly Disagree. *n=Number of participants.

Table 4: 5% in Group 3 Critical Attitude Participants Responses in Likert Point Scale

Items	Frequency (n=450)					F4+F5	Mean	Median
	1	2	3	4	5			
1. Does Measles and Rubella diseases lead to death	36(8%)	22(5%)	135(30%)	95(21%)	162(36%)	257(57%)	3.72	4
2. Does this vaccine gives protection against these diseases	18(4%)	86(19%)	121(27%)	126(28%)	99(22%)	225(50%)	3.45	4

Items	Frequency (n=450)					F4+F5	Mean	Median
	1	2	3	4	5			
3. Vaccine will not harm at any cost	148(33%)	131(29%)	99(22%)	41(9%)	31(7%)	72(16%)	2.28	2
4. Do you think parents not required beside children for vaccination programme in schools	144(32%)	135(30%)	99(22%)	41(9%)	31(7%)	72(16%)	2.29	2
5. Do you think SIA (School immunization activities) will encourage and support govt. to initiate many health related programmes for future generations.	22(5%)	18(4%)	36(8%)	68(15%)	306(68%)	374(83%)	4.37	4
6. Do you think Doctors in charge of vaccinations have Childs best interest at heart	0	45(1%)	13(3%)	45(10%)	387(86%)	432(96%)	4.99	5

*f4+5: frequency (f4+5) of participants who selected agree or strongly agree regarding the 6 characteristics in Likert point scale.
*5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1=Strongly Disagree. *n=Number of participants.

Discussion

Joint effort of District immunization officer of Meerut, Station health organization of Meerut cantonment and Principals of all schools a realistic achievement has been accomplished in organising mass Measles Rubella immunization programme. The key success of campaign is appropriate micro and macro planning. Various painting, poem competitions in schools before and after vaccinations has become interesting ingredient for success along with additional surveillance, IEC activities etc.

Comparison with similar campaigns conducted nationally and internationally: Demographic variables like literacy and religion associated with non-immunization in study carry out Canton of Aargau, Switzerland[6], similarly MMR immunization carried out in Bhutan[7]. Parents hesitance to immunization is due to overlook of vaccination card and not aware of proper vaccination schedule[8]. Higher proportion of employed mothers able to show fully immunization to their children due to better understanding of importance of elimination of diseases[9].Another review of study carried out Pune suggests mass media campaign and continuous IEC strategies increases the knowledge quotient among women and school children which will contribute in long term foe better healthy society[10].

Conclusion

The perception of the mother is clearly emblematic and accepted the supervision of doctor for mass injectable immunization campaign in schools, conjointly further shown response to bring many such campaigns in future for upcoming generations. These campaigns not only prevent the killer diseases also easy to achieve the elimination which is evident after success of making country polio free and also reducing the disease burden against diphtheria, pneumonia, diarrhoea and many other vaccine preventable diseases.

Ethical Committee Clearance: Institutional Ethical Committee Clearence Taken.

Source of Fundind: Self.

Conflict of Intrest: Nil

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The Prevalence of Yoga Practice:
A Survey in the Kolhapur Population

Sudhir Sase[1], Alka Gore[2], Dimple Gajwani[3]

[1]*Tutor, Department of Biochemistry, Dr. D. Y. Patil Hospital and Research Centre, D.Y. Patil Education Society (Deemed to be University), Kolhapur,* [2]*Assistant Professor, Bharati Medical College and Hospital, Sangli,* [3]*International Yoga Teacher, Sri Sri Ravishankar Foundation Center, Empire tower, Kolhapur, Maharashtra, India*

Abstract

Background: Yoga is a form of alternative medicine, which aims for an overall physical, mental, and spiritual health. Several benefits of yoga in terms of disease prevention have been well documented in literature. However, there is a lack in the studies relating to its prevalence, especially in the Indian scenario. Here we aimed to decipher the prevalence of yoga practice in the Kolhapur population.

Method: A survey was conducted on 5003 residents of Kolhapur. The survey was designed to evaluate the knowledge and practice of yoga in the respondents. Socio-demographic variables were presented by MS-Excel. Logistic regression was performed by R-studio 1.2.5001.

Results: Most of the yoga users were between 40-49 years. The primary occupation of most of them was service. Men were more likely to practice yoga, as compared to females (OR-0.29, $P<0.05$). Also, older (OR-1., $P<0.5$) and retired people (OR-1.8, $P<0.05$) were more like to practice yoga. Yoga was also shown to be mostly practiced among people of higher economic status as opposed to people with low economic status.

Conclusion: This is the first study on the prevalence of yoga practice in Kolhapur population. Results depict that a considerable number of people knew about yoga, but only a few of them practiced it. Additional studies are thus required for a better deduction of yoga prevalence.

Keywords: *Age, gender, Yoga, integrative medicine, therapy.*

Introduction

Yoga is a form of therapy that aims to improve overall physical, mental and spiritual health. It is believed to have originated in India about 2000-3000 years ago.[1]

Corresponding Author:
Dr. Sudhir Sase
Department of Biochemistry, Dr. D.Y. Patil Hospital and Research Centre, D.Y. Patil Education Society (Deemed to be University), Kolhapur–416 006, Maharashtra, India
e-mail: sase.sudhir@rediffmail.com
Tel No.: +91 9822674624

It includes several practices, most important ones being postures (asanas), breathing exercises (pranayama) and meditation (Dhyana).[2] It is now being globally recognized as an alternative form of medicine, known as integrative medicine therapy.[3,4,5]

There is increasing evidence on the use of yoga for the prevention and cure of various types of medical conditions. The therapeutic effects of yoga on physical disorders like pain and arthritis have been suggested.[6,7] Similarly, yoga has also found positive impact on a variety of metabolic and lifestyle disorders like diabetes mellitus, cardiovascular disorders, asthma, and cancer.[8,9,10,11,12,14] Furthermore, yoga has also been shown to be beneficial in various psychological disorders like anxiety, depression and cognition.[15,16,17]

While there have been several studies reporting the usefulness of yoga in improving the quality of life of people in general and providing relief in different medical conditions, studies relating to the prevalence of yoga are scanty, especially in the Indian population.[6,4] Despite its origin and practice in India since centuries, an accurate data regarding the practice of yoga and its types is lacking. Therefore, a detailed knowledge of current prevalence, patterns and other variables associated with yoga is required.

The purpose of the current study is to determine the prevalence of yoga practitioners in the Kolhapur district of Maharashtra and draw possible associations between the various socio-demographic variables and yoga practice.

Materials and Method

This was a descriptive study conducted in the Kolhapur city of Maharashtra, India. Preliminary data on the population of the district was extracted from 2011 census and sample size was calculated as per the formula of Yamane i.e sample size (n) $=N/1+Ne^2$, where N is the population size, and e is the margin of error. Here, N= 549000, e=1.46 and n was calculated to be 4652. Based on the calculation, the study involved 5003 participants from 18-85 years.

A questionnaire comprising of the sociodemographic parameters and yoga practice among the participants was designed by an art of living international yoga teacher following literature survey of similar studies. It was validated by piloting the questionnaire among 55 patients at a yoga center in the city, following which the main study was conducted. The responses were recorded and analysed. Descriptive analysis was performed by MS-Excel. Association between variables (Odds Ratio at Confidence Interval 95 %) was calculated by logistic regression in R studio version 1.2.5001. P value <0.05 was considered as significant. Data is presented in frequencies and percentage.

Results

The mean age of the respondents was 44 ± 11.86 ranging from 18-85 years. They were predominantly male (n= 3721, 74.37 %), while females were 25.62% (n=1282). While 2730 (54.74 %) reported that they had knowledge about yoga, there were only 934 (19 %) who practiced it regularly. In general, people over the age of 30 were more likely to practice yoga, with the maximum number of practitioners in the age group of 40-49 (n=293, 5.86%), followed by age groups <30 (n=183, 3.66%), 50-59 (n=169, 3.38%), 30-39 (n=143, 2.86%), 60-69 (n=92, 1.84%) and >70 n=54, 1.08%).

Most of the respondents (n=4006) were in the orange color ration card slab (i.e. 15000-100000 INR/annum*)*, among which, only 598 practiced yoga, followed by 908 respondents in white color slab, >100000 INR/annum), among which 291 (5.82 %) were yoga users. Likewise, most respondents in the survey were engaged in service, (n=2016, 40.30 %), among which 243 (4.86 %) practiced yoga, followed by people engaged in business, (n=1036) among 174 i.e. 3.48% practiced yoga, respectively. There were 299 (5.98%) housewives, 97 (1.94 %) students, 71 (1.42%) retired people who practiced yoga in the studied population. There were 1028 respondents who had hypertension and 317 who suffered from diabetes mellitus (DM). Among the respondents, who suffered from hypertension, only 3.89 % (n= 195) practiced yoga. Similarly, among the respondents who had diabetes, only 1.33 % (n=67) practiced yoga regularly.

Association between the number of people who practiced yoga and gender revealed that males were more likely to practice yoga regularly, as compared to females. Likewise, people who were engaged in business (OR=1.9, CI 95%, P<0.05) were more likely to practice yoga, followed by retired respondents (OR=1.8, CI 95%, P<0.05) and housewives. Furthermore, economically sound people were more likely to practice yoga than those belonging to economically weaker sections as described in Table-1.

Among the people who practiced yoga regularly, pranayama was the most common form of yoga performed. Other important forms of yoga, practiced among the respondents were asanas, meditation and surya namaskar. Most people practicing yoga did a combination of forms like pranayama with asanas or pranayama with meditation. A representation of the different yoga forms practiced has been given in Figure 1. An overwhelming 79% of respondents who practiced yoga regularly identified that yoga had positive effects on both their physical and mental health. Few of them (14%) also opined for the spiritual health benefits of yoga.

Discussion

Originating from India, yoga has found is its importance around the world, primarily because of its

far-reaching effects on the human health and mind.[6,7] The positive health benefits of yoga have now been globally recognized. Despite its benefits, there are only a handful of studies highlighting its prevalence, especially in India.[8] The lack of data on prevalence of yoga in the Indian population, necessitates the need for more studies in order to generate a consensus about yoga practice and awareness about its benefits.

A recent U.S. based study showed an increase of about ten times increase in the yoga mentions in the electronic health record, over a 10-year period, indicating the growing use of yoga globally.[9] Similarly, a survey by the National Center for Health Statistics (NCHS), U.S.A reported increase in the yoga practice as one of the largest increases among complementary and alternative therapies from the 2002 to 2007 i.e. 5.1 % to 6.1% .[10,11]

Males were more likely to practice yoga than females. This is in close agreement with a cross-sectional study conducted in north India.[12] However, it is in contrast to most previous studies conducted in other countries. [4,13,5,10,14] A gender difference in the perceived benefits of yoga have also been reported in a recent study.[15] In the Kolhapur population, retired people, housewives, people engaged in business were more likely to practice yoga. The main barrier to yoga practice reported were time and occupational commitments, which corroborates to why retired people, housewives and people engaged in business are more likely to practice yoga, than students or the ones engaged in service.[14, 16] Yoga has been shown to provide beneficial outcomes in the elderly. A recent review endorsed that yoga could be used as an intervention in providing physical, mental and emotional well-being to the elderly population,

thereby enhancing their quality of life.[17] Higher earners were more likely to practice yoga. This is in line with a previous US based prevalence study, who also found that economically sound people were more likely to practice yoga regularly.[4] The respondents practising yoga endorsed it for general wellness as well as a therapy in diseases. They also acknowledged the physical and mental benefits of it. The mental benefits of meditation, a form of yoga in curbing anxiety, depression and stress has been well documented.[18]

It was indicated that even though a large fraction of people surveyed knew about yoga, very few of them practiced it regularly. This indicates a need to create awareness among the people regarding the benefits of practicing yoga regularly. Practice of yoga and meditation regularly has been shown to provide benefits in patients suffering from anxiety and depression.[19,20] The World Health Organization (WHO), in its survey of 2015 estimated that about 4.5 % of Indians suffer from depression and 3% of them suffer from some form of anxiety disorders.[21] However, when the respondents were asked if they got depressed at times, very few people agreed (1.3 %), suggesting that they were uncomfortable talking about their emotional well-being during the survey.

To the best of our knowledge, this is probably the first study on yoga prevalence in Kolhapur population. The sample size and selection of respondents might put a limitation of the study. It is subject to recall bias, being questionnaire based and cross-sectional. However, as this is a very preliminary study, there is a need of more studies like this, to evaluate the prevalence of yoga in a population in order to deduce a conclusion about the prevalence of yoga practitioners.

Table 1. Factors associated independently with yoga, calculated by logistic regression (n=5003)

Variable	Subcategories	Odds Ratio	Confidence Interval		P-value
Gender	Female	1.00 (Reference)			
	Male	0.2931	0.2294	0.3748	< 0.05
Age	< 30	1.00 (Reference)			
	30 to 39	0.42833	0.29904	0.6143	< 0.05
	40 to 49	0.27295	0.19703	0.3792	< 0.05
	50 to 59	0.30872	0.21795	0.4381	< 0.05
	60 to 69	0.45478	0.29682	0.6951	< 0.05

Ration Card Colour	No Card	1.00 (Reference)			
	Orange	0.066223	0.032944	0.127	< 0.05
	White	0.16074	0.079195	0.3117	< 0.05
	Yellow	0.092986	0.030071	0.2649	< 0.05
Occupation	Service	1.00 (Reference)			
	Business	1.9486	1.5444	2.4568	< 0.05
	Education	0.42835	0.28216	0.6493	< 0.05
	Housewife	1.5597	1.1684	2.0857	< 0.05
	Retired	1.8756	1.211	2.8843	< 0.05
	Self-Employee	0.88758	0.61501	1.2565	0.5120555
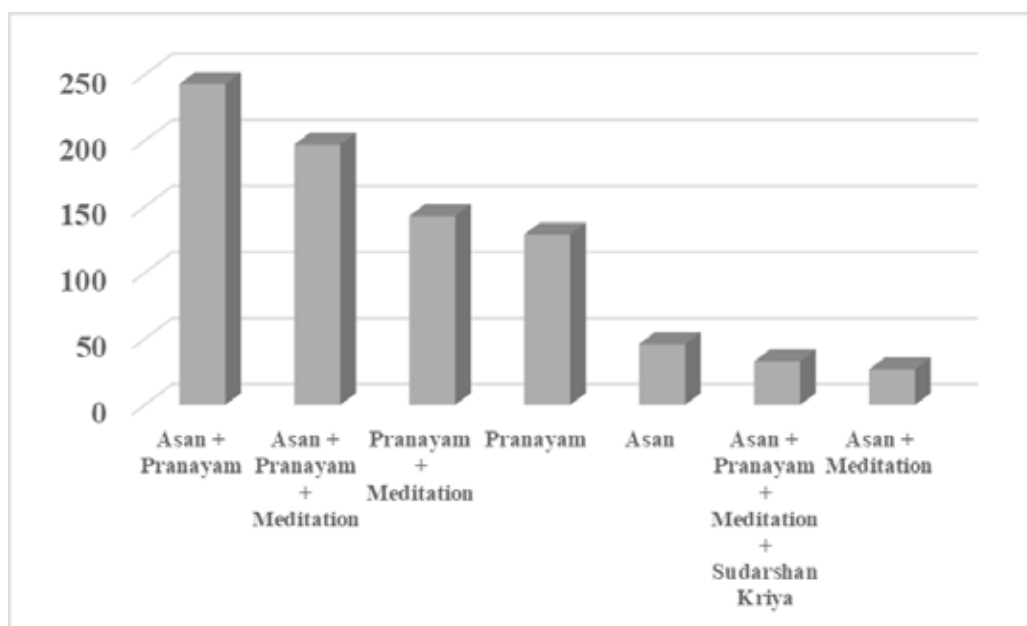
Figure 1. Representation of the number of respondents practicing different forms of yoga. Y-axis depicts the number of respondents.

Conclusion

Although people in the Kolhapur population know about yoga, only a few of them practiced it. As it is a first study of its kind, more studies are required on different populations to acquire information on the yoga prevalence. Lower socioeconomic group is unaware about the yoga. To reduce the mental stress, minimize respiratory disease, weight control regular yoga practice is necessary, but this practice is very rarely seen in the city.

Ethical Clearance: Was obtained from the Institution review board (IRB).

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Cardiac Morphology Changes Occur at the Preparatory Stage of Periodization Training among the Male and Female Athletes Involved in Different Running Events

Fissehatsion G.yohannes[1], Soumitra mondal[2], Mathivanan[3] Abraha Hailu[4]

[1]Research Scholar, [2]Associate Professor, [3]Assistant Professor, Department of Sports Science, Mekelle University,
[4]Cardiologist, Department of Internal Medicine, College of Health Science, Mekelle University

Abstract

This research aimed to determine the influence of certain cardiac morphological variables in novice training athletes on the volume and intensity at the Preparatory stage of the training period**.** present study was conducted to determine the changes occurs in cardiac variables of (LVEDD, LVPWD, LVEF, LVEDV, LVESV) at Preparatory stage of periodization training in different athletic events such as middle distance and long-distance running from the male and female novice athletes in athletic training center at maychew, Tigray region, Ethiopia

Materials and Method: In this qazi-experimental study, 18 athletes selected from different phases of training at maychew athletic training center in Ethiopia. The novice athletes of male and female were selected by their performance in the regional wise, as they are novice athletes in the training center they used to go for more than a year training however the researcher wanted to know the cardiac parameters changes occurs before the athletes used to engage in a specific period of training. To analyze the cardiac parameter the subjects were taken to the comprehensive specialized regional hospital then, Echocardiography was performed by VIVID E-19 undertaken using a 2.5MHz probe are used to calculate several cardiac-related parameters the values of cardiac parameters were recorded at intervals. The recorded data were analyzed by SPSS 21 software, using independent t-test, In conclusion, while comparing the male and female novice athletes male athletes are dominating in and long-distance then female athletes were as female athletes are dominating only in middle distance running events as cardiac morphology variables concerns.

Keywords: *Cardiac morphology, middle distance, long-distance events, echocardiograph.*

Introduction

Training includes different exercises performed in a given period. A recommended training session consists of the athlete's events related exercises, which increases the strength of large muscle groups that are important in everyday activities (arms, shoulders, spine, hips, and legs). An intensity equal to 80% 1-RM (i.e. 10-15 repetitions per set) seems to be the recommended amount of load necessary to produce significant changes.[1] At the beginning of a training program, it is suggested to perform only one set of each exercise with 2-3 min rest periods between sets. Progression can go from 1 to 3 sets over training time for each type of exercise. The training consisting of 2-3 sessions per week is recognized as sufficient for gaining health benefits, each session consisting of single sets of 8- 10 exercises.[2 & 3] Similar recommendations can also be found in Endurance running capacity may have initially arisen in the genus Homo. [4] Throughout evolution, human physiology has been optimized for covering large distances every day, to find enough food to sustain the brain's metabolism. [5] Indeed, the increasing popularity of marathon running in modern humans of all ages and abilities can be viewed as a legacy of our species' evolutionary capacity to

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Corresponding Author:
Fissehatsion G/yohannes
Research Scholar, Department of Sports Science,
Mekelle University, Ethiopia
e-mail: fisho2004@gmail.com

run long distances (>5 km) using aerobic metabolism. Indeed, the number of starters in the London Marathon has risen from 7,000 to 35,000 over the last 30 years and participation in road racing, in general, has increased by more than 50% over the last decade. The increasing popularity of road running is typified by the emergence of recreational marathon runners who complete the 42.195 km event in a time of between 2hr 40min and 4hr 40min. [6]The marathon's potentially negative impact on the cardiac status and the occurrence of sudden cardiac deaths during this type of event have prompted much debate

To be able to deliver the appropriate volume of blood to the tissues over a lifetime, the heart must be extremely adjustable and sustainable. With every heartbeat, the normal healthy heart at rest typically pumps 70ml of blood out into the systemic circulation. At a heart rate of 70 beats per minute, approximately 5 liters of blood is ejected from the heart every minute. 70 During exercise, the stroke volume and heart rate increase and the heart of an elite athlete can pump over 200ml of blood with every beat during exercise (i.e 40 liters/min at a heart rate of 200).

Total heart volume variation when the AV-plane moves down towards the apex during systole, the atria fill reciprocally thus, the volume of blood leaving the heart and the volume of blood entering the heart due to longitudinal pumping is approximately the same, and therefore the longitudinal pumping does not cause any outer volume change of the heart. [7]The radial pumping, however, causes a small change in total heart volume (THV) over the cardiac cycle. The difference in THV over the cardiac cycle has been defined as the total heart volume variation (THVV). By using mainly longitudinal pumping, the heart is kept energy efficient. [8]If the heart pumped using mainly radial pumping, it would not only need the energy to move the blood forward but also it would need to use energy to pull on the surrounding tissues that attach to the pericardial sac.

Several studies have shown that males have larger absolute cardiac dimensions when compared to females. However, the question of whether training affects the male and female heart differently is not yet clear. Petersen et al. 82 found no sex-specific adaptive structural and functional changes to exercise training in elite athletes. In contrast, other studies have found a larger left ventricular mass (LVM) normalized for body weight (g/kg) and a larger LVM normalized for body surface area (BSA) (g/m2) in male athletes when compared to female athletes. [9]The larger LVM in males may in part be explained by their higher systolic blood pressure during exercise. Furthermore, testosterone has been shown to stimulate myocardial growth. Left ventricular cavity size normalized

Materials and Method

Study area and study design; This study was conducted in Maychew athletic training center, Maychew town located in the tigray regional state, Ethiopia. The study design was quasi experimental. The athlete trainees used to participate for one-year athletic training which includes different phases of training

Selection of Subject and Study Design: The population defined in the research has included by novice athletes in middle distance and long-distance running. The sample included a total of 18 from 9 male and 9 female athletes, who have selected from the different regions of Ethiopia and the selected athletes will participate for a yearly advance training program to improve the top performance in athletics and participate in the national and international competitions. The variables of cardiac morphology parameters are (LVEDD, LVPWD, LVEF, LVEDV, LVESV).

Results and Discussions

Table: 1: The Preparatory stage Cardiac morphology parameters of middle-distance running among male and female athletes

Cardiac morphology	LVEDD	LVPWD	LVEF	LVEDV	LVESV
Male	49.33333±2.08	8.333333±0.57	60±6.08	118.6667±9.60	55.66667±4.04
Female	45.66667±5.50	8.333333±0.57	67.66667±5.50	85±14	37.33333±9.45
T- value	0.234751	0.507685	0.088644	0.026153	0.073963
p-value	0.825966	0.63844	0.933658	0.980428	0.944638

Abbreviations: (LVEDD-left ventricular end-diastolic diameter, LVPWD- Left Ventricular Posterior Wall Dimensions, LVEF- Left ventricular ejection fraction, LVEDV- left ventricular end-diastolic volume, LVESV- left ventricular end-systolic volume)

The Cardiac morphology parameters analyzed by echo-cardiograph of all subjects LVEDD-left ventricular end-diastolic diameter in (M=16.90% & F=18.72%) LVPWD (M=2.85% & F=3.42%) LVEF (M=20.55% & F=27.73%) LVEDV (M=40.64% & F=34.84%) and LVESV(M=19.06% & F=15.30%) association of mean and standard deviation values the obtain t-values are LVEDD (0.234751) LVPWD (0.507685) LVEF(0.088644) LVEDV (0.026153) and LVESV (0.073963) but based on the p-values of the cardiac morphology variables such as LVEDD (0.825966) LVPWD (0.63844) LVEF(0.933658) LVEDV (0.980428) and LVESV (0.944638) while compared to male and female athletes of cardiac morphology variables at the Preparatory stage of novice athletes as df=4, the obtained p-value is greater than the set value P<0.005, therefore, there is no significant difference in all the cardiac morphology variables among the male and female novice athletes in middle distance running.

Table: 2: The Preparatory stage Cardiac morphology parameters of long-distance running among male and female athletes

Cardiac morphology	LVEDD	LVPWD	LVEF	LVEDV	LVESV
Male	49.66667±4.04	9.333333±1.15	61±8.88	101.3333±15.01	34.66667±2.08
Female	46.33333±7.09	8±0	64.66667±11.54	91±17.69	42.66667±6.42
T- value	0.527897	0.183503	0.686836	0.484583	0.154468
p-value	0.6255	0.86332	0.5299	0.6533	0.884772

Abbreviations: (LVEDD-left ventricular end-diastolic diameter, LVPWD- Left Ventricular Posterior Wall Dimensions, LVEF- Left ventricular ejection fraction, LVEDV- left ventricular end-diastolic volume, LVESV- left ventricular end-systolic volume)

The Cardiac morphology parameters analyzed by echo-cardiograph of all subjects LVEDD-left ventricular end-diastolic diameter in (M=19.40% & F=18.34%) LVPWD (M=3.65% & F=3.42%) LVEF (M=23.83% & F=25.59%) LVEDV (M=39.58% & F=36.02%) and LVESV(M=13.54% & F=16.89%) association of mean and standard deviation values the obtain t-values are LVEDD (0.527897) LVPWD (0.183503) LVEF(0.686836) LVEDV (0.484583) and LVESV (0.154468) but based on the p-values of the cardiac morphology variables such as LVEDD (0.6255) LVPWD (0.86332) LVEF(0.5299) LVEDV (0.6533) and LVESV (0.884772) while compared to male and female athletes of cardiac morphology variables at the Preparatory stage of novice athletes as df=4, the obtained p-value is greater than the set value P<0.005, therefore, there is no significant difference in all the cardiac morphology variables among the male and female novice athletes in long-distance running

Table 3: Percentage differences of cardiac morphology variables of male and females athletes in, middle distance and long-distance running events

Events		Cardiac morphology variables				
		LVEDD	LVPWD	LVEF	LVEDV	LVESV
Middle distance running	Male	16.90	2.85	20.55	40.64	19.06
	Female	18.72	3.42	27.73	34.84	15.30
Percentage Difference		**10.21%**	**18.18%**	**29.74%**	**15.36%**	**21.88%**
Long distance running	Male	19.40	3.65	23.83	39.58	13.54
	Female	18.34	3.17	25.59	36.02	16.89
Percentage Difference		**5.61%**	**14.07%**	**7.12%**	**9.41%**	**22.01%**

Discussion

The aim of this study was to evaluate and observe the changes occurs at the Preparatory stage of male and female athletes involved in, middle distance and long distance running events while testing the cardiac morphology variables such :(LVEDD-left ventricular end diastolic diameter, LVPWD- Left Ventricular Posterior Wall Dimensions, LVEF- Left ventricular ejection fraction, LVEDV- left ventricular end-diastolic volume, LVESV- left ventricular end-systolic volume) the male and female athletes participate in different athletes events may not have a significance difference in cardiac morphology variables hence the obtain p values are greater than the set value $P<0.005$ though statistically there is no significance difference while observing the data shows there could be some difference in certain hemodynamic parameters therefore, the researcher converted the values in percentage mode as mentioned (table 3) further the researcher observed the changes happens at the different percentage levels of hemodynamic variables such the difference in percentage levels of the LVEDD (4.53%) LVPWD (3.35%) LVEF(5.27%) LVEDV (3.95%) and LVESV (5.41%) Similarly in middle distance running LVEDD (10.21%) LVPWD (18.18%) LVEF(29.74%) LVEDV (15.36%) and LVESV (21.88%) in long distance running LVEDD (5.61%) LVPWD (14.07%) LVEF(7.12%) LVEDV (9.41%) and LVESV (22.01%) according to the percentage difference in middle-distance running the difference in percentage level of females athletes are **higher** in LVEDD, LVPWD, LVEF than the males' athletes and **lower** in LVEDV,LVESV. In long-distance running the percentage difference in females athletes are **lower** in LVEDD, LVPWD, LVEDV than the male's athletes and **higher** in LVEF, LVESV in cardiac morphology variables. This conclusion is confirmed by, suggesting that [11]regular physical training first induces ventricular dilatation while muscular hypertrophy begins to develop sometime later. When interpreting LV mass in childhood, [12] the American Society of Echocardiography (ASE) recommends reporting normal measurements to be indexed or divided by body surface area (BSA) to reduce variance among subjects

Conclusion:

The data from this investigation demonstrates that athletes who performed the same training process may develop different dimensions of the left ventricular cavity, left ventricular mass, and wall thickness. It seems that in some athletes, physical training can induce more profound adaptive changes in cardiac morphology. We hypothesized that this different adaptation is a consequence of more profound mechanical force during exercise or a greater increase in growth factors in athletes with cardiac hypertrophy

We suggested that cardiac structure and function adaptations could occur in pre-pubertal children and continue to change through age. This is confirmed by the aforementioned authors who confirmed that the features of athletes All these changes can be accepted as a physiological adaptation for systematic intense activity and to a lesser degree in other factors like genetic factors which are a subject of controversy. This conclusion is confirmed by the result of a [10]longitudinal study, which provided convincing evidence of the causal role between specific sport activity and cardiac structure and function.

Ethical Consideration: Approval and ethical clearance of the protocol was sought for Health Research and Ethical Review Committee of Mekelle University registration No ERC 1235/2019 dated 07.03.2019

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Changes of Hemodynamic Parameters at the Preparatory Stage of Periodization Training among the Male and Female Athletes Involved in Different Running Events

Fissehatsion G.yohannes[1], Soumitra Mondal[2], Abraha Hailu[3], Mathivanan[4]

[1]Research Scholar, [2]Associate Professor, Department of Sports Science, Mekelle University, [3]Cardiologist, Department of Internal Medicine, College of Health Science, Mekelle University, [4]Assistant Professor, Department of Sports Science, Mekelle University

Abstract

The present study was conducted to determine the changes occurs in hemodynamic variables of (HR, LVSD, LVESD, Stroke volume, Cardiac output) at different training phases of periodization in athletic events such as, middle distance and long-distance running between the male and female novice athletes in athletic training center at maychew, Ethiopia.

Materials and Method: In this qazi-experimental study, 18 athletes selected from different phases of training at maychew athletic training center in Ethiopia. The novice athletes of male and female were selected by their performance in the regional wise, as they are novice athletes in the training center they used to go for more than a year training however the researcher wanted to know the hemodynamic parameters changes occurs before the athletes used to engage in specific period of training. To analyze the hemodynamic parameter the subjects were taken to the comprehensive specialized regional hospital then, "Echocardiography was performed by VIVID E-19 undertaken using a 2.5MHz probe" are used to calculate several hemodynamic parameters the values of hemodynamic parameters were recorded at intervals. The recorded data were analyzed by SPSS 21 software, using independent t-test, it is concluded that while comparing the male and female novice athletes male athletes are dominating in long-distance then female athletes are dominating in middle distance running events.

Keywords: *Hemodynamic, athletes, events, echocardiograph.*

Introduction

A training session includes general and specific exercises related to their events performed in a given period. A recommended training session consists of different exercises, which increase the strength of large muscle groups that are important in everyday activities (arms, shoulders, spine, hips, and legs). An intensity equal to 80% 1-RM (i.e. 10-15 repetitions per set) seems to be the recommended amount of load necessary to produce significant changes. At the beginning of a training program, it is suggested to perform only one set of each exercise with 2-3 min rest periods between sets. Progression can go from 1 to 3 sets over training time for each type of exercise.[1] The training consisting of 2-3 sessions per week is recognized as sufficient for gaining health benefits, each session consisting of single sets of 8- 10 exercises.[2] Similar recommendations can also be found in Endurance running capacity may have initially arisen in the genus Homo. For evolution, human physiology has been optimized for covering large distances every day, to find enough food to sustain the brain's metabolism. Indeed, [3]the increasing popularity of marathon running in modern humans of all ages and abilities can be viewed as a legacy of our species' evolutionary capacity to run long distances (>5 km) using aerobic metabolism. Indeed, the number of starters in the London Marathon has risen from 7,000 to 35,000 over the last 30 years and participation in road racing, in general, has increased by more than 50% over the

Corresponding Author:
Fissehatsion G/yohannes
Research Scholar, Department of Sports Science,
Mekelle University, Ethiopia
e-mail: fisho2004@gmail.com

last decade. The increasing popularity of road running is typified by the emergence of recreational marathon runners who complete the 42.195 km event in a time of between 2hr 40min and 4hr 40min. [4] The marathon's potentially negative impact on the cardiac status and the occurrence of sudden cardiac deaths during this type of event have prompted much debate

The study of hemodynamic of athletes is one of the important areas of sports medicine, aimed at identifying the characteristics of the body that trains and diagnosis of preparedness. Body preparedness determines the level of fitness and characterizes the readiness of an athlete to achieve high sports results. [5]It develops under the influence of systematic and targeted training phases and its level depends on the balanced interaction of many functional systems that determine the nature of adaptive capacity, hemodynamic being among the most important ones. [6]To determine the functional condition and adaptive capacities, heart rate variability, blood pressure, and central hemodynamic of athletes are recently taken into consideration Such techniques are applied in sports medicine practice. [7]when it is primarily necessary to identify pre-pathological changes in the body of athletes, to predict athletic performance, which is only possible with a clear understanding of applied and adaptive mechanisms that develop in the body under the influence of training activity Recognition of these mechanisms can not only determine the tolerance towards physical exercises but also adjust training process purposefully with the use of various kinds of exercises

Materials and Method

Study area and study design: This study was conducted in Maychew athletic training center, Maychew town located in the tigray regional state, Ethiopia. The study design was qazi experimental. The athlete trainees used to go for one-year athletic training which includes different phases of training, but currently, the athletes are at the Preparatory stage of periodization.

Selection of Subject and Study Design: All subjects fulfilling selection criteria were provided informed consent for participating in the research The population defined in the research has included by novice athletes in, middle distance and long-distance running The sample included a total of 18 from 9 male and 9female athletes, who have selected from the different districts & woredas of Tigray region, Ethiopia and the selected athletes will undergo for a yearly advance training program to improve the top performance in athletics and participate in the national and international competitions. The variables of hemodynamic parameters are (HR-Hear rate, LVSD-Left ventricular systolic dysfunction, LVESD- left ventricular end-diastolic dimension, Stroke volume, Cardiac output)

Tools used for the study: Echocardiography and 2D imaging are used to calculate several hemodynamic parameters such as stroke volume, cardiac output, and cardiac index. These parameters are important for LVF. They can be derived from two measurements: The velocity-time integral (VTI) and the cross-section of the Left ventricular outflow tract (LVOT). The VTI represents the total flow across the area of the sample volume in systole. Therefore a PW Doppler is placed in the LVOT. The diameter of the LVOT = the cross-section of the LVOT. Stroke volume is the result of VTI multiplied with a diameter of LVOT.

Echocardiography performed by SJ. Echocardiography was undertaken using a Siemens Cypress® system with a 2.5-MHz probe. Echocardiography was performed in the standard way, with the male and female athletes placed in the left lateral decubitus position and 2D, M Mode and color Doppler techniques used. A fractional shortening, using M Mode echocardiography, of less than 25% or ejection fraction, using Simpson's method, of less than 50% was used as the cut-off for the presence of LVSD

Results and Discussions

Table: 1: The Initial stage Hemodynamic parameters of male and female athletes in middle distance running

Hemo dynamic	HR	LVSD	LVESD	SV	CO
Male	70±5.19	9±1	32.33333±2.30	40.66667±3.21	2.83±0.19
Female	66.33333±4.04	9±1	27.33333±0.57	36.66667±5.68	2.426±0.354
T-Value	0.950724	0.754404	0.046205	0.24558	0.173
p-value	0.3955	0.492589	0.965365	0.8181	0.871053

DF =4at level α=0.05, Abbreviations :(HR- Heart rate, LVSD- Left ventricular systolic dysfunction LVESD- left ventricular end-diastolic dimension, SV- Stroke volume, CO- Cardiac output)

The hemodynamic parameters by impedance cardiograph of all subjects in middle distance running the HR (M=45.21% & F=45.20%) LVSD (M=5.81% & F=5.56%) LVESD (M=20.88% & F=21.09%) SV (M=26.27% & F=26.42%) and CO(M=1.83% & F=1.72%) association of mean and standard deviation values the obtain t-values are HR (0.950724) LVSD (0.754404) LVESD (0.046205) SV (0.24558) and CO(0.173) but based on the p-values of the hemodynamic variables such as HR (0.3955) LVSD (0.492589) LVESD (0.965365) SV (0.8181) and CO(0.871053) while compared to male and female athletes of hemodynamic variables at the initial stage of novice athletes as df=4, the obtained p-value is greater than the set value P<0.005, therefore, there is no significant difference in all the hemodynamic variables among the male and female novice athletes in middle distance running.

Table: 2: The Initial stage Hemodynamic parameters of male and female athletes in long-distance running

Hemo dynamic	HR	LVSD	LVESD	SV	CO
Male	62.66667±6.02	9.333333±1.15	32.33333±2.51	40.33333±4.72	2.135±2.56
Female	72±9.84	8±1	31.33333±4.16	38.66667±6.65	2.813±0.86431
T-Value	0.247841	0.206526	0.743442	0.743355	0.668
p-value	0.81649	0.8464	0.49853	0.49846	0.54070

DF =4at level α=0.05, Abbreviations :(HR- Heart rate, LVSD- Left ventricular systolic dysfunction LVESD- left ventricular end-diastolic dimension, SV- Stroke volume, CO- Cardiac output)

The hemodynamic parameters by impedance cardiograph of all subjects in long-distance running the HR (M=45.20% & F=47.12%) LVSD (M=5.56% & F=5.24%) LVESD (M=21.09% & F=20.50%) SV (M=26.42% & F=25.30%) and CO(M=1.72% & F=1.84%) association of mean and standard deviation values the obtain t-values are HR (0.247841) LVSD (0.206526) LVESD (0.743442) SV (0.743355) and CO(0.668) but based on the p-values of the hemodynamic variables such as HR (0.81649) LVSD (0.8464) LVESD (0.49853) SV (0.49846) and CO(0.54070) while compared to male and female athletes of hemodynamic variables at the initial stage of novice athletes as df=4, the obtained p-value is greater than the set value P<0.005, therefore, there is no significant difference in all the hemodynamic variables among the male and female novice athletes in long-distance running.

Table 3: Percentage differences of Hemodynamic parameters of male and females athletes in middle distance and long-distance running events.

Events		Hemodynamic parameters				
		HR	LVSD	LVESD	SV	CO
Middle distance running	Male	45.21	5.81	20.88	26.27	1.83
	Female	45.20	5.56	21.09	26.42	1.72
Percentage Difference		0.02%	4.39%	1.00%	0.56%	6.19%
Long-distance running	Male	45.20	5.56	21.09	26.42	1.72
	Female	72.00	8.00	31.33	38.67	2.81
Percentage Difference		4.15%	5.92%	2.83%	4.33%	6.79%

Discussion

The aim of this study was to evaluate and observe the changes occurs at the initial stage of male and female athletes involved in, middle distance and long distance running events while testing the hemodynamic variables such (HR- Heart rate, LVSD- Left ventricular systolic dysfunction LVESD- left ventricular end diastolic dimension, SV-Stroke volume, CO- Cardiac output))the male and female athletes participate in different athletes events may not have a significance difference in hemodynamic parameters hence the obtain p values are greater than the set value P<0.005 though statistically there is no significance difference while observing the data shows there could be some difference in certain hemodynamic parameters therefore, the researcher converted the values in percentage mode as mentioned (table 4) further the researcher observed the changes happens at the different percentage levels of hemodynamic variables such the difference in percentage levels of the HR(2.18%) LVSD (1.07%) LVESD (0.52%) SV(5.16%) CO (4.54%) Similarly in middle distance running HR (0.02%) LVSD (4.39%) LVESD (1.00%) SV(0.56%) CO (6.19%) and in long distance running HR (4.15%) LVSD (5.92%) LVESD (2.83%) SV (04.33%) CO (6.79%). In middle-distance running the difference in percentage level of Female athletes are **higher** in LVESD and SV and **lower** in HR, LVSD, and CO than male athletes and in long-distance running the percentage difference in females athletes are **higher** in all hemodynamic variables such as HR, LVSD, LVESD, SV, CO than the males athletes. In trained athletes, physiologic cardiac adaptations occur to the hemodynamic load with chronic exercise training. LV volume overload might induce greater LV end-diastolic diameter and earlier and better early diastolic stretching of myocardial fibers, which in turn could be able to induce an enhanced SV through better use of the Frank-Starling mechanism (Warburton DE,2002). Endurance trained female athletes had lower SV and SI than males but the latter difference was no longer significant. [8]Because of the smaller body mass, female athletes have smaller heart volumes which may reduce LV end-diastolic volume that compared to male athletes, female athletes had lower SV values but when expressed relative to body mass, there was no gender difference.

Conclusion and Recommendation

To conclude we observed that male and female athletes will have unique differences in genetically considering the hemodynamic variables the results indicate though statistically there are no significant differences a percentage difference observation pointed that females have higher percentage levels in long-distance running than the male athletes. The males' athletes have a higher percentage level of hemodynamic parameters in middle distance running than the female athletes. The data obtained can be considered as baseline data athletes undergoing serious training in different phases. [9]All these changes can be accepted as a physiological adaptation for systematic intense activity and to a lesser degree in other factors like genetic factors which are a subject of controversy. This conclusion is confirmed by [10] the result of a longitudinal study, which provided convincing evidence of the causal role between specific sport activity and cardiac structure and function.

Ethical Consideration: Approval and ethical clearance of the protocol were sought for Health Research and Ethical Review Committee of Mekelle University registration No ERC1235/2019 dated 07.03.2019.

Conflict of Interest: Nil

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The Practice and Challenges of Women's Participation in Decision Making in the National Sports Organizations of Ethiopia

Mlashu Tsegay[1], Kesatie Legesse[2], AbebeEjigu[3], Mathivanan[4]

[1]Research Scholar, Department of Sport Science, Woldia University, Woldia, Ethiopia, [2]Associate Professor, Department of Sport Science, [3]Associate Professor, Department of Management, [4]Assistant Professor, Department of Sport Science, Mekelle University, Mekelle, Ethiopia

Abstract

The purpose of this study was to investigate the practice and challenges of women executive members in their participations in decision making in the National Sport organizations of Ethiopia. In the study, 21 federations,4 associations and 2 committees were included. We applied descriptive design with qualitative and quantitative method to conduct the study and the participants,from these organizations, were executive officers (n=162), general secretaries (n=27), and experts (n=27). The samples from each of the population unit were selected using universal sampling technique. For analyzing the collected data, Pearson Chi-square(sig) and descriptive statistics including computation of percentile and mean were used. The results reveal that women executive officers in most originations have shown low performance and low participation indecision making and policy implementation of the organizations. The major inhibiting challenges have been found to be incompetence ($p<0.002$), lack of conducive working conditions ($p<0.004$)and lack of time to make contribution in the organizations ($p<0.006$). To increase women's performance and participation in decision making in the national sport organizations, it is essential to change the work place environment and empower them through recurrent training workshops

Keyword: *Decision Making,Participation, Sport Organization, Women.*

Introduction

[1]Decision making is the key factor that determines organizational success in terms of achieving the intended goals. Being a component of organizational function, as points out, it is the process of choosing from the alternative course of actions. The author further explains that decision making is a process of locating and defines the problems and developing alternative solution to the problem weighing the variety of alternative solutions. [2] On the other hand, clarify that "decision making involves different changing conflicts and the risk of being right or wrong or building of number of facts, alternatives to choose the better from the alternatives".

Corresponding Author:
Mlashu Tsegay
Research Scholar, Mekelle, Ethiopia
e-mail: mlashu321@gmail.com

In connection to this, people who are to participate in making decisions particularly in organizational settings are required to choose the better one out of the alternatives to minimize the possible risks. Participation in making decision involves broader meanings.[3] Several authors such as clearly explain the term participation by using three important ideas namely involvement, contribution and responsibility.[4] Participation in decision making usually requires not only mental but also physical, emotional and psychological involvement. This obviously places more challenges on active participation of women in decision making activities as expected in the organizations.

[5]Women's participation in decision making is important to create conducive environment and encourage others to women's participation in organization issues in national sport organizations

From the view point of organizational decision

making[6] argues that women's participation and consultation have been understood as a mode of management and a set of procedures of which women may collectively have a shared role in making decisions about the institution in which they serve. These idea shows that participation of women in the management of technical activities should be taken into consideration in the process of making decision

Material and Method

Research Design: In the study, cross-sectional descriptive survey design with qualitative and quantitative method was applied since the design is more appropriate to describe the characteristics of a certain group.

Study population and sampling techniques: The population units of the study were composed of executive officers of the 27 national sport organization, (N=162), general secretaries (N=27), and experts (N=27. Applying universal sampling technique, all (216) of them were taken to be participants of the study. Of these participants, the majority (80.5 %) was men and only 19.5 were women.

Table 1: List of Ethiopia national sport organizations

List of federations			List of associations	List of committee
Football	Cycling	Chess	Bowling	Olympics
Volleyball	Gymnastics	World Taekwondo	Motor	Paralympics
Handball	Tennis	Dart	Feres	
Basketball	Swimming	Cultural sport	Golf Associations	
Athletics	Karate	International Taekwondo		
Table tennis	Box	Power lifting		
Badminton	Wushu			

Tools used in data collection: To collect the required data, two method of data collection namely questionnaire and interview were used.

Procedure of Data collection: The data were collected using questionnaires and interview from presidents general secretaries and experts. The questionnaires were distributed to the respondents through assistant data collectors selected based on set criteria who took the responsibility. The completed tool also collected back by them which made managing the work simple. The interviews were conducted by the researchers based on appointments fixed in agreement with the interviewees. To collect the data during the interviews, interview guidelines in which guiding questions were included were developed.

Study Variables: There were two categories of variables, independent and dependent, in the study. The variables were described, evaluated and their relationships were investigated. The independent variables were working environment, budget, and education level of women, experience and the dependent variables were participation of women in decision making.

Data Analysis: The data collected was systematically coded organized and entered the chosen software for analysis. SPSS version 22.0 was used for computing percentile, mean and Chi-square to investigate the associations between the challenges and performance of women in making decision.

Result and Discussion

Participation of women in decision making:

Table 2: Degree of women's participation inplanning and policy making in the organization

	Number of respondents (216)				
	Very low	**Low**	**Moderate**	**High**	**Very high**
Frequency	92	96	12	9	7
Percentage	42.59	44.44	5.5	4.16	3.24

The majority (87%) of women working in the executive positions of the national sport organizations did not have participation in making decisions while planning and designing and implementing policies (**Table 3.1**). However, insignificant (7.4%) number respondents replied that the extent of participation of women in decision making in the aforementioned situation was very high and high. From this analysis the result of the respondents can be analyzed the participation of women professionals in the decision process of the Ethiopian national sport organization is very low.

Table 3: Women's participation in budget and income generating activates

No	Item	V.L.		Low		Modern		High		V. High	
		F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
1	Establishing organization budget	73	33.7	78	36.	27	12.5	21	9.7	17	7.8
2	Setting budget for the organization development program	69	31.9	61	28	32	14	29	13.4	25	11.5
3	Amount budget for organization material supplies	85	39.5	87	40.5	16	7.4	15	6.9	13	6.06

As shown in Table 3.2 the level of women s' participation in establishing organization budget in national sport organization is 70% which was very low and low) and 60%of the participant responded that the present level of womens' participation in setting budget for the organization development program in national sport organization is V. low and low and 80%of the respondents states that the Present level of women's participation in preparing amount of budget for organization material supplies is Very low and low.

This shows that the present level of women s' participation in budget and income generating activities in each of the organizations are relatively low.

Eighty one percent of the respondents agreed that there was enabling condition for women to make decisions regarding planning and policy making. Furthermore, they explained that the involvement of women s' in decision making have the mandate and right to participate women in organization decision making in national sport organization but women did not have any participation in the decision making process.

Table 4 The presence of enabling environment for women's participation in decision making

	Responses	
	Yes	**No**
Frequency	44	10
Percentage	81.48	18.51

For the question "How do women participate in your organization in the planning and policy making in the organizations", most of them responded that there were no women's involvement in the organizations where as some others responded that they just allowed medium participation. Furthermore, they explained that women's must participate in planning and policy implementations of the Ethiopian national sports organizations

Table 5: Levels of women participation in the decisions to allocate budget and generate income in the organizations

	Responses				
	Very low	**Low**	**Moderate**	**High**	**Very high**
Frequency	30	19	-	4	1
Percentage	55	35	-	7.4	1.8

For the question how they in the women participated in allocation of organization's budget and income generating activities, 90% of them responded very low and low 10% of them replied that levels of women in allocated organization - budget and income generating activities is very low and low according to respondents idea few women's participate in budgeting and income generating activities of the organization.

The results of the associations of different factors with present practice of women's decision making in planning and policy implementation of the organizations indicates that the factors like sex of the employs. Establishing disciplinal policy, lack of good well from principals are not an association with present practice of women's decision making in planning and policy implementation of the organization this implies the main reason why women's are not participating in decision making in national sport organization is not depend on the above factors .rather it depend on other factors. Like The organization plans,(P<0.000), Evaluation of supervising practice (p < 0.005), setting budget for the organization (p<0.003),incompetence of women's(p<0.002),lack of conducive working conditions (p<0.004)and lack of time to participate(p<0.006)have an association with present practice of women decision making in planning and policy implementation of the organization.

Discussion

Most of the respondents stated that the present practice of women's decision making both in planning and policy implementation of the organizationis low. This finding was supported by

The Fourth World Conference on Women, held in Beijing in 1995, drew attention to the persisting inequality between men and women in decision-making. The Beijing Platform for Action reaffirmed that women's persistent exclusion from formal politics, in particular, raises a number of specific questions regarding the achievement of effective democratic transformations, in practice. It undermines the concept of democracy, which, by its nature, assumes that the right to vote and to be elected should be equally applied to all citizens, both women and men. The absence of women from political decision-making has a negative impact on the entire process of democratization. In addition, democratic institutions, including parliament, do not automatically achieve gender equality in terms of representation, or in terms of policy agenda setting and accountability. The Beijing Platform for Action emphasized that "women's equal participation in decision making is not only a demand for justice or democracy, but can also be seen as a necessary condition for women's interests to be taken into account. Without the perspective of women at all levels of decision-making, the goals of equality, development and peace cannot be achieved.

[7]The above result is also supported around the world, women now have more influence over the decisions that affect their lives. In even the most conservative societies, feminists and gender advocates have been able to forward more equitable policies and outcomes.[8] It also support the result Although women have equal status with men, they are still discriminated against, often due to gender stereotypes that are deeply rooted in society and amongst the Ukrainian power holders.[9] The finding indicated that a few women are from achieving equal participation in decision- making and leadership.

Pearson Chi-Square test result shows that the present practice of women's decision making in national sport organization doesn't have any relation with sex of the employees at the level of significance (p,<0.697), Establishing disciplinal policy of the organization (p<0.211), lack of good well from principals (P<0.231). This implies the main reason why women's are not practicing decision making in planning and policy implementation of the organization is not depending on the above factors.

Among the factors that havean association with women decision making in planning and policy implementation of the organizations were.

1, the organization plans have an association with present practice of women in planning and policy implementation of the organizations. Most of the respondents said that the organization plan doesn't consider the women to participate Planning and policy implementation of the organization. This indicates that women need to take part in deciding organization activities which give a sense of identification with the organization. Accordingly, the potential benefits of involving women s participation of decision making in organization seems unquestionable. Government should create a conducive environment which enables women's to participate women on organization decisions that enhance the organization development.

This result is supported by [10] conclude that in the organization plan does not consider womento participate in leadership. Those factors are all men's network, gender discrimination and conflict among women.

2nd factors that has an association with women decision making in Planning and Policy implementations is evaluation of supervision practice of the organization most of the respondents said that the evaluation of the supervision practice in national sport organization is very low (p<0.000). [11, 12] supports the above result showed a significant positive relationship between school practice supervision and student teacher performance (r=0.518, p,<0.000)in higher institution

The third factor is an association with women decision making all Planning and Policy implementation of the organization is setting transparent decision making(p<0.004). Most of the respondents said that setting transparent decision making in national level is low. [13]states that competence of an organization is affected by lack of setting transparent decision making. 4th factor is setting budget for the organization an association with women decision making Planning and Policy implementation of the organizations (p<0.003) [14]the above result was supported the results revealed that budget enables mobilization of resources and maximizes proper utilization of resources in the adequate and correct ways and that is facing the problem of being not having computerized budgeting software. According to the findings it is recommended that the organization should be carefully in setting the goals for the financial year by making sure that those goals must be achievable

in order to avoid wastage of resources.

5th factor incompetence of women have an association with present practice of women decision making in Planning and Policy implementation of the organization the above result was supported to Women make up the majority of civil servants at lower-level positions, requiring lower qualifications and not carrying significant responsibility and supported by his findings showed that lack of self-esteem among women and girls was one of the factors identified to have been preventing more women and girls from participating in sports organization and management

6th factor is lack of time to participate association with present practice of women's participation in planning and policy making (p<0.006) the above result was supported by Gender gaps in [15]unpaid care work begin at an early age for girls and boys, increasing for women at marriage and childbirth. For men, however, marriage may actually decrease their time spent on unpaid care work: married women spend less time on routine housework than single women do

Conclusions

The Research finding indicates that present practice of women's decision making, in Planning and Policy implementation in the organization is very low. The factors that affect women's decision making, in Planning and Policy implementation in the organization are organization plan, evaluation of supervision practice, lack of budget for the organization, lack of time to participate. Those factors are an association with women do not participates in Planning and Policy implementation in national sport organizations. The respondents also states that there is lack of budget in most of the organizations to facilitate training program, to fill full the necessarily equipment's,, lack of team spirit, lack of motivation,lack of attention to participate in the organization are also the other factors that affect women decision making in national sport organizations of Ethiopia

This indicates that women need to take part in deciding organization activities which give a sense of identification with the organization. The overall women s' participation of decision making in national sport organization is below average. This indicates that organization s do not properly utilize the different potentials and experiences of women s for bettering either the quality of their women or organization activities.

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Anthropometric and Physiological Profiles of Football Players in Tigray Region, Ethiopia

Mulugeta Worku[1], Soumitra Mondal[2], Saravanan Muthupandian[3], Leyekun Tadesse[4]

[1]Research Scholar, Department of Sport Science, Mekelle University, Ethiopia, [2]Associate Professor, Department of Sport Science, Mekelle University, Ethiopia, [3]Associate Professor, Medical Microbiology and Immunology, Mekelle University, Ethiopia, [4]Assistant Professor, Department of Sport Science, Mekelle University, Ethiopia

Abstract

The objective of the study was to compare Anthropometric and physiological profiles of different playing position football players in the Tigray region, Ethiopia. From a total of 200 Tigray region football players, 101 different playing positions (Gk, DF, MF, and SK)were selected with purposive sampling technique. Descriptive cross-sectional design and quantitative research method were employed to compare physiological variables Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Mean arterial pressure (MAP), and resting heart rate (RHR) of players. To determine the significant difference between different club football players one-way analysis of variance (ANOVA). The result showed that there were no significant differences between age, BMI, Systolic blood pressure, diastolic blood pressure, mean arterial pressure, and resting heart rate. But, there were significances different on height and weight of Goalkeepers, Defenders, Midfielders and Strikers football players $P< 0.05$. It was concluded that there was no significant difference between SBP, DBP, MAP, and RHR of different position football players. Coaches and sport science experts take into consideration factors, height,weight,Body mass index, and position of football players during evaluating physiological tests.

Keywords: *Football, Physiology, Blood pressure, playing position.*

Introduction

Modern soccer is the most popular sport worldwide and originated from United Kingdom, England. It played by both teams of eleven players within ninety minutes of 15 mints break time. [1]Most elite African soccer players migrated to English premier league clubs and Spanish league. Football is governed by the worldwide federation international football association (FIFA). [2]Training youth football players important for developments of sport at national and international levels. [3]Modern football games greatly demand physiological profiles Vo2Max, heart rate, blood, and physical fitness of the players.

Physiological characteristics have a positive relationship with the playing ability of soccer players. [4]Soccer requires agility, speed, tactical, technical, physical fitness, and physiological profile players, and studies are useful to identify the performance and talents of Ethiopian premier league soccer players. [5]Soccer is the most spectacular team sport that needs systematic investigations on scientific training with different playing positions of players.

[6]Football helped in nation-building of different societal values and cultures. 270 million people were involved in soccer developments from Africa, Brazil, and Russia. [7]Physiological evaluation of football training refers to the measurement of anatomical, physiological, biochemical, and functional changes of the target to effects of training. Also, physiological assessments are very important to researchers and coaches to identify talents, performance, and modify training intensities and durations.

Aerobic capacity of soccer players affected by

Corresponding Authour:
Mulugeta Worku
Research Scholar, Department of Sport Science
Mekelle University, Ethiopia
e-mail: mulugetaworku92@gmail.com

Anthropometric conditions of participants. Similarly, physical and physiological parameters affected by the player's position and mental ability of players during competition season. [8]As the researcher recommended that during planning, training program coaches, football players, and sport managers consider positional differences. Therefore, football coaches have to give appropriate specific training based on formation and player positions.

Study on physiological parameters of between American professional soccer players during a competition session, sedentary population, and long-distance runners' results of the study concluded that [9] American soccer players have high cardio-respiratory endurance (Vo2 max) as compared with that of the sedentary population but low compared with that of long-distance runners. Also, there is a significant difference in body mass index (BMI) among professional soccer players and sedentary populations.

[10]Soccer is influenced by Anthropometric characteristics, physiological, psychological, tactical, and technical and biochemical conditions of football players. Improving the physical fitness and aerobic capacity of soccer players has significance for team success. Physiological tests are important for players and referees. Based on physiological data coaches can determine performances and screen out the best players .

[11]Various studies have been conducted on the assessment of the physical performance of football players, but very few studies were conducted based on playing position, especially in Africa. Ethiopian premier league soccer players problems that affect effectiveness clubs were lack of sports facilities, finances, and highly qualified professional players. [12] Ethiopian sport development and challenges as compared with that of other countries scholars suggest that [13]Ethiopian soccer players need to develop physical, technical, tactical, and psychological skills. Coaches better to give training based on the player's position and consider players' soccer ability. Concluded that players should consider playing position is influenced by height, weight, and age of players.

Physiological profiles are helpful to measure the effect of exercise training on performance and the health condition of soccer players. Tigray region clubs are Tigray wuha sera F.C, Dedabit F.C, Shire Endaselassie F.C, Mekelle 70 Enderta F.C, and Welwallo Adigrte University football clubs are newly emerging and participated in the Ethiopian premier league, super league, and national first league. But, more physiological research was not done before due to these reasons, researchers believe that the study has a significant base of filling the scientific knowledge gap on anthropometric and physiological profiles of different playing position Tigray region football players.

Methodology

Study Area: The research study was conducted in northern parts of Ethiopia Tigray region, Mekelle, Adigrate, and shire town representing clubs who had played in the Ethiopian premier league, Ethiopian super league, and National league competition program formats.

Research Design: Descriptive Cross-sectional design and quantitative research method were employed to test and compare the physiological variables of different club soccer players.

Sample and Sampling Technique: To obtain the required data soccer players were selected through purposive sampling techniques based on the player's position from a total of 200 Tigray region football players 101 players such as fifteen goalkeeper, twenty seven defenders, thirty six mid fielders, and twenty three strikers' players.

Administration of the physiological test: The researcher has given orientation and detailed procedures of the study for football players. Informed consent was signed before sample collection on a consent form. Hospital nurse was recorded the blood pressure of soccer players' by using Digital Blood Pressure Monitor. Height of players measured at standing position and body weight in kilograms measured with the digital weighing machine. Similarly, body mass index (BMI) was calculated with kg/m2) conversion formula.

Statistical Analysis: The data obtained from football players' physiological variable test was first collected, organized, tabulated, and coded in SPSS version 21. Descriptive statistics mean and standard deviation are used to analyze basic information and distribution of scores. The data collected through physiological tests were summarized and analyzed quantitatively, then, analyzed by one-way analysis of variance (ANOVA) to conclude the differences between different playing position soccer players. Multiple comparison test was done by post*hoc* test (LSD) at the significant alpha value of ($p < 0.05$)

Results

Table 1. Comparison of Anthropometrics and physiological variables of different position soccer players

Variables	N	GK Mean±SD	N	DF Mean±SD	N	MF Mean±SD	N	SK Mean±SD	N	All Positions Mean±SD
Age (Years)	15	24.2±3.32	27	24.67±3.187	36	23.69±3.64	23	23.83±3.70	101	24.06±3.46
Height (Cm)	15	1.80±0. 08	27	1.74±0.05	36	1.75±0.06	23	1.71±0.06	101	1.74±0.06
Weight (Kg)	15	75.87±5.80	27	68.07±6.37	36	69.42±8.29	23	66.52±7.18	101	69.36±7.70
BMI (Kg/M^2)	15	23.42±2.27	27	22.32±1.67	36	22.65±2.29	23	22.55±1.81	101	22.65±2.03
SBP (Mm Hg)	15	119.53±7.65	27	118.56±8.85	36	120.58±11.84	23	122.39±10.32	101	120.3±10.15
DBP (Mm Hg)	15	75.93±6.64	27	73.52±9.78	36	74.42±11.34	23	78.43±10.13	101	75.32±10.10
MA P (mmHg)	15	90.34±5.47	27	86.66±10.24	36	89.65±9.77	23	92.96±9.31	101	89.71±9.43
RHR(B/min)	15	68.2±19.81	27	61.89±16.38	36	61.14±9.43	23	61.39±8.38	101	62.45±13.31

M-Mean, SD-Standard Deviation, GK-Goal Keeper, DF-Defender, MF Midfielder, SK-Striker, BMI- Body Mass Index, SBP-Systolic blood pressure, DBP-Diastolic blood pressure, MABP-Mean Arterial pressure, RHR-Resting heart rate

Table 2. One Way Analysis of variance (ANOVA) results of GK, DF, MF and ST football players of Tigray region, Ethiopia

		Sum of Squares	Df	Mean Square	F	Sig.
Age	Between Groups	16.3	3	5.433	0.445	0.721
	Within Groups	1183.343	97	12.199		
	Total	1199.644	100			
Height (M)	Between Groups	0.068	3	0.023	5.218	0.002
	Within Groups	0.42	97	0.004		
	Total	0.488	100			
Weight (KG)	Between Groups	865.094	3	288.365	5.515	0.002
	Within Groups	5072.074	97	52.289		
	Total	5937.168	100			
BMI (Kg/M2)	Between Groups	11.924	3	3.975	0.959	0.416
	Within Groups	402.15	97	4.146		
	Total	414.074	100			
SBP (mmHg)	Between Groups	194.461	3	64.82	0.622	0.603
	Within Groups	10116.628	97	104.295		
	Total	10311.089	100			
DBP (mmHg)	Between Groups	345.785	3	115.262	1.133	0.34
	Within Groups	9868.076	97	101.733		
	Total	10213.861	100			
MAP (mmHg)	Between Groups	499.921	3	166.64	1.923	0.131
	Within Groups	8406.962	97	86.67		
	Total	8906.884	100			
RHR(B/min)	Between Groups	592.1	3	197.367	1.117	0.346
	Within Groups	17138.85	97	176.689		
	Total	17730.95	100			

GK-Goal Keeper, DF-Defender, MF-Midfielder, SK-Striker, BMI- Body Mass Index, SBP-Systolic blood pressure, DBP-Diastolic blood pressure, MABP-Mean Arterial pressure, RHR-Resting heart rate, P<0.05.

As the ANOVA comparison Table, 2 showed that there were no significant differences between in Age, BMI, Systolic blood pressure, diastolic blood pressure, mean arterial pressure, and resting heart rate. But, there were significances different on height and weight of different playing position Goalkeepers, Defenders, Midfielders and Strikers football players P< 0.05.

Discussions

The results of the study showed that no significant difference between goalkeepers, defenders, midfielders and striker football players in physiological profiles. But, there were significant differences in the height and weight of football players. Another study examined the physical fitness, physiological and Anthropometric parameters of Indian different club soccer players. 150 soccer players from six Indian different clubs participated in the study. The results of the study showed that there were significant differences in age, height, weight, body fat %, flexibility, agility, and Vo2 max. [14]Concluded that heredity factor and physical fitness levels may be the major cause of differences in playing position, physiology, fitness, and Anthropometric variables of Indian football players as compared to international standards of Americans, Europeans, and Austrian football players.

Assessed the physical and physiological profiles of a soccer player in the pre-competition session. A total of 270 professional soccer players' goalkeepers, midfielders, defenders, and forwards involved in the study and (ANOVA) were used to determine their significance differences. [15]The results of the study showed that there was a strong relationship between body composition, aerobic fitness, aerobic powers, and playing positions. However, there were also significant differences between blood lactate, maximum oxygen consumption, and body compositions. Coaches and medical stressed on specific playing positions and physiological profiles during designing scientific training programs for soccer players.

[16]English premier league professional soccer players' physical performance was high due to high-intensity training such as sprinting, jumping, talking, and covering lots of distance .FIFA world cup 2010 held in South Africa a total of 443 different position players such as goalkeepers, external defenders, central defenders, midfielders, and forward players distanced covered by players were analyzed. There were significant differences in the distance covered by different position soccer players . [17]Football sport requires excellent fitness levels, high endurance training, and aerobic and anaerobic energy production mechanisms. [18]Aerobic high-intensity training and speed endurance training are elements of fatigue resistance training which increase soccer player's fatigue resistance.

Modern times much research has been carried out on a scientific training, nutritional strategies, and matches the performance of soccer players. But, more research not did on the physiological function of soccer players. [19]The contemporary research report described that 70 % of players perform a low-intensity activity, heart rate, and body temperature. Some players perform high-intensity exercise during a much which leads to muscle glycogen, oxidation of fat, fatigue, and tiredness. High-intensity speed training helps to improve the performance and playing ability of soccer players. Thus, coaches should-have to give high-intensity speed training for football players.

Comparative study of physiological variables among the cross river and Akwa Ibom state 20 football referees which were studded in a quasi-experimental design. [20]The results of the study showed that there are no significant differences between cross river and Akwaibom state football referees on physiological variables such as systolic blood pressure, diastolic blood pressure, and resting heart rate. [21]There is little scientific review literature in the area of performance and physiology of soccer sport based on the player's position to compare with international standards. As he concluded that there is a significant difference in Vo2 max among Indian national players on specific playing positions. [22]There was a significant change in the biological and physiological parameters of football players. Football sport needs strength, speed, tactics playing abilities, and high-intensity training before competitions.

Thestudy aimed to analyze the body composition of male football players in Macedonia. 942 young male football players participated in the study. Results of study showedthatheight=178.39±6.11cm;weight=77.02±7.57; Lean body mass =65.65±6.38; muscle mass percentage =53.23±2.78; body mass percentage =17.05±1.27; fat mass percentage =14.58±1.48. [23]Based on the result of the study concluded it serves as references results for young football players of Mekodenia.

[24]The main objectives of the study were to evaluate the relationship between physiological variables and

playing ability of university soccer players. Based on the result of the study researcher concluded that there is a significant difference between playing ability of university soccer players and physiological variables such as systolic blood pressure, diastolic blood pressure, breath-holding time, and resting heart rate.

The purpose of the study was to test the physiological variables of South African university soccer players. 27 male soccer players participated in the study. There is no significant difference between defenders, goalkeepers, midfielders, and strikers in flexibility. But there is a significant difference between different playing positions on Vo2 max, height, and weight. Based on the result of the study, researchers concluded that coaches and sports scientists can adjust and reshape programs according to playing position.

The study tested the physiological and skill, fitness levels of *Asante Kotoko* soccer players.25 different soccer-playing positions such as defenders, mid-fielders, strikers, and goalkeepers were involved in this study. [25] The results of the study showed that except for muscular endurance all physiological and fitness variables such as body mass index, heart rate, blood pressure, 30 m dash, and agility have significant differences based on the players' position at p<0.05.

Studied on problems that affect the physical performance and possible solutions of university soccer players. [26]Eleven soccer players with the age of 19-22 had participated in the study and training was given to players. Based on the results of the study researcher concluded that there are significant differences among university soccer players on Anthropometric and physiological variables in pre and post-test scores. Also, there are no significant differences observed in the pre-posttest on hematological and biochemical variables of university soccer players. The researcher recommended that further investigation is important in professional soccer players.

There is much review literature on the physiological variables of soccer players in different countries such as the U.S.A, Europe, but no more review on India and South Asia on the physical characteristics of soccer players. The study aimed to find out the physiological variables of elite soccer players in India.22 professional soccer players were participating in this study. [27]The results of the study showed that due to lack of Indian soccer player's success height, weight, body fat %, Vo2 max, forced vital capacity, anaerobic threshold, lactic power index, lactic work index were low as compared with that of other international competitive professional team in the world. The researcher recommended that to be successful in international competitions must improve the fitness and skill of players by giving scientific training.

Conclusion

There was no significant difference between SBP, DBP, MAP, and RHR on goalkeepers, defenders, midfielders, and strikers P>0.05. Playing position has no effects physiological profiles of systolic blood pressure, diastolic blood pressure, mean arterial pressure and resting heart rate of football players; but there were significant differences in height and weight of football players in Tigray region during the preparatory season. Therefore, coaches and sport science experts should take into consideration height, weight, body mass index and playing position while testing and designing training programs.

Ethical Clearance: This research study paper does not affect the morals and health of soccer players. Soccer players participated in this research study and blood pressure measured with their consent. Club coaches aware of to whom it concerns the latter has written by the sports science department. The research was done based on national and international scientific guidelines of ethics approved Number of ERC-1376/2019 approved by Mekelle University, health research ethics review committee (HRERC).

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The Effect of High Intensities and Moderate Intensities Football Specific Circuit Training on Selected Hematological Variables among Under-17 Football Players

Muez Tsegay[1], Soumitra Mondal[2], Hayelom Kebede Mekonen[3], Theodros Berhanu[4]

[1]Research Scholar, Department of Sports Science, Adigrat University, Adigrat, Ethiopia, [2]Associate Professor, Department of Sports Science, Mekelle University, Mekelle, Ethiopia, [3]Assistant Professor, Department of Anatomy, College of Health Sciences, Mekelle University, Ethiopia, [4]Assistant Professor, Department of Sports Science, Mekelle University, Mekelle, Ethiopia

Abstract

Objective: The purpose of the study was to investigate the comparative effect of high intensities and moderate intensities football specific circuit training on selected Hematological Variables among Under-17 football players in Ethiopia.

Method: Randomized control group pretest-posttest design was implemented for this experimental study. For the purpose of this study from a total of ninety (90) football players of Adigrat city sixty (60) footballers were taken as a sample size. The subjects were at the age of $16.15\pm.71$ years, height of $1.62\pm.54$ meter and weight of 50.67 ± 3.71. These subjects were distributed into the experimental groups of high intensity circuit training group (HICT group) $N_1=20$, moderate intensity circuit training group(MICT group)$N_2=20$and control group (CG) N=20. Only HICT group and MICT group were engaged in high intensity circuit training and moderate intensity circuit training for sixteen weeks respectively. The selected hematological parameters were Red blood cells (RBC), White blood cells (WBC), Hemoglobin (Hgb), Hematocrit (HCT), Mean cell volume (MCV) and Mean cell hemoglobin (MCH). The data was collected from cubital vein as per the guide for blood specimen collection procedure at both pre and post-tests. The data was analyzed using ANCOVA and post hoc test for paired mean comparison when significant difference exists.

Result: Our finding indicated that the High intensity circuit training group increased significantly in RBC, WBC, Hgb and MCV than control group with (519, P=.000), (91.595, P=.000), (.903, P=.019) and (5.668, P=.000) respectively. Moderate intensity circuit training Group increased significantly from the control group on RBC, WBC, Hgb and MCV with a mean difference of (.746, P=.000), (1.894, P=.000), (1.238, P=.000) and (2.777, P=.000) respectively. The High intensity circuit training group decreased significantly in HCT and MCH with (-3.175, P=.000) and (-1.344, P=.000) respectively. Moderate intensity circuit training Group decreased significantly from the control group on HCT and MCH with (-4.310, P=.000) and (-2.076, P=.000) respectively. In addition to this the Moderate intensity circuit training Group showed significant increase in RBC and decrease in MCH from High intensity circuit training group with (.227, P=0.014) and (.732, P=.032) respectively. The High intensity circuit training group increased significantly in MCV than the Moderate intensity circuit training Group with (2.892, P=.001).

Conclusion: From our finding we conclude that different intensity of training brings different changes in different Hematological parameters and similar changes in some variables as well. Thus the circuit training intensity should be considered in the coaching plan for junior players.

Keywords: *High intensity, Moderate intensity, circuit training and hematological parameters.*

Corresponding Author:
Muez Tsegay
Research Scholar, Department of Sports Science,
Adigrat University, Adigrat, Ethiopia
e-mail: mueztsegay8@gmail.com

Introduction

[1]Football is the well-known and widely spread type of sport in the world and it is also among the leading sports in Ethiopia.[2] The match of football is an intermittent type of activities that requires both aerobic and anaerobic qualities of its participants and thus to ensure players quality as per the demand of the match.[3] The coaches of Football training have been incorporating systematic method of training .[4] Among which the modern circuit training method is one of the most commonly used method in many sports including football. [5 & 6] This method of training has been playing a role on improving the physical, physiological and hematological demands of footballers to participate in the game efficiently. [7] Circuit training is a conditioning training method in which 9 to 12 exercise protocols were arranged in different stations where participants perform at moderate intensity at each stations with rest time in between stations. [8 & 9] Some studies indicated that increasing the intensity of this type of training by limiting the rest time given between stations would give better benefits for the trainers as well as trainees. But the comparative benefit of varied intensity of circuit training in relation to the hematological variables is not studied yet to focus. Thus, researchers of the current study initiated to fulfill the study gap related to hematological variables in relation to the intensity. This study was focused on subjects of under 17(seventeen) football players. This is because; [10] this stage of age category is the stage, from which qualified players of high level football develops their physical, physiological and hematological qualities. [11 & 12] Hematological parameters are crucial for the football players to be efficiently provided with enough amount of energy that the game required for its aerobic performance demand of the players. [13 & 14] The changes in blood parameters bring changes in the physical performance capacity of the players to enhance aerobic performance and [15 & 16] the hematological parameters can be changed as the result of training. However the change on hematological parameters depends on type and intensity of training. So the current study was intended to examine the comparative effect of high intensity and moderate intensity football specific circuit training on selected hematological parameters of Under 17 football players in Ethiopia. We hypothesized that there would be significant difference on the effect of moderate and high intensity circuit training groups on hematological parameters.

Materials and Method

Study setting and ethical approval: Ethical clearance was obtained from Mekelle University, College of health sciences, Health Research Ethics Review Committee (HRERC) with a Ref. ERC 1236/2019 dated 7/ 03/2019 and the written assent from the subject themselves and the consent from their guardians was obtained before the experimental procedures and Physical activity readiness questionnaire form was fulfilled by each participant. The study was conducted in Adigrat city which is found in eastern zone of Tigray regional state of Ethiopia with an elevation of 2,457 meters above sea level. It is located at longitude and latitude 14°16'N and 39°27E.

Study design and participants: The design of this study was Randomized control group pretest-posttest which aimed to study on the effect of high intensity and moderate intensity football specific circuit training on selected hematological variables among Under-17 football players. For the purpose of this study from a total of ninety (90) players of Adigrat city sixty (60) players were taken as a sample size using the[15 & 16] corrected formula for finite population. I.e. $n = \dfrac{n_o}{1 + \frac{n_o - 1}{N}}$ to meet 80% of power where=is new adjusted sample size; no is Cochran's sample size recommendation at p=0.2 variance; 95% confidence and ±5 precision; N is population size.

Inclusion Criteria: In this study male players are at the age of 15-17 years and volunteers to give their assent and consent from their guardian were included.

Excluding criteria

Those who were taking any drug for any medical case

Who fails to fulfill physical activities readiness questionnaire

Randomization: The sixty (60) subjects were randomly using the random number selected from the eligible subjects. These were distributed into the experimental N_1=20 (high intensity circuit training group), N_2=20 (moderate intensity circuit training group) and N=20 (control groups) using the simple random sampling technique.

Procedures of data collection: To collect the data from blood specimen at both pre and post training the subjects were well instructed to be fasting during the blood specimen collection time. Before testing the subjects were removed their tight closes, the subjects were take 15 minutes of rest in a sitting chair. The subjects were sat with feet flat on the floor, arms were supported at the heart level on the chair and the body had support back to the chair. The data was collected from cubital vein at 7:00–9:00 AM East African time zone using 5ml syringe to take 3-5ml of whole blood. The collected blood was drawn in to k2EDTA anticoagulant test-tube. After properly mixing the blood with EDTA anticoagulant the sample was transported to area where hematological analysis is taking place. The hematology machine (Mindras 5800) was checked its quality control using the high, normal and low values of the quality control samples to check the machine performance and also using the background (blank) checkups. After, the machine is passed all the necessary quality inspection steps the sample was analyzed. The machine took 6μl of whole blood of the sample. The result was printed out for further analysis.

Training (Interventions): For the purpose of this study pilot study was taken to determine the required intensity which is 75% to 85% of HR max for Moderate intensity and 85% to 90% of HR max for high intensity training using the heart rate monitor. Thus the training program was designed based on the required intensity. The two experimental groups of HICT group and MICT group were engaged in the high intensity circuit training (HICT) and Moderate intensity circuit training (MICT) respectively for sixteen(16) weeks and three times per week whereas the Control group did not engage in the circuit training but in the activities that are not performed by the experimental groupsexcept the circuit training. Pre-test was taken to consider the base line data and After 16 weeks training post-test was taken. The intensity was determined based on a relationship between the work intensity and HR. (Banister 1991).

Data Analysis: Descriptive statistics was employed for mean, standard deviation, minimum and maximum of the data and P-P-plot was used to check the normality of the continuous data. To check significance difference among the groups analysis of covariance (ANCOVA) was employed and its assumptions were checked. In the result that showed significant difference boneferrani post hoc test was used for paired mean comparison to identify which group significantly differs from the others. All statistical analyses were performed using IBM-SPSS version 23. Significant level was set at 0.05.

Results

The comparison on demographic parameters of HICT group, MICT group and Control group showed that they had no significant difference in all parameters of the demographic characteristics (Table 1). Thus we can conclude that the groups formed for the purpose of this study were almost homogeneous groups.

Table 1: Comparison on the Demographic data of HICT Group, MICT group and Control group

Variables	HICT group (n=20)	MICG group (n=20)	Control group (n=20)	F' ratio	Sig
Age	16.20±.69	16.30±.73	15.95±.68	1.30	.297
Weight	51.70±2.90	50.55±4.01	49.75±4.03	1.41	.253
Height	1.62±.041	1.64±.049	1.60±.064	2.43	.097
BMI	19.55±.93	19.42±1.15	19.14±1.73	.497	.611

The analysis of covariance for RBC, WBC, Hgb, HCT, MCV and MCH (Table 2) yieldedF ratio of 50.96, 13.64, 9.27, 26.06, 29.21 and 27.55 respectively. This showed the F ratio found for each selected hematological parameters was greater than the required table Value for Df (2,56) which is 3.155 and thus the three groups showed significant difference on their RBC, WBC, Hgb, HCT, MCV and MCHas the result of the intervention.

The result was subjected to the boneferrani post hoc test for paired mean comparison(Table 3). The RBC result yielded that the mean difference of HICT group and MICT Group was (-.227). This result showed that the difference made by MICT group over HICT group was significant (P=.014), the mean difference made by HICT group on Control Group was (.519) which is significant (P=.000). The mean difference made by MICT group

on Control group (.746) was significant (P=.000). The mean difference of WBC made by HICT group on Control Group (1.595) was significant (p=.000) and the mean difference made by MICT group on Control Group (1.894) was significant (P=.000). The mean difference made by MICT group on HICT group (.299) was not significant (P=1.000). The mean difference of Hgb made by HICT group on Control group was (.903) which was significant (P=.019). The mean difference made by MICT group on Control Group (1.238) was found to be significant at (P=.000). The mean difference made by HICT group on MICT group was (-.336) which was not significant(P=.989). The HCT mean difference made between HICT group and Control group was (-3.175, P=.000). The mean difference of MICT group and Control Group (-4.310) was found to be significant at 0.05 levels (P=.000). The mean difference made by HICT group and

MICT group (1.135) showed no significant difference (P=.212). The MCV mean difference of HICT group and Control group showed significant difference. I.e. the HICT group increases significantly(5.668, P=.000). The mean difference of MICT group and Control Group were found to be significant at 0.05 levels(2.777, P=.001). The MICT group increased significantly. The HICT group also showed significant increase than the MICT group (2.892, P=.001). The MCH mean difference made between HICT group and Control group showed significant difference. That is HICT group decreased significantly (-1.344, P=.000). The mean difference of MICT group and Control Group showed significant difference at 0.05 levels. That is the MICT group showed significant decrease from Control group(-2.076, P=.000). The MICT group showed significant decrease from HICT group (.732, P=.032) and

Table 2 Analysis of covariance for the adjusted post-test mean of HICT group, MICT group and Control group

Variables		Source of Variance	Sum of squares	Df	Mean square	F ratio
RBC in (x10^6/µL)	Adjusted post-test	Between	5.85	2	2.92	50.96*
		Within	3.21	56	.057	
WBC in (x10^6/µL)	Adjusted post-test	Between	41.42	2	20.71	13.64*
		Within	85.02	56	1.51	
Hgbin (g/dL)	Adjusted post-test	Between	16.40	2	8.20	9.27*
		Within	49.51	56	.88	
HCT in %	Adjusted post-test	Between	194.27	2	97.13	26.09*
		Within	208.43	56	3.72	
MCV in(fL)	Adjusted post-test	Between	320.68	2	160.34	29.21*
		Within	307.39	56	5.48	
MCH in (Pg)	Adjusted post-test	Between	42.50	2	21.25	27.55*
		Within	43.19	56	.77	

Significant at 0.05 level of significance F=Ratio was tested its significance at 0.05 level of significance = Df (2, 57) = 3.155, df (2, 56) = 3.155

Table 3 Boneferrani post hoc test for paired mean comparison

Variables	HICT group	MICT group	Control group	Mean difference	Sig
RBC	5.91	6.14		-.23*	.014
	5.91		5.34	.52*	.000
		6.14	5.34	.746*	.000
WBC	7.86	8.16		-.299	1.000
	7.86		6.27	1.595*	.000
		8.16	6.27	1.894*	.000

Variables	HICT group	MICT group	Control group	Mean difference	Sig
Hgb	16.62	16.95		-.336	.989
	16.62		15.72	.903*	.019
		16.95	15.72	1.238*	.000
HCT	46.96	46.32		1.135	.212
	46.96		49.96	-3.00*	.000
		46.32	49.96	-3.63	.000
MCV	92.59	89.70		2.89*	.001
			86.92	5.66*	.000
		89.70	86.92	2.77*	.001
MCH	28.56	27.82		.732*	.032
	28.56		29.90	-1.34	.000
		27.82	29.90	-2.07	.000
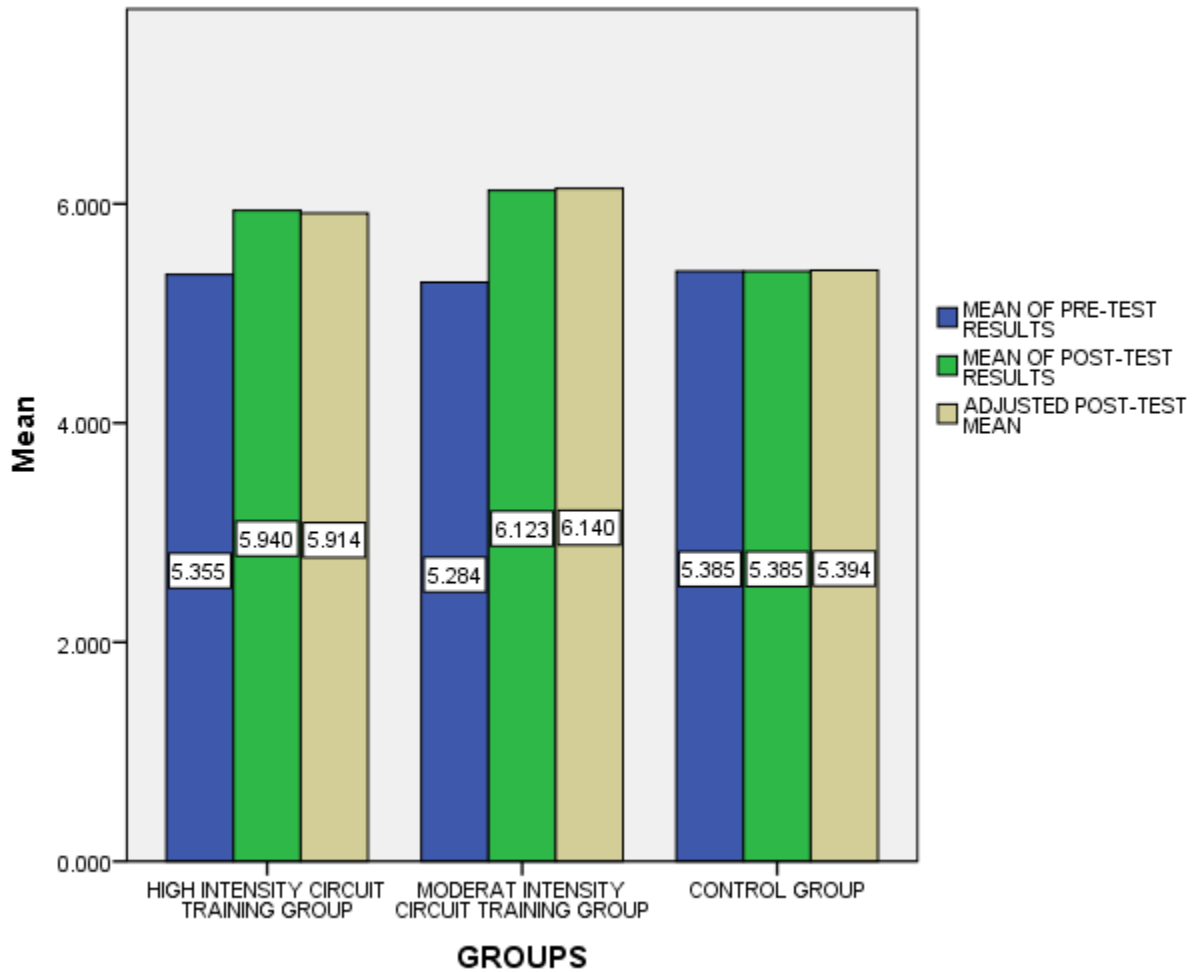
Fig. 1 Descriptive statistics of RBC.
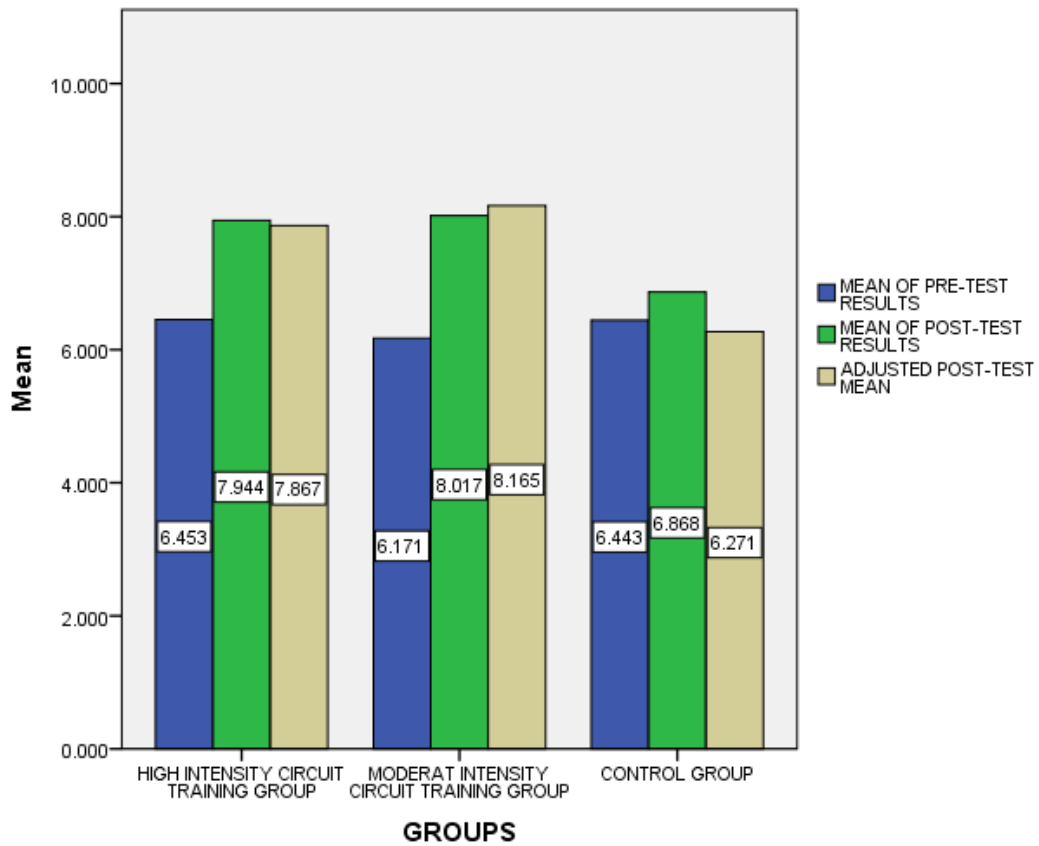
Fig. 2 Descriptive statistics of WBC.
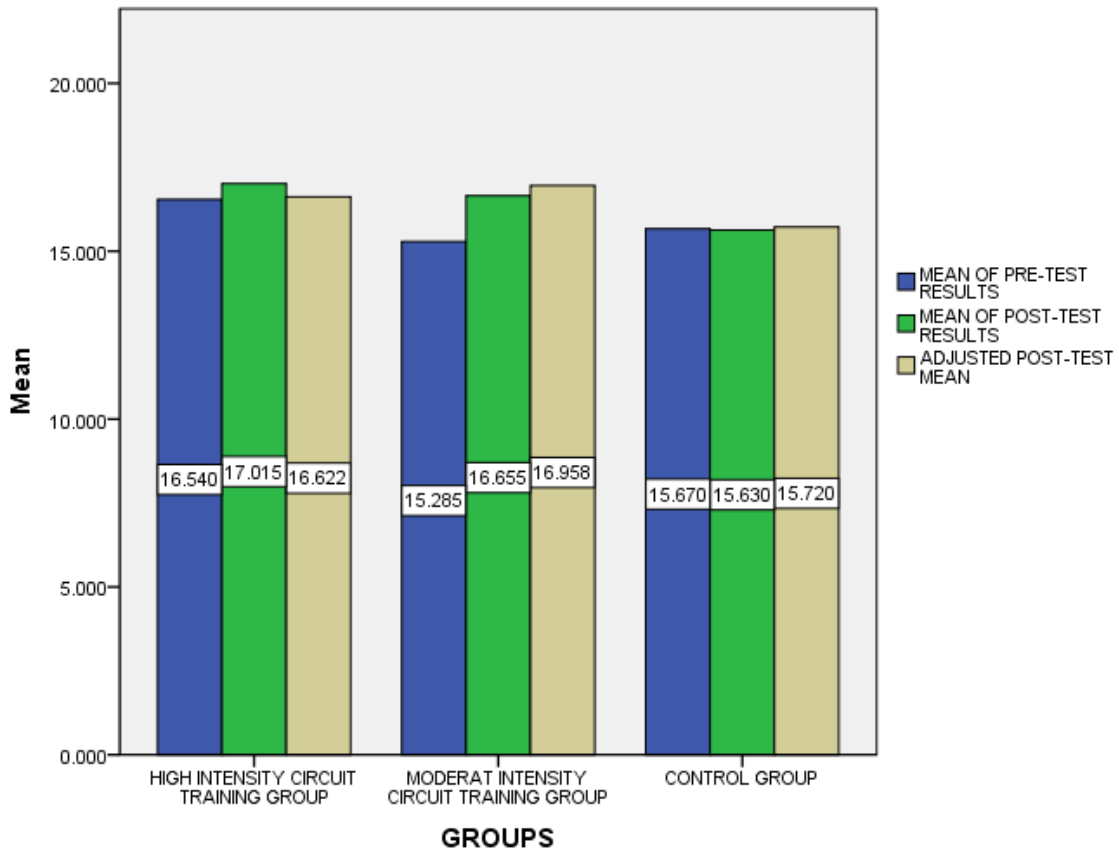
Fig. 3 Descriptive statistics of Hgb.
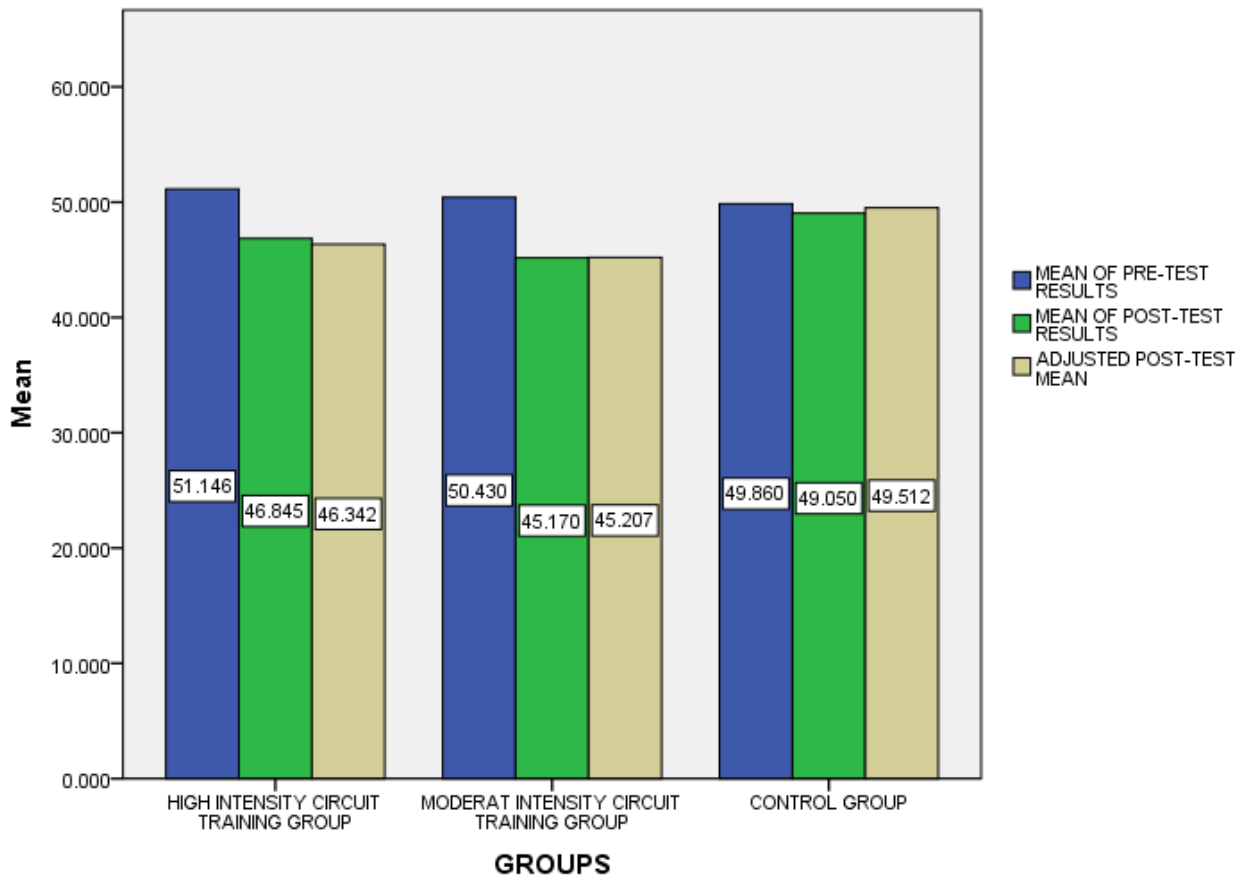
Fig.4 Descriptive statistics of HCT.
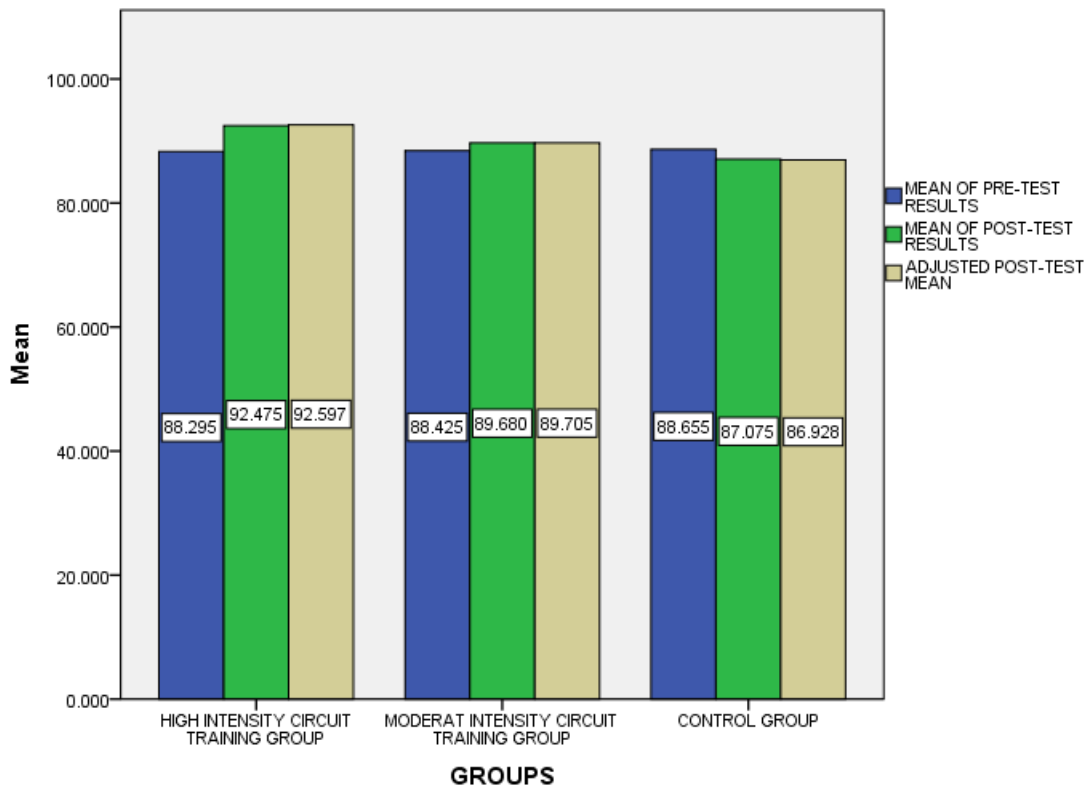
Fig. 5 Descriptive statistics of MCV.
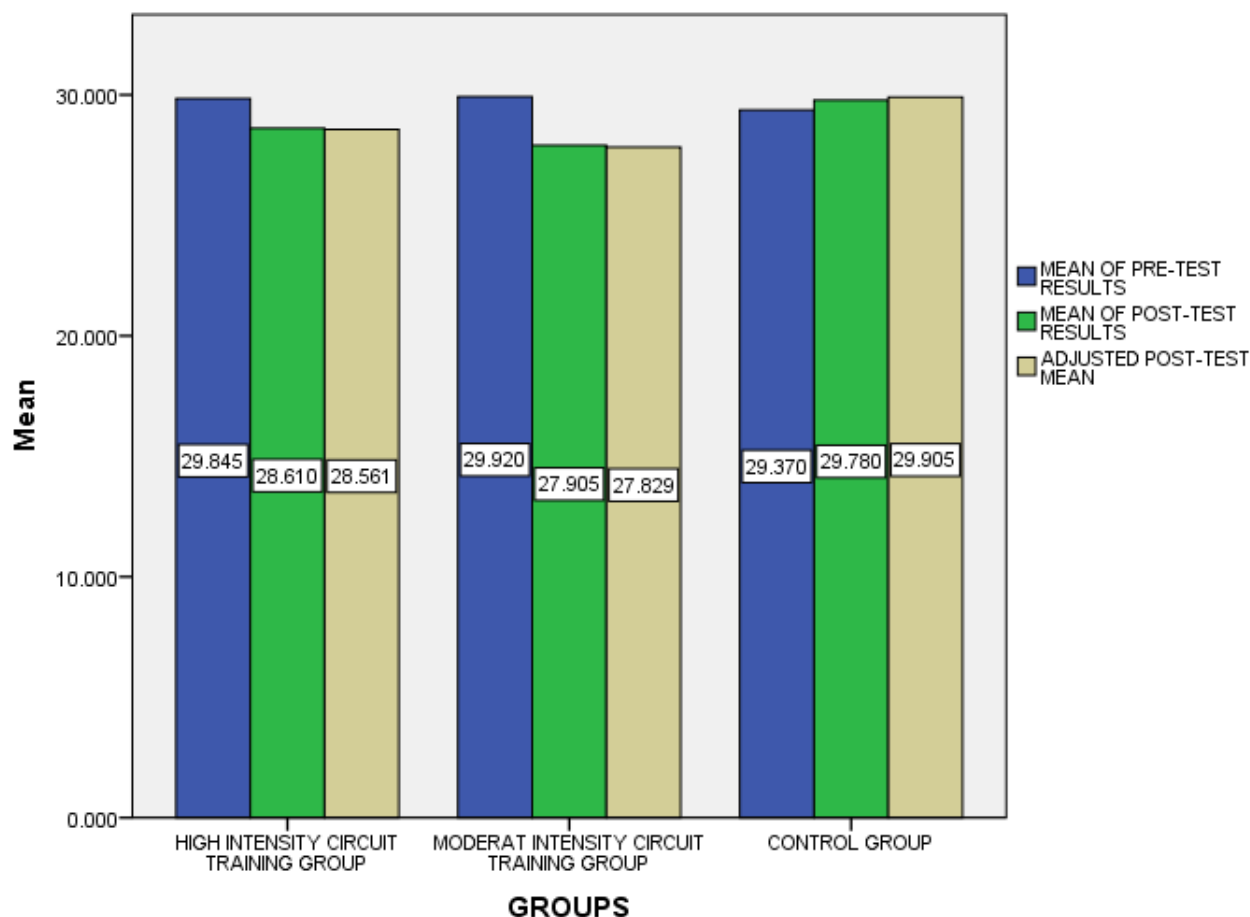
Fig. 6 Descriptive statistics of MCH.

Discussion

[18 & 19] This study gives clear information to understand the comparative effect of High intensity and Moderate intensity football specific circuit trainings on hematological parameters. It is believed that Hematological parameters affect the aerobic capacity of football players which is considered as basic for technical and tactical development of footballers. However the [20] improvement in hematological parameters depends on type, intensity and duration of the training. Thus our study was aimed to make clear understanding on the comparative effect of high and moderate intensity of circuit training to bring changes on hematological parameters for footballers. [21] Findings of the previous studies reviled that aerobic, strength training and preparation training of sport brings alterations in blood parameters. Besides of this study from our finding both experimental groups showed significant increment in the parameters of RBC, WBC, MCV and Hgb which was similar finding [22 & 23] with the finding of six month football preparation exercises. This is due to that the

training stimulates erythropoiesis within [24] the bone marrow to boost the RBC production which is required to increase the oxygen carrying capacity of the cells as to the training created stress on the body and high intensity circuit training group showed significant improvement on WBC which was contradictory to the Previous study, [25] which ensured that well trained people are with a lower WBC as the result of training adaptation so this might be that the previous finding took athletes with five years of experience from different sports but did not specifically identify the activity the subjects were engaged on and it did not consider the intensity of the activity they were engaged on. In contrary both groups significantly decreased in MCH and HCT after sixteen week training of moderate and high intensity circuit training. This means that the concentration of hemoglobin in a specific volume of red blood cell decreased as the number of RBC increases in the blood even if they had a variation in the type and intensity of exercise this finding supports to the finding that found decreased MCH in the eight weeks training for preparation of teackando players. T

he current study also showed decreased HCT this was strengthen the finding that training increases blood plasma volume which resulted decreased in HCT. Our new finding to the quantum of knowledge was that the WBC increased only in high intensity circuit training groups and the MCV also significantly increased better in high intensity circuit training group than the moderate intensity circuit training group thus the parameters of WBC and MCV are sensitive to high stress of the body whereas the RBC increased better in moderate intensity circuit training group than the high intensity circuit training group so this showed that the adaptation of hematological parameters varies as the stress on the body or training load varies. Thus we conclude that the different intensity of training brings different changes in different Hematological parameters and similar changes in some variables as well. So coaches or trainers should well understand with the benefit of varied intensity while they are planning for training.

Conclusion

From our new finding we conclude that different intensity of training brings different changes in different Hematological parameters and similar changes in some variables as well. Thus the circuit training intensity should be considered in the coaching plan for junior players.

Ethical Consideration: Approval and ethical clearance of the protocol was sought for Health Research and Ethical Review Committee of Mekelle University

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Effect of Varied Intensity of Football Specific Circuit Training on Agility, Speed and Explosive Strength among U-17 Football Players in Ethiopia

Muez Tsegay[1], Soumitra Mondal[2], Hayelom Kebede Mekonen[3], Theodros Berhanu[4]

[1]Research Scholar, Department of Sports Science, Adigrat University, Adigrat, Ethiopia, [2]Associate Professor, Department of Sports Science, Mekelle University, Mekelle, Ethiopia, [3]Assistant Professor, Departments of Anatomy, College of Health Sciences, Mekelle, Ethiopia, [4]Assistant Professor, Department of Sports Science, Mekelle University, Mekelle, Ethiopia

Abstract

Objective: The purpose of this study was to examine the effect of high intensity and moderate intensity football specific circuit training on selected motor fitness variables among football players in Ethiopia.

Method: For the purpose of this study random group design was implemented. To achieve this objective 60 football players were taken as the subjects of the study. These subjects were distributed in to three high intensity football specific circuit training group (N1=20), moderate intensity football specific circuit training group (N2=20) and control group (N=20) using random sampling technique. The high intensity football specific circuit training group and moderate intensity football specific circuit training group were engaged in high intensity football specific circuit training and moderate intensity football specific circuit training respectively. The selected variables were agility, explosive strength and speed. The data was collected using the standardized tests such as zigzag run test for Agility, 30 meter speed test for Speed and Standing long jump test for Explosive strength.. The data was analyzed using ANCOVA and bonefferani post hoc test for paired mean comparison when significant difference exists.

Result: Our finding indicated that the HICT group increased significantly in agility, explosive strength and speed than the control group with a mean difference made (-.743, P=.000), .(360, P=.000) and (-.725, P=.000) respectively. The MICT group also showed significant difference on speed, explosive strength and speed than the control group with a mean difference made (-.562, P=.000), (.236, P=.000) and (-.367, P=.000) respectively. Moreover the difference made between the HICT group and MICT group on explosive strength and speed was significant with a mean difference made (.125, P=.000) and (-.358, P=.000) respectively. Whereas the HICT group and MICT group didn't show significant difference on their agility with a mean difference of (-.180, P = .099).

Conclusion: From the finding we concluded that the intensity of circuit training is very crucial for the magnitude of adaptation in circuit training. Thus for the effectiveness of circuit training the plan of trainers or coaches should seriously consider the intensity to bring the intended or required changes.

Keywords: *High intensity circuit training, moderate intensity circuit training, Agility, Explosive strength and Speed.*

Corresponding Author:
Muez Tsegay
Research Scholar, Department of Sports Science,
Adigrat University, Adigrat, Ethiopia
e-mail: mueztsegay8@gmail.com

Introduction

[1,2]During football match players perform a large number of explosive bursts such as shooting, jumping, tackling, sprinting and pace changing in conjunction with high intensity actions such as sprinting, jumping and directional changes which is important to sprint,

accelerate and decelerate alongside change of direction which is commonly known as agility.[3] Successful sport performance at elite levels of competition often depends on high levels of technical, tactical and physical skills including aerobic and anaerobic power, muscle strength, flexibility, and agility are heavily on the explosive leg of the athletes

[6]During the process of training athlete's body adapts to loading or adjustment to specific environmental conditions.[7] Indeed external loading is determined by sports trainers prescribing their trainees the corresponding sports training plans.[8] The sport training plan includes a sequence of sport training sessions for a specific period of sports training, thus sports training session is determined by exercise types, duration, intensity and frequency. [9] Adaptation of sport training plan is a very important task of real sport trainers, especially for those who are not very experience. There for coaches are required to approach each training session with a well-structured plan and method of training. [10] Among the trainings which coaches use to train youth is circuit training.[10,11] Circuit training was developed at the University of Leeds England. From that time on wards it becomes one of the important method to improve the physical fitness qualities of athletes Circuit training has gained popularity as a training strategy due to its improvement in different physical fitness qualities. [12] Circuit training is an excellent way to improve mobility and develop strength and stamina. However some researchers recommend that increasing the intensity of circuit training may acquire better benefits. [13] Limited studies are found on the comparative effect of varied intensity of circuit training. Some studies indicated that higher levels of speed, agility and flexibility and the combination of their quality contribute for the explosive strength of the athletes. Hence [14,15] the current study focused on the effect of varied intensity football specific circuit training on speed, agility and explosive strength of the leg. [16] The explosive strength is an action that is accomplished with maximum effort in a minimum amount of time. [17] The basis for explosive strength is in speed, strength, a physical quality displayed in many sport skills such as jumping for a maximum height, hitting for maximum power or distance.

Materials and Method

Study setting and ethical approval: Ethical clearance was obtained from Mekelle University College of Health Sciences; Health Research Ethics Review Committee (HRERC) with Ref. ERC 1236/2019 dated 7/03/2019 and the written assent and consent was obtained from all participants and their guardians respectively and the physical activities readiness questionnaire was fulfilled by the participants. The study was conducted in adigrat city which is found in eastern zone of Tigray region Ethiopia with an elevation of 2,457 meters above sea level. It is located at longitude and latitude 14°16'N and 39°27E.

Study design and participants: This study was an experimental with Randomized control group pretest-posttest design which aimed to study on the effect of high intensity and moderate intensity football specific circuit training on selected Motor fitness variables among Under-17 football players. For the purpose of this study from a total of ninety (90) players of Adigrat city sixty (60) players were taken as a sample size using the Cochran[18&19] corrected formula for finite population. I.e. $n = \frac{no}{1+\frac{n_{0}-1}{N}}$ to meet 80% of power where= n is new adjusted sample size; no is Cochran's sample size recommendation at p=0.2 variance; 95% confidence and $\pm$5 precision; N is population size. In this study male players who are at the age of 15-17 years and volunteers to give their assent and consent from their guardian were included. The sixty (60) players were distributed into the experimental N_1=20(high intensity circuit training group), N_2=20(moderate intensity circuit training group) and N=20 (control groups) using the simple random sampling technique.

Procedures: For the purpose of this study pre-test was taken to collect base line data from the experimental groups and control group and after sixteen week of training three times per week in the Moderate intensity training (75% to 85% of HRmax) and High intensity training (85% to 90% of HRmax) for Moderate intensity group and High intensity group respectively post-test was also taken place. To collect the data from the subjects at both pre and posttests standardized tests were used. The tests or instruments were zigzag run test for Agility, 30 meter speed test for Speed and Standing long jump test for Explosive strength. In addition to the testers' competency the subjects were well informed about all the experimental procedures to perform strictly the tests to make the tests reliable.

Training: For the purpose of this study pilot study was taken to determine the required intensity. The intensity was determined based on a relationship

between the work intensity and HR[20]. For the purpose of this study intensity was set at 75% to 85% of HRmax for Moderate intensity and 85% to 90% of HRmax for high intensity training using the heart rate monitor. The training program was designed based on the required intensity. The two experimental groups of HICT group and MICT group were engaged in the high intensity circuit training (HICT) and Moderate intensity circuit training (MICT) respectively for sixteen(16) week three times per day whereas the Control group did not engage in the circuit training.

Data Analysis: Descriptive statistics was employed for mean, standard deviation, minimum and maximum of the data and P-P-plot was used to check the normality of the continuous data. To check significance difference among the groups analysis of covariance (ANCOVA) was employed and its assumptions were checked. In the result that showed significant difference boneforrani post hoc test was used for paired mean comparison to identify which group significantly differs from the others. [21] All statistical analyses were performed using IBM-SPSS version. Significant level was set at 0.05 levels of significance.

Results

Table 1: Demographic characteristics of the participants

Variables	HICT group (n=20)	MICT group (n=20)	Control group (n=20)	F' ratio	Sig
Age in years	16.20±.69	16.30±.73	15.95±.68	1.30	.297
Weight in Kg	51.70±2.90	50.55±4.01	49.75±4.03	1.41	.253
Height in meters	1.62±.041	1.64±.049	1.60±.064	2.43	.097
BMI in Kg/m^2	19.55±.93	19.42±1.15	19.14±1.73	.497	.611

From the above table the F-ratio found for the Age, Weight, Height and BMI of the participant is (1.30, P=.297), (1.41, P=.253), (2.43,P=.097) and (.497, P=.611) respectively. This showed that the groups had no significant difference on their demographic characteristics. They were homogenous groups.

Table 2: Analysis of covariance on the Agility, Explosive strength and Speed of the three groups.

Variables		Source of variance	Sum of squares	Df	Mean square	F-ratio	sig
Agility	Adjusted posttest mean	Between	5.942	2	2.971	44.635*	.000
		Within	3.728	56	.067		
Explosive strength	Adjusted posttest mean	Between	1.228	2	.614	101.453*	.000
		Within	.339	56	.006		
Speed	Adjusted posttest mean	Between	4.754	2	2.377	43.118*	.000
		Within	3.087	56	.055		

The F-ratio for the adjusted means was found 44.635 which is significant at 0.05 level this shows significant difference among the groups. There for the result should be subjected to the bonferroni post hoc tests paired mean comparison to identify which group is different from the others.

The analysis of covariance for Explosive strength indicated that F-ratio for the adjusted means was found 101.453 which is significant at 0.05 level this shows significant difference among the groups. There for the result was subjected to the bonferroni post hoc tests for paired mean comparison to identify which group is different from the others.

The analysis of covariance for speed indicated that The F-ratio found for the adjusted means was found 43.118 which is significant at 0.05 level this shows significant difference among the groups. There for the result was subjected to the bonferroni post hoc tests for paired mean comparison to identify which group is different from the others.

Table 3: Post hoc test result of paired mean comparison

Variables	HICT group	MICT group	Control group	Mean difference	Sig
Agility in seconds	7.812	7.993		-.180	.099
	7.812		8.555	-.743*	.000
		7.993	8.555	-.562*	.000
Explosive strength in meters	2.256	2.131		.125*	.000
	2.256		1.896	.360*	.000
		2.131	1.896	.236*	.000
Speed in seconds	4.006	4.364		-.358*	.000
	4.006		4.731	-.725*	.000
		4.364	4.731	-.367*	.000

From the above table it is evident that the mean difference of HICT group and Control Group:MICT group and Control Group of the agility were found to be significant at 0.05 levels. The mean difference made by MICT group and MICT group showed statistically no significant difference between them however the mean difference showed that the HICT group improved better than the MICT group.

The mean difference of HICT group and Control Group: MICT group and Control Group of Explosive strength were found to be significant at 0.05 levels. The mean difference made by MICT group and MICT group also showed significant difference.

The mean difference of HICT group and MICT group as well as HICT group and Control Group showed significant difference: MICT group and Control Group were also found to be significant at 0.05 levels.

Figure 3: Descriptive statistics of speed

Discussion

The aim of this study was to get clear information to understand on the effect of moderate intensity football specific circuit training and high intensity football specific circuit training on agility, explosive strength and speed. In this study it was hypothesized that there would be a significant difference on the effect of varied intensity football specific circuit training on agility, explosive strength and speed among U-17 football trainees. The result of the study yielded that the HICT group and MICT group showed significant improvement on agility, explosive strength and speed. This result is obtained as the result of engaging in the selected exercises in the circuits training which is supported by the findings However the

HICT group showed significant difference from even the MICT group on explosive strength and speed. This means that our finding make clear understanding that the high intensity football specific circuit training is better training to improve the explosive strength and speed this is due to that the high intensity circuit training was with more repetitive activities as well as relatively more strenuous exercises. The finding of this study strengthen the finding that had ensured as an intensive sport specific endurance circuit training is an effective enough to bring changes on speed and power. Thus from the finding of the current study we conclude that varied intensity brings varied magnitude of adaptation.

Conclusion

From the finding we concluded that the intensity of circuit training is very crucial for the magnitude of adaptation in circuit training. Thus for the effectiveness of circuit training the plan of trainers or coaches should seriously consider the intensity to bring the intended or required changes.

Ethical Clearance: Taken from ethical committee department of sports science

Conflict of Interest: Nil

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An Analytical Study on Breath Hold Capacity and Respiratory Rate in Performing Floor, Skipping and Combined Aerobic Exercise Program of Female High School Students in Wukro City, Ethiopia

Shimels Hailekiros[1], D. Mathivanan[2], Mulay G/tensay[2]

[1]Lecturer, [2]Assistant Professor, Department of Sports Science, Mekelle University, Mekelle, Ethiopia

Abstract

The purpose of this study was to investigate the analyze of floor, skipping and combined aerobic exercise on physiological variables of wukro high school students and to forward possible solutions. In this study complete experimental design was employed. To select the subjects of the study, simple random sampling technique was used. The study Subjects (n=80) female students in age range from 15-16 were included. The selected samples by simple random sampling technique; the samples were grouped in to four of(n=20)G-1 floor aerobic group,(n=20)G-2 skip aerobic group, G-3 combined aerobic group and (n= 20)G-4 control group. Special training or treatment was provided for groups G-1 and G-2 and G-3 for twelve consecutive weeks and G-4(control group) did not get any special treatment. The selected physiological variables are RHR, and breathe hold. The study period was twelve week and three times per week. The statistical technique used in this study was ANCOVA; post hoc multiple comparisons and Scheffe's Confidence Interval post hoc test at the significant level of 0.05. Beside this to compare the post test results mean difference between the four groups were employed. Result indicated following the treatment of combined aerobic exercise group on physiological variables significantly improved than skip aerobic, floor aerobic group and control group and the mean arterial blood pressure had shown not significant improvement. The result concluded that combined exercise program method shows a better improvement on selected variables due to twelve weeks training program of wukro female students. Finally, based on the findings and conclusions recommendations were forwarded to high school students, physical education teachers, fitness trainers and coaches.

Keywords: *Aerobic, training, floor, skip, combined. Statistical technique.*

Introduction

[1]The word aerobic meaning with oxygen to represent idea Even so the dynamics of the idea are more complicated than implied by the definition. Aerobic can be viewed as an intricate system of bodily supply and demand. That is the body needs energy for any kind of activity and the need is filled by burning off the foods that eat. Aerobic exercise refers to exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process.

Many types of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time. [2] To obtain the best results, an aerobic exercise session involves a warming up period, followed by at least 20 minutes of moderate to intense exercise involving large muscle groups, and a cooling down period at the end. [3] Aerobic exercise help Proper growth and maintenance of good health, participation in daily physical activities is an essential one. To perform the daily activities in a more efficient manner,

Corresponding Author:
Shimels Hailekiros
Lecturer, Department of Sports Science, Mekelle University
e-mail shimea19@gmail.com

a condition of muscles, their strength and endurance are essential to man. A muscle must be overloaded in order to be strengthened.

[4]Since different games make different demands up on the organism with respect of neurological, respiratory, circulatory and temperature regulating functions physiological fitness is specific to the activity. Physiological systems are highly adaptable to exercise.

In order to find out the influence of floor aerobic, skip aerobic and combined aerobic exercise on physiological variables, the researcher selected variables resting heart rate, mean arterial blood pressure, breath holding time and respiratory rate.

Objectives of the Study:

- To assess the effect of floor, skipping and the combined exercise program on the selected breathe holding time

- Compare the fitness level among the three experimental groups and control group based on resting heart rate breathe holding time

  Hypothesis of the research:

  H_1 It is hypothesized there might be significant differences between the experimental groups and control groups on the resting heart rate and breathe holding time.

Methodology

Design of the Study: The study was formulated as a complete group design consisting of a pre-test and posttest. The subjects (n=80) was randomly assign to four equal groups of twenty female students. The groups were assigned as experimental group I – (floor aerobic exercises), Experimental Group II (skip aerobic exercises) experimental Group III (in both floor aerobic and skip aerobic) and control group respectively. Pre tests were conducted for all the 80 subjects on selected physiological variables. After the experimental period of twelve weeks posttest were conducted and the scores as recorded. The subjects were given respective training three days a week from 6.30 to 7.30 p.m.

Area of the Study: Wukro city is located in Tigray Regional of Northern Ethiopia it is found about 826 K.M from Addis Ababa, capital city of Ethiopia and 43 k.m from the capital city of tigray Under the study area there are III high schools (Wukro 2ry school,Megabit 30 high schools and Awlaelo 2ry school).

Sample and sampling technique: According to Tigray educational office in Tigray there are 150 high schools and 53 are in Easter zone from this high school three of them are in wukro city around 4500 regular students found in the schools. The total numbers of female students are 1480. The selection of school was made using purposive sampling technique. Disproportionate stratified sampling technique is employed to allocate subject numbers to each school. The selection of samples was conducted using simple random sampling method. Based on the above information 80 female high school students in the age group 15-16 years old were identified. [5] Sample size determination formula = 50 + 8m= 74, where m=number of independent variables. 7% of the calculated sample is added for contingency for subjects who quite the intervention (0.07 x74=6). Hence, the total sample size is 80.

Selection of Subjects: 80 untrained students and free form deformities and ailments were selected from three high schools in wukro. The subjects was from different family background and heterogeneous in their academic activities. The subjects were selected at simple random sampling and the schools selected in purposive method. They were in the age group of 15–16 years.

The subjects are randomly divided in to four groups and each group contains twenty subjects. Group one acted as experimental group one(floor), group two acted as experimental group-two(skip) and group-three acted as combined (floor and skip aerobic) and group four as control group for twelve weeks and the Control group was not exposed to any treatment.

Analysis of results and discussion of findings:

Table 1: Analysis of covariance for pre test, post test and adjusted posttest on respiratory rate experimental groups and control group (scores in numbers per minute)

Groups	F.A	S.A	COM\G	CONG	SV	Ss	Df	MS	'F' Ratio	Sig
Pre-test Mean SD	41.15	42.45	44.25	40.50	B	164.138	3	54.713	2.686	.001
					W	660.250	76	8.688		
	1.814	2.164	2.124	4.718	Total	824.388	79			
Post-test Mean SD	38.50	38.75	39.40	41.35	B	99.900	3	33.300	10.999*	.000
					W	230.100	76	3.028		
	1.573	1.482	1.698	2.134	Total	330.000	79	330.000		
Adjusted post-test Mean	38.816	38.628	38.672	41.884	B	138.618	3	46.206	22.316*	.000
					W	155.287	75	2.070		

SV- Source of variance, SS – sum of square, df- degree of freedom, MSS- mean sum of square, B=between Means Variance, W=Within Group Variance, * Significant at 0.05 level of significance, F=Ratio needed for significance at 0.05 level of significance = df (3,76) = 2.73, df (3, 75) = 2.73

Table 1 shows that the pretest mean scores of respiratory rate of floor aerobics exercises group was 41.15, skip aerobics group was 42.25,combined aerobics exercises group was 44.25 and control group was 40.50.

The posttest means showed reduction over the pre test scores due to twelve weeks varied aerobic exercises and mean values recorded were 38.50, 38.75, 39.40 and 41.35 respectively. The obtained F value on pre test scores 2.686 was less than the required F value of 2.73 to be significant at 0.05 level. This proved that there was no significant difference among the groups at initial stage and the randomized assignment of the subjects into three groups were successful. [6] The post test scores analysis proved that there was significant difference among the groups, as they obtained F value 10.99 was greater than the required F value of 2.73. This proved that there was significant difference among the posttest means of the subjects.

To find out the effect of varied aerobic exercises, ANCOVA was calculated. The adjusted mean scores taking into consideration the pre and post test scores among the groups were calculated and subjected to statistical treatment. The obtained F value of 22.361 was greater than the required table F value of 2.73.[7] This proved that there was significant differences among the means due to twelve weeks varied aerobic exercises on physiological variable respiratory rate. since significant improvements were recorded;[8] the results were subjected to post hoc analysis.

Analysis of Breath Holding Time: The pre and post test scores of the physiological variable, breath holding time was measured and subjected to statistical treatment. The results on the effect of twelve weeks varied aerobic exercises are presented in Table 2.

Table: 2 Analysis of covariance for pre test, post test and adjusted post test on breath holding time experimental groups and control group (scores in seconds)

Groups	F.A	S.A	Comg	Cong	Sv	Ss	Df	Ms	'F' Ratio	Sig
Pre-test Mean SD	56.20	57.55	57.75	57.55	B	30.637	3	10.212	1.737	.167
					W	446.850	76	5.880		
	3.750	1.849	1.773	1.701	Total	477.487	79			
Post-test Mean SD	61.25	63.55	64.05	57.35	B	559.600	3	186.533	20.131*	.000
					W	704.200	76	9.266		
	2.900	3.220	3.034	3.014	Total	1263.800	79			
Adjusted post-test Mean	62.007	63.345	63.703	57.145	B	549.331	3	183.110	28.767*	.000
					W	477.397	75	6.365		

SV- Source of variance, SS – sum of square, df- degree of freedom, MSS- mean sum of square, B=between Means Variance, W=Within Group Variance, * Significant at 0.05 level of significance, F=Ratio needed for significance at 0.05 level of significance = df (3,76) = 2.73, df (3, 75) = 2.73

Table:2 shows that the pretest mean scores of breath holding time of floor aerobics exercises group was 56.20, skip aerobics group was 57.75, combined aerobics group was 57.75 and control group was 57.55.

The posttest means showed improvement over the pre test scores due to twelve weeks varied aerobic exercises and mean values recorded were 61.25, 63.55, 64.05 and 57.35 respectively.

The obtained F value on pre test scores 1.737 was less than the required F value of 2.73 to be significant at 0.05 level. [9] This proved that there was no significant difference among the groups at initial stage and the randomized assignment of the subjects into four groups were successful.

The post test scores analysis proved that there was significant difference among the groups, as they obtained F value 20.131 was greater than the required F value of 2.73. [9] This proved that there was significant difference among the post test means of the subjects.

To find out the effect of varied aerobic exercises, ANCOVA was calculated. The adjusted mean scores taking into consideration the pre and post test scores among the groups were calculated and subjected to statistical treatment. The obtained F value of 28.767 was greater than the required table F value of 2.73. [10,11] This proved that there was significant differences among the means due to twelve weeks varied aerobic exercises on physiological variable breath holding time. Since significant improvements were recorded

Discussions on Hypothesis

it was hypothesized that there would be significant differences between the experimental groups and control groups on the selected physiological variables, resting pulse rate, respiratory rate and breathe holding time was accepted at 0.05 level.

Conclusions

1. Floor aerobic, skip aerobic and combined aerobic exercises significantly influenced on physiological variables: resting pulse rate, respiratory rate and breath holding time except on mean arterial blood pressure.

2. There was no significant alteration by Floor aerobic, skip aerobic and combined aerobic exercises on physiological variable, mean arterial blood pressure.

Ethical Clearance: Taken from ethical committee department of sports science

Source of Funding: Self

Conflict of Interest: Nil

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Determinants of Job Satisfaction among Nurses Working in Selected Hospitals of Udupi and Mangalore Districts Karnataka, India

Tessy Treesa Jose[1], Sripathy M. Bhat[2]

[1]Professor & Head, Department of Psychiatric/Mental Health Nursing, Manipal College of Nursing MAHE, Manipal, Karnataka, India, [2]Professor in the Dept. of Psychiatry, Kasturba Hospital, MAHE, Manipal, Karnataka, India

Abstract

Background: Job satisfaction is the affective orientation that an employee has towards their work. Identification of the factors related to job satisfaction has the potential to aid the development of employment strategies to improve retention and reduce turnover.

Objectives: The study was conducted to assess the job satisfaction of nurses as measured and to identify the determinants of the job satisfaction with regard to selected demographic and work related variables.

Method: A cross sectional survey design was used to conduct the study. The study population consisted of 1040 registered nurses working in selected medical college hospitals and government hospitals of Udupi and Mangalore districts during the period of data collection. Subjects were selected through purposive sampling. Data were gathered by administering Background proforma, and The Minnesota Satisfaction Questionnaire (MSQ).

Results: Majority i.e. 977 (93.94%) were in the category of low satisfaction and only 10 (0.96%) subjects had high job satisfaction. Significant association between job satisfaction, income per month, area of work and working hours ($p < 0.05$) is observed.

Conclusions: Findings clearly indicate that the nurses are underpaid in many institutions which may affect their job satisfaction. No standard is followed in most of the institutions regarding the nurses duty hours in a day.

Keywords: *Nurses, Intrinsic Job satisfaction, Extrinsic Job satisfaction, Hospitals, work variables.*

Introduction

Most published research from various countries indicates that job satisfaction is a major predictor of nursing absenteeism, burnout, turnover and intention to quit[1]. Thus identification of the factors related to job satisfaction and exploration of their effects on job satisfaction have the potential to aid the development of employment strategies to improve retention and reduce turnover.

A study investigated the interrelationships among burnout, role conflict and job satisfaction among 450 health care staff of two major hospitals in Szeged, Hungary. Questionnaire contained items on work and health-related information (i.e., burnout, job satisfaction, role conflict, and psychosomatic symptoms) and on some basic socio-demographics. Findings show that emotional exhaustion and depersonalization scores were higher, while scores on personal accomplishment was lower

Corresponding Author:
Dr. Tessy Treesa Jose
Professor & Head, Department of Psychiatric/Mental Health Nursing, Manipal College of Nursing MAHE, Manipal, Udupi, Karnataka–576 104
e-mail: tessy.j@manipal.edu

as compared to Canadian, Norwegian or US samples. Burnout, particularly emotional exhaustion (p<0.001), was found to be strongly related to job dissatisfaction. Schooling was inversely related to satisfaction with the job (p<0.05). While job satisfaction was a negative predictor of each type of burnout subscale (p<0.001), role conflict was a factor contributing positively to emotional exhaustion (p<0.001) and depersonalization scores (p<0.001).[2]

Job satisfaction of 546 nurses who worked in private psychiatric hospitals in Pennsylvania was assessed in a study. Respondents rated their level of satisfaction on the 100-item survey by using a 5-point Likert scale. Management's actions and attitudes demonstrated the largest mean correlation with all the other factors (mean of 0.64), including overall satisfaction (r=0.98). Therefore, management's actions and attitudes were found to strongly relate to other areas of job satisfaction for the RNs. Compensation demonstrated the lowest mean correlation with the other factors (r=0.31), including global satisfaction (r=0.46)[3].

The magnitude and determinants of job satisfaction in 500nurses working in 9 Ministry of Health hospitals Riyadh, Kingdom of Saudi Arabia was found in a survey. A modified version of the Minnesota Job Satisfaction Questionnaire by Weis, DJ (1967) is used to. Data analysis consisted of descriptive statistics, t-tests, one way-analysis of variance, correlation analysis, and regression analysis. Overall job satisfaction was measured in two different ways: first the average score of responses to all 25 items of the job satisfaction scale, then through the averages score of the global measure. Results show that overall satisfaction scores were similar when measured in both ways, and its value was 3.3 on a scale of 5, indicating that nurses have a moderate level of job satisfaction, or that they are "somewhat satisfied". No significant differences in overall levels of job satisfaction were found according to gender, nationality, age, marital status, job tasks, and monthly income. Significant differences were only found according to education level at p<0.01. Results indicate that overall job satisfaction is significantly lower among bachelors' degree holders than middle college graduates and graduates of the Health Institutes, and that it is also significantly lower among middle college graduates than graduates of the Health Institutes. Patterns of association between overall job satisfaction scores and experience level (years of experience) were measured using Pearson product correlation. Significant but low positive correlation was found between the two variables (r=0.21 p <0.01) indicating that overall job satisfaction improves with time on the job. The highest satisfaction was found with their colleagues, while the lowest satisfaction was found with pay, and job advancement.[4]

The objectives of the study were to find the determinants of job satisfaction among nurses with regard to demographic variables and work place variables.

Materials and Method

Study type and setting: Cross sectional survey approach was adopted for the study. Selected medical college hospitals and government hospitals of Udupi and Mangalore districts were the settings.

Study Population: All registered nurses working in selected medical college hospitals and government hospitals were selected as the study population.

Sampling: Purposive sampling was used to select the samples. Total sample size was 1040. Sampling criteria included female nurses who were: registered with state nursing council,working as staff nurses, involved in direct patient care, employed at the hospital at least six monthsandworking in respective units at least six months. These criteria were chosen because: to practice as a licensed staff nurse she has to be registered in state nursing council, job satisfaction experienced by different category of nurses differs as their job description is different, similar working situations, respondents would be well-oriented to the organization, and past the initial stress of working in a new environment.

Data collection tools and techniques: A questionnaire consisting 11 items such as age, professional qualification, marital status, married status, type of family, number of children, monthly income, area of work, daily working hours, experience in current area of work and total years of experience as a nurse was used to collect the background information. The Minnesota Satisfaction Questionnaire (MSQ)-Short form 1977 was used to assess job satisfaction among nurses. It is a standardized questionnaire designed to measure an employee's satisfaction with his or her job. It is composed of twenty items which consists of three scales: Intrinsic satisfaction, Extrinsic satisfaction and General satisfaction. The response choices are: Very dissatisfied, Dissatisfied, Neither satisfied nor dissatisfied, Satisfied and Very satisfied with the scoring weight of 1,2,3,4 and 5 respectively. Scale scores are determined by summing

the weights for the responses chosen. The reliability coefficient of intrinsic, extrinsic and group satisfaction was 0.87. 0.8 and 0.98 respectively. Thus the reliability coefficient of the tool was 0.88. Job satisfaction was classified as high, average and low.

The nurses were contacted and administered the questionnaires in their respective wards during different shifts according to their convenient time.

Ethical Considerations: The study was approved by the faculty of nursing and the administrators of the institutions selected and approval was taken from the Institutional Ethics Committee of Kasturba Hospital Manipal before conducting the study. Purpose of the study was explained to the subjects and written consent was obtained from the subjects before collecting the data. Anonymity and confidentiality were ensured throughout the study.

Results

The descriptive statistics was used to analyse the data related to sample characteristics in terms of frequency and percentage. Determinants of job satisfaction was determined by computing Kruskal-Wallis test, and Mann-Whitney (Z) test. The statistical level was specified at $p < .05$. Age of the subjects varied from 21 to 56 years, with a mean age of 28.9 + 7.67 years. Majority (70.2%) of the subjects were in the age group of 21- to 30 years. General Nursing and Midwifery was the professional qualification for 906 (87.1%) of the subjects. With reference to marital status, 555 (53.4%) were single and among the married 326 (67.22%) of the subjects were staying with spouse and 142 (29.28%) were staying away from spouse due to job related reason. With regard to type of family 858 (82.5%) were from nuclear family. Data on number children show that among 485 married subjects most of them i.e. 214 (44.13%) have two children and 17.32% had no children. Monthly income for 532 (51.2%) of the subjects was within the range of rupees 5001-9000.

With regard to area of work most (32.1%) of the nurses were from medical area followed by surgical area which was 17.6%. Majority (75.5%) of them was working for eight hours a day, but 5.7 % of them were working for 12 hours or more. With reference to data on total years of experience 592 (56.92%) had 1-5 years of experience and 54 (5.19) of them had experience more than 20 years. Data on Experience in current area of work reveal that 390 (37.5%) had less than one year of experience and 138 (13.27) had more than five years of Experience in current area of work.

Majority of the participants i.e. 977 (93.94%) were in the category of low satisfaction based on the transformed score and only 10 (0.96%) subjects had high job satisfaction. Moderate satisfaction was present for 53 (5%) of the participants.

As age was a continuous variable and did not follow normality, Spearman's rho was calculated between job satisfaction and age to determine whether age is a factor which determines job satisfaction of nurses. The Spearman Rho calculated was 0.04 with p value of 0.24 which is not significant at 0.05 level. Determinants of job satisfaction in relation to and other demographic variables was determined by computing Kruskal-Wallis test, and Mann-Whitney (Z) test and significant association exist only between job satisfaction and monthly income (p=0.002). Data were further analysed with Bonferroni correction and findings are presented in table 1.

Findings from table 1 suggest that there is significant association (p=0.001) between job satisfaction and income category in the pair of rupees <5000: 5001-9000. It is evident from the median score presented in table 1 that nurses who are having the income <5000 rupees are less satisfied with their job.

Findings of determinants of job satisfaction in relation to work variables are presented in table 2 and show a significant association between job satisfaction, area of work and daily working hours (p=0.001). Hence job satisfaction, area of work and daily working hours are identified as determinants of job satisfaction of nurses. No significant association is observed between job satisfaction and total years of experience and experience in current area of work.

Significant association exists between job satisfaction and area of work in the pair of Surgical ward and Intensive Care Unit (p=0.001). With regard to Daily working hours association is significant in the pair of 8:10. Thus it may be interpreted that nurses working in Intensive care unit (Md=55) and working for eight hours per day (Md=54) are having more job satisfaction compared to the nurses working in other areas and nurses who are working more than eight hours per day.

Table 1: z value, and p value of job satisfaction with regard to monthly income, with Bonferroni correction n=1040

Grouping variable	Groups	z value	p value
Monthly income in Rupees*	<5000	3.32	0.001
	5001-9000		
	<5000	0.66	0.51
	9001-13000		
	<5000	0.17	0.87
	>13000		
	5001-9000	2.07	0.04
	9001-13000		
	5001-9000	2.41	0.02
	>13000		
	9001-13000	0.67	0.5
	>13000		

Bonferroni corrected level of significance 0.0083

Table 2: Median, IQR, Test statistic, df and p value of Job satisfaction and work variables of nurses n=1040

Work variables	Median	Inter quartile range	Test statistic & df	p-value
Area of current work Medical	53	45-60	17.49 8	0.025
Surgical	52	45-57		
Operation theatre	55	49-61		
Intensive care unit	55	48-65		
Casuality	54	47-58.5		
Special ward	54.5	47.25-61		
Paediatrics	54	46-60		
OBG	53	47-67.5		
Dialysis	53	47-67.5		
Daily working hours 8	54	47-61	13.33 2	0.001
10	52	45-57		
12 and more	50	43-58		
Total years of experience 1-5	54	46-61	5.1 4	0.28
6-10	52	45-60		
11-15	54	48.75-61		
16-20	53.5	47-59		
>20	53	47.75-65		
Experience in current area of work <1	54	47- 60	4.26 3	0.23
1-3	52	45-60		
3-5	52.5	44-63		
>5	54	48-60		

Discussion

Based on the transformed score majority i.e. 977 (93.94%) out of 1040 subjects were in the category of low job satisfaction and 53 (5.1%) had moderate satisfaction and only 10 (0.96%) subjects had high job satisfaction. This finding is in agreement with the study by Ravindran, Sood (1996)[5] in a sample of 75 staff nurses working in a large hospital in Delhi. Fifty three percent of nurses in general wards and 48% of nurses in special wards had their scores exceeding mean value, indicating a higher degree of dissatisfaction. A descriptive survey among 438 Jordanian nurses on job satisfaction and retention found that subjects were moderately satisfied in contrast to the findings of present study. This could be due to the differences in pay scale and the role functions of nurses in India as compared to the other countries. In India nurses are underpaid in most of the private institutions which was evident from the present study. The magnitude and determinants of job satisfaction in nurses working in Ministry of Health hospitals, Kingdom of Saudi Arabia was found and reported the findings similar to the study on Jordanian nurses, i.e. nurses had a moderate level of job satisfaction, or that they are somewhat satisfied with their job[4]. Balseiro, Valle, Gracida, Guerrero, Hernández (2006) in Mexico city found that 79.23% of the nurses had satisfaction in the work[6]. The findings of the present study are supported by a study in Iraq hospital which found that most nurses were dissatisfied with their job description. In both of these studies salary was rated as the least satisfying aspect of work[7].

Significant difference in job satisfaction was observed in the present study in monthly income, area of work, and working hours. Nurses who are having the income of<5000 rupees per month, are less satisfied with their job. Nurses working in Intensive care unit and nurses working for eight hours per day are having higher job satisfaction. Similar finding is reported by Cimete, Gencalp, Keskin (2003)[8] who found a significant difference in job satisfaction according to their age, economic level, marital status, duration of working life, and position at work.

Conclusion

Nurses are underpaid in many institutions which may affect their job satisfaction. No standard is followed in most of the institutions regarding the nurses duty hours in a day. Some institutions follow different duty hours for nurse. This also could be a significant factor contributing to poor reduced job satisfaction. Monthly pay and the hours of work in a day are the main factors affecting job satisfaction.

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Study to Assess the Maternal and Perinatal Outcome in Teenage Pregnancy

Rani Shree[1], B.S. Dhananjaya[2]

*[1]Post Graduate Student, [2]Professor and HOD, Department of Obstetrics and Gynecology,
Sri Siddhartha Medical College, Tumkur*

Abstract

Background: A pregnant teenager ''A child in child''as to meet the growing demands of fetus in addition to her own growing needs, thus putting her in a stressful situation. Teenage pregnancy is dangerous for the mother, child and the community. Medical complications such as preterm labor, pregnancy-induced hypertension, anemia and low birth weight babies are strongly associated with adolescent pregnancy. Such pregnancies are seen mostly amongst the poorer and less educated sections of the society.

Aim: To evaluate the maternal and perinatal outcome in teenage pregnancy in a tertiary care center.

Objectives: To compare the maternal and perinatal outcome in teenage and adult pregnancies

Design: A prospective study

Setting: Department of Obstetrics and Gynecology, Sri Siddhartha medical college, Tumkur.

Materials and Method: This study was undertaken at Sri Siddhartha medical college and hospital research centre tumakuru between October 2018 to October 2020, among the married pregnant women visiting to antenatal OPD and inpatients in the department of the OBG between 18 to 19 yrs as per the inclusion and exclusion criteria.

Results: Teenage pregnancy may cause a significant obstetric complication Anaemia, preterm delivery, prom, pph, low birth weight babies, NICU admissions, respiratory distress syndrome were found to be higher among teenage mothers when compared to adult mothers.

Conclusion: Teenage pregnancy was associated with increased incidence of anaemia and contract ed pelvis. Consequently there were higher incidence of lscs and PPH. There was in creased incidence of low birth weight babies, RDS, NICU admissions among the ba bies born to teenage mothers. Teenage pregnancy is associated with increased mater nal and perinatal morbidity.

Keywords: Teenage pregnancy, maternal outcome.

Introduction

Teenage" or "Adolescence" is the transition from childhood to adulthood. It is defined by the World Health Organization as period between 10 and 19 years of age. Adolescence represents a key stage in the development and a critical opportunity for ensuring a successful transition to adulthood.[1]

A pregnant teenager ''A child in child'' as to meet the growing demands of fetus in addition to her own growing needs, thus putting her in a stressful situation. She is at high risk and more vulnerable for complication.[2]

Teenage pregnancy is one of the most important social and public health problem all over the world with

Corresponding Author:
Dr. B.S. Dhananjaya, MBBS, MS, DNB.
Professor and HOD, Department of Obstetrics and Gynecology, Sri Siddhartha Medical College, Tumkur
Ph No: 9886416885
e-mail: drdhananjaybs@gmail.com

varying prevalence rate. Teenage pregnancy represents a high risk group in reproductive terms because of the double burden of reproduction and growth. Teenagers make up more than one billion i.e., nearly one fifth of the world population.

Teenage pregnancy is dangerous for the mother, child and the community. Medical complications such as preterm labor, pregnancy-induced hypertension, anemia and low birth weight babies are strongly associated with adolescent pregnancy.

Adolescent pregnancy is on the rise, emerging as a concern all over the world and more so in developing countries like India where early marriages and early pregnancies are long established and well-accepted customs.[3]

While there is growing recognition of the need for action to promote adolescent reproductive health, work done in this regard is often piecemeal. In this background, as no study about teenage pregnancy was done in this area, a study to know the outcomes and sociodemographic factors associated with adolescent pregnancy was taken up.

So, the study is being done to obtain a reliable data on the pregnancy outcomes and labour complications of the teenage pregnant patient at tertiary level centre.

Aim and Objectives

Aim: To evaluate the maternal and perinatal outcome outcome in teenage pregnancy in a tertiary care center**.**

Objectives: To compare the maternal and perinatal outcome in teenage and adult pregnancies.

Materials and Method

The study was conducted at Sri Siddhartha medical college and hospital, Tumkur among the married pregnant women visiting to antenatal OPD and inpatients in the department of the OBG between 18 to 19 yrs as per the inclusion and exclusion criteria.

Study Design: A prospective study

Study Period: 18 months (November 2018 to April 2020)

Sample Size: 101

No. of participants – 202 (101 cases and 101 controls)

Calculated using sample size calculation and formula for two proportions.

$$n = \frac{\{z1 - \alpha \sqrt{2\bar{P}(1- \bar{P})} + z1 - \beta \sqrt{P1(1-P1)+P2(1-P2)}\}}{(P1-P2)^2}$$

Where:

P1 is Proportion of teenage pregnancies - 0.27

P2 is Proportion of normal pregnancies - 0.16

P is Average of proportions

$z1-\alpha$ - 1.96

$z1-\beta$ - 2.8

Hence sample size is 101

Sampling Method: Purposive sampling

Inclusion Criteria:

• Inclusion Criteria for Teenage Pregnancy

Married pregnant girls between 18-19 years.

• Inclusion Criteria for Adult Pregnancy

Married pregnant women between 20-35 years would be included for the study.

Exclusion Criteria:

• Exclusion Criteria for Teenage Pregnancy

Married pregnant between 18-19 years with pre existing medical disorders such as heart disease, bronchial asthma, hypertension, diabetes mellitus and hypothyroidism

• Exclusion Criteria for Adult Pregnancy

Married pregnant women between 20-35 years, with pre existing medical disorders such as heart disease, bronchial asthma, hypertension, diabetes mellitus and hypothyroidism.

Method of collection of data: Every married pregnant women between 18-19 yrs were included in this study and counseled and informed consent was obtained. All patients were subjected to elaborate clinical and obstetric examination along with detailed history to satisfy the inclusion and exclusion criteria.

Adequate antenatal care (ANC) was defined by the following criteria viz., (1) ≥ 4 antenatal checkups (2) receipt of 2 doses of tetanus toxoid and iron and folic acid supplementation.

202 patients (101 teenage and 101 adult) cases were included and comparision was done for the following parameters. Maternal risk factors and obstetric outcome and results were tabulated and analysed.

Statistical Analysis: Data collected was entered and tabulated in MS Exel spread sheet. Statistical software Data analysis pack of MS excel was used. Variables which show continous data was expressed as mean and standard deviations. These data was subjected to two independent sample t-test. Categorised variables was presented in the form of proportions and percentages. Variables were analysed using chi square test.

Results

Table 1 : Distribution in two groups of case-Controls based on socio economic status

Socio Economic	Cases	Control	Total
Upper	10(9.9)	36(35.6)	46(22.7)
Middle	29(28.7)	48(47.5)	77(38.1)
Lower	62(61.3)	17(16.8)	79(39.2)**
Total	**100**	**100**	**100**

P<0.001**, Significant, Chi-Square Test

Table no 1 shows the distribution of patients based on socio economic status, Low socio economic status was more significant in teenage pregnancy.

Table 2: Distribution of patients based on Antenatal Risk Factors

Antenatal risk factors	Cases (n=101)	Control (n=101)	Total (n=202)	P value
Nil	44(43.6%)	52(51.5%)	96(47.5%)	0.260
Yes	57(56.4%)	49(48.5%)	106(52.5%)	
• Post LSCS Pregnancy	4(4%)	19(18.8%)	23(11.4%)	0.001**
• Preterm	9(8.9%)	4(4%)	13(6.4%)	0.152
• Gestational Hypertension	10(9.9%)	4(4%)	14(6.9%)	0.096
• Prom	8(7.9%)	4(4%)	12(5.9%)	0.234
• Pre-Eclampsia	4(4%)	2(2%)	6(3%)	0.407
• Placenta Previa	4(4%)	2(2%)	6(3%)	0.407
• Pprom	2(2%)	2(2%)	4(2%)	1.000
• Antepartum Haemorrhage	3(3%)	1(1%)	4(2%)	0.312
• Anemia	19(18.8%)	8(7.9%)	27(13.36%)	0.023*

Chi-Square Test

According table no 2, Total of 23 (11.4%) patients had a risk factor of post lscs pregnancy, out of which 4(4%) patients were in case group and 19 (18.8%) patients were from control group . Preterm delivery, Gestational hypertension, pre eclampsia, PROM, antepartum haemorrhage and Anemia was more significant in teenage pregnancy.

Table 3: Distribution of patients based on Indication for LSCS

Indication LSCS	Cases (n=56)	Control (n=57)	Total (n=113)
• CPD	30(29.7%)	7(6.9%)	37(18.3%)
• FD	12(11.9%)	16(15.8%)	28(13.9%)
• Threatened scar	2(2%)	16(15.8%)	18(8.9%)
• NPOL	3(3%)	7(6.9%)	10(5%)
• Contracted pelvis	3(3%)	4(4%)	7(3.5%)
• DTA	3(3%)	4(4%)	7(3.5%)
• Placenta previa	2(2%)	2(2%)	4(2%)

P=0.887, Not Significant, Chi-Square Test

According table no 3, the most common indication for LSCS is CPD which was present in 30 (29.7%) patients in case group and 7 (6.9%) patients in control group and overall was 37 (18.3%) patients. The second most common indication was fetal distress which is seen in 28 (13.9%) of patients with 12 (11.9%) patients in case group and 16 (15.8%) patients in control group.

Table 4 : Distribution of patients based on Birth weight

Birth weight in kgs	Cases	Control	Total
<1.0	0(0%)	1(1%)	1(0.5%)
1.1-1.5	4(4%)	2(2%)	6(3%)
1.51-2.49	38(37.6%)	20(19.8%)	58(28.7%)
2.50-3.5	58(57.4%)	76(75.2%)	134(66.3%)
>3.5	1(1%)	2(2%)	3(1.5%)
Total	101(100%)	101(100%)	202(100%)
Mean ± SD	2.39±0.49	2.69±0.48	2.54±0.51

P<0.001**, Significant, Student t test

According to table no 4, 64 (31.7%) neonates were less than 2.5kg, out of which 42 (41.6%) were from case group and 22 (21.8%) neonates were from control group. Low birth weight was more significant in teenage pregnancy.

Table 5: Distribution of patients based on neonatal complications

Neonatal complications causing admission	Cases (n=101)	Control (n=101)	Total (n=202)
No	56(55.4%)	80(79.2%)	136(67.3%)
Yes	45(44.6%)	21(20.8%)	66(32.7%)
• RD	21(20.8%)	10(9.9%)	31(15.3%)*
• LBW	8(7.9%)	6(5.9%)	14(6.9%)
• Neonatal Jaundice	5(4.9%)	2(1.9%)	7(3.5%)
• Prematurity	7(6.9%)	1(0.9%)	8(3.9%)
• Sepsis	2(1.9%)	1(0.9%)	3(1.5%)
• Iugr	2(1.9%)	1(0.9%)	3(1.5%)

P<0.001**, Significant, Chi-Square Test

According to table no 5, the most common cause of NICU admission is respiratory distress, which was around 31 (15.3%) neonates . 21(20.8%) neonates were from case group and 10(9.9%) neonates from control group. Respiratory distress was more significant in teenage pregnancy.

According to table 6, the post partum complications were noted in 17(8.4%) patients, out of which 13(12.9%) patients were from case group and 4(4%) patients were from control group. PPH was more significant in teenage pregnancy.

Table 6: Distribution of patients based on Post partum complications

Postpartum complications	Cases	Control	Total
Nil	88(87.1%)	97(96%)	185(91.6%)
PPH	13(12.9%)	4(4%)	17(8.4%)
Total	101(100%)	101(100%)	202(100%)

P=0.023*, Significant, Chi-Square Test

Discussion

Adolescent pregnancy is on the rise, emerging as a serious problem all over the world and more so in

developing countries like India where early marriages and early pregnancies are long established and well-accepted customs. Teenage pregnancy is dangerous for the mother, child and the community.. Medical complications such as preterm labor, pregnancy-induced hypertension, anemia and low birth weight babies are strongly associated with adolescent pregnancy.

This study was conducted at Sri Siddhartha Medical College Hospital and Research center, Tumakuru, a premium Institute providing tertiary care facilities to all the patients in and around the city who hail from different ethnic groups and cultural diversity . This study aimed to assess the Maternal and Perinatal Outcome in Teenage Pregnancy.

In this study, 44(43.6%) patients in teenage pregnancy group and 52 (51.5%) patients in adult pregnancy group had no antenatal risk factors. A Total of 23 (11.4%) patients had a risk factor of post lscs pregnancy, out of which 4(4%) patients in case group and 19 (18.8%) patients . Post lscs pregnancy incidence is low in teenage pregnancy because most of the patients were primigravida.

In a similar study conducted by Martina Derme et al found that the outcomes of previous studies for adolescent pregnant women, mainly regarding the increased risks of preterm deliveries.[4] The incidence of hypertensive disorder in teenage pregnancy group is 13.9% which similar to others studies namely Kumar et al.[5]

The CPD is the most important determining factor for normal delivery and contributes to increase in the rate of caesarean delivery. Fouelifack (2014) noted that the 18.9% rate in the teenagers was significantly higher than the 10.5% among the controls with the main indication being CPD.[6]

Around 13 (6.4%) patients had preterm delivery, out of which 9(8.9%) patients were in teenage pregnancy group and 4(4%) in control group had preterm delivery. This is similar to the studies conducted by Sudha et al[7] and Yasmin et al.[8] In the rural area, the availability, content and quality of antenatal care varies enormously, and is often inadequate, especially in countries with high maternal mortality.

20 (19.9%) patients had hypertensive disorders, out of which 10(9.9%) patients had G.Htn and 4 (4%) patients had pre eclampsia in teenage pregnancy group and 4 (4%) patients had G.Htn and 2 (2%) had preeclampsia. The incidence of hypertensive disorder in teenage pregnancy group is 13.9% which similar to others studies namely Kumar et al, Sudha et al and Sowbhagya et al. Around 19 (18.8%) patients had anemia in teenage pregnancy group and 8 (7.9%) patients in adult pregnancy group with overall cases of 27(13.36%).

In this study, overall 87(43.1%) patients had normal delivery, 40 (39.6%) patients and 47(46.5%) patients in teenage pregnancy group and adult pregnancy group had normal delivery respectively. Overall 114(56.5%) patients had LSCS, 61(60.4%) patients and 53(52.5%) patients in case and control group had LSCS respectively. The elective LSCS is seen in only 7 (3.5%) patients and rest all is emergency LSCS. The most common indication for LSCS is CPD which is around 30 (29.7%) patients in teenage pregnancy group and it is just 7 (6.9%)patients in adult pregnancy group and overall is 37 (18.3%) . The second most common indication was fetal distress which is seen in 28 (13.9%) of patients with 12 (11.9%) patients in teenage pregnancy group and 16 (15.8%) patients in adult pregnancy group. These findings are similar to study conducted by Ayuba et al[9] which has similar results to our studies.

In this study, total of 64 (31.7%) neonates were less than 2.5kg, out of which 42 (41.6%) neonates were from teenage pregnancy group and 22 (21.8%) neonates were from adult pregnancy group. Our study has the similar results as the study conducted by Dennis et al at USA in the year 2013.[10]

In this study, a total of 66 (32.7%) neonates required NICU admission, out of which 45 (44.6%) neonates were from teenage pregnancy group and 21(20.8%) neonates from adult pregnancy group. The most common cause of NICU admission is respiratory distress, which was present in 31 (15.3%) neonates .21(20.8%) neonates are from teenage pregnancy group and 10(9.9%) neonates were from adult pregnancy group.

The post partum complications were noted in 17(8.4%) patients, out of which 13(12.9%) patients were from teenage pregnancy group and 4(4%) patients were from adult pregnancy group. We found a higher risk of postpartum haemorrhage among teenagers in our study which is in concurrent with study conducted by Junita Indarti et al.[11]

Conclusion

Teenage marriage has been a traditionally accepted social custom but legally unac cepted practice. Teenage pregnancy is an eonic problem with significant obstetrics complications. Teenage pregnancy was more common in low socioeconomic status.

Teenage pregnancy was associated with increased incidence of anaemia and contract ed pelvis. Consequently there were higher incidence of lscs and PPH. There was in creased incidence of low birth weight babies, NICU admissions, respiratory distress syndrome among the babies born to teenage mothers. Teenage pregnancy is associated with increased maternal and perinatal morbidity.

Increasing the female literacy, offering reservation for women in higher education and jobs along with educating the society about the complications associated with teenage pregnancy can reduce the maternal and perinatal morbidity and mortality associated with teenage pregnancy.

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Effect of Range of Motion Exercises on Prevention of Deep Vein Thrombosis among Neurosurgical Patients

Hincy Francis[1], Kanmani Job[2]

[1]2nd year M.Sc Nursing Student, Amrita College of Nursing, Amrita Vishwa Vidyapeetham, Health Sciences Campus, AIMS-Ponekkara P.O, Kochi, [2]Professor, Amrita College of Nursing, Amrita Vishwa Vidyapeetham, Health Sciences Campus, AIMS-Ponekkara P.O , Kochi.

Abstract

Deep Vein Thrombosis, commonly referred to as the 'silent killers', the third leading cause of morbidity among critically ill patients and occurs after the neurosurgery, needs comprehensive care for the prevention of DVT during postoperative periods.

Objectives: The objectives of this study were to identify the risk of DVT among the neurosurgical patients in experimental and control group, to compare the risk of DVT among the neurosurgical patients in the experimental and control group and to find out the association between risk of DVT with the selected demographic and clinical variables.

Methods: A quantitative, quasi experimental study was done among 62 (31 experimental and 31 control) samples using semi structured questionnaire to collect the demographic and clinical data and standardized tool (Autar risk assessment scale) to assess patient at risk for DVT.

Results: The results revealed that among 31 subjects in each group, the experimental group bears 25 (80.6%) subjects with low risk whereas in the control group only 5 (16.1%) of subjects had low risk. The risk level of DVT was significantly lower than the control group, the difference was statistically significant (p<0.001). The risk level of DVT had significant association with selected clinical variables like co morbidity of Coronary Artery Disease at p< 0.05 level.

Conclusion: The result obtained in this study indicated that ROM exercise found to be effective to prevent the risk level of DVT in the postoperative period in spite of pneumatic compression devices and compression stockings.

Key words: *ROM exercise, Deep Vein Thrombosis, Autar risk assessment scale*

Introduction

Deep Vein Thrombosis (DVT) is a blood clot or thrombus that develops in deep vein usually in leg. It tends to occur in the popliteal or femoral veins, as well as deep veins within the pelvis but it can also occur in the arm. This condition can be fatal, if a part of the clot breaks off and blocks blood vessels. DVT of the lower extremity is a relatively common diagnosis made in the emergency department and up to 6, 00,000 Americans are hospitalized with this diagnosis each year[1, 2]. DVT is the third leading cause of morbidity among critically ill trauma patients but it can be prevented by appropriate risk assessment and preventive strategies [3]. Almost 50-60 % of DVT cases do not show any visible symptoms and hence are commonly referred to as the **'silent killers'**[4]. Higher incidence, underestimation of risk, low level of clinical suspicion, under used prophylaxis with high fatality has made DVT a worldwide for concern[5].

DVT prevention is important because it is often asymptomatic and difficult to detect. It is important to know about DVT because it can happen to anybody and can cause serious illness, disability and in some cases death may occur [5]. DVT can be prevented by both chemical and mechanical methods. Chemical methods of prophylaxis are primarily directed towards decreasing coagulability; mechanical methods attempt to decrease stasis[6]. In chemical anticoagulants are very useful medications but

Corresponding Author:
Kanmani Kanmani Job
Professor & HOD, Department of Medical Surgical Nursing, Amrita College of Nursing, Amrita Vishwa Vidyapeetham, Health Sciences Campus, AIMS-Ponekkara P.O, Kochi-41, Kerala
Email: kanmanijob@aims.amrita.edu,
Contact no. 09446986374

can also lead to haemorrhagic as well as thrombo embolic complications when not used correctly or without proper medical attention[7]. Many reports have documented the ability of anticoagulation management services by clinical pharmacist to help patients receiving anticoagulants especially warfarin therapy achieves better outcomes[8]. The mechanical methods for preventing venous stasis include graduated compression stockings, intermittent pneumatic compression devices and the ankle and foot exercises. Ankle exercises in the form of repetitive dorsi flexion and plantar flexion is another option for reducing venous stasis[7].

Nurses are the front liners in terms of delivery of the therapeutic regimens of both prevention and treatment for DVT. Neuro intensive care patients are vulnerable to the development of DVT because they tend to have a higher degree of immobility due to their neurological deficits which can be compounded by lengthy stays in the ICU. Immobility and paralysis leads to stasis of the veins which in turn occurs as DVT. Early mobilization has been shown to improve outcomes, and ROM exercises improve blood flow to the lower extremities. Active and passive ROM proved to be the best methods to decrease the one's risk of DVT. Nurses are the key persons to incorporate these exercises into the daily plan of care for their patients. Efforts to improve nursing compliance with this ROM exercise programme should be the focus of nursing care.

Materials and Methods

A quantitative quasi experimental two group post test only design was used for the present study. The study involved two groups, an experimental and a control group. The samples were post operative patients in the Neurosurgical ICU who were with pneumatic compression devices and compression stockings and were selected through purposive sampling. The sample size was 62 (31 in each group). The setting was Neurosurgical ICU, Tertiary care hospital, Kochi.

The data collection instruments were semi structured questionnaire which includes two sections. Section I consists of demographic data; Section II consists of clinical data and the Autar Risk assessment scale. The content validity index for semi structured questionnaire was 1 and for Autar risk assessment scale was 0.88-0.95. The intra class correlation coefficient values of 0.94-0.99 confirmed the inter rater reliability of the DVT scale. The pilot study was conducted among 6 patients (3 in each group) followed by main study among 62 patients (31 in each group).

Results

The data obtained were analyzed using descriptive and inferential statistics.

Table 1: Distribution of subjects based on socio-demographic variables

Demographic data	Experimental group (n=31)		Control group (n=31)	
	Frequency	%	Frequency	%
Age in years				
21-30	4	12.9	3	9.7
31-40	1	3.2	5	16.1
41-50	8	25.8	3	9.7
51-60	7	22.6	7	22.6
61-70	10	32.3	8	25.8
>70	1	3.2	5	16.1
Diet				
Non vegetarian	31	100	31	100
Alcohol				
Yes	15	48.3	15	48.3
No	16	51.61	16	51.61
Smoking				
Yes	15	48.3	15	48.3
No	16	51.61	16	51.61
Drug abuse				
Yes	1	3.23	0	00
No	30	96.8	31	100

Data presented in table 1 depicts the characteristics of the sample based on socio-demographic variables. The data shows that 8(25.8%) of the subjects in the control group and 10(32.3%) in the experimental group are in the age group of 61-70. All samples were non vegetarian in both groups, and about the smoking and drinking habits, 15(48.3%) were in experimental group and 16(51.61%) were in control group
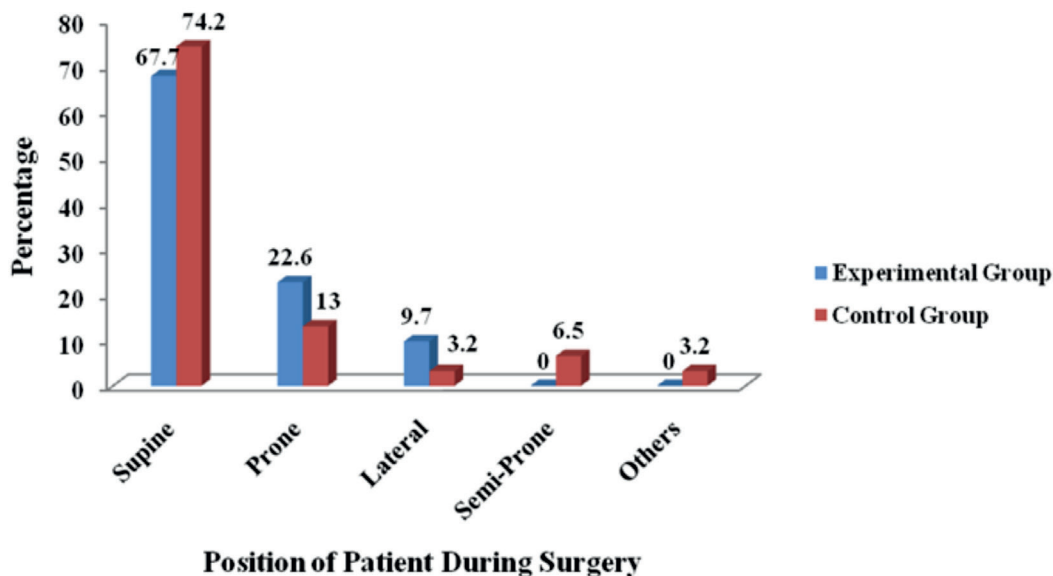

Fig. 1: Bar diagram of distribution of samples based on position of patient during surgery.

Fig. 1 shows 21 (67.7%) in the experimental group and 23 (74.2) in the control group were in supine position during surgery, 7 (22.6%) and 4 (13%) in the experimental and control group were in prone position respectively..2 (6.5%) samples from control group were positioned in semi prone during the surgery but in experimental group no one was positioned semi prone.
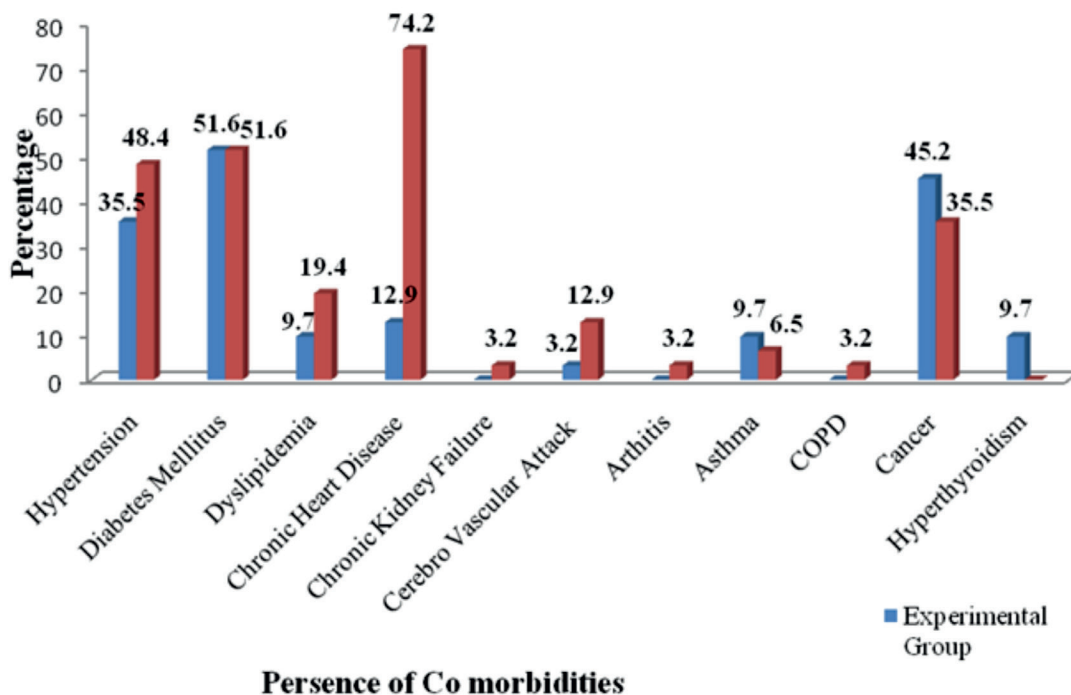
Fig. 2: Column diagram of distribution of samples based on the presence of co- morbidities

Fig. 2 depicts, the hypertension is present in 11 (35.5%) samples of experimental group and 15 (48.4%) of control group. Diabetes Mellitus was present equally in both groups 16(51.6%). The number of samples with chronic heart disease and dyslipidemia in control group was 23 (74.2%) and 6 (19.4%) respectively..

Table 2: Comparison of risk of DVT in experimental and control group using chi-square test

Risk	Experimental Group n= 31		Control Group n=31		χ^2	p value
	Frequency	%	Frequency	%		
Low risk	25	80.6	5	16.1		
Moderate risk	4	12.9	0	0	40.86**	0.001
High risk	2	6.5	26	83.9		

Tab $\chi^2 (2) = 13.82$ **significant at 0.01 level

Table 2 shows the computed χ^2 value 40.86 is greater than the table value 13.82, the test is statistically significant (p<0.001). So there is a significant difference between the risk of DVT among the samples in experimental and control group.

Table 3: Effect of range of motion exercise on prevention of DVT

Groups	Mean $\pm$ Standard Deviation	t value	p value
Experimental group	9.48 ± 2.67	6.78**	0.001
Control group	14.97 ± 3.63		

tab $t (60) = 2.58$ ** significant at 0.01 level

Table 3 depicts the effect of range of motion exercise on prevention of DVT. The mean score of experimental group was 9.48 with standard deviation of 2.67 and for control group 14.97 with standard deviation of 3.63. The *t* value for the above mean was 6.78 which is greater than table value of 2.58, the test is statistically significant (p<0.01).

Discussion

The first objective was to identify the risk level of DVT among neurosurgical patients in the experimental group and the control group.

It was observed that the risk level of DVT was experienced by all the subjects in varying degrees. As the number of the exercise therapy sessions increased the risk level of DVT has also changed. In the control group, treating the risk of DVT with pneumatic compression devices or compression stockings alone the number of subjects experiencing great risk of DVT is high. In the experimental group who received foot and ankle range of motion exercises the number of subjects experiencing high risk of DVT is less compared with low and moderate risk of DVT.

Irrespective of whether the subjects received an intervention or not, all the subjects who undergone neurosurgery experienced risk of DVT in varying degrees. Among 31 subjects in each group, the experimental group bears 25 (80.6%) subjects with low risk, 4 (12.9%) of them with moderate risk and 2 (6.5%) of them with high risk of DVT. Where as in the control group 5 (16.1%) of subjects had low risk, none of them had moderate risk and 26 (83.9%) subjects had high risk.

This finding was supported by similar study conducted by Jing M *et al.* in China on effects if early exercises of care in the prevention of cerebral haemorrhage patients with Deep Vein Thrombosis, the patients were observed for femoral vein blood flow velocity and the occurrence of DVT results after the first seven days of the exercise group femoral vein blood flow velocity was significantly higher compared with the control group (P<0.05), postoperatively. The incidence of DVT was significantly lower than the control group (P <0.05). The study findings shows that early postoperative care given to patients with cerebral haemorrhage movement can improve venous blood flow velocity, and can significantly reduce the incidence of cerebral haemorrhage patients of lower extremity DVT [9].

Lee et al conducted a randomized control trial to find out the effect of pressure therapy combined with exercise therapy on cerebral haemorrhage prevention of postoperative deep vein thrombosis in 2012 in Gaoyang, 40 cases of cerebral haemorrhage patients were randomly divided into experimental and control groups, the control group was given conventional treatment and care, the

experimental group was given pressure therapy plus exercise therapy and pressure in the conventional treatment and care. The results show that after the treatment comparing with venous blood flow velocity, the blood flow velocity was higher in the experimental group, the difference was statistically significant (P <0.05), deep vein thrombosis in the control group was higher than in the experimental group, the difference was statistically significant (P <0.05)[10].

In the light of the above mentioned study findings, which support the present study, it can be concluded that foot and ankle range of motion exercises are more effective and a powerful nursing intervention used by the nurses to prevent the risk of DVT among patients undergone neurosurgery.

The second objective was to compare the risk level of DVT among patients receiving foot and ankle ROM exercises and patients not receiving foot and ankle ROM exercises.

On comparing the risk level of DVT between the experimental and control group it was evident that the experimental group had experienced more low risk level. Even though 4(12.9%) and 2(6.5%) of total subjects in experimental group had moderate to high risk level, none had experienced moderate risk level and 26(83.9%) experienced high risk level in the control group.

The study findings show the fact that the group who are not receiving the foot and ankle pump exercises were at high risk level. The experimental group who were receiving add on therapy experienced low risk level more. So there was a statistically significant (χ^2(2)= 40.86 p<0.001) difference between the subjects who were receiving the foot and ankle pump exercises and who were not receiving the foot and ankle pump exercises using this test.

Another important study finding was the statistical significant (Z value=2.992 p<0.01) difference between the mobility score in both the groups, who were receiving the foot and ankle pump exercises and who were not receiving the foot and ankle pump exercises. The computed Z value 2.992 was greater than the table value 2.58 the test was statistically significant at 0.01 level. There was significant difference between the mobility score among subjects in the experimental group and control group.

This strengthens the nurse's point of view that the early mobilization after the neurosurgery plays an important

role. So passive foot and ankle pump exercises after the neurosurgery had a promising role in the ICU settings.

Weiming H, Lili Z, Aiwen Li, and Chunlei X conducted a study on effects of early activity on the prevention of DVT among 100 cases of postoperative cerebral haemorrhage in Guangdong , divided into experimental and control groups all 50 cases, the test group except cerebral haemorrhage after giving routine care. The incidence of DVT in the results of the test group was significantly higher, while the incidence of postoperative DVT was significantly lower than the control group [11].

Wu Liu et al conducted a randomized control trial on effects of early exercise of care in the prevention of cerebral haemorrhage patients with deep vein thrombosis in Changsha. 80 cases of cerebral haemorrhage patients undergoing brain surgery divided into the test group and the control group, 40 cases in each case , Test group deep vein thrombosis after surgery were significantly less than the control group, a significant difference between two groups with statistical significance, p <0.05.The study concludes that early mobilization of scientific and reasonable care patients with intra cerebral haemorrhage can safely and effectively prevent post-operative deep venous thrombosis, thereby reducing unnecessary suffering and medical expenses, have greater social, economic and clinical importance [12].

On comparing the present study findings with the above studies, it can be interpreted that foot and ankle range of motion exercises was very effective intervention in reducing the risk level of DVT after the neurosurgery in the postoperative period.

The third objective was to find the association between risk level of DVT with selected demographic and clinical variables.

The association between the risk level of DVT with selected demographic and clinical variables like age, gender, education, occupation, alcohol use, smoking, diet, family history of diseases, co morbidities, type of surgery, type of admission, position during surgery, GCS score, preoperative treatment, previous history of vascular diseases etc. were done using chi-square test the risk level of DVT had significant association only with co morbidity CAD at p<0.05 level.

These findings were supported by a study conducted by Prandoni P, Bilora F, Marchiori A, Bernardi E *et al* to

find the association between atherosclerosis and venous thrombosis. The result revealed, at least one carotid plaque was detected in 72 of 153 patients with spontaneous thrombosis (47.1%; 95% confidence interval, 39.1 to55.0), 40 of the 146 with secondary thrombosis (27.4 %; 95% confidence interval 20.2 to 34.6) [13].

Conclusion

The foot and ankle ROM exercises found effective to prevent the risk level of DVT in the post operative period in spite of pneumatic compression devices and compression stockings. The nurses have a promising role in the comprehensive care of patients after neurosurgery. So early mobilization and exercise therapy was more important than other mechanical devices.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Consideration: Permission had been taken from the research committee of Amrita College of Nursing and Thesis Review Committee of AIMS, Kochi. Informed Consent was obtained from the subjects.

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