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Rising Trends of Overweight and Obesity among Women in India

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Introduction:

Overweight and obesity have reached epidemic proportions globally, with a world- wide prevalence of around 39%. [1,2] It is the fifth leading cause of death, resulting in about 2.8 million deaths of adults globally every year. Diabetes (44%), Ischemic heart disease (23%) and certain cancer(7-14%) burdens are attributable to overweight or obesity.[1] The problem is not only restricted to developed countries but poses a new challenge for developing countries, calling for immediate attention.[3] In developed countries, food patterns like energy-dense food consumption and sedentary lifestyles may contribute to this increasing burden of obesity. While in developing countries like India, there is a transition from traditional food patterns to more westernized food which includes highly-saturated fats, sugar, and refined food. Apart from this, reduced levels of physical activity, better transport facilities, better healthcare, and increased stress, particularly in the rapidly-growing urban populations, are all critical factors leading to an increased burden of obesity in India.[4-6] According to the National Nutritional Monitoring Bureau (NNMB) report (2012), the prevalence of overweight/obesity was significantly higher in those with high consumption levels of milk and milk products, fats and oils, sugar, and salt.[7] India has more than 30 million obese people, which is increasing alarmingly.[8-10] The problem is more acute among women than men. In India, the proportion of overweight or obese women is 24%, one percent higher than that of men (23%). [11]

National Family Health Survey (NFHS) data shows a doubling in the prevalence of obesity among women from 10.6% to 24% in two decades. Figure 1 illustrates rising trends of overweight and obesity among Indian women, as evidenced by NFHS data. Earlier, it was found to be maximum in the age group of 30-39 years (increase from 7.3% in 1998-99 to 27.7% in 2015-16), whereas, in NFHS 5, the maximum overweight and obese women were in the 40-49 years age group with a prevalence of 36.9%.[8-11] The prevalence was more among widowed and married than never-married women. The overweight or obesity among women increases with an increase in wealth. The proportion of overweight or obese is 10% in the lowest wealth quintile while 39% in the highest wealth quintile.[11] There are 16 states where ≥30% of women have a Body Mass Index (BMI) ≥25 kg/m^2. Puducherry (46%), Chandigarh (44%), Delhi, Tamil Nadu, and Punjab (41% each), and Kerala and Andaman & Nicobar Islands (38% each) have the highest proportion of overweight or obese women in India.[11] The proportion of overweight or obese women is more in urban areas (33%) than in rural areas (20%). The highest proportion of thin women is in Jharkhand and Bihar (26% each), followed by Gujarat, Dadra & Nagar Haveli, and Daman & Diu (25% each).[11] Mean BMI for women has increased from 20.3 kg/m^2 to 22.4 kg/m^2 from 1998-99 to 2019-21.[8-11] More than half of the women (57%) have a high waist-to-hip ratio (WHR ≤ 0.85) that can put them at increased risk of type 2 diabetes mellitus, myocardial infarction, stroke, and premature death.[11]

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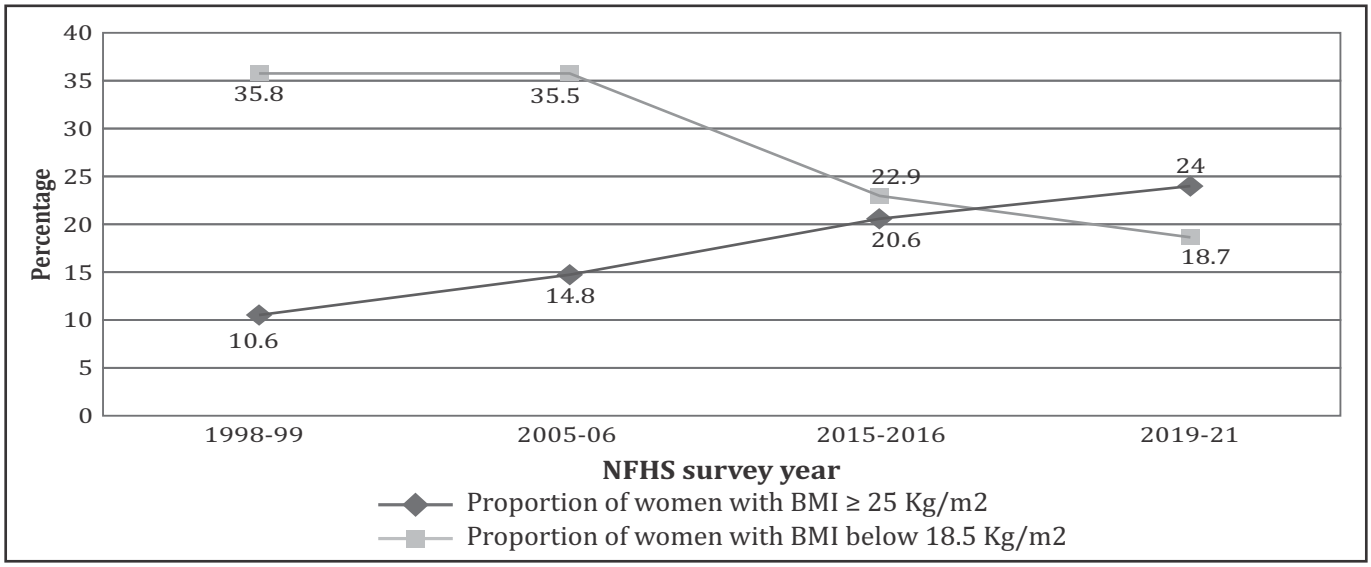
Situation analysis as per NFHS (National Family Health Survey) data [8-11]

Figure 1: Proportion of overweight and thin women in India (15-49 years)



Risk factors for overweight and obesity among Indian women

- **Dietary factors:**

The nutrition theory by Popkin(1993) explains changing food patterns and reduced physical activity as major factors leading to an increase in obesity globally.[12] Nutritional and anthropometric status of Indian women is affected by vast cultural differences in food patterns, food fads, and habits mainly decided by socioeconomic status, regional differences, and food cooking practices. A study in Gujarat explored the influence of dietary factors on the weight status of adults and reported that the total calorie intake and habit of snacking had a positive association with weight gain.[13] The average Indian households get almost half (47%) of their total calories from whole grains. The share of calories from protein sources is only 6–8%. Which ideally should be double this, around 15%. Even the wealthiest households in India do not consume adequate amounts of fruits, vegetables, and non-cereal proteins in their diets. The average Indian families get almost half (47%) of their total calories from whole grains.[14] As per NFHS 5, 7% of women consume fried foods daily and 36 percent weekly. Aerated drinks which comprises of high level of dissolved sugar are consumed daily by 3 percent of women and weekly by 13 percent of women in India.[11] A study reported that Indians consume unhealthier saturated fats like palm oil. Urban households in the highest income group consume almost 30% of their daily calories from processed food. The consumption of Vanaspati is known to have risen by 51% between 1993 and 94 and 2011–12 and it is widely used for cooking at home, in restaurants, by street vendors, and in the preparation of processed foods.[14] In metro cities, the consumption of visible fat is 33g/day, which is higher than the recommended levels of ICMR (20g/person/day). The average consumption of visible fat was marginally higher among men (34.1g) than women (31.1g).[15]

- **Physical activity:**

As per an ICMR study, the estimated number of inactive individuals in India is 392 million. The prevalence of physical inactivity was significantly greater in urban areas compared to rural areas (65.0% vs. 50.0%) and among females compared to males (63.0% vs. 45.7%). The percentage of individuals with no recreational activity increased with age.[17] In many cultures in India, especially in rural India, women are not allowed to engage in fitness activities, run, or even walk, as their true purpose is to serve as a housewife and perform only indoor household chores. Socialization is essential to individual holistic health, and many Indian women are still victims of this social exclusion governed by their family members. All these

factors make obesity the core of women's lives as it may affect their lives on a personal, professional, emotional, mental, and physical level.[16]

- **Environmental factors:**

A term-built environment refers to the infrastructure of a geographic area that influences proximity to and types of resources, transportation methods, and neighbourhood quality. As NFHS 5 data shows, every fifth woman in the rural area is obese.[11] One of the reasons could be that the residential areas are farther from the market, health care, and recreational opportunities, which may restrict them from practising healthy behavioural patterns to prevent obesity.[18] Also, the type of food available through food vendors in the community and its frequency could be an essential factor contributing to obesity.[18] Along with this, socioeconomic statuses (SES) variables, such as income, education, or occupation, have a significant impact on following healthy lifestyle practices and the development of overweight and obesity. [18]

In the last two decades, there has been a major shift in the marketing strategy of food items, and there is now a propensity for "Ready to Eat"/ ready in 2-minutes items available around the corners. Every cinema house/multiplex/shopping mall gives you a tempting range of dishes you can order at any time; besides that, many food items are presented with a deal of "Buy one get one free," which results in higher food consumption. During the COVID-19 pandemic concept of "home delivery" has reached from urban areas to rural areas as well, and one can get any food of their choice with just a phone call. So this easy access and lucrative marketing strategies lead to higher calorie consumption. This situation is not only affecting women but equally affecting boys as well, leading to overweight and obesity.

- **Stress:**

Stress is a double-edged sword in both causes and consequences of obesity. Stress can affect behaviour by inducing overeating and consuming foods high in calories, fat, or sugar; decreasing physical activity; and disturbing sleep. It also triggers physiological changes in the hypothalamic-pituitary-adrenal axis, reward processing in the brain, and possibly the gut microbiome.[19] Obesity can be stressful due to weight stigma, in society, including in media, employment, healthcare, and interpersonal and educational settings.[19, 20] Studies have shown that greater sleep variability is associated with obesity in both children and adults. High sleep variability has been associated with higher daily energy intake and sugar-sweetened beverage consumption.Sleeping may influence obesity by shifting the timing of eating patterns. Compared to those with earlier sleep times, those with later sleep times are more likely to engage in breakfast skipping and after-dinner snacking.[21] Studies reported that parents provide less financial support for their higher BMI than their lower-BMI daughters[22], and heavier women are less likely to go to or graduate from college.[23] All these leading a vicious cycle of stress from obesity to stigma to stress. [19]

COVID-19 pandemic has further aggravated this situation, as many lost their jobs, lost financial support, lost guardians, etc. So it is expected that there could be an exponential rise in obesity soon if we do not take corrective actions promptly.

- **Sedentary habits:**

Pooled analysis of 22 low- and lower-middle-income countries (LLMICs) reported the odds of a women being overweight or obese were 1.20, 1.40, and 1.18 times higher among those who watched television less than once a week, at least once a week, and almost every day, respectively, compared with those who did not watch television. Women who own mobile are 1.72 times more likely to experience overweight or obesity.[24] In India screen time has increased during and after the COVID period as due to lockdown people were working from home and sources of entertainment were limited to television and phones.

Consequences of overweight and obesity:

Being overweight and obese results in various physical, mental, and social problems. Obesity is associated with the development of diabetes, hypertension, cardiovascular diseases, ischemic heart disease, osteoarthritis, meningioma, multiple myeloma, adenocarcinoma of the esophagus, and

cancers of the thyroid, postmenopausal breast, gallbladder, stomach, liver, pancreas, kidney, ovaries, uterus, colon and rectum (colorectal). Around 23% of ischemic heart disease cases are attributed to obesity.[25-27] Many women experience breathlessness as the most important consequence of obesity which interferes with their daily routine work. Difficulty in sitting, standing, walking, joint pain, and fatigue are also some of the problems experienced by women.[16] Being in proper shape (good figure) makes women feel more socially acceptable. Most obese women consider themselves 'ugly' and less attractive, which leads to low confidence, demotivation, and low self-esteem when appearing in a job interview, selecting a life partner, or part of a social group. Women may face trouble while choosing a career, a hobby, or clothing choices and may also be rejected in a marriage proposal if they are obese. Obese women, especially young girls, are more prone to bullying and humiliation, the fear of which even makes them stay indoors and exercise less. All these factors increase stress levels among women[28] which also serves as an independent risk factor for obesity.

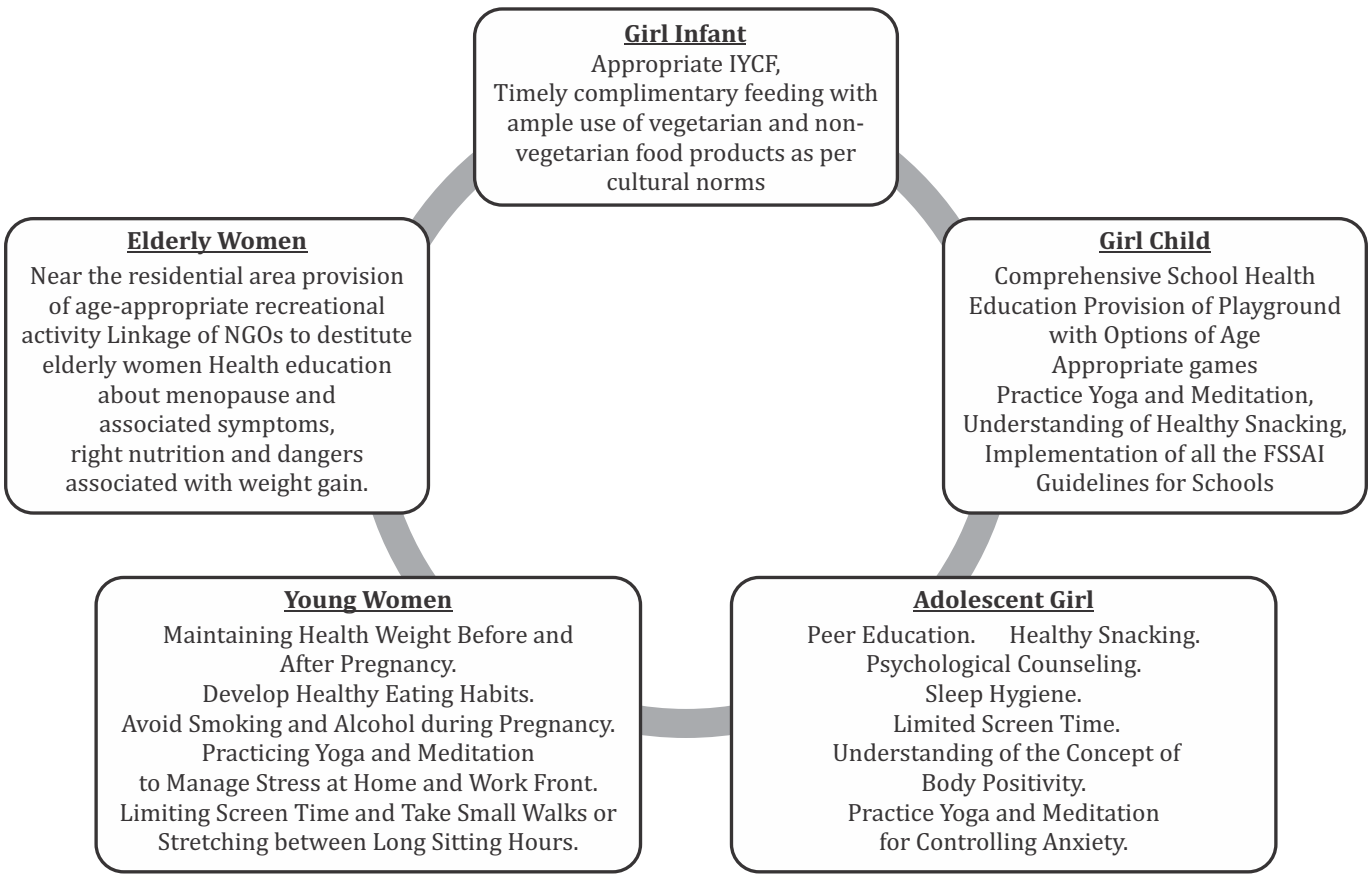
Preventive strategies for overweight and obesity:

Given the rising burden and all the health consequences of obesity, both physical and psychosocial aspects, prevention of this public health problem is of major concern. A comprehensive strategy is needed, including preventive, promotive, and curative elements. Life cycle approach can be used for controlling the epidemic of overweight and obesity. Figure 2 illustrate various preventive measures to be implemented at each level of the life cycle.

Following obesity prevention strategies should be implemented at the family and community levels.

- Centre staging prevention of overweight and obesity in different national schemes and programs-

Figure 2: Preventive Measures to be Implemented at each level of the Life Cycle



- Urban development – Setting up of societies where ample space is provided for playgrounds, parks, and gymnasiums with female trainers, accessible and separate areas for the elderly for various recreation activities like yoga, walking, and socializing.
- The National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) program was launched with an aim to prevent and control chronic Non-Communicable diseases through health promotion and opportunistic diseases. Integration with AYUSH was also suggested for health promotion regarding a balanced diet, exercise, yoga, etc. As Health and wellness centers are now launched yoga sessions should be conducted every day with at least two sessions a day so that the females can find a convenient time to participate.
- The National Nutrition Mission has various objectives targeting malnutrition and anemia. As India is transitioning towards a double burden of malnutrition it does not address the issue of over-nutrition among children and females.
- Food Safety and Standards Authority of India (FSSAI) has launched Eat Right Movement with the goal of improving public health and combating negative nutritional trends to fight lifestyle diseases. They also released a Trans Fat-free logo to encourage food establishments to use healthier fat/oil options. They have also asked the school authorities to display a board at the main entrance with a sign school "Do not sell the food products high in saturated fat or trans-fat or added sugar or sodium within school premises or campus" in English or one Indian language as applicable. Posters around the canteen should be displayed containing information about the highly processed food and their effect on health so that students can make an informed decision.
- National Health policy (2017) aims to SwasthyaNagrik Abhiyan which is a social movement emphasizing balanced, healthy diets, regular exercise, and reduced stress at the workplace for which health policy level intervention is required with the active involvement of significant stakeholders.

- A comprehensive school health education curriculum for children and adolescent need to be implemented in school, focusing on nutrition, physical activity, limitation of sedentary behavior, and tobacco use.
- Posters and banners focusing on causes, consequences, and preventive aspects of obesity should be presented in communities, hospitals, shopping complexes, eateries, and all public places.
- The food consumption pattern plays a vital role in the control of obesity and associated diseases. Policy-makers can play an important role by imposing higher taxes and appropriate labelling on food items containing high fat, salt, or sugar.
- In urban areas, youngsters mostly rely on fast food as the availability of healthier alternatives are few and expensive. Every school, college, and shopping complex must have food joints with healthier food choices.
- Locally grown and cooked food can be made available at an affordable price with appropriate branding so that people can make an informed decision regarding their food habits.
- Females should be encouraged to participate in sports in schools and colleges. Women's sports day should be organized regularly in offices and various organizations so that staff members are encouraged and motivated to participate in physical activities.
- Health care workers play a crucial role in educating people on their health. Accredited Social Health Activist (ASHA), Anganwadi Workers (ANW), and Health Workers (HW), who serve as the first level of a contact person in the community, should be trained to impart this education in the community.
- Public health strategies such as the availability of dietitians and nutritionists in hospitals providing professional and organizational support can further help to address this situation. [29]

Conclusion :

There is an exponential rise in the waist to hip ratio among women which is concerning as it is a risk factor for all the metabolic syndromes which eventually lead to premature death or a debilitating life. Hence it is the need of the hour to formulate a focussed approach at a national policy level addressing women's heath as a priority.

Declaration:

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Conflict of Interest: Nil

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Feasibility and Effectiveness of Objective Structured Clinical Examination for Assessment of Field Visits in Community Medicine for Undergraduate Medical Students

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Abstract:

Introduction : The Graduate Medical Education Regulation (GMR) 2019 in the curricular reforms recommends that "Shows How" level of the Miller's Pyramid is assessed through long case, Objective Structured Clinical Examination and Mini-Clinical Evaluation Exercise (Mini CEX). **Objectives :** 1. To utilize OSCE for assessing Field Visits carried out by Undergraduate medical students as formative assessment. 2. To find out the feasibility and effectiveness of Objective Structured Clinical Examination (OSCE) in Community Medicine. **Method :** An Educational Innovation Pilot Project was carried out in the department of Community Medicine of a Medical College in India. A pilot (18) of 3rd MBBS students were assessed through Objective Structured Clinical Examination (OSCE) for epidemiological case study of malaria assigned to the author faculty. These students were also exposed to the oral viva. The analysis of the assessment was through assessment of codes of the procedure stations through checklists and mean scores of procedure and response stations. Qualitative analysis of emerging themes and quantitative analysis as likert scale were utilized for evaluation of the exam were used. **Results :** The mean score of all response stations was 5.1. Almost all students felt that OSCE was better than the conventional oral viva in assessing skills. Furthermore, almost all students and faculties suggested that it should gradually become a part of curriculum and scaled to entire and other batches with suggested modifications. The residents who participated as simulated cases found it to be a novel experience and a different kind of learning process. **Conclusion :** It is feasible to introduce OSCE with some modifications in assessing skills acquired in field visits in Community Case Management.

Key Words : Community Medicine, Field Visit, Internal Assessment,Medical Undergraduates, Objective Structured Clinical Examination

Introduction:

The main aim of medical education is to foster the development of clinical competence in students at all levels. The traditional pattern of practical examination has several problems as reported by previous studies.[1-3] The variability in practical examination and examiners, lack of objectivity both affects grading in traditional pattern, significantly. Added to this, the traditional pattern of examination does not assess the attitudes and communication skills of the candidate. In response to these defects of clinical and practical examinations, some attempts have been taken to improve the current scenario.[1-3] The first innovation in this regard is the introduction of objective structured clinical examination (OSCE) later extended to the practical examination (OSPE) described by Harden and his group from Dundee in 1975 and in greater detail in 1979.[4-5] OSCE is meant to test "Shows How" level of the Miller's Pyramid.[4] OSPE has been recommended as an alternative

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instrument for the assessment of practical examinations.[6] In this, all the educational objectives of an exercise can be assessed through a structured evaluation pattern. The objectivity and uniformity in the questions and marking of students make OSPE better than traditional pattern of examinations. [7]

Currently OSCE/OSPE is conducted in a few medical colleges in association with other conventional methods in India, and is being allotted a small percentage of marks.[3,8] Competency assessment has been an obligation and an ongoing challenge for those institutions responsible for training and certification of doctors. The GMR 2019 in the curricular reforms for the competency-based-medical-education (CBME) for undergraduate medical curriculum recommends that "Shows How" level of the Miller's Pyramid is assessed through long case, OSCE and Mini CEX. [9] There is paucity of studies till date on assessment of students in Community Medicine using OSCE/OSPE. The traditional assessment methods being; spotting, oral viva, epidemiological case studies and reports/logbooks and these methods are not able to test all the skills. The current study utilized OSCE; to assess Field Visits carried out by Undergraduate medical students as formative assessment and; to find out the feasibility and effectiveness of the same in Community Medicine.

Method:

The present Educational Innovation Pilot Project was carried out during August 13, 2013 to November 13, 2013 in a Department of Community Medicine of a college located in western India. Teachers in the department, Postgraduate students of Community Medicine and a pilot of 18 students of 3rd MBBS were the study participants. The teachers were trained by the author who was the co-ordinator of institutional medical education unit and curriculum committee regarding Objective Structured Clinical/Practical Examination with a PowerPoint Presentation, Role play, demonstrations and Interactive discussions. Most of the faculties were trained in the basics of medical education technologies. Another session was conducted on using Standardized patients. Residents in the department were taken as Standardized patients. The students were also briefed about the importance, concept and method of OSCE. Their consent was sought and queries answered. They were also appraised about feedback to be given and obtained by them.

Context: Process of teaching and learning a community case; a group of five students were assigned a family having a case of a disease commonly seen in the community under the guidance of a teacher. During epidemiological case study students spent nearly ten hours at the patient's house and family to learn integrated practice and to apply the principles of holistic patient management and good communication skills. The students were then assessed through oral viva and report presentation. So, to start with and to overcome the short comings of conventional examinations it was decided to assess a pilot of 3rd MBBS students through OSCE for epidemiological case study. These students were also exposed to the oral viva as were other students to eliminate bias in assessment.

Preparation for OSCE: In consultation with the four teachers who became part of the examination, OSCE blueprint was constructed, stations, scenarios for Standardized Patient and checklists were prepared and finalized. There were four Procedure and seven Response stations as shown in Table1. Four senior residents acted as standardized cases and other four assisted in conducting the examination. Community case was a family member suffering from Malaria.

Implementation of OSCE: Included: Preparation of space; Procuring and arranging required materials for the 11 stations; Instructing students on the previous day and solving queries; Briefing with observers and standardized patients as residents. A team was formed for each of the four procedure stations comprising of a senior teacher, a senior resident as a simulated case and a junior resident. The role of each of the member

was further cleared, appraised and the checklist was again discussed with the observer teachers. Two non-teaching staff in form of social workers also assisted in the conduction of the examination. Administering OSCE; the exam was administered and was completed in about two hours, Figure 1. Immediate group and sandwiched feedback was given to the students regarding their performance in the examination. Confidentiality of the stations was maintained up till the end of the examination.

Evaluation of Examination: For evaluation of the exam mixed methods were used viz; **Quantitative and Qualitative. 1) Qualitative method:** One Focus group Discussion (FGD) each with students, simulated case and teachers was conducted. A semi-structured guideline for each of them was prepared in order to understand the process of OSCE and obtain their perceptions on the same. The emerging themes were then analyzed. 2) Quantitative method: A semi- structured questionnaire was administered to each student just after the exam to get their views about the exam (Some of the questions were: Did learning take place in field visits? (Cognitive); Was OSPE better than the conventional exam (oral exam)?; How skilled do you feel? (On a likert scale). Should it be scaled?; Perception about Visits; Perception about stations; Perception about faculties; Modifications required if any.

Analysis: Assessing codes of the procedure stations through checklists and mean scores of both the stations. Qualitative method analysis of emerging themes and quantitative as % and likert scale.

The approval of the Institutional Ethics Committee for Human Research of the institution was obtained before starting the data collection (approval dated 24th June, 2013).

Results :

Field Visits carried out by undergraduate medical students of 3rd MBBS in Community Medicine at a Medical College in India was assessed by OSCE. A pilot of 18 students, four teachers, 10 residents and two paramedical staff participated in the study.

A) Assessment of OSCE; The scores obtained by the students in the procedure stations are shown in Figure 2.

It is seen from Figure 1 & Table 2 that the students scored well in the 4th station (Mean Score=7.6 & 95%CI= 8.45-6.82)which assessed their skills in dietary history taking and counseling and poorly in the second station that assessed them on arriving at environmental diagnosis and preventive advice. The mean score of all response stations (Table 2) was 5.1 and this shows the need to bring improvement in specific areas of cognitive and psychomotor domain. The response stations were structured and to bring in objectivity, an answer key was prepared and the same were assessed by the same examiner.

Feedback offered to the students by the teachers assessing OSCE : group and sandwiched feedback to the students was given immediately after the exam as the teachers felt that most of the mistakes were committed uniformly by most students. For instance; greeting the patient, use of local language and avoidance of scientific terminology (jargons for eg deficiency / absorption / iron / calorie / quality / quantity). The need for eliciting complete personal history was stressed upon. Feedback on diet included; importance of eliciting complete history on intake of green leafy vegetables/fruits/milk/dry fruits; and inclusion of information on food fads in history taking. Appropriate information on menstrual hygiene should also be asked by male students as most of them skipped it.

B) Evaluation of OSCE : The OSCE administered to the students was assessed by Qualitative methods: a) Semi structured questionnaire administered to the students to get their feedback and b) Focus Group Discussion with the students, teachers and simulated cases to understand the process and perceptions of participants.

Students' perspective on overall assessment: In the present study almost all the students felt that

Table 1: Stations of OSCE

Station No.	*Station Details/Objectives	Domain assessed	Patient used
1.	Procedure: To assess complete clinical history taking using good communication skills	Cognitive and Affective	Simulated patient
2.	Procedure: To assess environmental history taking and advising on prevention of malaria next time, also in the family and community.	Cognitive and Affective	Simulated patient
3.	Procedure: To assess socio-cultural history taking regarding mother and child care.	Cognitive and Affective	Simulated patient
4.	Procedure: To assess dietary history taking and counselling on the improvement of the same.	Cognitive. Psychomotor and Affective	Simulated patient
5.	To assess management of the case as per National Guidelines.	Higher cognitive	Response station
6.	a) To identify type and stage of malaria parasite in the given photograph of peripheral smear of blood b) To identify the given vector (female anopheles mosquito) through a microscope	Cognitive and Psychomotor	Response station
7.	To comment on the photograph of a house from urban slum regarding breeding places of mosquitoes and enlisting measures to prevent the same.	Higher cognitive	Response station
8.	To comment on the table of diet consumed by the patient.	Higher cognitive	Response station
9.	To calculate malariometric indices from the given data	Higher cognitive	Response station
10.	To depict through a flow diagram health organisation for malaria in slums.	Higher cognitive	Response station
11.	To prescribe chemoprophylaxis to prevent malaria to a patient visiting an endemic area.	Higher cognitive	Response station

*Seven Minutes & Ten Marks for each Station

Figure 1 : Stations of OSCE

A Procedure Station

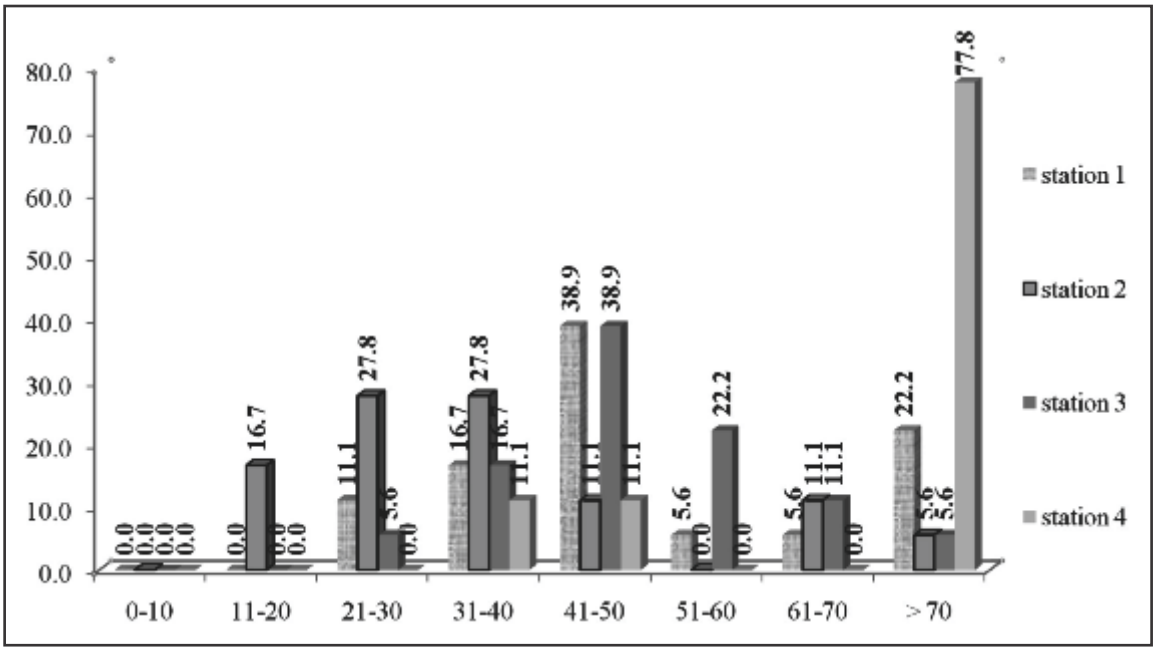
A Response Station

Table 2: Score of the students at different Procedure & Response Stations of OSCE (N=18)

Procedure Stations of OSCE (4)	Station 1	Station 2	Station 3	Station 4
***Mean Score and SD (standard deviation)**	5.1&1.4	3.6 &1.8	5 &1.4	7.6 &1.7
95% CI (Confidence Interval)	5.67-4.21	4.45-2.77	5.58-4.33	8.45-6.82
**Response Stations of OSCE (7)	**Mean Score and SD(standard deviation): 5.1 & 1.4 95%CI (Confidence Interval): 5.79-4.48			

* From the score in the checklist (Out of 10)
* *From mean of the total of seven stations. (Out of 10)

Figure 2: Score of the students at different Procedure Stations of OSCE in % (N=18)



OSCE was better than the conventional oral viva in assessing skills. In students' own words, "It was too near to the practical approach as required in MBBS. Till now, we had only learnt to give viva and not dealt with patients and that is what we have to actually do in future. As a doctor, it gives complete assessment of intellectual, emotional, communication skills and social aspects (of patients). It checks the skills (personal and performance) at community level and increases practical knowledge. In case of viva, there are theory questions, so there is less exposure to actual communication. Oral viva depends on the mood of the examiner & topics are jumped (skipped) in oral viva. Helps develop communication skills & it (OSCE) is perfect. Furthermore, almost all students suggested that it should become a part of curriculum and scaled to entire and other batches, however few modifications suggested by them were; minor changes required regarding the scenario and the patients; not only a single disease, but all-important diseases should be covered by OSCE.

Students' perspective on OSCE: from FGD conducted with students immediately after the exam the following points emerged; "Time was not enough though OSCE stations were easy". "It was first exposure of counseling so we were hesitant, more so because the cases were simulated by resident teachers from the department". Almost all said that,

one demonstration of what is ideal counseling is needed.

On importance of Field visits/Epidemiological Visits; almost all students (17/18) mentioned that exposure to the community is necessary. In students' own words, "You cannot study ground level people by sitting in Air-Conditioned Chambers. So, one has to go to community level and know what the reality is". "Learning through visits/natural environment, provides learning at community level (problems and practical aspects). Base of clinical visits is really excellent if properly implemented". "There is good learning through visits". "Nutritive advice to the patients in the local language within the limits of their economic status improved our (students') diet consciousness". "Learnt about community practice and their culture. Acquired more knowledge by seeing the patients in their natural environment". A modification required by a student was, "Patients should be present at the time of case presentation so that the students can be cross checked". I would like to counsel the community by conducting one day program and similar such programs can be held for under-graduate students".

Regarding teachers' support, important quotes were; "Co-operative and friendly attitude of teachers and staff". "Co-operative and friendly attitude and acceptive approach of most of the faculty members". "Co-operative and skilled teaching faculty. Good demonstrations on part of the teachers".

Feedback on OSCE from simulated cases (residents): A focus group discussion was also conducted with the simulated cases as residents and the following salient quotes/points emerged;

"Good initiative by the department to introduce OSCE on experimental basis this year". "New experience and different kind of learning process". "Helps improve counseling and communication skills of undergraduate by taking history from the epidemiological point of view". "Tests Knowledge, Attitude and Practice about housing, environmental condition and how to improve it". "Teaches students integrated practice of Public Health problems in family and community and to understand problems from patients' perspective"

Feedback on OSCE from teachers: A focus group discussion was conducted with the teachers and the following salient points in form of modifications required emerged;

Process modification; Students need to be sensitized about OSCE before starting visits in order to align objectives with assessment i.e., during postings or lectures.

Stations modification; As more time was being spent on reading questions, instead a play (2-5 minutes) or case scenario would-be easy for the students to comprehend and to answer questions. The presence of junior teachers (residents) enacting roles of patients made students awkward due to their seniority, instead of them interns or social workers could play role as simulated cases. Students can be asked to prepare a small role play themselves (citing as doctor-patient) for a particular scenario given to them was suggested by a few. Almost all teachers felt that the OSPE should be introduced and scaled gradually as a pattern of internal assessment in Community Medicine. It could be taken up with some modifications and gradually be started with clinical posting examinations.

Discussion:

Field Visits carried out by undergraduate medical students of 3rd MBBS in Community Medicine at a Medical College was assessed by OSCE. The aim of the study was to find out the feasibility and effectiveness of the same in Community Medicine. Till date, there is less information available on effectiveness and feasibility of OSCE/OSPE in Community Medicine in India. The study found out that it is feasible to introduce OSCE with some modifications in the Community Medicine examination as well, to start with as formative assessment. Several studies have proved objective structured practical examination to be a reliable assessment tool.[10,11] Previous studies have reported

that OSCE/OSPE is an effective tool in discriminating between good and poor performers in practical examinations of medical subjects.[12-13] In a study by Muthusami Anitha, et. al[14], 49 surgery residents in Pondicherry were assessed, they concluded that OSCE is a reliable, valid and feasible method for evaluating surgery residents at various levels of training. Bhatnagar, et. al[15], administered OSCE in Maharashtra and found the OSCE to be feasible to conduct and had high perceived construct validity. Both students and faculty members expressed a high degree of satisfaction with the format. In a study by Mazumder, et. al [16] conducted in West Indies, the OSCE was perceived very positively and welcomed by both the students and examiners. To overcome challenges regarding OSCE better orientation of the faculty and preparation of the students for the OSCE was suggested. Mishra Priyadarshini, et. al[17] concluded that OSCE could be used as a complement to a traditional examination. Adding two or three relevant questions on applied aspects to each station would be more helpful in the assessment procedure. In systematic reviews conducted by Varghese Abin and George Gigini [18] and Rao Pallavi, et. al[19] in India, authors found out that the faculty and students perceived OSCE as an effective tool for competency assessment. Time allotted at different stations, student anxiety and the implementation cost were addressed as barriers.

In the present study almost all the students felt that OSCE was better than the conventional oral viva in assessing skills. Similarly, previous study reported that OSCE/OSPE can examine both the clinical and experimental skills, better than a conventional examination.[20] Furthermore, almost all students suggested that it should become a part of curriculum and scaled to entire and other batches, however few modifications were also suggested by them. Majority of the students found the assessment by OSCE to be very important to them. The residents who participated as simulated cases found it to be a novel experience and different kind of learning process. They opined that it would help improve counseling and communication skills of undergraduate by taking history from the epidemiological point of view. Almost all teachers felt that the OSCE should be introduced and scaled gradually as a pattern of examination in Community Medicine. It should be taken up with some modifications and gradually be started with clinical posting examinations.

Conclusion :

All stakeholders felt that this pattern of assessment along with the traditional method can be easily incorporated in the competency based medical education (CBME) as envisaged in the GMR 2019 reforms for undergraduate medical education in India. It is feasible to introduce OSCE with some modifications in the Community Medicine examination as well, to start with as formative assessment. However, more studies are needed with larger subject numbers and also experience from other subjects before the implementation of OSCE in university examination.

Recommendations:

Based on the results from this study (pilot project), it is recommended to scale up this OSCE method of assessment to entire batch of students with modifications as suggested by the students and the teachers. We also recommend that other departments of medical sciences should incorporate OSCE/OSPE as an assessment tool for assessing "Shows How" level of the Miller's Pyramid also suggested in the GMR 2019 reforms for undergraduate medical education in India. National Medical Council for Technical Education can develop guidelines to implement OSCE.

Learning Experience while carrying out the project:

The process was not difficult as many teachers in the department felt the need to assess skills taught to the students. The higher authority and staff were supportive. This knowledge building task project got the teachers to work together. Teaching leads to learning and learning leads to thinking and therefore,

all stakeholders felt that this pattern along with the traditional method can be easily incorporated in the competency based medical education (CBME) as envisaged in the GMR 2019 reforms for undergraduate medical education in India. Overall study was conducted very smoothly.

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Client Satisfaction with Services Provided at Integrated Counselling and Testing Centre in a Rural Hospital, Panvel, Maharashtra, India

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Abstract:

Introduction : HIV is a global pandemic and has been a serious concern for public health among individuals and communities. Measuring client satisfaction can help the country to carry out an evaluation of the health service system as well as, clients can develop a long-lasting relationship with the service provider. **Objectives:** 1) To assess the client satisfaction by the services provided at the Integrated Counselling and Testing Centre at the Rural Hospital, Panvel. 2) To provide recommendations to improve the services provided at the Integrated Counselling and Testing Centre. **Method:** A descriptive, cross-sectional, facility-based study was conducted in an Integrated Counselling and Testing Centre (ICTC) at a Rural Hospital, Panvel using simple random sampling technique. Exit interviews were conducted for three hundred clients after the required consent was obtained. Clients were stratified into pregnant and non-pregnant females. All clients above 18 years were included in the study however, clients not giving consent or severely ill were excluded. The data was analyzed using Microsoft Excel, and Epi Info Version 7.2. **Results:** Among 300 clients, 66% (198) of the clients belonged to the age group of 18-28 years and 54.3% (163) were literate. The study found that nearly74% (222) of the clients were referred and about 71.7% (215) clients were unsatisfied with the ICTC services. **Conclusion:** Majority of the clients were unsatisfied with the services provided at ICTC. Literate clients were more unsatisfied as compared to illiterate clients.It is further recommended that the counsellors at ICTCs should spend more time with the clients and tere should be a mandatory requirement of female counsellors.

Key-words: Client satisfaction, HIV, Integrated Counselling and Testing Centre (ICTC)

Introduction:

The Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS) is a global pandemic and has been a serious public health concern.[1] HIV counselling and testing services is a key entry point in prevention and treatment of HIV infection. With the initiative of preventing the spread of HIV infection, HIV counselling and testing services were started in India in 1997. An ICTC is a place where a person is counselled and tested for HIV, by his own free will or as advised by the medical provider.[2] India is a signatory toward the global vision to end HIV/AIDS as a public health threat. Satisfied clients are more likely to develop a stronger and longer-lasting relationship with the service provider, leading to better compliance with community care, which in effect, can lead to better health outcomes.[3]

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Measuring a client satisfaction can help the country to carry out an evaluation of the health service system.

The present study would highlight the client satisfaction at a single ICTC at a rural hospital to understand the present condition and would further draw recommendations for improving the centre.

Method:

The institutional ethical committee approval was obtained prior to the commencement of the study (N-EC/2019/SC/8/115). A facility-based, cross-sectional study was conducted in an ICTC set up at Rural Hospital, Panvel. The study was carried out from September 2019 to February 2020. The clients were divided into general clients and pregnant females. Approximately 120 clients attend the ICTC centre monthly. All the clients attending the services in that duration were included in the study. Those clients not giving consent or severely ill were excluded from the study. The sample size was determined presuming the lowest possible level of client satisfaction with ICTC as 50 percent.[4] Holding the confidence level at 95 percent and 6 percent of the error margin, the sample size was 267. The final sample size was calculated accounting for a non-response rate of 10% as 294.

Client exit interviews were undertaken immediately after post-test counselling. The data was collected through a structured face to face interview schedule using validated questionnaire. The required data was collected twice weekly. Simple Random sampling technique was used in the study. A pilot study of 25% of study subjects was carried out to see the feasibility of the study. Pilot study subjects were also included in main study subjects and there was no modification. An informed consent was taken from the study participants after explaining the objective of the study and ensuring the confidentiality of the data. The questionnaire was designed to capture: -

- Socio-demographic profile of clients attending ICTC
- Time spent in availing the services
- Satisfaction and counselling

The interview took approximately 15-20 minutes per client. Client exit interviews were performed using tool 7 of the Joint United Nations Programme on HIV/AIDS (UNAIDS), this tool was developed to evaluate the Voluntary Counselling and Testing (VCT).[4,5] The tool is a generic tool which is standardized and validated. Literate is defined as a person aged seven years and above who can both read and write in any language.[6] The tool for assessing client satisfaction was modified with the addition of 3-point Likert scale (Disagree, Neutral and Agree) with eight statements.[7] The total maximum score of eight statements will be 24. The client's satisfaction will be graded as satisfied (score >16) and not satisfied (score <16).[1] The data was analysed on Microsoft Excel, SPSS (V27.0.1.0) and Epi Info (V7.2.0.1)Chi-square was used for the comparison of categorical variables; values less than 0.05 was considered significant.

Results:

A facility-based cross-sectional study was conducted among 300 clients in a Rural Hospital of Panvel, to assess the socio-demographic characteristics, time spent in availing the services and client satisfaction at the ICTC.

Out of 300 clients, 213 (71%) were females. 198 (66%) of the clients attending the ICTC centre was belonged to the age group of 18-28 years and was found to be significantly higher than other age groups. Majority of the study participants i.e. 235 (78.3%) were Hindus and the remaining fell in other denominations. The percentage of single clients was found to be low with about 19 (6.3%) as compared to married clients. Out of the total number of clients, 180 (60%) were unemployed. It was observed that 163 (54.3%) were literate clients (Table 1).

Out of the 300 clients, it was observed that the mean time spent in locating ICTC site was 25 minutes; however, it ranged between 2-180 minutes.

The mean time period spent in waiting to see the counsellor was 8 minutes, however it ranged between 1-30 minutes. The mean duration spent in the counselling session was 4 minutes; however it ranged between 1-15 minutes. The time duration taken to collect the results by the clients was less than 24 hours was observed to be 192 (64%) and 108 (36%) clients collected the test results after 24 hours (Table 2).

It was observed that almost 222 (74%) of the clients were referred to the ICTC centre through health workers and the remaining 78 (26%) were self-referred/direct walk-in.

Among the referred clients, 192 (86.5%) females were referred more as compared to the male clients and most of the referred clients were from Gynaecology department. The main sources of information among the clients regarding ICTC was from health worker 244 (81.3%) followed by family and friends 39 (13%) and the least was found to be through media 17 (5.7%).

Out of the total study participants, 215 (71.7%) of the clients were unsatisfied with the ICTC services provided. There was a statistically significant difference between literate and illiterate clients (chi-square: -24.35, p-value<0.005). On calculating the association between attending the ICTC centre as per first contact and satisfaction with ICTC services was found to be significant (chi-square: 4.062, p-value: 0.04, Table 3).

Discussion:

The present study evaluated client satisfaction with services provided at ICTC and is believed to be one of the most reliable methods to evaluate any programme[8] and could contribute in improving the counselling services.

The present study highlights the fact that, 66 (66%) clients belonged to 18-28 years age group which is considered as the most sexually active age group which is in agreement with the National AIDS Control Organization (NACO) report 2018-19 and was similar to another study by Chourasiya SK et al.[3] It was

Table 1: Distribution of clients as per the Socio-demographic Characteristics

Socio Demographic Characteristics	Range	n (%) [n =300]
Age (years)	18-28	198 (66)
	29-38	83 (27.7)
	39 and above	19 (6.3)
Gender	Male	87 (29)
	Female	213 (71)
Religion	Hindu	235 (78.3)
	Muslim	60 (20)
	Christian	5 (1.7)
Marital Status	Married	281 (93.7)
	Single	19 (6.3)
Occupation	Semi profession	2 (0.7)
	Clerical, Shop-owner, Farmer	6 (2)
	Skilled worker	32 (10.6)
	Semi-skilled worker	23 (7.7)
	Unskilled	57 (19)
	Unemployed	180 (60)
Education	Literate	163 (54.3)
	Illiterate	137 (45.7)

Table 2: Time spent in availing services

Time Spent in availing services	Range	n (%) [n =300]
Location Time	Less than 30 minutes	258 (86)
	More than 30 minutes	42 (14)
Waiting Time	Less than 15 minutes	273 (91)
	More than 15 minutes	27 (9)
Counselling Time	1 to 4 minutes	106(35.3)
	5 to 15 minutes	194 (64.7)
Time duration to collect results	Less than 24 hours	192 (64)
	More than 24 hours	108 (36)

Table 3: Satisfaction of the clients with counselling session at ICTC (n=300)

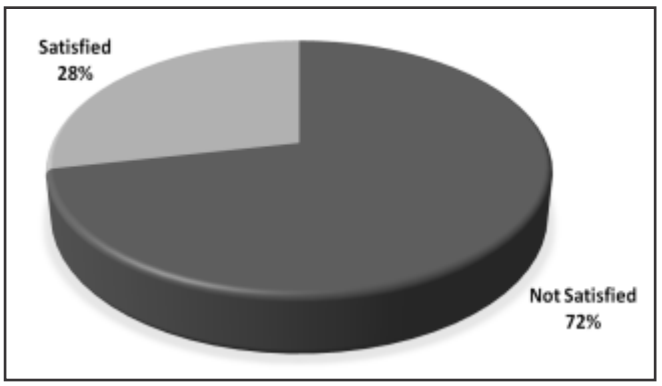
No.	Client Satisfaction (n=300)	Disagree Freq. (%)	Neutral Freq. (%)	Agree Freq. (%)
1.	Satisfaction with the Audio-Visual privacy	58 (19.3)	80 (26.7)	162 (54)
2.	Satisfaction with counselling by opposite gender	13 (4.3)	75 (25)	115 (38.3)
3.	The counsellor showed interest in explaining issues pertaining to HIV that I was not aware of	192 (64)	48 (16)	60 (20)
4.	During the session I was given the opportunity to ask questions and clarify my doubts	121 (40.3)	103 (34.3)	76 (25.4)
5.	The counselling provided to me was very helpful	65 (21.7)	170 (56.7)	65 (21.6)
6.	The counselling session had brought change in my perspective about HIV/AIDS	192 (64)	47 (15.7)	61 (20.3)
7.	If I had attended HIV counselling sessions earlier, it would had been more beneficial for me	155 (51.7)	72 (24)	73 (24.3)
8.	I feel counselling session was good	33 (11)	197 (65.7)	70 (23.3)

Table 4: Association of client literacy with satisfaction of services at ICTC (n=300)

Variables	Satisfied clients (%)	Unsatisfied clients (%)	Total (%)
Education			
lliterate	58 (68.2)	79 (36.7)	137 (45.7)
Literate	27 (31.8)	136 (63.3)	163 (54.3)
Total	85 (28.4)	215 (71.6)	300 (100)

Chi-square: -24.35, p-value<0.005, df = 1 and Odd's ratio: 3.698

Figure 1: Client Satisfaction with the services



also observed that 163 (54.3%) clients were literate and a similar finding was observed by Kabassh I.A. et al.[9]

In this study we found that, the mean time spent in locating ICTC service was 25 minutes, which ranged from 2-180 minutes. This shows a large time spent in travelling to ICTC. It can be reduced by advising the clients to visit the nearest ICTC centre and also by placing sign boards in the hospital. A similar study by Chellaiyan et al[1] showed a different finding. The present study showed mean time spent by the clients in waiting to meet the counsellor was 8 minutes, which ranged from 1-30 minutes. A similar study by Lyatuu MB et al[10] with mean waiting time higher than the present study was observed. However, waiting time can be further reduced by recruiting an additional counsellor at the centre when the client load is high.

The present study highlights the mean time duration spent by clients with the counsellor was 4

minutes, which ranged from 1-15 minutes. It was observed that counselling on HIV was not done on the guidelines provided by NACO. Training can also be provided to the counsellors on how to provide adequate counselling to the clients and reviewing of the counselling content by NACO supervisors on timely basis.Papanna et al[4] found the finding to be higher than the present study. This study also highlights the time duration to collect the post-test results was, 64.5% (n=192) in less than 24 hours and 36% (n=108) in more than 24 hours. Training of the counsellor should be done on timely basis. This finding is completely in disagreement with the Operational Guidelines of ICTC.[11]

64% clients disagreed to the satisfaction statement that "The counsellor showed any interest in explaining issues pertaining to HIV". This was due to lack of trained counsellor and overload of clients at the ICTC. Chellaiyan et al[1], Papanna et al[4], Lyatuu MB et al[10], GinwallaS et al[12] showed a similar finding. 40.3% clients disagreed to the statement that "during the session I was given the opportunity to ask questions and clarify my doubts." This was observed due to the inadequate time spent by the counsellor with the clients. This finding was found differentfrom the present study. Study highlights the fact that, 51.7% clients disagreed to the statement which stated that "If attending HIV counselling session earlier, it would have been more beneficial" as they commented that counselling was not done at all and there was staff ignorance due to which there would not have been any change in their perspective if it was attended prior.[1,4,9,12] This result was found to be different in Papanna et al[4] from the current study. Present study highlights the fact that, 24.3% clients agreed to the statement "The counselling session had brought change in my perspective about HIV/AIDS" as they did not know what are the Operational guidelines of ICTC [1] on which counselling has to be done and was not aware on what testing was been suggested by the staff and what was the reason for the test. Papanna et al[4] showed a finding than the current study. The client satisfaction found in the present study is 28.3% (n=85) which is low due to majority being literate clients and lack of adequate time spent with the counsellor and inadequate awareness about HIV given by the counsellor which was in accordance to the previous studies.[4,9,12] Out of 300 clients who accessed the ICTC services, 215 (71.66%) were unsatisfied with the services. It was observed that there was statistically significant difference between literate and illiterate clients with the level of services at ICTC. (p value < 0.005)which was in contrast to another study[1] where the authors had a higher level of satisfaction.

Conclusion and Recommendations:

Majority of the clients were unsatisfied with the services provided at ICTC. Literate clients were more unsatisfied as compared to illiterate clients.

Thus, following are the recommendations from the present study-

- Recruiting additional counsellor in the centres where the client load is high could reduce the waiting time.
- Counsellors should be advised to spend more time with the clients to discuss the implications of the disease.
- It is mandatory requirement of both male and female counsellors in all the ICTCs so that clients do not feel hesitant to express themselves to the counsellor of the opposite sex.
- The results should be provided on the same day to the clients to avoid unnecessary travel to the hospital again.

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Attitude and Practice on Foot Care among Patients with Type 2 Diabetes Mellitus Attending a Tertiary Care Centre at Southern Part of Tamilnadu, India

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Abstract:

Introduction : Diabetic foot has got a high prevalence of 52% among diabetics. The duration of hospital stay and physical disability are likely to cause depression and affects overall quality of life. So it is important for general population, to know about Self Care activities which include foot care practice to avert long term complications and improve quality of life which is likely to be effective in reducing the burden of diabetic foot ulcer. **Objective:** To assess the knowledge, attitude and practice about foot care among Type 2 DM patients in a Tertiary health care center, Tamil Nadu. **Method:** A cross-sectional study was done during August and September 2021 among diabetic patients after obtaining consent at a Tertiary Hospital in southern district of Tamil Nadu. **Results:** The mean age of the study participants was 47.56 ± 9.718 years with 55.9% being male and 44.1% female and the majority (65.6%)of subjects was residing in rural areas. Among the participants, 103 (92.8%) were found to have good attitude towards self-care activities whereas69 (62.2%) respondents practiced proper footcare. Age, gender and education were found to have significant association with the practice of proper foot care. Female gender was found to be an independent predictor for practice of adequate foot care. **Conclusion:** Regardless of good attitude towards diabetic foot care there is considerable resistance in practicing it.

Key words: Attitude, Diabetes, Diabetic foot, Knowledge, Practice.

Introduction:

Diabetes, a multi system and multi-organ disease is now considered to be an epidemic affecting both developing as well as developed countries. It is a chronic metabolic disease with elevated blood glucose level and over the years it causes damage to heart, kidneys, eyes and nerves. Type 2 diabetes is a common type of diabetes among adults. About 422 million people in the world have diabetes, majority living in low- and middle-income countries.[1] Diabetes is a major causeof increased morbidity and mortality in India. Treatment adherence is a major challenge for diabetics further contributing to the bottlenecks.[2]

Among the various complications, Diabetic Foot is one of the most prevalent and devastating micro vascular complication. In India, footwear practices vary widely from a significant proportion of patients

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walking barefoot outdoors, to a majority of Indians walk barefoot indoors.[3] Diabetic foot has got a high prevalence of 52% among diabetics.[4] Various factors contributing to diabetic foot syndrome are peripheral sensory neuropathy, lack of patient knowledge about foot care, improper footwear and uncontrolled diabetes. Lower Extremity Amputation (LEA) is one of the most distressing consequences of Diabetic Foot Ulcer (DFU).[5] Almost 85% of all lower extremity amputations is attributed to DFU. Management of DFU and LEA requires prolonged hospital stay and increases Out of Pocket expenditure. The longer duration of hospital stay, increased expenditure and physical disability are likely to cause depression and affecting overall quality of life.[6-8] Diabetes has added on the economic burden in both urban and rural diabetic subjects in India. Total direct cost spent on diabetes management has doubled from 1998 to 2005.[9] Despite being preventable, Diabetic foot ulcer (DFU) tends to affect not only physically but also has impact on psychosocial, economic domains thereby affecting DALY. Adequate knowledge and practice regarding diabetic foot care will reduce the risk of diabetic foot complications preventing disability.

Henceforth, it is important for general population, especially the diabetics to know about recommended Diabetes Self Care activities which includes foot care practice to avert long term complications and improve quality of life and thereby effective in reducing the burden of diabetic foot ulcer. There are dearth in studies on attitude and practice of adequate foot care among type 2 diabetic patients. The present study aims at assessing the attitude and practice about foot care among Type 2 Diabetes Mellitus patients in the area of Kulasekaram in Kanyakumari district of Tamil Nadu.

Objective:

To assess the attitude and practice about foot care among Type 2 Diabetes Mellitus patients attending one of the Tertiary health care centers, Tamil Nadu.

Method:

This cross-sectional study was done among 111 previously diagnosed diabetic patients attending general medicine Out Patient Department (OPD), in a Tertiary Hospital in Kulasekharam, Kanyakumari district of Tamil Nadu, during August and September 2021.The sample size was calculated using the formula $Z\alpha^2pq/d^2$ where p was 46.9% and relative precision of 20% and 111 subjects were chosen by non-probability technique. All diabetic patients of more than 5 years duration who were available in the hospital during the study period were included in the study and those who had cognitive impairment were excluded. Each participant provided a written informed consent after receiving a full explanation of the study's purpose and procedure that has been approved by the Institutional Review Board. A semi-structured self-administered questionnaire was used and data on socio-demographic details, attitude and practice of self-care activities of diabetic patients were asked.

Framework of Analysis

The data collected from the respondents were coded and entered in MS Excel 2016 sheet. The data were classified, tabulated, analyzed, and interpreted during processing. The questions on attitude and practice were evaluated separately and the mean score was determined. Participants who scored more than the determined mean score in each attitude and practice were classified as having good attitude and good practice respectively, and those who scored less than the mean score were classified as bad in each category. The data were analyzed using the SPSS (Statistical Package for Social Sciences) version 20.0 software. The statistical techniques were chosen based on the study's objectives as well as the nature of the data analyzed. Quantitative variables were expressed as mean and standard deviation and qualitative variables were expressed as percentage. Chi-square test was used to find out the association between independent and dependent variables.

Binary logistic regression method was used to find the independent predictors for following good foot care practice.

Results:

The mean age of the study participants was 47.56 ± 9.718 years with minimum age 26 years and maximum 76 years. Majority of the participants were male 62 (55.9%) while 49 (44.1%) were female. More than half of the study participants were 58 (52.3%) PG/Diploma graduates, 28 (25.2%) high school education, 8 (7.2%)middle school and 11 (9.9%) primary school level education, and only 6 (5.4%) had no formal education. Professional/ semi-professional occupation formed the majority i.e., 46 (41.4%) followed by semi-skilled/ skilled works 30 (27.0%), unskilled work 21 (18.9%) and unemployed 14 (12.6%).

Majority of the study participants 75 (67.7%) thought that the factors such as hereditary, obesity, smoking, and physical inactivity combined together contribute to Type 2 DM. Most of the study participants 103 (92.8%) had been diagnosed in the past 5-10 years. Among the respondents, majority 62 (52.9%) were taking meals 3 times a day, instead of advised frequent small quantity intake. Among the participants, 103 (92.8%) were found to have goodattitude and 8 (7.2%) had bad attitude towards self-care activities. Interestingly, only 69 (62.2%) had good practice and 42 (37.8%) were not following the adequate measures to prevent foot ulcers (bad practice). Among our study participants, 39 (35.1%) were smokers. About 107 (96.4%) were aware that uncontrolled diabetes can lead to non-healing foot ulcer. It was found that 108 (97.3%) of the participants felt that it is necessary to inspect the foot daily whereas only 95 (85.6%) practiced it. Similarly, 82% felt the need of using indoor foot wear but only 67 (60.4%) practiced it. Majority of the study participants 105 (94.6%) felt that it was necessary to consult a healthcare provider in case of non-healing ulcer, interestingly, when asked what they would do if found one on their own feet, about 94 (84.7%) were willing to seek a healthcare provider,12.6% would self-treat and 2.7% leave it untreated. Table 1 shows the measures taken by the participants to avoid foot ulcers.

Chi-square test was used to find the association between different variables and attitude (Table 2), it was found that those who were diagnosed in the past 15 years had good attitude towards foot care among diabetics.

Among the variables studied, age 50 years and less, female gender and education of high school and above were found to have significant association with good practice on foot care (Table 3).

Variables which were found to have significant association with good practice of foot care in bivariate analysis were analyzed using binary logistic regression. Female gender was found to be the independent predictor for good practice of foot care (Table 4) in our study. This regression model had Cox & Snell R square value of 0.117 and Nagelkerke R square value of 0.159.

Discussion:

The present cross-sectional study had highlighted on the attitude and practice of foot care among type 2 diabetic patients, measures taken by them to prevent foot ulcer and the factors associated with their attitude and practice of adequate foot care in a rural area of Kanyakumari.

Our study found that majority of the study participants had good attitude towards following proper foot care but only 62.2% were practicing it. Good attitude towards foot care could be due to the high literacy rate in the district of Kanyakumari, even in the rural area.[10] The study by Pothiraj Pitchai et al in Maharashtra found that the rural diabetic patients had inadequate knowledge of diabetic foot care and its self-care measures. Majority of diabetics were not aware regarding inspection of feet which included 64% of urban and 82 % of rural diabetics.[11] Our result also contradicts the result of a study done at Puducherry, India[12] and Ethiopia.[13]

Table 1: Measures practiced by the respondents to avoid foot ulcers (n=111)*

Measures	Yes	No
	Frequency (percentage)	Frequency (percentage)
Self-inspection of foot	95 (85.6%)	16 (14.4%)
Use of indoor foot wear	67 (60.4%)	44 (39.6%)
Control of blood glucose	87 (78.4%)	24 (21.6%)
Wash the feet daily with warm water	65 (58.6%)	46 (41.4%)
Pat dries the foot after washing	65 (58.6%)	46 (41.4%)
Moisturize the dry area of feet daily	60 (54.1%)	51 (45.9%)
Check the feet for any injury	84 (75.7%)	27 (24.3%)
Change the foot wear if shoe bite occurs	88 (79.3%)	23 (20.7%)

*Multiple Responses

Table 2 : Association between different variables and attitude towards foot care among the study participants

Variables		Attitude		c^2	p value
		Bad n (%)	Good n (%)		
Age	≤ 50 years	4 (5.3 %)	71 (94.7 %)	1.21	0.271
	≥ 51 years	4 (11.1 %)	32 (88.9 %)		
Gender	Male	7 (11.3 %)	55 (88.7 %)	3.50	0.061
	Female	1 (2 %)	48 (98 %)		
Education	Up to middle school	1 (4 %)	24 (96 %)	0.49	0.481
	High school and above	7 (8.1 %)	79 (91.9 %)		
Occupation	Skilled works and above	7 (9.2 %)	69 (90.8 %)	1.44	0.229
	Unemployed/Semi-skilled works	1 (2.9 %)	34 (97.1 %)		
Income of the individual	≤ Rs 10,000	1 (2.2 %)	44 (97.8 %)	2.81	0.094
	> Rs 10,000	7 (10.6 %)	59 (89.4 %)		
Duration of Diabetes	≤ 15 years	6 (5.7 %)	100 (94.3 %)	8.41	0.004*
	≥ 16 years	2 (40 %)	3 (60 %)		

*Statistically significant association with p value < 0.05

Self-inspection of foot is an important measure to check for any ulcers. In the current study 97.3% were aware of self-inspection of foot but only 85.6% practiced it daily. One Ethiopian study found that 64.2% of the study participants did inspect their feet daily.[13] This finding contradicts the result of previous studies where the percentage of study subjects who did self-inspection of foot was low [14,15] and highlights effective health education.

Practice of using indoor foot wear was 60.4% in the current study which was higher when compared to previous studies[4,13] but another study found that 73.5% of diabetics used indoor foot wear.[16] About 54.1% of our study participants applied moisturizer to their feet daily which is similar to the finding of Tuha A et al.[13] In another study, about 67.1% participants used to apply moisturizer to their feet daily.[15] Kulasekharam being wet area receiving

Table 3: Association between different variables and practice towards foot care among the study participants

Variables		Practice		c^2	p value
		Bad n (%)	Good n (%)		
Age	≤ 50 years	23 (30.7 %)	52 (69.3 %)	5.05	0.025*
	≥ 51 years	19 (52.8 %)	17 (47.2 %)		
Gender	Male	31 (50 %)	31 (50 %)	8.83	0.003*
	Female	11 (22.4 %)	38 (77.6 %)		
Education	Upto middle school	14 (56 %)	11 (44 %)	4.52	0.033*
	High school and above	28 (32.6 %)	58 (67.4 %)		
Occupation	Skilled works and above	25 (32.9 %)	51 (67.1 %)	2.50	0.114
	Unemployed/Semi-skilled works	17 (48.6 %)	18 (51.4 %)		
Income of the individual	≤ Rs 10,000	19 (42.2 %)	26 (57.8 %)	0.61	0.432
	> Rs 10,000	23 (34.8 %)	43 (65.2 %)		
Duration of Diabetes	≤ 15 years	40 (37.7 %)	66 (62.3 %)	0.01	0.919
	≥ 16 years	2 (40 %)	3 (60 %)		

*Statistically significant association with p value < 0.05

Table 4: Binary logistic regression to find the independent predictor for good practice of foot care

Variables	b	**S.E**	**Significant**	**Exp** (b)	**95% C.I for EXP** (b)
Gender	1.122	0.440	0.011*	3.072	1.296 – 7.278
Age	0.715	0.463	0.123	2.044	0.825 – 5.065
Education	0.461	0.521	0.377	1.585	0.571 – 4.402
Constant	-0.774	0.468	0.098	0.461	

*Statistically significant with p value < 0.05

heavy rainfall with humid climate, usage of moisturizer is generally low.

In our study we found that the patients with duration of diabetes (⩾ 15 years) had statistically significant association with the good attitude towards foot care. Result from another study found significant association between practice of adequate foot care among diabetics who were diagnosed for more than 5 years.[15] With increased duration of illness, there is fear about development of complication enabling better attitude towards foot care.

The current study shows statistically significant association of female gender and practice of adequate foot care among the diabetics. Previous studies also found that female gender had practiced proper foot care.[13,17] Literacy rate among female is higher than males in this district ensuring better foot care.

Educational status of the patient had an impact on the practice of adequate foot care. This study found a statistically significant association between education of patient above high school level and good practice of foot care. This finding is consistent with the result done by previous studies.[12, 18-20] Education results in better understanding of the issue enabling behavioral change towards better practices. Occupation was not found to have statistically significant association with attitude and practice on

foot care. This result was supported by the findings from previous study.[15]

Younger age group was found to have statistically significant association with practice of foot care. Similar finding was observed by another study done at rural North India.[20] Younger age has better access to information and health care facility resulting in better foot care practices. This highlights the need in improved health education of geriatric people.

Conclusion:

The current study found that diabetes patients' practice of foot care was inadequate despite having good attitude towards adequate foot care. Female gender was found to be independent predictor for adequate foot care practices to prevent foot ulcer. The study findings have revealed gaps in their attitude and practice, emphasizing the urgent need for a patient-centered educational intervention for behavior change. To reduce diabetic foot complications, it is critical to activate the role of health education and motivationby everyone who has direct contact with the patient.

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Effectiveness of Health Education in Improving Menstrual Hygiene Knowledge and Practices among Adolescent Girls of Rural area of Tamilnadu, India

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Abstract:

Introduction : Menstruation is still surrounded by many myths, misconceptions and taboos. Adolescent girls in India, seems to have inadequate and inaccurate knowledge on menstruation and its hygiene. Improper menstrual hygiene can lead to reproductive tract infections which can adversely affect a woman's reproductive health. This study was aimed at assessing the effectiveness of health education in improving the knowledge on menstruation and menstrual hygiene practice among rural adolescent girls of India. **Method:** An interventional study was done among 82 college girls selected by convenient sampling in a rural area of Tamilnadu, India. Intervention done was health education on menstrual physiology and hygiene practice using animated video and interactive session in local language. Questionnaire on knowledge about menstruation and menstrual hygiene practice was administered to the participants before health education session. Improvement in knowledge and practice was assessed after one month of the session. **Results:** Baseline knowledge about menstruation was adequate only for 57.5 percent of participants. Baseline menstrual hygiene practice was good only among 8.8 percent of participants. Following health education, knowledge about menstruation significantly improved to 90%. Menstrual hygiene practice also showed a significant improvement from 8.8% to 30 percent%. **Conclusion:** This study showed that providing a comprehensive health education on menstrual physiology and hygiene would greatly improve the menstrual hygiene practice of adolescent girls.

Keywords: Adolescent girls, Health Education, Menstrual Hygiene, Menstruation

Introduction:

Adolescence is a period of rapid transition from childhood to parenthood. During this phase, adolescents face various physiological, psychological and developmental changes. Menstruation is one of the most important changes which are unique to females that begin in adolescence. The mean age at menarche in Indian adolescent girls is 12.5 (±1.42) years.[1]

Although menstruation is a natural process, it has been clouded by several myths, misconceptions, superstitions, cultural and religious taboos which affects the knowledge about menstruation among girls.[2,3] There is lack of communication between young women and teachers and parents about proper menstrual hygiene due to stigma associated with menstruation.[4] Most of the girls receive their gynecological information from their friends.

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However, such information, generally given after menarche rather than before, is often inadequate and inaccurate.[5,6]

In addition to stigma, inadequate knowledge about menstruation causes many girls and women to carryout dangerous practices. Improper hygienic practices during menstruation has a serious health impact in terms of increased vulnerability to Reproductive Tract Infections.[7-9] These infections are often transmitted to offspring during pregnancy.[2] Poor menstrual hygiene can lead to urinary tract infections, scabies in the vaginal area, pelvic inflammatory disease, and sickness absenteeism.

It is important for girls to reach their full potential at schools to achieve the gender equality target of Sustainable Development Goals (SDG).[10] Good menstrual hygiene is also essential for dignity of girls and women. It improves comfort and mobility for the menstruating women. Menstrual hygiene practices and reaction to menstruation depend on the awareness and knowledge about the subject. Providing knowledge on menstruation and its hygiene can improve reproductive health of women. It also improves school attendance and reduce dropouts among school girls in developing countries.[11-14] Hence there is a need to provide healthy menstrual education to the woman particularly adolescent girls.

Many studies were done to assess menstrual hygiene practice among adolescents in India.[2-6] Only few interventional studies were done to improve the hygienic practice and had shownthat targeted intervention did improve menstrual hygiene knowledge and practices.[15,16] Hence, this study is done to improve the knowledge about menstruation and its hygiene among adolescent girls in rural Tamilnadu and also to study the effectiveness of health education in improving their menstrual hygiene practices.

Method :

This study was done as an interventional study at a selected college inThoothukudi district of Tamilnadu state, India. The study period was from November 2019 to January 2020. Females undergoing first year undergraduate course in arts and science, those who had attained menarche and those who were willing to participate in the study were included in this study. Female students who did not give consent and who were absent at the time of health education were excluded from the study.

Sample size was calculated based on a study done among rural adolescent girls of India by Dongre et al at Maharashtra.[15] In this study, the practice of using sanitary pad increased from 5% to 25% after a community-based health education intervention. Assuming α error as 5%, β error as 10% and attrition or non-response rate as 20%, sample size was calculated to be 82 using the formula,

$$n = \frac{2(p)\,(1 - p)\,(Z\alpha + Z\beta)^2}{(p1 - p2)^2}$$

where p1 = 5; p2 = 25; p = {(p1+p2)/2 = 15}; zα = 1.96; zβ = 1.29.[17]

The study tool was a semi-structured self-administered questionnaire in Tamil. The questionnaire included questions on the following: 1. Socio-demographic details of the participant, 2. Knowledge on menstruation: This section included four questions. Each correct response was given a score of one and incorrect response a score of 0. Participants who got a score of more than 3 out of 4 were considered to have adequate knowledge. 3. Menstrual hygiene practice: Menstrual hygiene practice was assessed using 8 questions. Each good practice was given a score of 1 and poor practice a score of 0. Only those participants who got a score of 8 out of 8 were considered to have good menstrual hygiene practice.

Ethical clearance for the study was obtained from the Institutional Ethics Committee. Official permission to conduct the study was obtained from the selected college Principal and a mutually feasible

date was fixed for data collection. Written informed consent was obtained from the study participants. For the participants below 18 years of age, assent was obtained from their parents. A baseline survey was conducted to assess the knowledge about menstruation and menstrual hygiene practice among the students. This was followed by a health education session on menstrual hygiene for a duration of 60 minutes.

The study participants were divided into four groups and separate sessions were conducted for each group on menstrual hygiene. Improvement of menstrual hygiene after health education was assessed after a period of 1 month. Health education session on menstrual physiology and menstrual hygiene practice included the following:

1. A 25 minutes animated video "Mythri" dubbed in Tamil developed by a NGO which is available to provide awareness about menstrual hygiene.[18]
2. A 30 minutes teaching session on reproductive tract anatomy, menstrual physiology and hygiene practices using audio-visual aids was given to each group separately by the primary investigator
3. Interactive session to clarify the doubts raised by study participants.

Data was entered in Microsoft Excel and analysis of descriptive and inferential statistics was done using SPSS Version 16. Appropriate statistical tests like Chi square tests, Paired t test and Pearsons correlation were used to compare knowledge and practices between groups and also to compare knowledge and practices before and after the intervention.

Results :

During the baseline study, 99 first year undergraduate female students were available. The age of the participants ranged from 17 years to 20 years. The mean (S.D.) age of the study participants was 17.6 (0.65) years. Follow-up study included only 80 college girls. Remaining 19 were not included as they did not have menstruation during the one month period or were absent at the time of data collection. These 19 college girls did not have any significant difference in socio-demographic profile. Hence, further analysis was done only for those 80 participants. The socio- demographic profile of the respondents is shown in Table 1.

None of the socio-demographic details showed significant association with the knowledge and menstrual hygiene practice of the study participants before intervention. A scatter plot between knowledge and practice score during baseline survey showed that menstrual hygiene practice improved with improvement in knowledge about menstruation. Figure 1 shows that the knowledge scores and practice scores of the study participants are weakly but positively correlated with r=0.258. The correlation was also found to be statistically significant (p=0.02, Pearsons correlation).

From figure 2, it could be seen that knowledge adequacy about menstruation increased significantly from 57.5% to 90% following health education (p value – 0.04, Paired t test). Nearly 98% understood that menstruation is a physiological process. About 64% did not knew that menstrual blood is not impure/unhygienic. This proportion was reduced to 24% following health education. After intervention, almost every participant acquired knowledge that menstruation does not occur during pregnancy.

From table 2, it could be seen that 30% of the study participants adopted good menstrual hygiene practice following intervention as compared to 8.8% before intervention (p value < 0.001, Paired t test). Proportion of study participants disposing used sanitary material in toilets has been significantly reduced after the health education. Frequency of changing sanitary material during a menstruating day has also been significantly improved. Despite health education, only 50% washed their hands with soap and water after changing sanitary material.

Table 1 : Socio-demographic details of the study participants

Characteristic	Category	Frequency (N=80)	Percentage
Age group of the participants	17 years	39	48.7
	18 years	37	46.3
	19+ years	4	5
Religion	Hindu	69	86.3
	Christian	4	5
	Muslim	7	8.7
Father's education	No formal education	4	5
	Primary/secondary	53	66.3
	High school/Higher secondary	21	26.3
	Degree/Dilpoma	2	2.4
Mother's education	No formal education	12	15.1
	Primary/Secondary	55	68.8
	High school/Higher secondary	12	15.1
Socio-economic status*	Class I	2	2.5
	Class II	10	12.5
	Class III	18	22.5
	Class IV	24	30
	Class V	26	32.5

*Modified B. G. Prasad Socio-economic Scale (CPI for November 2019 – 328)[19]

Figure 1 : Scatter plot between knowledge and practice score before intervention

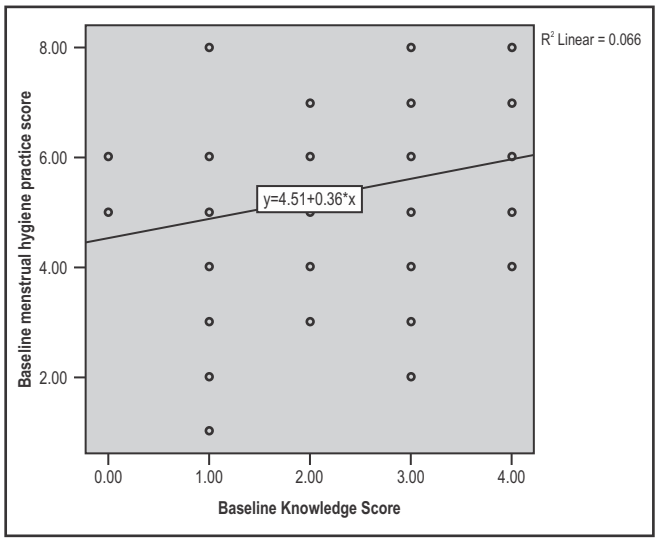

Figure 2 : Effectiveness of health education on menstrual hygiene knowledge

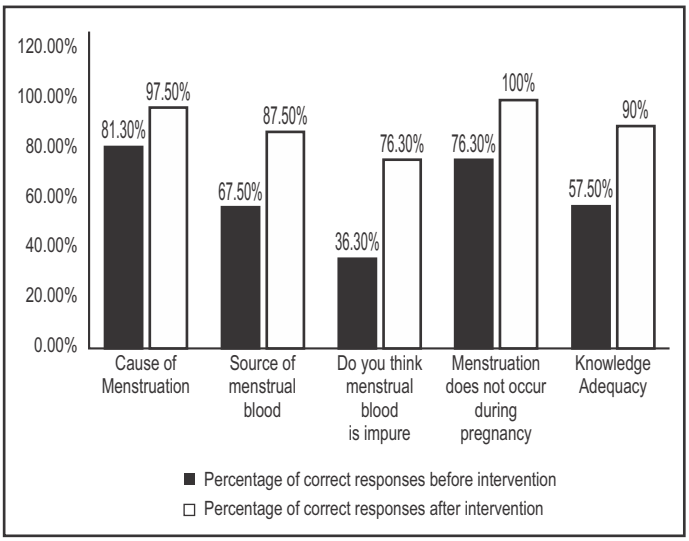

Table 2 : Effectiveness of health education on menstrual hygiene practice (N=80)

Practice of menstrual hygiene		Before intervention	After intervention	p value
		No. of participants (%)	No. of participants (%)	
Absorbent used	Sanitary pad	75 (93.8%)	78 (97.4%)	0.06
	Old cloth	3 (3.8%)	1 (1.3%)	
	New cloth	2 (2.4%)	1 (1.3%)	
Disposal of used sanitary pads	Dustbin	49 (61.3%)	54 (67.5%)	<0.001
	Toilet	12 (15%)	3 (3.8%)	
	Incineration	8 (10%)	9 (11.2%)	
	Burial	11 (13.7%)	14 (17.5%)	
Frequency of changing sanitary material in a menstruating day	Thrice or more	23 (28.8%)	54 (67.5%)	0.001
	Twice	52 (65%)	26 (32.5%)	
	Once	5 (6.3%)	0	
Wrapping of used sanitary material before disposal		43 (53.8%)	71 (88.8%)	<0.001
Changing innerwear daily during menstruation		76 (95%)	79 (98.8%)	1.00
Taking bath daily during menstruation		76 (95%)	79 (98.8%)	0.05
Washing hands with soap and water after changing sanitary material		26 (32.5%)	40 (50%)	<0.001
Cleaning external genitalia with soap and water during menstruation		51 (63.8%)	75 (93.8%)	0.005
Menstrual hygiene practice	Good	7 (8.8%)	24 (30%)	<0.001
	Poor	73 (91.2%)	56 (70%)	

Discussion:

Before health education, knowledge about menstruation was adequate for 57.5% of adolescent girls in rural area. This proportion differs largely from a previous study done among school girls in Chennai, where the knowledge adequacy before health education was only 26%.[6] In this study, only 4% felt menstruation as a curse from God. This proportion is much less when compared to similar studies done at Chennai and Bengaluru.[6,20] More than half of the study participants (58%) knew the correct source of menstrual blood. This proportion is higher when compared to study done among school girls.[21]

Menstrual hygiene practice was good only among 10% of study participants before intervention. Nearly 94% used sanitary pads. This is higher when compared to previous studies.[4,6,7,16] Sanitary napkins are freely distributed through Integrated Child Developmental Scheme (ICDS) in Tamilnadu state which could have led to its increased use.[22] Before health education, cleaning of external genitalia during menstruation is higher in the current study when compared to previous studies.[7]

Both knowledge about menstruation and menstrual hygiene practice did not have any association with socio-economic status and mother's education. However, in previous studies, the knowledge showed significant relationship with mother's educational level.[6]

Baseline survey revealed that knowledge adequacy scores showed a statistically significant weak positive correlation with menstrual hygiene

practice score before intervention. This proves that education about menstruation and its significance should be emphasized right from a girl's childhood. This would escalate safe hygiene practices throughout her life.[15]

Following health education, knowledge adequacy on menstruation significantly increased from 57.5% to 90% (p value – 0.04). The improvement seen in the current is in accordance with previous similar studies done.[6,19,24] Nearly 40% of study participants changed their belief that menstrual blood is not impure. This understanding would help in breaking the misconceptions, myths and superstitions about menstruation. Still 25% of study participants held the belief that menstrual blood is impure/ unhygienic. This is in contrast to a previous study done at Bangladesh wherein nearly 96% of study participants had understood that menstrual blood is not impure following educational intervention.[16] In the latter study, health education was given in twelve sessions every 15 days.

Menstrual hygiene practice has significantly improved from 8.8% to 30% following health education ($p < 0.001$). However, the effectiveness of health education in improving practice is lesser when compared to previous studies.[15,22-24] Frequent health education sessions for a longer period as done in a similar study at Egypt would have improved menstrual hygiene practices among more number of adolescents girls.[25] This shows that proper reinforcement of the message at adequate intervals could have resulted in a much better outcome.

More than 50% of the study participants who used new/old cloth as absorbent before intervention had started using sanitary pad. Participants who still used new/old cloth after health education had understood appropriate methods to wash and dry the cloths.

Disposal of used sanitary material and frequency of changing sanitary material was also improved following the intervention. The proportion of participants disposing used sanitary material in toilets has been significantly reduced by 11.2% ($p <0.001$). This change is similar to that observed in a previous study done at Bangladesh.[16] Nearly 60% of the study participants reported that they disposed their used sanitary material in dustbins. This will generate more menstrual waste when practiced in a long run. This menstrual waste will end up in landfill and certainly cause larger problems, particularly in developing countries. Hence, encouraging menstrual hygiene practices must be accompanied by adequate and proper waste management.

The frequency of changing sanitary material in a day has also been significantly improved (p value - 0.001). Almost all participants changed their sanitary material at least twice in a day. This is supported by a previous study, wherein almost 99.5% of participants changed their sanitary material at least twice a day.[16]

Half of the study participants did not wash their hands after changing sanitary material despite health education intervention. This is in contrast with previous studies where more than 90% of study population showed improvement following health education.[22-26] A study done at the state of West Bengal showed that hygienic practices like hand washing and daily bathing had significant relationship with availability of continuous water supply and toilet facilities.[27] Hence, water supply, sanitation and hygiene facilities should be improved in the community, work place, schools, and colleges and at home to ensure good menstrual hygiene practice.[28]

One of the principles of health education is reinforcement. Without reinforcement there is a chance for the adolescents to go back to the pre-awareness stage. Hence sustained health education should be provided to all adolescents to improve reproductive health. Teachers can be trained in schools/colleges to act as counsellors of reproductive health.

The information given by the study participants were self-reported and may differ from actual

behavior. Hence, there is a chance of information bias in this study. It is well known that menstruation is clouded by many taboos and cultural beliefs. This study did not attempt at studying the restrictions imposed on adolescent girls during menstruation.

Conclusion :

This study has shown significant positive changes in knowledge and menstrual hygiene practice among adolescents following an effective health education intervention. Adolescents who had better knowledge about menstruation had better menstrual hygiene practices. Hence awareness about menstruation and its hygiene should be provided right from childhood to improve woman's reproductive health.

Recommendations:

An ideal, age appropriate, continuous menstrual health education should be included in curriculum of school going girls. Encouraging healthy menstrual hygiene practices should be accompanied by appropriate waste management strategies. Water, sanitation and hygiene facilities need to be improved to improve menstrual hygiene, comfort and mobility of menstruating women.

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Declaration:

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Conflict of Interest: Nil

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A Study on Screening of Glaucoma among Patients Attending Tertiary Eye Care Hospital at One of the Cities of Western India

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Abstract:

Introduction : Glaucoma is the leading cause of irreversible visual loss in world and also in India. Because of the relatively asymptomatic initial phase of the disease, it is often detected by chance and is frequently associated with extensive and irreversible damage at the time of diagnosis. **Objectives:** To screen for Glaucoma among patients eligible as per inclusion criteria, to classify the glaucoma cases according to clinical presentation and to correlate the occurrence of glaucoma with different variables. **Method:** The present study was conducted at one of the tertiary care hospitals of Ahmedabad city during celebration of "World Glaucoma Week - 2021". Total 1421 patients were offered opportunistic screening after oral informed consent during 6-12 March 2021, who attended the institute. After applying exclusion criteria, 945 were found eligible who underwent a comprehensive ophthalmic examination like visual acuity, intra-ocular pressure measurement, gonioscopy, optical disc and visual filed examinations were carried out as per standard protocols. Sociodemographic details, any relevant ophthalmic history pertaining to glaucoma and systemic illnesses were also assessed. The data were entered and analyzed in MS excel. **Results:** The incidence of newly diagnosed cases of glaucoma among opportunistic screened cohort was 36.71% (n=347). Of total newly diagnosed, the presentation as per clinical classification was as follows: Primary open angle glaucoma (POAG) - 202 (58.21%), Primary angle closure glaucoma (PACG) - 77 (22.19%), Primary angle closure suspect (PACS) – 41 (11.82%), Ocular hypertension (OHT) – 6 (1.73%), Normal tension glaucoma (NTG) – 10 (2.88%), Secondary glaucoma – 9 (7.09%) and Congenital glaucoma – 2 (0.58%). In yield, 25 (19.68%) were $\leqslant$ 40 years and 36 (28.35%) had positive family history of glaucoma. **Conclusion:** Presence of stand-alone Diabetes and Hypertension or presence of both accompanying – all three conditions were found to be statistically significant determinant for occurrence of particular variety of Glaucoma. There was highly significant statistical association between cup-disc ratio level at the time of presentation and clinical variety of glaucoma.

Keywords: Glaucoma, Incidence, Screening, World Glaucoma Week.

Introduction:

The word glaucoma originally meant 'clouded' in Greek; as such, it may have referred either to a mature cataract or to corneal edema that might result from chronic elevated pressure. Glaucoma is defined as a disturbance of the structural or functional integrity of the optic nerve that can usually be arrested or diminished by adequate

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lowering of IOP. [1] The two most common forms of the disease are Primary Open Angle Glaucoma (POAG) and Primary Angle Closure Glaucoma (PACG), with variable patterns of disease prevalence in different ethnic groups.[2]

Globally, at least 2.2 billion people have a near or distance vision impairment. In at least 1 billion or almost half of these cases, vision impairment could have been prevented or has yet to be addressed. This 1 billion people include those with moderate or severe distance vision impairment or blindness due to unaddressed refractive error (88.4 million), cataract (94 million), glaucoma (7.7 million), corneal opacities (4.2 million), diabetic retinopathy (3.9 million), and trachoma (2 million), as well as near vision impairment caused by unaddressed presbyopia (826 million).[3] Vision impairment severely impacts quality of life among adult populations. Adults with vision impairment often have lower rates of workforce participation and productivity and higher rates of depression and anxiety. In the case of older adults, vision impairment can contribute to social isolation, difficulty walking, a higher risk of falls and fractures, and a greater likelihood of early entry into nursing or care homes.[4]

Glaucoma is the fourth leading cause of preventable blindness globally. Although there is a decline in the overall prevalence of blindness in India, blindness and visual impairment (VI) continues to be a major public health problem and there are significant disparities in the prevalence and its causes across different regions in the country.[5]

Considering the above facts and paucity of region-specific data pertinent to glaucoma in the western region of India, especially in Gujarat province, the current research was planned especially during celebration of 'World Glaucoma week' during March 6-12, 2021 at one of the tertiary care hospitals in Ahmedabad. The study was planned with following objectives: To screen for Glaucoma among patients eligible as per inclusion criteria, to classify the glaucoma cases according to clinical presentation and to correlate the occurrence of glaucoma with different variables.

Method:

The present study was conducted at one of the tertiary eye care hospitals of Ahmedabad city during the celebration of "World Glaucoma Week - 2021"after obtaining necessary approval from appropriate institutional authorities. Every year, the duration of 6-12 March is being celebrated as "World Glaucoma Week" worldwide. Total 1421 patients who attended the institute were offered opportunistic screening after oral informed consent during period mentioned above. After applying exclusion criteria, 945 were found eligible who comprise the final study cohort. The selected participants underwent a comprehensive ophthalmic examination like visual acuity check by Snellen chart, Intra Ocular Pressure measurement by Goldmann applanation tonometry, Anterior segment examination by slit lamp biomicroscopy (to rule out pigment dispersion, pseudo exfoliation and other secondary causes of glaucoma), Gonioscopy by one mirror Goldmann gonio lens (Shaffer grading system) and Optic disc examination by slit lamp biomicroscopy 60D lens. Staging of glaucomatous damage was done based on cup disc ratio into early (≤0.6), moderate (0.7-0.8) and advanced (>0.8). [6]

All glaucoma suspects were then subjected to Visual field analysis using Humphrey's visual field analyzer, optical coherence tomography (OCT) and Diurnal variation of intraocular pressure (DVT).Those undergoing contact procedures were tested for COVID-19.

Socio-demographic details, any relevant ophthalmic history pertaining to glaucoma (like any ocular surgery, trauma, history of steroid intake or medication which can lead to glaucoma) and systemic illnesses were also assessed. The data were entered and analyzed in MS excel.

The following definitions were used to classify persons into specific diagnostic categories:[7]

Primary open angle glaucoma (POAG): Anterior chamber angles open and normal appearing by gonioscopy, typical features of glaucomatous optic disc and visual field defects corresponding to the optic disc changes.

Ocular hypertension(OHT): Intraocular pressure $\geqslant$ 21 mmHg without evidence of optic nerve damage or visual field abnormalities characteristic of glaucoma; open and normal-appearing anterior chamber angle by gonioscopy.

Normal tension glaucoma(NTG): Intraocular pressure $\leqslant$ 21 mmHg with evidence of optic nerve damage or visual field abnormalities characteristic of glaucoma; open and normal-appearing anterior chamber angle by gonioscopy.

Primary angle closure suspect(PACS): Greater than 270° of iridotrabecular contact, absence of PAS, normal IOP, disc and visual fields.

Primary angle closure (PAC): Greater than 270° of iridotrabecular contact, either elevated IOP and/or PAS, normal disc and visual fields

Primary angle closure glaucoma (PACG): Greater than 270° of iridotrabecular contact–Elevated IOP plus optic nerve and visual field damage.

Secondary glaucoma: Glaucomatous optic nerve damage and/or visual field abnormalities suggestive of glaucoma coupled with ocular disorders that contribute to a secondary elevation in IOP such as neovascularization, trauma, cataract and uveitis.

Inclusion & Exclusion criteria:

All adult patients visiting tertiary eye care centre at study site during "World Galucoma Week", i.e., 6-12 March, 2021 and were willing to take part in the screening programme by oral informed consent were included in the study. All patients with signs and symptoms of COVID 19 were subjected to rapid antigen test and if found positive, excluded from the study.

Results:

The incidence of newly diagnosed cases of glaucoma among opportunistic screened cohort was 36.71% (n=347 out of 945 eligible study participants were diagnosed to have glaucoma). Of total newly diagnosed, the presentation as per clinical classification was as follows: Primary open angle glaucoma (POAG) - 202 (58.21%), Primary angle closure glaucoma (PACG) - 77 (22.19%),Primary angle closure suspect (PACS) – 41 (11.82%), Ocular hypertension (OHT) – 6 (1.73%), Normal tension glaucoma (NTG) – 10 (2.88%), Secondary glaucoma – 9 (7.09%) and Congenital glaucoma – 2 (0.58%).(Table 1)

POAG was found to be maximum in 50-60 years of age group whereas both Angle closure glaucoma and secondary angle glaucoma was found more common in 40-50 years of age group.

At the time of diagnosis, 95 (47.03%) cases of POAG and 48(62.34%) cases of PACG were in the early stage of disease whereas 23 (11%) of POAG and 4 (5%) of PACG were in the advanced stage of the disease. POAG being asymptomatic in the initial stage usually presents late as compared to PACG. Thus, relatively more cases of PACG were in the early stage as compared to POAG in present study. Also, both cases of congenital glaucoma were in advanced stage at the time of diagnosis. (Figure 2)

As shown in Table 2, the association between early, moderate and advance stage of cup-disc ratio were evaluated for their association with clinical variety of glaucoma. The same reveled that there was highly significant statistical association between cup-disc ratio level at the time of presentation and clinical variety of glaucoma. ($\chi 2 = 69.927$ with P value ≤ 0.001) (Table 2)

On analyzing the effect of selected systemic illness like diabetes mellitus and hypertension on occurrence of specific variety of glaucoma (i.e., POAG and PACG), it was found that presence of stand-alone Diabetes and stand-alone Hypertension or presence

Table 1: Distribution of clinical varieties of glaucoma among study participants (n=347)

Clinical classification of Glaucoma	Frequency (Percentage)
Primary open angle glaucoma (POAG)	202 (58.21)
Primary angle closure glaucoma (PACG)	77 (22.19)
Primary angle closure suspect (PACS)	41(11.82)
Ocular hypertension (OHT)	6 (1.73)
Normal tension glaucoma (NTG)	10 (2.88)
Secondary Glaucoma	9 (2.59)
Congenital Glaucoma	2 (0.58)
Total	347 (100)

Figure 1: Age-wise distribution of study participants for various types of glaucoma

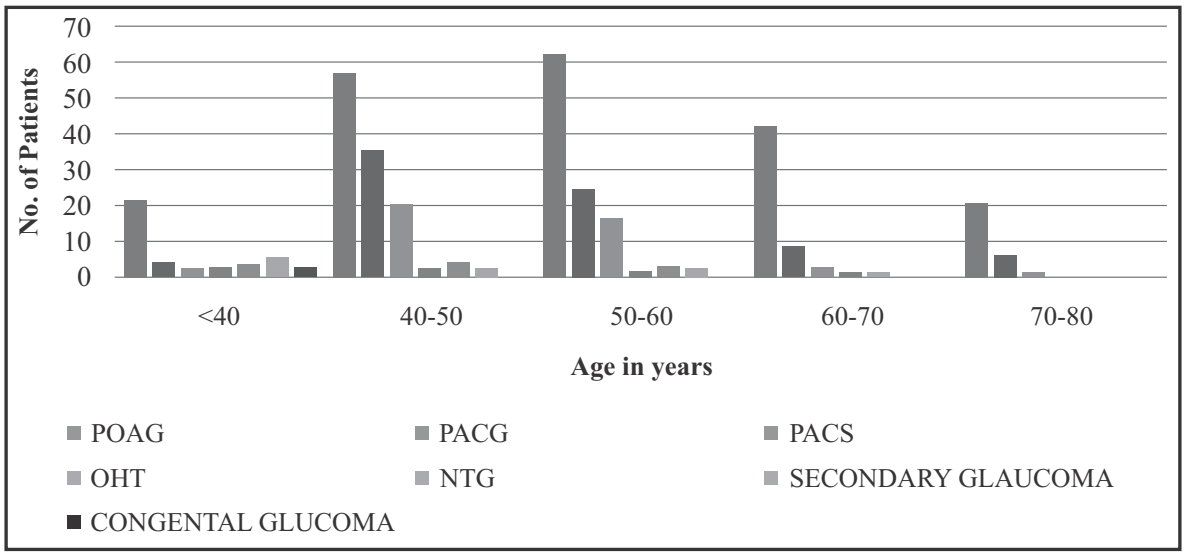

Figure 2: Distribution of Cup-Disc Ratio (CDR) among various types of glaucoma

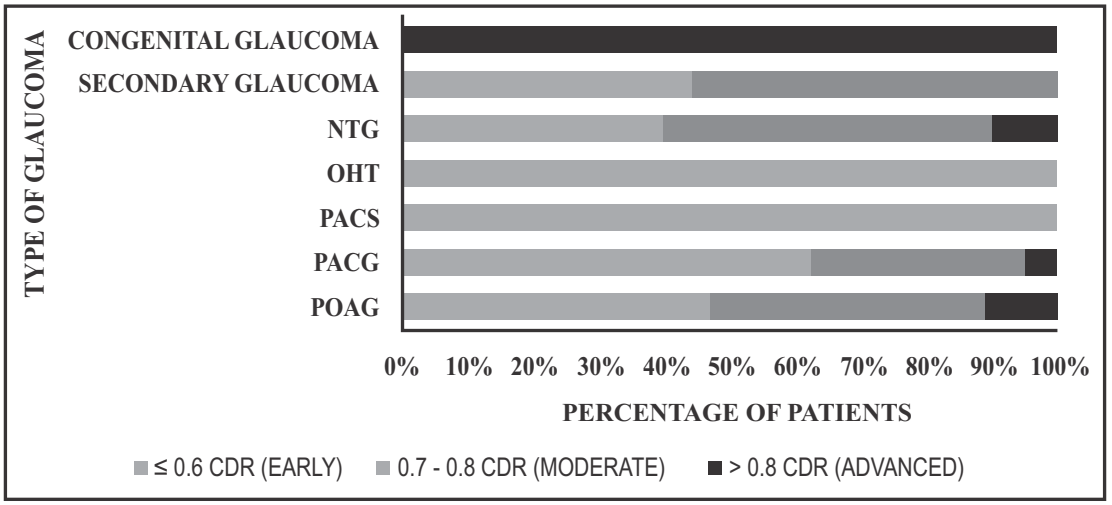

Table 2: Distribution of CDR among clinical varieties of glaucoma

Cup-Disc Ratio (CDR)	POAG	PACG	PACS	OHT	NTG	Secondary Glaucoma	Congenital Glaucoma	Chi-Square Value (P Value)
⩽0.6 (early)	95	48	41	6	4	4	0	69.927 (<0.0001)
0.7- 0.8 (moderate)	84	25	0	0	5	5	0	
> 0.8 (advanced)	23	4	0	0	1	0	2	
Total	202	77	41	6	10	9	2	

Table 3: Association of clinical variety (POAG and PACG) with selected systemic illnesses

Selected Systemic illnesses	POAG (n=202)	PACG (n=77)	Total	Z proportion test (p value)
	Frequency (%)	Frequency (%)	Frequency (%)	
Only Diabetes Mellitus (DM)	11 (68.75)	5 (31.25)	16	2.121 (0.034)
Only Hypertension (HTN)	33 (73.33)	12 (26.67)	45	4.427 (<0.0001)
Both (DM + HTN) Present	6 (75)	2(25)	8	2 (0.046)

Table 4: Association of clinical variety (POAG and PACG) with selected demographic variables (n=279)

Selected Demographic Variable	POAG	PACG	Total	χ^2 test (p value)
	Frequency (%)	Frequency (%)	Frequency	
Gender				
Male	122(74.85)	41(25.15)	161	47.622(<0.0001)
Female	80(68.96)	36(31.04)	116	
Family history of glaucoma				
Present	31 (86.11)	05 (13.89)	36	3.888 (0.048)
Absent	171(70.37)	72(29.63)	243	

of both accompanying – all three conditions were found to be statistically significant determinant for occurrence of particular variety of Glaucoma. Of total Hypertensive patients (n=45), 33 developed POAG while 12 developed PACG, which was found highly statistically significant (p<0.0001) compared to other two variables studied. (Table 3)

On assessing the Association of clinical variety (POAG and PACG) with selected demographic variables, i.e., gender and family history of glaucoma, it was found that both variables were statistically significantly associated. Gender has highly statistical significant role (p< 0.0001) and positive family history has statistically significant role in occurrence of particular clinical variety of glaucoma. (Table 4)

Discussion:

There are approximately 11.2 million persons aged 40 years and older with glaucoma in India. Primary open angle glaucoma is estimated to affect 6.48 million persons. The estimated number with primary angle-closure glaucoma is 2.54 million. Those with any form of primary angle-closure disease could comprise 27.6 million persons. Most of those with disease are undetected and there exist major challenges in detecting and treating those with disease. In the light of the existing manpower and

resource constraints, the present study evaluate options for improving case detection rates in the country.[8]

The proportion of newly diagnosed glaucoma in our study population was 36.71% of which POAG was the most common subtype followed by PACG and PACS.This is probably explained by the fact that all patients visiting tertiary eye care centre were examined without any age limit and more males turned up for the screening program as compared to females. Of the newly diagnosed cases of glaucoma, total no of PACG and PACS cases were 77 (22.19%) and 41(11.81%), respectively which can be explained by the comprehensive examination protocol that included gonioscopy for all subjects. POAG being asymptomatic in the initial stage usually presents late as compared to PACG, hence 47.03% of POAG and 62.34% of PACG were in the early stage of disease at the time of diagnosis while 11% of POAG and 5% of PACG had advanced glaucomatous disc damage. This is almost comparable to a study conducted by KT Daba et al in Ethiopia in 2020, where the proportion of newly diagnosed glaucoma was 10.2% with POAG being most common and 40% of POAG and 66% of PACG were in the early stage of the disease.[9]

According to the study conducted by A Jacob et al in 1998, the prevalence of PACG was found to be several times that of POAG. [10] However their study included younger age groupin the study population and also significantly more number of females responded to the study which might be the cause of PACG being more prevalent than POAG in their study. In a study conducted by A Raychaudhari et al in 2005, the ratio of POAG to PACG was 10:1. [2] The same for our study was found to be 2.6:1.

In a study conducted by R Ramakrishnan et al in 2003, persons with 40 years or more were examined and the age group with majority of POAG cases was found to be 40-49 years.[7] The age group with majority of POAG cases was noted to be 51-60 years in our study.

Findings of current study revealed that 39 (11.23%) patients were ⩽ 40 years of age of which 21 (6.05%) had presented with POAG variety. Positive family history of glaucoma was found in 36 (10.37%) patients – 31(8.9%) POAG and 5(1.44%) PACG.

Limitations of the study:

The role of systemic illness like Diabetes and Hypertension and selected demographic variables like gender and family history of glaucoma were statistically evaluated for POAG and PACG only due to comparatively very small sample size with positive details in other varieties of glaucoma as revealed in studied cohort and mentioned in Table 1. The same was not acquiescent to analyze statistically, the results in context to POAG and PACG are presented only. Further study with larger sample size to include sufficient proportion of other varieties could be carried out with long term follow up of the patients.

Conclusion:

The proportion of primary open angle glaucoma is more in our study population.A changing trend towards younger age group (⩽ 40 yrs) being affected in Primary open angle glaucoma is seen. The burden of undiagnosed primary angle closure glaucoma can be reduced by comprehensive eye examination. Such glaucoma screening camps at institutional level should be promoted for early diagnosis and intervention to prevent irreversible blindness.

Declaration:
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A Cross-sectional Study on Prevalence and Determinants of Preconception Anemia in Women of Reproductive Age Group at Gandhinagar, Gujarat, India

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Abstract:

Introduction : Nutritional anemia is a major public health issue that affects women of all ages, notably those of reproductive age (15-49 years). Anemia has an adverse effect on the outcome of pregnancy including miscarriage, intrauterine growth retardation, low birth weight, post-partum hemorrhages and stillbirth. **Objectives:** It is to estimate prevalence of anemia and to investigate socio-demographic and obstetric factors associated with the prevalence of anemia during preconception period. **Method:** We conducted a cross-sectional study among 306 reproductive age group (15-49 years) women who were residing in field practice area of Urban Health Training Center (UHTC) in sector-24, Gandhinagar, Gujarat, India who are planning to conceive within a year. Study participants were selected from the records of the female health worker according to our inclusion and exclusion criteria for the study. **Results:** Out of 306 participant women, 76% were found to be anemic, out of which, 31% had mild, 55% had moderate and 14% had severe level of anemia. Education level significantly associated ($P < 0.05$) with presence of anemia as women with lower level of education had higher presence of anemia – 81.97% in primary education group and 79.17% among illiterate women. BMI, parity and family type was also found to be significantly ($P < 0.05$) associated with the severity of anemia. **Conclusion:** Nearly three fourth Women who planned to conceive within a year had anemia. Out of women who had anemia, nearly three fourth had moderate to severe anemia. Education had significant association with presence of anemia and low BMI, Parity and type of family had significant association with severity of anemia.

Keywords: Anemia, Preconception, Reproductive women

Introduction:

India is one of the countries with a very high prevalence of anemia in the world, especially nutritional anemia due to iron deficiency. NFHS-4 data suggest that anemia is widely prevalent among all age groups and 53% of women in the reproductive age group (15-49 years) are affected by it.[1] In Gujarat state, 65% of women in the reproductive age group have anemia, including 26% having mild anemia, 35% having moderate anemia, and 4% having severe anemia.[2] Numerous factors contribute to the development of anemia. In developing countries like India, early onset of childbearing, high number of births, short intervals between births, poor access to

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antenatal care, and insufficient iron supplementation significantly contribute to the occurrence of anemia during pregnancy. [3]

Anemia has an adverse effect on the outcome of pregnancy. Severe anemia during pregnancy impairs oxygen delivery to the fetus and interferes with normal intra-uterine growth, resulting in intrauterine growth retardation, stillbirth, low birth weight and neonatal deaths.[4] It predisposes to premature delivery, increased perinatal mortality and increased risk of death during delivery and postpartum.[5] Anemia contributes to postpartum hemorrhages[6] and affects the children by permanent reductions in children's cognitive capacity.[7] To mitigate the consequences of anemia, prophylactic iron and folic acid supplementation is provided weekly to all women of reproductive age and daily to pregnant women in India.[8] However, NFHS-4[1] data suggests inadequate adherence to this supplementation - only 30.3% of the pregnant women had consumed prophylactic iron and folic acid supplementation for at least 100 days.

Pregnancy is also one of the contributors for causing anemia. Pregnancy causes a disproportional increase in plasma and RBC volume, which produces a state of hemodilution. And also at term, there is a fall of about 2gm% hemoglobin from the non-pregnant value, called physiological anemia.[9] On top of that, iron demands are high during pregnancy and if anemic woman gets pregnant, it is very difficult to replenish her iron store later on.[5,10] Hence when anemic women are planning to conceive within short duration without treating anemia, their anemia deteriorates further during pregnancy, potentially resulting in an unfavorable pregnancy outcome for both mother and child. Therefore, the women who are already anemic or have depleted iron stores just before conception, are to be investigated for anemia and if found anemic, advice should be given to postpone the pregnancy till the correction of the anemia.

With this background, study was conducted among the reproductive age women who were residing in a field practice area of an Urban Health Training Centre (UHTC) in sector 24, Gandhinagar and planning to conceive within a year. This study was done to determine the socio-demographic and obstetric factors associated with prevalence of anemia and also the severity of anemia so that targeted awareness efforts can be planned.

Method:

This cross-sectional study was carried out in the field practice areas of UHTC of Department of Community Medicine, GMERS Medical College, Gandhinagar during May-June 2016.

Total eligible couples as per records of the female health worker in the area were 1955, out of which authors have made a list of probable study participants according to inclusion criteria which included reproductive age women who were non-pregnant and non-lactating at that time, but planning to conceive within a year and hence not using any sort of contraception so sample size turned to be 352. Then home visits were done to ascertain their eligibility for the study, those who had not given informed written consent and during 3rd time home visit if probable participant was not present at home then we had included them in non-responder and they were excluded from the study. So, at the last total 306 eligible participants were invited to participate in the study. A pre-form validated questionnaire was used to collect the data. Questionnaire had two parts; one had oral questionnaire and the other included physical examination and investigation. Oral questionnaire was filled by authors themselves which included the basic demographic details like age, education, occupation and socio-ecomic status calculated from revised modified BG Prasad socioeconomic classification Scale, 2016. It included obstetrics history of the participant also. A complete general examination and systemic examination was done by lady medical office of urban health training center to exclude any existing illness.

BMI (Body Mass Index): Weight was measured in kilograms with standard digital weighing machine.

Weighing scales were standardized against known weight. The height was measured between top of the head (vertex) and bottom of the feet in upright position without footwear and headgear. It was measured in centimeters to exact point using calibrated fixed scales. BMI is used as the criterion for classifying nutritional status. BMI (also called Quetelet Index) is derived by dividing weight in kilograms by the square of height in meters. WHO guidelines were used for classifying the nutritional status of the participant.[11] Weight and height was measured by Medical social workers of the department of community medicine posted at UHTC.

Blood Examination: Participants were explained about the procedure for blood sample collection and their consent was taken for the same. Capillary blood was taken after finger prick by sterile lancet. Hemoglobin concentration was measured on the field using portable Sahli's hemoglobin method. Anemia grade was assessed adopting WHO recommended classification.[12] Hemoglobin estimation was done by trained public health nurse and laboratory technician of the community medicine department posted at the UHTC. Emergency kit was made available to them and training was done to deal with any emergencies related to needle prick.

Data Entry and Statistical Analysis: Data entry and analysis was done in software Epi Info version 7.0. Chi-square test was used to find statistical significance.

Ethical Issues

Written informed consent was taken from the study participants. Anybody found to be having illness was treated for the same. Institutional ethical clearance was obtained for the study. Participants were also given an informed consent sheet to sign and a participant information sheet, without which, further proceedings were not carried out.

Results :

Out of 306 participant women, 234 (76.47%) had anemia of varying severity. Table 1 shows that out of all anemic women, 30.77% had mild anemia, 54.7% had moderate anemia, and 14.53% had severe anemia. (Table 1)

Table 1: Prevalence of anemia in reproductive age-group of 15-49 years who are planning to conceive

Anemia	Number (%)
Mild (11-11.9 gm/dl)	72 (30.77 %)
Moderate (8-10.9 gm/dl)	128 (54.7 %)
Severe (<8 gm/dl)	34 (14.53 %)
Total	**234**

Table 2 shows the distribution of several socio demographic factors (like age, education, family size etc.) in participant women and prevalence of anemia in each group. Among all 306 participant women, 38.56% were in the age group of 20–24 years, followed by 31.37% women in age group 25-29 years. Majority of women had low level of education with 39.86% having primary education and 31.37% being illiterate. Hindus constituted majority 97.38% among the participants with other religions constituting 2.61%. 89.22% women worked as housewives and 66.0% women lived in joint family. Majority were belonged to low socioeconomic class.

High prevalence of anemia was found among the age group of 25-29 years (82.29%) compared to other age groups, although the difference was not statistically significant. Significant negative association was found between the level of education and prevalence of anemia. Women with lower level of education had higher presence of anemia – 81.97% in primary education group and 79.17% among illiterate women. Whereas the women with higher level of education showed less prevalence of anemia and this difference was found to be statistically significant ($P<0.05$). Other socio-demographic factors including occupation, religion and type of family and socioeconomic status did not show considerable association with anemia.

Table 3 shows distribution of BMI and obstetric factors, and prevalence of anemia in each group.

Table 2: Association of socio demographic factors with anemia

Variable	Total N=306(%)	Anemia N=234(%)	Non-anemia N=72(%)	c^2 value p-value
Age (Years)				
<20	18 (5.88)	12 (66.67)	6 (33.33)	4.86
20-24	118 (38.56)	91 (77.12)	27 (22.88)	0.30
25-29	96 (31.37)	79 (82.29)	17 (17.71)	
30-34	47 (15.36)	33 (70.21)	14 (29.79)	
≥35	27 (8.82)	19 (70.37)	8 (29.63)	
Occupation				
Housewife	273 (89.22)	209(76.56)	64(23.44)	1.18
Laborer	19 (6.21)	14(73.68)	5(26.32)	0.76
Self-employed	12 (3.92)	10(83.33)	2(16.67)	
Employee	2 (0.65)	1(50)	1(50)	
Education				
Illiterate	96 (31.37)	76(79.17)	20(20.83)	13.99
Primary	122 (39.86)	100(81.97)	22(18.03)	0.003*
Secondary	77 (25.16)	54(70.13)	23(29.87)	
Higher secondary& above	10 (3.27)	4(40)	6 (60)	
Religion				
Hindu	298 (97.38)	228(76.51)	70(23.49)	0.37
Muslim	8 (2.61)	6(75)	2(25)	0.79
Family Type				
Nuclear family	104 (33.99)	75 (72.12)	29 (27.88)	1.66
Joint family	202 (66.01)	159 (78.71)	43 (21.29)	0.19
Socioeconomic Status				
Class 1 & 2	12 (3.92)	8 (66.67)	4 (33.33)	4.74
Class 3	39 (12.75)	25 (64.10)	14 (35.89)	0.19
Class 4	141 (46.08)	111 (78.72)	30 (21.28)	
Class 5	114 (37.25)	90 (78.95)	24 (21.05)	

* Denotes statistically significant finding (P < 0.05)

Majority of the 306 participant women (62.74%) had mid-range BMI, followed by low BMI (26.81%) and high BMI (10.46%). 87.9% women reported to have regular menstrual cycle. 19.28% women had abortion in the past whereas 17.97% chose not to answer. 78.1% nearly 50% women were multiparous.

Though the difference was not found to be statistically significant as the BMI <18.5 Kg/m^2 had higher prevalence of anemia (80.49%) compared to 18.5-24.9 (76.56 %,) and >24.9 (65.63%). Prevalence of anemia was found almost similar in Multiparous women, primiparous and nulliparous women. Women with and without a history of abortion also

Table 3: Association of BMI and obstetric factors with anemia

Variable	Total N=306(%)	Anemia N=234(%)	Non-anemia N=72(%)	c^2 value p-value
BMI (kg/m^2)				
<18.5	82(26.81)	66(80.49)	16(19.51)	2.83
18.5-24.9	192 (62.74)	147(76.56)	45(23.44)	0.24
>24.9	32(10.46)	21(65.63)	11(34.37)	
Parity				
Nulliparous	67(21.90)	52(77.61)	15(22.39)	0.06
Primiparous	85(27.78)	65(76.47)	20(23.53)	0.96
Multiparous	154(50.33)	117(75.97)	37(24.03)	
H/O Abortion				
Yes	59 (19.28)	47(79.66)	12(20.34)	0.43
No	192 (62.74)	145(75.52)	47(24.48)	0.81
Not-responded	55 (17.97)	42(76.36)	13(23.64)	
Menstrual History				
Menstrual cycle regular	269 (87.9)	206(76.58)	63(23.42)	0.0072
Menstrual cycle irregular	37 (12.1)	28(75.68)	9(24.32)	0.93

had similar presence of anemia (79.66% and 75.52%). Women with regular and irregular menstruation cycle had similar presence of anemia (76.58% and 75.68% respectively).

Table 4 shows prevalence of mild, moderate and severe anemia according to various factors. Mild anemia was found to be more common in elder women with age >24 years with highest presence in 25-29 years. Whereas moderate anemia was more common in lower age group, especially in <20 years age group (75%), followed by 20-24 years age group (65.93%). Severe anemia was higher in women >35 years of age (26.32%). But these differences were found to be not significant to show an association between age and severity of anemia. With increasing level of education, the severity of anemia was found to be decreasing, barring a few exceptions in education level of higher secondary and above where we had a sample size of only 4. Those with a history of abortion had more prevalence of severe anemia (21.28% as compared to 14.48%), whereas women with abortion history showed higher prevalence of severe anemia. Women with irregular menstruation had more prevalence of severe anemia (21.43% as compared to 13.59%), whereas women with regular menstruation showed lower grade of anemia. However, menstruation cycle history, education level and abortion history didn't show a significant association with the severity of anemia. Women with low BMI (<18.5) had more moderate (59.10%) and severe types of anemia (22.73%) as compared to women with high BMI (>24.9) who had more mild anemia (52.38%), and this association was found to be statistically significant ($P < 0.05$).Severe anemia was more common in multiparous women (16.24%) than nulliparous women (9.62%), Women belonging to joint families had higher prevalence of severe anemia whereas women from nuclear families had more prevalence of moderate anemia. This trend was found to be statistically significant($P<0.05$).

Table 4: Association of socio demographic, BMI and obstetrics factors with severity of anemia

Variable	Total N=234(%)	Mild N=72(%)	Moderate N=128(%)	Severe N=34(%)	c^2 value, p value
Age (Years)					
<20	12 (5.13)	2 (16.67)	9 (75)	1 (8.33)	
20-24	91 (38.88)	21 (23.10)	60 (65.93)	10 (10.99)	14.35
25-29	79 (33.76)	31 (39.24)	34 (43.04)	14 (17.72)	0.07
30-34	33 (14.1)	11 (33.33)	18 (54.55)	4 (12.12)	
≥ 35	19 (8.11)	7 (36.84)	7 (36.84)	5 (26.32)	
Education					
Illiterate	76 (32.47)	20 (26.32)	41 (53.95)	15 (19.73)	9.94
Primary	100 (42.73)	29 (29)	59 (59)	12 (12)	0.13
Secondary	54 (23.07)	22 (40.74)	27 (50)	5 (9.26)	
Higher secondary & above	4 (1.7)	1 (25)	1 (25)	2 (50)	
Family Type					
Nuclear	75 (72.12)	11 (14.67)	56 (74.67)	8 (10.67)	18.47
Joint	159 (78.71)	61 (38.36)	72 (45.28)	26 (16.35)	0.0001*
Socioeconomic Status					
Class 1 & 2	8 (66.67)	5 (62.5)	2 (25)	1 (12.5)	11.78
Class 3	25 (64.10)	10 (40)	11 (44)	4 (16)	0.066
Class 4	111 (78.72)	38 (34.23)	55 (49.55)	18 (16.22)	
Class 5	90 (78.95)	19 (21.11)	60 (66.67)	11 (12.22)	
Parity					
Nulliparous	52 (77.61)	27(51.92)	20(38.46)	5(9.62)	14.47
Primiparous	65(76.47)	18(27.69)	37(56.92)	10(15.38)	0.006*
Multiparous	117(75.97)	27(23.08)	71(60.68)	19(16.24)	
Abortion Status					
Yes	47 (20.08)	14 (29.79)	23 (48.94)	10 (21.28)	7.34
No	145 (61.96)	49 (33.79)	75 (51.72)	21 (14.48)	0.12
Non-responded	42 (17.94)	9 (21.43)	30 (71.43)	3 (7.14)	
BMI (kg/m^2)					
<18.5	66 (28.2)	12 (18.18)	39 (59.10)	15 (22.73)	12.36
18.5-24.9	147 (62.82)	49 (33.33)	80 (54.42)	18 (12.24)	0.01*
>24.9	21 (8.97)	11 (52.38)	9 (42.86)	1 (4.76)	
Menstrual History					
Menstrual cycle regular	206 (88.03)	65 (31.55)	113 (54.85)	28 (13.59)	1.4
Menstrual cycle irregular	28 (11.96)	7 (25)	15 (53.57)	6 (21.43)	0.5

* Denotes statistically significant finding ($P < 0.05$)

Discussion:

This study shows that the overall prevalence of anemia among reproductive age group women (15-49 years) was 76.47%. The result is higher than anemia reported in NFHS-4 (2015-16) for India (53%)[1] and in NHFS-5 (2019-20) for Gujarat (65%).[2] Prevalence of mild, moderate and severe anemia were 30.77%, 54.7% and 14.53% respectively, compared to the data of Gujarat[2] where it was 26%, 35% and 4% respectively. The high prevalence of anemia found in this study can be attributed to the population of this study which was more sampled from urban slum having more people from lower socio-economic background.

In the present study, there was significant association ($P < 0.05$) found between education level and prevalence of anemia as high prevalence of anemia was seen among illiterate women (79.17%) as compared to literate women (75.6%) as seen in studies in NFHS-4 India (illiterate 56% and literate 40%).[1] and data of NFHS-5 Gujarat 2019-20.[2] The prevalence of severe anemia was found to be slightly lower in educated women compared to illiterate women. This could be because gaining education may assist women in adopting healthy lifestyle patterns, access to a variety of meals rich in vitamins and minerals and hygiene routines, which can help them prevent anemia. This finding is also supported by other study.[13]

Study also found no link between women's age and anemia, similar to a study by Gautam et al.[14] In contrast, other studies conducted in Africa and Asia show correlation between women's age and anemia.[10-15] We posit that different geographical areas have different social, cultural, and dietary norms which may affect the results.

Women from joint families were found to have higher prevalence of anemia and we found significant association between family type (nuclear or joint) and severity of anemia. Ponny et. Al.[16] also found significant association between family type and anemia. Women belonging to lower socioeconomic class had higher prevalence and severity of anemia, although it wasn't statistically significant as reported by Sharma et al.[17]

In our study, underweight women with low BMI were slightly more likely to be anemic (80.49%) compared to women of midrange BMI which was also found in the study conducted by Hemamalini et al.[18] and also severe anemia was found more in the underweight women compared to women with midrange and high BMI ($P<0.05$). The finding was consistent with other studies done in developing countries of South Asia also. [19]

In this study, however, no significant association, women with a history of abortion were found to be slightly more anemic (79.66%) than the women with no abortion history (75.52%). This is inline with the study done by Uche-Nwachi et al.[20] Significant association was found by Sinha et al.[21] between miscarriage and severe anemia in contrast to this present study, although we found that history of abortion had a slightly higher rate of severe anemia. Study found that multiparous women were more prone to severe anemia than nulliparous women and this statistically significant result is consistent with the results Azhar et al.[22] also suggested that high parity exposes women to more frequent hemorrhage which could reduce iron store in the body and increase the risk of anemia.

In our study, we found no association between the irregularity of menstruation cycle and the prevalence of anemia. An earlier study by Miiller et al.[23] also argued that menstruation cycle has no significant correlation with iron deficiency. However, for women with heavy menstrual bleeding, increased loss of iron can lead to anemia.[24] Present study also observed that women with a normal menstrual cycle tended to have a milder form of anemia, whereas women with an irregular menstrual cycle had more severe form of anemia. But this trend was not statistically significant.

Conclusion:

The present study revealed that anemia is a major health problem among reproductive age group women who are planning to conceive in the urban slums of Gandhinagar. Women who are less educated had higher prevalence of anemia. Also, severity of the anemia is more prevalent among the women with low BMI, joint family or higher parity. Recommendation:

Before conception all the women should undergo hemoglobin estimation and after achieving desirable hemoglobin concentration women should plan for conception. Low BMI is associated with severity of anemia as well as it is itself a known risk factor for adverse outcome of pregnancy government need to be strengthen the health program for both. For broader and longer effects, women education should be promoted, especially in lower socio-economic communities, to ensure overall healthy lifestyle and lower risk of anemia related concerns before, during, and after pregnancy.

Declaration:

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Assessment of Delivery of Routine Immunization in Kashmir: A Qualitative Study

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Abstract:

Introduction: Immunization is one of the splendid public health interventions that remarkably reduced child morbidity, mortality, and disability. Despite attaining substantial immunization coverage in Kashmir, assessment of the immunization system is quintessential for sustaining the gains and exploring the gaps. **Objective:** To assess the gaps in the delivery of routine immunization services in Kashmir Valley. **Method:** In-depth face-to-face interviews were conducted with thirty-two (32) important stakeholders, who were purposively selected as they play an active role in the planning and implementation of the Immunization Program and devise strategies at different levels of healthcare delivery. At the state level, SEPIO and SMO were interviewed at the District level, DIO/Deputy CMO was interviewed in all ten (10) districts of Kashmir Valley. From all ten Districts, two Medical-Blocks were selected from each District, and one Block Medical Officer and one Medical Officer were interviewed alternatively from each Medical-Block. **Results:** The thematic qualitative analysis approach was used and the analysis process generated five themes. Each of these themes included many sub-themes. 1. Factors facilitating the implementation of Routine Immunization (RI), 2. Limitations and deficits related to knowledge, attitude, monitoring, 3. Constraints encountered in the implementation of (RI) program, 4. Difficulties in the implementation of RI revealed by respondents, 5. Transformational steps to bridge gaps in the delivery of Immunization (RI) **Conclusion:** There were visible deficits related to knowledge, attitude, and monitoring among health professionals. Certain constraints encountered in the implementation of the program were financial constraints in the training of health care professionals and human resources constraints. The study showed the need for transformational steps to bridge gaps in the delivery of the Immunization (RI), which included regular monitoring and review meetings, teamwork and peer learning, training, and improvement in cold chain maintenance.

Key words: Assessment, Cold Chain, Immunization, Kashmir

Introduction:

Immunization is one of the splendid public health interventions that remarkably reduced child morbidity, mortality, and disability. India has marched at a remarkable pace in improving immunization coverage in recent years. Immunization has proved to be a cost-effective intervention against vaccine-preventable diseases that affect our health besides it being a sustainable intervention for achieving long-term health goals.[1] As WHO statistics show immunization has been estimated to prevent 3 million deaths globally every

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year, although far more could be staved off through ideal use of currently available vaccines.[2-4] The Global Vaccine Action Plan (GVAP 2011–2020) sets the goal of 90% coverage at the national level and 80% in every district or equivalent administrative unit with all vaccines in national programs by 2020.[5] Immunizations are generally considered the most successful and cost-effective public health interventions employed today.[6-8] Successful immunization programs have achieved the global eradication of smallpox, elimination of polio from the world, and considerable depletion in illness and death due to diseases like measles, diphtheria, tetanus, and whooping cough. Despite attaining substantial immunization coverage in Kashmir, assessment of the immunization system is quintessential for sustaining the gains and exploring the gaps. The study aims in delving into the functional assessment of the immunization system in Kashmir. Therefore, this study was conducted to garner evidence and information on the factors that influence childhood immunization and factors that attribute to barriers and difficulties in the uptake of immunization in Kashmir.

Method:

The study was conducted in the Kashmir valley which consists of ten Districts and each District is further divided into medical blocks of multiple sizes (2- 10 Medical Blocks). The study was conducted from March 2018 to March 2019. An explorative qualitative design using individual, face-to-face interviews with thirty two (32) different stakeholders from the State, District, Medical Block, and PHC levels. Purposive sampling was done, and Block Medical Officer (BMO) was taken from one medical block nearer to the District Headquarters as per convenience and Medical Officer (MO) was selected from the another far-off Medical Medical Block of the District.

Data collection :- In-depth interviews were conducted with stakeholders at all levels. Interviews were arranged by fixing prior appointments with the participant. An interview guide focusing on the specific areas of interest was developed beforehand to facilitate the interviews and was used to ensure participants' opinions were investigated fully during the interview, each interview started with some "background characteristics questions", interviews provided an opportunity to probe and gain deeper insights on the major issues of the topic being studied. In this study, in-depth interviews were held with thirty-two(32) important stakeholders, interviews were audio-recorded after written informed consent was obtained from the respondents. The minimum & maximum duration for recording of Interview was 45 minutes & 1 hour respectively. The thematic qualitative analysis approach was used, all interview recordings were transcribed verbatim, the process of transcribing, reading, and rereading transcripts was continued till emerging key ideas, concepts, and themes were identified and made into a list. Voice recordings having Urdu or Kashmiri content were translated and transcribed verbatim into English. Transcripts were assigned in word files, and data analysis started as a process of carefully scrutinizing data by placing it into inductively created code structures, categories, sub-themes, and themes. The process of theme identification involved many stages.[9] 1. Acquaintance with the data, 2. Coding, 3. Discerning themes, 4. Analyzing themes, 5. Delineating and naming themes, 6. Write up.

Results :

Five themes were generated and each of these themes included many sub-themes as shown in table as below (Table 2).

Theme 1: Factors facilitating Implementation of Immunization

The factors that have facilitated the implementation of the Universal Immunization Program revealed by respondents have been: planning and management; linking services with the community; supportive supervision; revitalized outreach and static vaccination services; monitoring and use of data for action; district level micro-plans for immunization.

Table 1: Details of interviewed stakeholders

Qualitative in-depth interviews (n=32)	Interviewee/ Stakeholder
State Level Incharge/Head (n=2)	SMO, SEPIO*
District Level Incharge/Head (n=10)	DIO*/Deputy CMO*
Block Level Incharge/Head (n=10)	BMO*(From one Block of the District)
PHC Level Incharge/Head (n=10)	MO*(From another Block of the District)

*Surveillance Medical Officer (SMO), State Extended Program Immunization Officer (SEPIO), District Immunization Officer (DIO), Chief Medical Officer(CMO), Block Medical Officer (BMO), Medical Officer (MO)

Table 2: Themes generated from qualitative analysis

Themes	Sub-themes
1. Factors facilitating implementation of Immunization (RI).	1.1 Planning and management. 1.2 Linking services with the community. 1.3 Monitoring & use of data for action. Supportive supervision
2. Limitations and deficits related to knowledge, attitude, monitoring.	2.1 Knowledge. 2.2 Attitude. 2.3 Monitoring.
3. Constraints encountered in the implementation of (RI) programme.	3.1 Financial constraints in training. 3.2 Human resources constraint. 3.3 Deficiencies in training.
4. Difficulties in the implementation of RI revealed by respondents.	4.1 Lack of training. 4.2 Lack of coordination. 4.3 Cold chain maintenance. 4.4 Utilization of available human resources.
5. Transformational steps to bridge gaps in delivery immunization (RI)	5.1 Regular monitoring and review meetings. 5.2 Teamwork and peer learning, 5.3 Political commitment, training, 5.4 Improvement in cold chain maintenance.

It was revealed that planning was important for immunization of children and for outreach immunization sessions in order to reach every child with quality immunization services. Furthermore, various registers have been introduced from time to time, where children under five years are entered and other information related immunization is kept. Regular updates of the registers and feedback meetings with the Auxiliary Nurse Midwifery (ANM) & Accredited Social Health Activist (ASHA) are planned for including defaulter tracing and identifying newborn children in communities.

"……. we have district plans for immunization, then micro-plans, which envisage immunization requirements. Management of these planned activities is another activity that is very important which leads to the successful implementation of the planned activities. Without planning you are likely to fail in achieving what you want."

"……ASHA workers serve as agents of Communication, they are a link with community and help in community mobilization towards immunization……."

"…….our ANM maintains various registers related to immunization, ANC and, RCH registers,apart from other registers….."

"….We do some observations, collection, and examination of data which helps us to know whether we are progressing or not. It is from the same data that we are able to correct what is wrong in the immunization program and improve where we needed to do so."

"…….We go to hospitals for monitoring of immunization, cold chain technician accompanies me. We go to districts, then blocks, talk to, DIO, BMO, and then move to 2-3 PHCs, in a month. ."

Theme 2: Limitations and deficits related to knowledge, attitude, monitoring.

The respondents revealed, that there is insufficiency of knowledge and attitude among health care workers and Medical officers, like lack of knowledge of micro-plan for immunization, lack of knowledge of VVM & open vial policy. They noted the need of improvement in monitoring of immunization.

"……. We give vaccination to children, our ASHA worker sometimes accompanies them, there is no micro-plan, we know our population, I mean eligible children. We don't watch immunization sessions at PHC, as we are busy with OPD. "

"We must make field staff accountable, you can't blame administrative staff. We have to see OPD, make FMPHW, MPHW, CHO, accountable and see improvement in immunization."

" …. there are some people ,like nursing orderly, they have been promoted to ANM, JHI, CHO they don't have proper knowledge of immunization, knowledge of micro-plan, open vial policy, VVM etc……."

"…….those hard to reach areas which have ANM there, they are not well monitored, and well taken care of ,so problem is like either ANM is not coming for duties or cold chain maintenance is not proper.

"……We have hard to reach areas like Dignibal,Bachpathri, Baltal, etc, I don't remember all names, in those areas we conduct outreach immunization sessions, response is good people come with children, but it should be a monthly affair at least.

Theme 3: Constraints encountered in implementation of UIP

It was reflected by one of the key respondent that there are not adequate funds available for regular training of health personnel; they are utilizing National Health Mission (NHM) funds for training. Some respondents referred to the shortage of health personnel, especially in hard to reach rural areas. This deficit in human resources affects the delivery of vaccination and the immunization program as a whole. The interviewees described training is not being given effectively to health personnel involved in immunization (RI).

" …….. I can give you an example of Srinagar district, if there are 100 Sub-Centres, there must be 200 ANMs, working there, each ANM should be trained once in a year 2-3 days, but since 2-3 years, I am getting funds from NHM only, which is not sufficient, so I am training only 25 ANMs, what about 175 remaining ANMs in Srinagar……"

"……..Every health worker wants to work in the urban areas and towns. We have a shortage of ANMs at certain places, although NHM has given a big boost, certain places are there which lack staff."

"…… We need training in Universal Immunization Programme (UIP), on job training should be given , I haven't received any training till date in UIP, ."

Another respondent described how the 'cascade' model of training was partly responsible for the training gap. The respondent described how dilution occurred, with the quality of the training declining at each stage, leading to poor training outcomes:

"…….Let me tell you, they sent one medical officer along with H.E(health educator) to attend some

training, then they were told to train health personnel at block level, they were not able to reproduce it, they couldn't disseminate information, fact is ,medical officer or H.E, himself is not retaining full information……

…….CHOs (Community health officers), H.E (health educators) are not able to transfer updated information regarding immunization, as some of them are less qualified and lack communication skills. So you end up training and training and training. Some people are not just trainable."

Theme 4: Difficulties in the implementation of RI revealed by respondents

It was noted by the respondent that we need to utilize available human resources in a more planned way, and train more Para-medics in immunization, so that, they can become a backup staff in an exigency.

They highlighted the lack of well-trained health personnel as a barrier to effective immunization,

".....our health workers need training, some of them have been promoted from nursing orderlies, and they are not well versed. These things hamper effective immunization.

"….if we have Block, PHC or Sub-Centre where ANM is not posted, sessions are missed and immunization is not possible.."

"… As per guidelines you have to take vaccines in the morning and return them on the same day, what has been seen, they don't return it on the same day, what happens to vaccines, we don't know, where they keep it, we don't know, on what temperature they keep them, we don't know…."

"….in hard to reach area like Gurez, where snowfall is heavy around twelve (12) feet snow gets accumulated there, it remains cut off for six months. Our cold chain gets hiccups there, our Deep freezers, ILR, etc, get defunct due to power curtailments, they don't work when 12 feet snow is there, they have a problem in maintaining cold chain, …."

A difficulty encountered in taking vaccines to hard to reach areas was described by one of the respondents:-

"……..there are hard to reach areas, we have one area like Chuttali ,Chuttali is nearer to Gulmarg, but road is through Boniyar, from Boniyar, our workers go through by foot, vaccines remain overnight with them, they don't open it(vaccines), possibly cold chain remains. They do their drills in 15 days. I have been to this place, we don't have alternative to it, we have separate micro action plans for them…..regarding cold chain, it's as long as ice remains in pack, possibly it remains up to second day, condensed ice packs are given."

One respondent stated lapse in cold chain maintenance may be reason of measles cases in some Measles Containing Vaccine (MCV1) vaccinated children.

"……..I was thinking that there could have been a break down in the cold chain or something. It could have been low temperature or higher than the normal temperature or below. It could have affected the efficacy of the vaccine. I don't know if they did a follow up on this one. The problem was that we had 3 children at the age of nine plus months with measles, all were vaccinated with MCV1, and probably cold chain was not maintained."

Theme 5 : Transformational steps to bridge gaps in delivery UIP

Many interviewees reported to doing regular performance reviews of health workers to assess coverage improvement, quality of immunization. They suggested adopting practices such as quarterly district-level program review meetings, regular supervision of health workers and monthly meetings among health workers at block level and district level. The performance review should be team-oriented and focused on problem solving. They also suggested encouraging constructive discussion, peer learning, and friendly competition to engender collective accountability for improving immunization (RI). Regular review and supervision of health workers will lead to improved service delivery, improvement in vaccine delivery and cold chain maintenance:-

".....performance review of health workers can improve the delivery of immunization, we need to keep regular audit of immunization coverage, CHOs

need to go with checklists for supervision of immunization session,

"....I suggest improve monitoring of hard to reach areas, the cold chain needs to be maintained in these areas, some transformational measures need to be taken at the state level, political commitment is important again, for improvement in immunization"

Discussion:

Immunization service delivery is a multifarious and composite process that can break down at many stages which can propel the burden of morbidity and mortality of vaccine-preventable diseases in children. It is noteworthy that in our study respondents described the factors like, linking immunization services with the community, monitoring, and supportive supervision as facilitating factors in the implementation of immunization that directly influence immunization coverage. The study revealed that the RI (Immunization) program in the Kashmir Valley has involved ASHA workers and basic health workers as the link between community and immunization, aimed at strengthening routine immunization. The findings suggest the consequence of health system expansion and build-up as a key strategy for achieving results in specific health programs, including immunization as seen by Galichet et al. 2009,[10] in their study as well.

The study found that there was a lack of knowledge among health personnel regarding immunization implementation, monitoring by the health professional was not up to the mark especially in hard to reach areas, some health workers have not cultivated a positive attitude which becomes an impediment in the implementation of immunization (RI). The practice of monitoring, data-based performance review, development of the natural and safe culture of learning from peers, knowledge sharing by way of spot training can improve the attitude of health workers and bring motivation towards prosperous implementation of the immunization program. This culture can become normative and highly motivating over time to health workers. Fritzen et al,[11] found in their study motivation, adequate skills, and community appreciation of village health teams, showed significant improvement in achieving universal access to primary health care. The study showed certain constraints in the implementation of RI, constraints, related to finance, human resources, logistics, and training, lack of health workers, especially in rural and hard-to-reach communities, have important impacts on the effective delivery of immunization. Human resource is an important factor found to contribute to factors affecting the implementation of the immunization program. This is in line with the explanation by Dussault et al,[12] that any workforce needs to be motivated, well-staffed, and appropriately skilled in order to do their job well.

In our study respondents suggested Immunization program like any other program needs adequate human resources for quality delivery of immunization (RI). Additionally, the absence of skilled personnel, especially at lower levels of the health system, hard to reach areas, may prove a limitation in the implementation of RI. Buchan (2004),[13] explains that the extent to which providers deliver services to patients depends on the workforce Their findings are in line with our study. The training of health workers needs to be strongly addressed, so that health workers are well-skilled, which will improve immunization and child health in general.

The study brought attention to certain difficulties experienced by health workers in the implementation of immunization, which was lack of training, financial constraints to training, lack of coordination, cold chain maintenance/management, difficulties in utilization of available human resources. In the study some respondents alluded to the fact that there was an organized structure in the implementation of immunization(RI), other stakeholders pointed out that the structure on the ground did not translate into having trained health personnel at the grassroots level at all places to meet the objectives of the immunization program. They highlighted the lack of well-trained personnel as a barrier to effective immunization, especially in hard-to-reach areas.

It was found that some hard-to-reach areas get cut off due to winter and heavy snowfall which leads to electricity outages making Deep freezers and ILRs defunct in these areas. Considering the potency of vaccines, the electricity outages probably have a negative effect on the potency of the vaccine which can have deleterious effects in controlling VPDs. Aduet al.(1992),[14] found in their study that the causes of the outbreak of measles were due to breakage in the cold chain, shortage of vaccine, and distance of villages from the health center. Thereforethere is a need to ensure that the cold chain system is well monitored to ensure that the potency and safety of vaccines during transportation and distribution to the point of use are well preserved. In our study respondents suggested certain transformational steps improve the performance of immunization programs. It included practices such as regular monitoring and review meetings at district and Block levels, regular supervision of health workers, and meetings among health workers. Furthermore, respondents suggested peer learning among health workers, improvement in cold chain maintenance. Managers and supervisors should be employed in coaching and on-the-job training to guide and support workers.

The respondents precisely suggested certain steps should be included, like the use of data to assess performance through open discussion, and most importantly the sharing of experience and suggestions on how to improve performance. Furthermore, respondents had an unyielding belief that convergence of all these transformational steps is going to yield more positive results. The findings of our study go in line with the findings of the study by Naimoli et al 2008.[15] Lastly, the motivation and attitude of health personnel will provide the foundation for performance improvement, teamwork, and support coordination with district and block health officials with more refined strategies and practices that can drive performance improvement. Immunization(RI) performance is often hinged on the decisions and the behavior of teams and on their ability to creatively manage limited health system resources.

Conclusion:

There were visible deficits related to knowledge, attitude, and monitoring among health professionals. Certain constraints encountered in the implementation of the program were financial constraints in the training of health care professionals and human resources constraints. The study showed the need for transformational steps to bridge gaps in the delivery of the Immunization (RI), which included regular monitoring and review meetings, teamwork and peer learning, training, and improvement in cold chain maintenance.

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Determinants of Delay in Initiation of Post Exposure Prophylaxis for Rabies Prevention among Animal Bite Cases Attending a Rural Tertiary Care Hospital of Haryana

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Abstract:

Introduction : Rabies is a fatal but vaccine-preventable viral disease. Animal bite victims who report in primary and secondary level health care lack some measures which can help in protecting and preventing deaths due to rabies. The most important factor for prevention of death due to rabies is the timely administration of post-exposure prophylaxis (PEP) among animal bite victims. Therefore, in addition to an understanding of the epidemiological distribution of animal bites, it is necessary to explore the factors leading to delay in PEP initiation. **Objective:** To determine the determinants of delay in initiation of post exposure prophylaxis for rabies prevention among animal bite cases attending anti-rabies clinic of a ruraltertiary care hospital in Sonepat, Haryana. **Method:** This cross-sectional study was conducted at an Immunization-cum-antirabies clinic of Bhagat Phool Singh Government Medical Collegefor Women, Khanpur Kalan, Sonepat, Haryana. A pre tested, structured questionnaire was used to collect information among 410 participants after taking consent. The Institutional Ethics Committee of institute approved the study. The groups were compared with Chi-square test for categorical data. **Results:** Delay was present among 27.3% of participants. Significant factors of delay were no local wound treatment, any treatment taken prior to anti-rabies vaccine administration, rabies clinic closed on holidays, unawareness about PEP, non-availability of accompaniment, transportation issues and money problem for transportation. Knowledge also played significant role as delay was significantly more among the participants not having knowledge regarding source of infection, mode of transmission and incubation period of rabies. **Conclusions:** Delay ininitiation of PEP was common and were significantly associated with lack of knowledge and unawareness, closure of rabies clinic on Sundays/holidays, non-availability of accompaniment and money problem during transportation.

Key-words : Delay, Post exposure prophylaxis, Rabies

Introduction:

Rabies is an acute viral disease that causes fatal encephalomyelitis in virtually all the warm-blooded animals. Globally, canine rabies causes around 60,000 human deaths, over 3.7 million Disability Adjusted Life Years (DALYs) and 8.6 billion USD economic losses annually.[1] South East Asian countries contribute to more than half of global burden of rabies with approximately 45% of worldwide rabies deaths occurring in Asia. An estimated 31,000 human deaths due to rabies occur

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annually in Asia.[2-4] India is endemic for rabies accounting for 36% of the world's total deaths due to rabies. True burden of rabies in India is not fully known; although as per available information, eighteen to twenty thousand human deaths occur from rabies each year in India.[5]

Despite the availability of cost-effective strategies, rabies continues to be a major public health challenge in resource poor countries. The primary and secondary level of healthcare is of utmost importance to focus with regard to rabies since animal bite victims who report in primary and secondary level health care lack some measures which can help in protecting and preventing deaths due to rabies. One important among them being the timely administration of post-exposure prophylaxis (PEP).[6] Therefore, in addition to an understanding of the epidemiological distribution of animal bites, it is necessary to explore the factors leading to delay in PEP initiation. Present study was conducted with an objective to determine the determinants of delay in initiation of post exposure prophylaxis for rabies prevention among animal bite cases attending anti-rabies clinic of a rural tertiary care hospital in Sonepat, Haryana.

Method:

A Cross-sectional study was conducted from June 2021 to August 2021 at an Immunization-cum-antirabies clinic of Bhagat Phool Singh Government Medical College (BPSGMC) for Women, Khanpur Kalan, Sonepat, Haryana. The study population was the animal bite cases who visited the anti-rabies clinic of BPSGMC for Women for post exposure prophylaxis for rabies prevention.

Exclusion criteria : Severely ill patients who were not able to give interview and individuals who did not give informed consent for the interview.

Sample size : Sample size was calculated to be 372 at 5% alpha error and using the prevalence of delay in PEP as 41% from a previous study.[7] Formula used to calculate was $(Z_{1-\alpha/2})^2 pq/d^2$, where p= prevalence, q=100-p, d is permissible error which was taken as 5% (absolute precision), $Z_{1-\alpha/2}$ is standard normal deviate reflects the type I error and at 5% ($p<0.05$) it is 1.96.[8] With 10% non-response rate, the final sample size was 410. Consecutive sampling was done till the desired sample size was reached.

A pre tested, structured questionnaire was used to collect data having information on socio demographic variables like age, gender, residence, education, socio-economic status, and information regarding injury location, side, type of animal, the extent of wound, time of bite, time of reporting, distance from anti-rabies clinic, knowledge regarding source of infection of rabies, its transmission, incubation period, etc.

Ethical Consideration: The Institutional Ethics Committee in BPSGMC for Women, Khanpur Kalan, Sonepat, Haryana, approved the study (Registration number- BPSGMCW/RC575/IEC/2020). The methods used in the present study were implemented in accordance with the approved protocols. Informed consent was taken before starting the interview, in case of subjects less than 18 years of age consent was taken from the parents/guardian.Confidentiality of the data wasensured.

Operational definition of delay in PEP: For the purpose of the study, a delay in initiation of anti-rabies PEP was defined as initiation of PEP more than or equal to 48 hours after animal bite.[7]

Data analysis: Data were entered in a Microsoft Excel spread sheet and analyzed. Chi-square test was applied to find out association between delay in PEP and risk factors associated with it. P value less than 0.05 was considered statistically significant.

Results:

A total of 410 study subjects were interviewed from theanti-rabies clinic of BPSGMC for Women, Khanpur Kalan, Sonepat.The maximum animal bite cases were in children under 10 years age group and

then gradually decreasing as the age was increasing. Delay was present in about one third of study subjects but delay was less in older age group aged more than 50 years. (Figure 1)

Figure 2 shows gender wise delay in initiation of PEP in which most of the participants were males but delay was more among females.

Figure 1: Distribution of Age-wise delay in initiation of PEP for rabies prevention

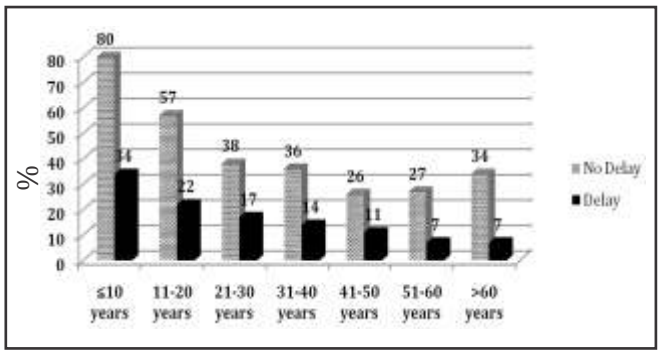

Figure 2: initiation of PEP Gender wise delay in initiation of PEP for rabies prevention

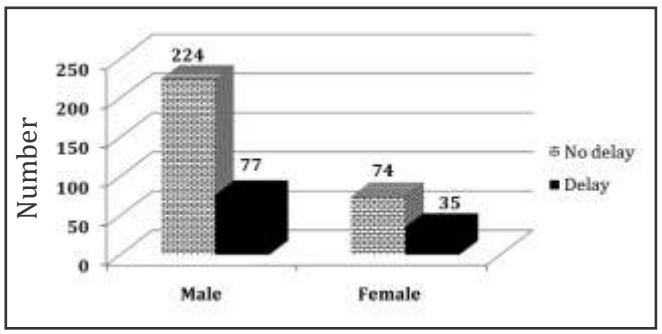

Table 1 shows that maximum cases reported were due to dog bite. The prevalence of delay was seen highest among cases of animal bite cases other than dog, monkey, bat, rat, buffalo etc. Delay was minimum in monkey bite cases. Although, the difference was statistically insignificant. Prevalence of delay was significantly higher among those study subjects who had not washed the local wound (42.9%) as compared to those who had washed the local wound with soap and water (24.1%).The delay was more among the study subjects who had applied local irritants over the wound as compared to participants who had not applied any irritants. Also, delay was more common among category 2 animal bite cases (30.6%) as compared to category 3 in initiation of PEP. No participant belonged to category 1. Although the difference is not statistically significant. The delay was significantly more among the participants who had taken prior treatment as compared to the participants who had not taken any prior treatment (p value <0.013).

Table 2 shows the association between the delay in initiation of PEP against rabies and the knowledge of study subjects about rabies. The prevalence of delay was maximum in those study subjects who had no knowledge regarding source of infection (31.7%), its transmission (30.1%) and its incubation period (30.3%) than those who had knowledge regarding these aspects of rabies. The association between delay in initiation of PEP and lack of knowledge of the study participants regarding source of infection in rabies, its transmission and incubation period, was statistically significant. But the association of delay with knowledge regarding case fatality did not show significant difference.

Table 3 shows the reasons of delay in initiation of PEP of rabies. Delay was more due to the closure of rabies clinic on holidays, unawareness about PEP, non-availability of accompaniment, transportation issues, money problem and these factors showed significant association. Although the delay is more among the participants reporting from a distance of ≥ 20 km and referred cases but the difference was insignificant.

Discussion:

In the present study the maximum delay was seen in children and young adults, and the trend went on decreasing with age. It is believed that children spend more time outside their homes (in school, in playgrounds, etc.), play with animals and are unaware of their biting habits. All these make them more prone to animal bites and also their history of animal bite often goes unnoticed by the family members. The same findings are also supported by another study.[9] In the current study, the delay was more common among females as compared to males.

Table 1: Distribution of delay in initiation of PEP as per characteristics of the animal bite and their management practices

Characteristics	No Delay (%)	Delay (%)	p value
Biting animal			
Stray dog	219 (72.5 %)	83 (27.5 %)	0.922
Domestic dog	58 (72.5 %)	22 (27.5 %)	
Monkey	12 (80.0 %)	3 (20.0 %)	
Others	9 (69.2 %)	4 (30.8 %)	
Local wound treatment			
Not washed	56 (57.1 %)	42 (42.9 %)	<0.001*
Washed with water	34 (89.5 %)	4 (10.5 %)	
Washed with soap & water	208 (75.9 %)	66 (24.1 %)	
Application of local irritants on wound			
No local application	208 (73.8 %)	74 (26.2 %)	0.468
Local application (e.g., red chili, turmeric, ash etc.)	90 (70.3 %)	38 (29.7 %)	
Any prior treatment before vaccination			
No	199 (76.8 %)	60 (23.2 %)	<0.013*
Yes	99 (65.6 %)	52 (34.4 %)	
Category of animal bite			
Category 2	154 (69.4 %)	68 (30.6 %)	0.102
Category 3	144 (76.6 %)	44 (23.4 %)	

This may be due to the fact that females often are unable to access to the hospital without the company of males. The same results were found in a study conducted in Iran by Khazaei et al. to evaluate delayed bite cases.[10]

In present study, most animal bite cases were due to dogs and among them, majority of the numbers are contributed by stray dogs followed by domestic dogs. The findings were consistent with other studies. [11-13] But the delay is usually same in both these cases (27.5%). In a study done in Tabbas by Riahi et al., the delay time was longer and correlated with domestic animal bites.[14]

In developing countries like India, it is very common to see or hear certain practices like not to wash the local wound site after animal bite or application of certain irritants over the local wound site with the belief that it will lead to the containment of the virus and would stop its transmission even when the wound is severe belonging to category 2 and 3. Studies done by Jain et al. and Salve et al. also showed high prevalence of such methods in Muradnagar and at a Primary Health Center (PHC) in Haryana respectively, along with the same reporting from certain other national and international studies and with this belief in their minds, they did not seek any proper medical advice.[15-17] But they did not know about its disadvantage of causing infection and being soft tissue irritants these applicants might cause local tissue necrosis. This again signifies the lack of education as an important influencing factor of delay in PEP. According to WHO, immediate wound

Table 2: Distribution of delay in initiation of PEP as per knowledge about rabies

Knowledge about rabies	No delay (%)	Delay (%)	p value
knowledge regarding source of infection of rabies			
Yes	119 (80.4 %)	29 (19.6 %)	0.008*
No	179 (68.3 %)	83 (31.7 %)	
Knowledge regarding transmission of rabies			
Yes	91 (79.8 %)	23 (20.2 %)	0.044*
No	207 (69.9 %)	89 (30.1 %)	
Knowledge regarding incubation period of rabies			
Yes	56 (88.9 %)	7 (11.1 %)	0.002*
No	242 (69.7 %)	105 (30.3 %)	
Knowledge regarding case fatality of rabies			
Always fatal	164 (71.3 %)	66 (28.7 %)	0.721
Sometimes fatal	69 (71.9 %)	27 (28.1 %)	
Not fatal	24 (75.0 %)	8 (25.0 %)	
Don't know	41 (78.8 %)	11 (21.1 %)	

*Significant difference

Table 3:Reasons of delay in initiation of PEP

Reasons		No delay n (%)	Delay n (%)	p value
Rabies clinic closed on holidays	Yes	11 (31.4 %)	24 (68.6 %)	<0.001*
	No	287 (76.5 %)	88 (23.5 %)	
Unawareness about PEP	Yes	8 (25.0 %)	24 (75.0 %)	<0.001*
	No	290 (76.7 %)	88 (23.3 %)	
Non availability of accompaniment	Yes	29 (47.5 %)	32 (52.5 %)	<0.001*
	No	269 (77.1 %)	80 (22.9 %)	
Transportation issues	Yes	29 (59.2 %)	20 (40.8 %)	0.024*
	No	269 (74.5 %)	92 (25.5 %)	
Money problem	Yes	1 (16.7 %)	5 (83.3 %)	0.002*
	No	297 (73.5 %)	107 (26.5 %)	
Distance from rabies clinic (km)	<20	230 (73.7 %)	82 (26.3 %)	0.301
	≥20	67 (68.4 %)	31 (31.6 %)	
Delay due to referral	Yes	2 (50.0 %)	2 (50.0 %)	0.306
	No	296 (72.9 %)	110 (27.3 %)	

*Significant difference

washing and flushing of wound for at least 15 minutes with soap and water or with water alone and disinfection with substances having anti-viral activity is essential after exposure to rabies virus.[18]

In the present study knowledge regarding source of infection of rabies, its transmission and incubation period played a significant role in timely initiation of PEP against rabies, same findings were reported by Liu Q et.al.[19] Our study showed that 60% of the population correctly knew about case fatality of rabies. A community-based study done by Krishnamoorthy et al. in Puducherry found it to be 75% while it was almost 90% in other studies done in rural parts of Puducherry, Pune, Gujrat and New Delhi. [20-23]

No doubt Education is a major factor but certain other significant factors were also found in our study like closure of rabies clinic on holidays, non-availability of accompaniment, transportation issues and money problem. Although the distance from rabies clinic played an important role and more delay was found if distance was more but difference was insignificant in our study and the results were similar to a study done by Khazaei et. al. [10] In a study done in Kashmir, distance from anti-rabies clinic showed a very strong association with the delay in initiation of PEP i.e. more the distance of anti-rabies clinic, more was the prevalence of delay.[24]

Conclusion:

The study has provided important information about various factors associated with delay in initiation of PEP. Most common biting animal was found to be dog. Among all the study participants, delay was predominantly seen in females, with distance more than 20 kms. But these factors were statistically insignificant. While certain other factors chosen for the study have played a significant role in the delay in initiation of PEP against rabies. Lack of knowledge and unawareness being the major factors, closure of rabies clinic on Sundays/holidays, non-availability of accompaniment, money problem during transportation, etc. too had a significant association. The study provides an insight into the facts of animal bites and PEP, which can be further explored to manage animal bites and control rabies in humans.

Recommendation:

Awareness camps should be organized time to time for imparting knowledge regarding source of infection, mode of transmission, washing of wound with soap and avoidance of local irritants over wound which may delay initiation of treatment. Increasing the number of anti-rabies clinic in the peripheries, making ARV available at PHC and sub-center levels will be helpful in minimizing many factors associated with delay like non-availability of accompaniment, transportation issues and money required during transportation. The finding of dog being the common biting animal, needs a multi-pronged strategy to decrease human dog interaction either by decreasing dog population and doing mass vaccination of stray dogs; thus, helping in control of rabies.

Limitation of the study:

Since it was a hospital based study, the results cannot be generalized to the community. Those who suffered from animal bite, but unable to come for vaccination at the hospital could not be studied at all, so the reasons for being unvaccinated could not be determined. But reasons for delay in getting vaccinated may act as indirect indicator for those unvaccinated. Despite its limitations, the study revealed some potential information to help policymakers to improve the national rabies PEP.

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Declaration:

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Conflict of Interest: Nil

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Prevalence and Predictors of Self-Medication Practice among Adults Residing in the Rural Field Practice Area of a Tertiary Care Hospital at Chandigarh

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Abstract:

Introduction : Self-medication is a harmful practice. There is a need to document its prevalence and educate people about its numerous dangers. This study assessed the prevalence of self-medication practice and its associated factors among adults. **Method:** This community based cross-sectional study was conducted among 1090 adults. A simple random sampling technique was used to select the study participants. A pre-tested interview schedule was used to collect data regarding self-medication practice and its associated factors. The data was analysed using Epi-info software for windows (CDC Atlanta). **Results:** The prevalence of self-medication was 18.6%. The most common symptom for which study participants practised self-medication was fever (58.6%). Previous experience was the most common reason for practising self-medication (59.0%). The bivariate analysis revealed that the self-medication practice was significantly more among those aged 50 years and above and widowed individuals; as compared to their counterparts. **Conclusion:** Nearly one-fourth of the adults practised self-medication. Interventions should be designed to discourage self-medication practice among adults, with a particular focus on those aged above 50 years and widowed individuals.

Keywords: Prevalence, Predictors, Self-medication

Introduction:

Self-medication is an individual's use of medicinal products to treat self-recognized disease or symptoms.[1] It's a public health problem in countries around the world. The undesired practice of self-medication can lead to incorrect choice of treatment and inaccurate dosage of medicine and is a risk factor for developing antibiotic resistance. Its repetitive use can cause adverse drug effects like allergic reactions, drug dependence, or drug abuse. Further, due to self-medication, the disease symptoms may subside, but eventually, the underlying disease condition may worsen. When the patient reaches the hospital, there is a considerable delay in seeking appropriate treatment.[2]

People practice self-medication either due to individual and or environmental factors. The individual factors include a self-perception of the disease symptoms to be non-serious and lacking knowledge of adverse effects of medicines.The environmental factors include the easy availability of drugs from a pharmacy shop without producing a doctor's prescription slip and the busy schedule of an individual during the hospital OPD hours,due to which they are unable to seek a physician consultation.[3]

Self-medication is an increasingly popular practice around the world. A systematic review conducted in India revealed that the prevalence of self-medication practice was 53.5%.[4] Studies

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conducted in Ethiopia, Nepal and Sri Lanka have reported that 78.2%, 38.2% and 34.6% self-medicated themselves, respectively.[5-7] To our knowledge, no prior study has assessed the self-medication practices among adults of Chandigarh. The research findings of this study are expected to be valuable in generating valuable information on this topic. With this background, the present study assessed the prevalence and predictors of self-medication practice among adults.

Method:

This community based cross-sectional study was conducted among residents of rural field practice area, sector 56, Department of Community Medicine, Govt Medical College and Hospital, Chandigarh. A sample size of 1107 was calculated based on the following presumptions : expected prevalence of self-medication practice = 11.9%,[8] absolute precision =2%, confidence level = 95% and non-response rate of 10%. Households in the area were selected by simple random sampling. Within each household, adults 18 years and above who had any health problem in the last three months preceding the survey were enrolled. If a household had more than one eligible individual, a study participant was chosen randomly from that family. A trained field investigator interviewed the eligible study participants at their homes using a pre-tested structured questionnaire. Prior to the interview, written informed consent was obtained from the study participants.

The dependent variable was self-medication, which was defined as the use of medications without a doctor's prescription to treat self-diagnosed health problems in the last three months preceding the survey. The study participants were asked about the symptoms for which they self-medicated and the reasons for it. The independent variables included age, gender, marital status, employment, education and suffering from chronic diseases (hypertension, diabetes, heart disease, Chronic Obstructive Pulmonary Disease (COPD).

The study approval was obtained from the research and ethics committee of the medical college. Statistical analysis was performed using Epi-info software for windows (CDC Atlanta).The variables were described using frequency and percentages. Bivariate analysis was done to find out the association of self-medication with independent variables. After the interview, the study participants were imparted knowledge regarding the harms of self-medication.

Results:

A total of 1090 adults participated in this study (response rate of 98.5%).The mean age of the study participants was 40.3 years (SD=15.4).The proportion of males (49.1%) and females (51.9%) was almost similar. There were 9% hypertensive, 8.5% diabetics, 2.5% suffered from heart disease (23/1090), and 1.5% had Chronic Obstructive Pulmonary Disease (COPD). Out of the 1090 study participants, 203 (18.6%) had practised self-medication in the preceding three months. The commonest symptom for which study participants practised self-medication was fever (57.6%), followed by headache (31.0%), respiratory tract problems (27.6%) and musculoskeletal problems (12.8%).The commonest reason given by the study participants for practising self-medication was a previous experience (59.0%)followed by the suggestion of family members/friends (18.3%). (Table 1).

In the bivariate analysis, the self-medication practice was significantly more among those aged 50 years and above (24.4%); than their counterparts (16.2%). In addition, widowed individuals (40.9%) had a significantly higher proportion of self-medication practice; as compared to married (18.7%) and unmarried individuals (16.3%). Gender, education, working status, and suffering from a chronic disease had no significant association with the self-medication practise. (Table 2)

Discussion:

The present study assessed the prevalence and predictors of self-medication among adults. In the current study, it was found that around 18.6% of study participants practised self-medication. A study

Table 1: Symptoms for which study participants self-medicated themselves and reasons for practising self-medication

Symptoms for which self-medicated	**N (%)**
Fever	117(57.6)
Headache	63(31.0)
Respiratory tract problems(cough/throat pain/running nose)	56(27.6)
Musculoskeletal pain(low backache/knee pain/ generalized body ache)	26(12.8)
Gastrointestinal problems(gastritis/diarrhoea/vomiting)	10(4.9)
Weakness	8(3.9)
Miscellaneous*	15(7.4)
Reasons for practising self-medication	
Previous experience	121(59.0)
Suggestions of family members/friends	37(18.3)
Busy at work, so did not get time to go to the hospital	33(16.2)
Considered diseases to be non-serious	10(4.9)
Miscellaneous**	30(15.0)

* includes symptoms namely skin rash, genital problems, dental pain, pain in the eyes,menstrual problems, and wounds.

**includes reasons namely the proximity of pharmacy, trust in the chemist, emergency, inexpensiveness

from South India reported a comparatively lower proportion of self-medicationpractice (11.9%).[8] A comparatively higher proportion of self-medication practice was reported in studies conducted in Karnataka (35.9%)[9], Uttar Pradesh (50.0%)[10], Rajasthan (73.6%)[11] and Delhi (92.8%).[12] This varied prevalence of self-medication across studies from India can be attributed to the different study areas and study populations. Studies from other countries worldwide have also reported varied prevalence of self-medication practice. For example, a study from Brazil reported that 14.9% of study participants were self-medicating.[13] Similarly, studies conducted in Eritrea and UAE have reported the prevalence of self-medication practise as 93.7%[14] and 52%,[15] respectively.

In the present study, the self-medication practice was comparatively higher among older study participants aged 50 years and above. Similar to this finding, a study reported significantly higher self-medication usage among study participants aged more than 40 years.[8] Contrary to this result, studies conducted by Kumar[11] and Jain [12] have reported that self-medication was more common among younger age groups. In the present study, the previous experience with a similar symptom was the commonest reason for practising self-medication. A similar finding has been reported in studies conducted by Araia,[16] Sridhar[15] and Afridi. [17]

In the current study, it was found that widowed individuals had a significantly higher proportion of self-medication practice. Due to social and financial constraints, they may choose self-medication. However, in contrast to this finding; a study reported no relation between marital status and self-medication.[18] Further, the present study found no relationship between gender and self-medication behaviour. Contrary to this finding, a study reported that gender significantly predicted self - medication practice.[16] In the current study, no relation was found

Table 2 : Predictors of self-medication practice among the study participants

Variable	Self-medication		Chi-square, p-value
	Yes (N=203) (%)	No (N=887) (%)	
Age group			
18-49 years	125 (16.2 %)	645 (83.8 %)	9.9; 0.01
>50 years	78 (24.4 %)	242 (75.6 %)	
Gender			
Male	110 (19.4 %)	456 (80.6 %)	0.51;0.48
Female	93 (17.7 %)	431 (82.3 %)	
Education			
Illiterate	32 (22.5 %)	110 (77.5 %)	3.5;0.32
Up to Primary school	17 (13.7 %)	107 (86.3 %)	
Up to High school	62 (19.3 %)	259 (80.7 %)	
Secondary school and above	92 (18.3 %)	411 (81.7 %)	
Employment status			
College student	15 (14.7 %)	87 (85.3 %)	7.8; 0.09
Doing some job	101 (19.8 %)	409 (80.2 %)	
Homemaker	53 (15.5 %)	289 (84.5 %)	
Retired	16 (27.6 %)	42 (72.4 %)	
Do not work	18 (23.1 %)	60 (76.9 %)	
Marital status			
Unmarried	42 (16.3 %)	215 (83.7 %)	8.1;0.02
Married	152 (18.7 %)	659 (81.3 %)	
Widowed	9 (40.9 %)	13 (59.1 %)	
Suffering from chronic disease			
Yes	36 (19.8 %)	146 (80.2 %)	0.19;0.66
No	167 (18.4 %)	741 (81.6 %)	

between self-medication and chronic diseases. Contrary to this finding a study reported that self-medication practice was significantly lesser among people with chronic diseases.[13]

In the present study, the most common symptom of taking self-medication was fever. This finding is consistent with previous studies conducted in Rajasthan[11] and Madurai.[19] However the finding isn't in line with previous studies conducted in UAE[15] and India[20]; wherein headache was the commonest condition for which study participants practised self-medication. Another study from Delhi reported the common cold to be the commonest condition for which study participants practised self-medication.[12]

The strength of our study is its community-based approach and a large sample size. There are, however, a few possible limitations. First is the cross-sectional study design, which does not indicate causality of association. Second is self-reporting of self-medication practice for the previous three months, and hence recall bias may be present.

Conclusion:

Around one-fourth of the study participants practised self-medication. It was comparatively higher among those aged 50 years and above and widowed individuals. The most common symptom of self-medicating was fever, and the most common reason was the previous experience of the study participant. Any disease symptom in an individual needs a thorough investigation and appropriate management by a physician. Patients at times may self-medicate based on their prior experience or for other reasons, which is altogether a bad practice. It may complicate the disease condition and risk the life of an individual. It is therefore recommended that health care workers should regularly spread awareness regarding the harms of self-medication. Patients should be motivated to seek a physician consultation as soon as they get ill.

Declaration:

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Conflict of Interest: Nil

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Cross Sectional Study of Knowledge about Pneumococcal Conjugate Vaccine Among Medical and Nursing Students studying at Civil Hospital campus, Ahmedabad

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Abstract:

Introduction: India is committed to to prevent pneumonia related deaths in children which is leading cause of vaccine preventable deaths among children under five globally and in India. **Objective :** To know awareness about pneumococcal (PC) vaccine among medical and nursing students of civil hospital, Ahmedabad. **Method:** This cross sectional study was conducted on medical and nursing students of civil hospital, Ahmedabad, Gujarat. Baseline knowledge of PC Vaccine, side effects of PC vaccine, was assessed by a self-administered structured questionnaire. Statistical analysis - Data analysis was done in Microsoft excel and chi square test was applied. **Results:** There were 444 respondents and among them 240 (54%) were medical students and 204 (46%) were nursing students, with male female ratio was 95:127. Awareness regarding PC vaccine integration to national immunization schedule found significantly more in nursing students as compare to medical students, (Chi-square = 63.4 at $p < 0.05$). Medical students had more knowledge about PC vaccine as compared to nursing students. **Conclusion:** There is still gap in awareness of PC vaccine integration to national immunization schedule among medical students. Field visits among nursing students have positive effects on awareness of nursing students. Medical students should visit to this type of field activities to improve their knowledge about ongoing activities like this.

Keywords: Knowledge, Medical students, Nursing students, Pneumococcal Conjugate Vaccine

Introduction:

The inclusion of pneumococcal conjugate vaccine (PVC) is an ambitious public health initiative of the Govt. of India to prevent pneumonia related deaths in children which is leading cause of vaccine preventable deaths among children under five globally and in India(7 per 1000 live births).[1] It targets children under 5 years age group. High population immunity will then be sustained by incorporation into routine immunization schedule at 6 weeks, 14 weeks and 9 months.[2] The PCV vaccine has a robust safety and effectiveness profile. Under field conditions, seroconversion is 80% at 6 weeks and 85% at 14 weeks or more for streptococcus, and 85% or more than 85% when given 9 months. Adverse reactions are generally mild and transient.[3]

For the integration of PCV to be effective, it is important that no child would be left behind. The current vaccination is implemented through existing health care facilities.[4] Therefore, the ASHA worker and ANM staff are relied on to convey the importance of vaccination.

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Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services.[4] and it is critical to understand this period of indecision. In India, resistance to vaccination was due to ignorance in the past, though currently, the integration of PCV on social media such as WhatsApp—fuels a mix of conspiracy theories, safety concerns, and questions the need for the integration.[5] Studies show that the messages are inconsistent and negative. This means that knowledge of medical and para-medical fraternity should be complete so that, they could pass the same message to the community. This study is done with the purpose of assessing the knowledge among the upcoming new generation of medical and para-medical fields. We conducted this study with objectives of to assess the awareness about pneumococcal conjugate vaccine among medical and nursing students and to evaluate the knowledge about integration of pneumococcal conjugate vaccine to national immunization schedule among the study participants.

Method:

A cross sectional study was conducted during December 2021 to January 2022. The study was carried out at respective college of medical and nursing school which were located at civil hospital campus of Ahmedabad. Total, 444 students (Third Year Part-1 Medical students =240 and Third Year B.Sc. Nursing students =204), (Male= 254, Female = 190) aged approximately 20-21years were included in the study by purposive sampling. Every student of the batch was included in study except those who were absent at the time of study. Those who didn't give informed consent were also not included in study. Data was collected by using structured questionnaire. The questionnaire included questions for assessing the knowledge regarding integration of PCV in national immunization schedule, knowledge regarding PC vaccine and usefulness of this campaign. Positive results (YES) regarding awareness were considered if they do know about integration of PCV in national immunization schedule at Gujarat from 20/10/2021 with the session site at facility, anganwadi and outreach station, for children of up to 9 months of age. Positive results (YES) regarding PC vaccine were considered if they do know that polysaccharide conjugate vaccine was given by intra-muscular route at anterolateral aspect of right thigh with 0.5 ml dose. Positive results (YES) regarding usefulness of the integration of vaccine if they do believe that this campaign would be helpful to control pneumonia related deaths in children which is leading cause of vaccine preventable deaths among children under five in India. The results were expressed in percentages represented by tables and analysis was done by M.S. Excel 2007. Permission to carry out the research was obtained from both Nursing school and medical college authorities. As this study doesn't include active intervention, ethical permission wasn't required. Students were enrolled after obtaining informed consent and participation was purely voluntary and they were also assured that the study will not have any detrimental effect on the participant.

Results:

In India, 500000 children Under five years of age die annually accounting for vaccine preventable disease out of them 15% death are due to pneumonia, most of them were not vaccinated by Pneumococcal vaccine. To combat this situation, India has committed the goal of control of pneumonia related deaths in children. In Gujarat, this was implemented on 20/10/2021.[1]

Table 1 shows awareness regarding campaign which was 91.8% among medical students and 84.3% among nursing students. This difference was not statistically significant. Only 32% medical students were aware of duration in which this integration was ongoing while surprisingly 84.3% nursing students, were aware about integration duration. This difference was statistically significant. (Chi square = 63.4 with p value < 0.05). The Vaccination was supposed to be given to eligible

Table 1: Awareness regarding PC vaccine integration to national immunization schedule among Medical and Nursing Students (N-444)

AWARENESS	MEDICAL (n = 240)		NURSING (n = 204)		χ^2	p value
	YES (%)	NO (%)	YES (%)	NO (%)		
CAMPAIGN	224(91.8)	20(8.2)	172(84.3)	132(14.7)	2.45	> 0.05
DURATION	76(32)	164(68)	172(84.3)	32(14.7)	63.4	< 0.05
AGE-GROUP	68(56.6)	104(43.4)	174(85.3)	30(14.7)	21.69	< 0.05
SESSION SITE	100(41)	140(59)	67(65.7)	70(34.5)	13.58	< 0.05

Table 2: Awareness regarding PC Vaccine among Medical and Nursing student.(N-444)

MR VACCINE	MEDICAL (n = 240)		NURSING (n = 204)		χ^2	p value
	YES (%)	NO (%)	YES (%)	NO (%)		
TYPE	168(68.9)	72(31.1)	184(90.2)	20(9.8)	15.03	< 0.05
DOSE	146(59.8)	94(40.2)	184(90.2)	20(9.8)	26.39	< 0.05
ROUTE	182(74.5)	58(25.5)	140(68.6)	64(31.4)	0.97	> 0.05
SITE	180(73.8)	60(26.2)	154(75.5)	50(24.5)	0.086	> 0.05

Table 3: Awareness regarding usefulness PC Vaccination integration(N-444)

USEFULNESS	MEDICAL (n = 240)		NURSING (n = 204)		χ^2	p value
	YES (%)	NO (%)	YES (%)	NO (%)		
CAMPAIGN	100(41.8)	140(58.2)	164(80.4)	40(19.6)	34.29	< 0.05
COMBINATION OF VACCINE	24(11.5)	216(88.5)	74(36.3)	130(63.7)	19.42	< 0.05

children (up to 9 months) at various sites like in the school, anganwadi and out-reach station.[1] Knowledge about age group included in campaign was known to 56.6% medical students and 85.3% nursing students, This difference was statistically significant. (Chi-square = 63.4 with p value < 0.05) Nearly 41% medical students and 65.7% nursing students had awareness regarding session site of the vaccination. This difference was statistically significant. (Chi-square = 13.58 with p value < 0.05)

For this integration to be effective, it is important that no child be left behind. The current campaign is implemented through fixed sites sessions as well as in schools and outreach centers.[1] Therefore, the teachers are relied on to convey the importance of vaccination.[6]

Table 3 shows that 41.8% medical students and 80.4% nursing students were aware about usefulness of vaccine integration. This difference was statistically significant (Chi square = 34.29 with p value < 0.05). PC vaccine integration is a part of global efforts to reduce illness and pneumonia related deaths in children which is leading cause of vaccine preventable deaths among children under five globally and in India (7 per 1000 live births).[1] Pneumococcal vaccination directly contributes to the reduction of under-five child mortality.

Discussion:

Present study found adequate awareness regarding campaign among (91.8%) students and (84.3%) nursing students and difference was not

statistically significant. In study by Mrs. Kirandeep Kaur et al, 53.3% of her study participants had moderately adequate knowledge about the vaccine integration.[7]

Current study found statistically significant difference in knowledge about age group included in campaign between medical students and nursing students. Study also found statistically significant difference in awareness regarding session site of the vaccination between medical students and nursing students. A knowledge assessed in an Egyptian University revealed that their students were generally poorly informed about vaccine's adverse effects, and contraindications although medical students tended to be better informed than other students.[8]

The polysaccharide conjugate vaccine was given by intra-muscular route at anterolateral aspect of right thigh with 0.5 ml dose during vaccination.[1] This knowledge was varying from 59.8% to 74.5% among medical students and from 25.5% to 40.2% among nursing students. (Table 2)

Study had some limitation such as single centric study. Pneumococcal Vaccination integration may have been more successful with better use of health education message especially in medical and para-medical personnel, as they are the bridge population between public and professional health team.

Conclusion:

There is still gap in awareness of PC vaccine integration to national immunization schedule among medical students. Field visits among nursing students have positive effects on awareness of nursing students.

Declaration:

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Depression, Anxiety and Stress among Undergraduate Medical Students during the COVID-19 Pandemic

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Abstract:

Introduction: Depression, anxiety, and stress among medical undergraduate students are often under-recognized and undertreated. Prolonged online classes in the backdrop of COVID-19 pandemic have resulted in tremendous psychological stress among students. **Objective:** To assess the prevalence of stress, anxiety and depression among medical students during the COVID pandemic and the associated factors. **Method:** A cross-sectional study was conducted among undergraduate students in a medical college in Delhi. A self-administrated questionnaire, containing general information (on-screen time, death or hospitalization in family due to COVID) and the DASS-21 version, was circulated to students enrolled before 2020. Data collected was tabulated in Microsoft Excel and analysed using SPSS version 23. **Results:** Out of 550 students, 345 (62.7%) participated in the study, of which 341 gave consent. High frequencies of depression 214 (62.8%), anxiety 199 (58.3%) and stress 150 (43.7%) were reported. Significant association was found between the determinants like hectic online classes and curbs on travelling and socializing. **Conclusion:** The high burden of depression, anxiety and stress detected among the students is a pointer towards a negative impact of online classes that can negatively impact academic performance, professionalism and empathy towards patients.

Keywords: Anxiety, Depression, Medical undergraduates, Online class, Stress.

Introduction:

Globally, mental health among undergraduate students represents an important public health entity. Undergraduate (UG) students in medical colleges are facing tremendous psychological stress during the COVID-19 pandemic with prolonged periods of online classes and lack of clinical correlation due to absence of practical physical sessions and clinical exposure. Research studies have highlighted that online classes may lead to serious disorders and mental health issues such as depression, anxiety and stress.[1,2] Stress is any action that places special psychological or physical demands upon a person, anything that can unbalance his or her individual equilibrium.[3] Furthermore, extended lockdowns and lack of social interaction has made their life monotonous resulting in burnout. Burnout is a state of emotional, physical, and mental exhaustion, wherein you feel overwhelmed, emotionally drained, and unable to meet constant demands.[4]

The literature on this area is scarce in India, hence the present study was undertaken with the objective to determine the prevalence of

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psychological stress, anxiety and depression among medical UG students during the second-wave of COVID-19 pandemic and to determine its associated factors so that appropriate measures may be taken on time. This study was undertaken in a girls' medical college in Delhi as this city was among the worst hit during the second wave. The UG hostels of the college were evacuated in April 2021 in response to the emergency situation prevailing in the city amidst an unprecedented crisis of oxygen and clamor for hospital beds.

Method:

A cross-sectional study was conducted among medical UG students of Delhi using the Depression Anxiety Stress Scales-21 (DASS-21) scale from May to July 2021.[5] The reference period used was April to May which corresponds to the upsurge in severe cases and deaths due to COVID-19 delta variant. Undergraduate medical students enrolled before 2020 and who were willing to participate and gave their consent, were included in the study. Those students who were suffering from any severe illness or already undergoing any psychiatric treatment at the time of the conduction of the study were excluded from the study.

Sample size: The sample size was calculated taking the Prevalence (p) of 24.9% [6] and relative precision (d) = 20% of p = 4.98 [6]

$n = 4pq/d^2 = 4*24.9*75.1 /4.98*4.98 = 301.6$

The sample size obtained was rounded off to 300 after taking into consideration all the three parameters (depression, anxiety and stress 300). Convenient Sampling method was used. The three batches enrolled before the year 2020 (2017, 2018, 2019) were included in the study. The class strength of each batch varied from 200-240.

Study tool: A semi-structured questionnaire consisting of general information, details regarding their online class duration, concerns and apprehensions related to the classes, total on-screen time spent, history of any hospitalization or death in the family due to COVID-19 were obtained. The standardized Depression Anxiety Stress Scales-21 (DASS-21) questionnaire was used to assess depression, anxiety and stress level for the past three months, was converted into Google format and circulated online on the official groups of students. DASS-21 questionnaire is 21 item scale is a pre-validated questionnaire with a set of three self report scales designed to measure the emotional states of depression, anxiety and stress. Each of three DASS-21 scales contains 7 items, divided into subscales with similar content.[5] Open-ended questions on barriers to accessing mental health care were also included.

For Ethical Consideration: Clearance from the Institutional Ethical Committee was obtained prior to the start of the study. Informed consent was obtained which was inbuilt in the Google-form. Strict confidentiality and anonymity was maintained throughout the study. Strict confidentiality and anonymity was maintained while collecting and analysing the data from the students during the study. Those students having higher scores were referred to the Institutional Mental Health Support Group and were provided tele-counselling and were referred to concerned professionals from the Psychiatry Department, LHMC if necessary.

Data analysis: The data was collected in google format and analyzed using SPSS version 23. The burden of mental health of students in each domain was analyzed in terms of proportion affected in terms of mild, moderate and severe categories and chi-square was used to analyze association between variables and scores of depression, anxiety and stress.

Results:

Although sample size calculated was 300, questionnaires were circulated to all eligible medical students from all batches (2017 to 2019) considering the fact that the response rate of online google questionnaires are generally 35-40% in most of the Online surveys. However a higher response rate (62%) was observed in the study. Since only 341

(62%) forms were found to be complete they were included for final analysis. Almost all the students (96.2%) were residing at their own residence and attending online theory and practical classes from home at the time of the study. The average online class duration was 5.5 ±4.6hrs. While average on-screen time (which is inclusive of passive time spent on browsing the internet or social media, watching TV and preparing online assignments) is 8.5±3hrs.

244 (71.6%) students reported that they found the college routine hectic and about half of the participants (54.5%) revealed that they could spend on average one hour of leisurely time with their family and friends on week-days as online classes were rescheduled during the late evening hours too. Some of the stressors as mentioned by the participants are depicted in figure 1.

The DASS-21 scores and its distribution among the participants are described in Table 1. Out of all the three domains, 'Stress' scores were found to be the most prominent followed by depression.

Highest DASS scores were contributed by the junior-most batch (63.34%) i.e 2019 admission year. Significant association was found between the determinants like hectic online classes and curbs on travelling and socializing post-second wave of COVID pandemic (Table 1).

The most frequently cited barriers to seeking professional help related to psychological stress were fear of breach of confidentiality (47.5%) resulting in stigma associated with using mental health services and documentation of academic records (45.1%). Hectic schedule of online classes and curbs on travelling, socializing and other leisure time activities outside home were significantly associated with depression, stress and anxiety. (Table 2)

Discussion:

Depression, anxiety, and stress among medical students are often under-recognized and undertreated. Medical students also seldom seek professional help. Epidemiological data suggested that the prevalence of depression increased by 18.4% from 2005 to 2015.[7] According to a cross-sectional study carried out in Pakistan, a high prevalence of anxiety (47.7%) was found among medical students.[8] An Indian study reported a relatively higher prevalence of depression 66.9% among medical UGs.[9] This corroborates with the findings of the present study in which the overall prevalence of depression, anxiety and stress was 62.8%, 58.3% and 43.7% respectively.

A comparatively lower prevalence was reported by a study from China, wherein 28.8% suffered from anxiety, 53.8% from stress and 16.1% from depression (using the DASS 21 questionnaire).[10] In a recently conducted study in Iranian Medical students in 2020 the prevalence of mild to severe anxiety and depression among them was 38.1% and 27.6%, respectively. Higher levels of anxiety were related to female gender, lower grade point average and experience of COVID-19 symptoms.[11] Barriers to seek mental health services were lack of time, lack of confidentiality, stigma associated with using mental health services and apprehension regarding academic record has been highlighted in few studies including the present study.[12] In addition, it is possible that medical students feel that developing resilience is an inseparable part of doctor's training and hence distress would need to be endured without complaining.[13] In this pandemic era, many factors might increase students' susceptibility to depression such as changes in lifestyle and reduced social interaction. Some other factors brought out in the present study were online class fatigue, lack of clinical exposure and inability to learn practical skills.

Research studies have also revealed that batch year and academic performance of medical students have a significant association with the prevalence of depression. First year students had the highest prevalence of depression followed by second year students (p value < 0.001).[9] Similar results have

Figure 1: Concerns and Stressors related to prolonged online classes as reported by participants

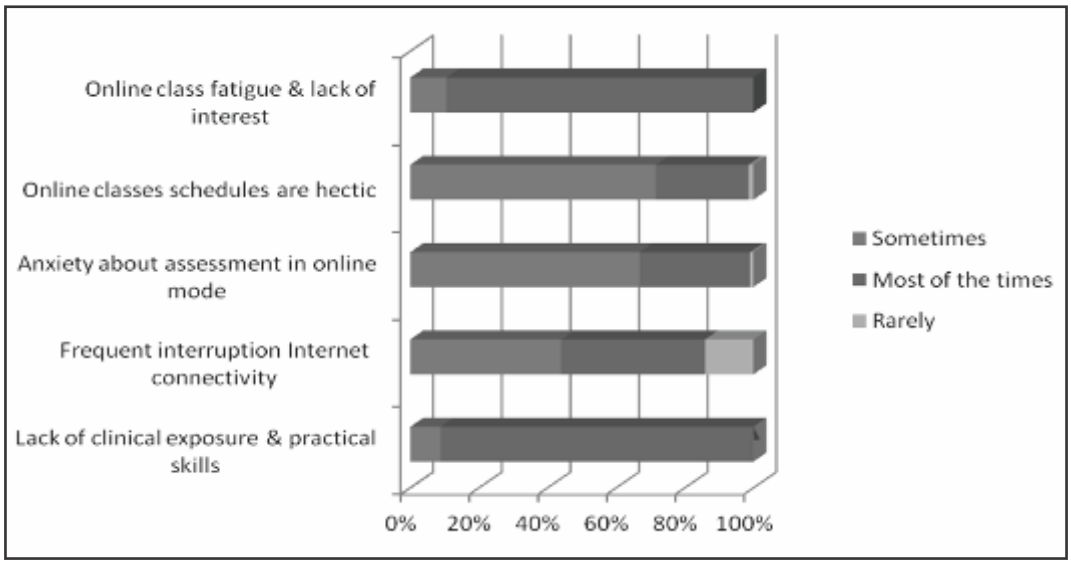

Table 1: DASS-21 Scores and proportion of students affected across different categories (N=341)

DOMAINS	DASS-21	Proportion of students affected				
	(Mean±SD)	Mild	Moderate	Severe	Extreme	Overall
Depression	13.80±10.58	51 (15.1)	80 (23.5)	34 (10)	49 (14.4)	214 (62.8)
Anxiety	10.09±8.27	30 (8.8)	87 (25.5)	34 (9.97)	48 (14.1)	199 (58.3)
Stress	14.30±5.6	56 (16.4)	44 (13)	37 (10.9)	13 (3.8)	150 (43.7)

Table 2: Association between various determinants with depression, anxiety and stress among students

Determinants	Association of depression, anxiety and stress			
	Strength of association	Depression	Anxiety	Stress
Curbs on travelling, socializing and other leisure time activities outside home	OR Chi square p-values	3.83 34.22 0.00	2.04 9.34 0.001	2.11 10.66 0.00
Death in the family due to COVID	OR Chi square p-values	1.23 0.64 0.42	1.29 1.03 0.31	1.19 0.47 0.34
Hospitalization in the family due to COVID	OR Chi square p-values	0.65 3.05 0.08	0.90 0.41 0.74	0.6 4.96 0.03
Impact of hectic schedule of online classes	OR Chi square p-values	1.54 3.45 0.04	4.2 36.9 0.00	2.62 17.84 0.000

been observed in our study. Risk factors correlating with the presence and severity of anxiety, such as the unsteadiness or disruption of family income, having COVID-19 symptoms or having a relative or an acquaintance infected with COVID-19[14,15] have been identified in the general population.

Conclusion and Recommendation:

The overall depression, anxiety and stress scores reported were substantial with hectic online classes and with curbs on socializing and travelling being one of the significant determinants. The national medical council should formulate guidelines for conducting online classes in Medical colleges in the event of fresh waves of pandemic or during outbreaks of similar nature. The faculty should take into cognizance of all determinants that were noted in the study while preparing the content and duration of teaching rosters particularly for practical classes. Since student distress and untreated anxiety are reported to negatively impact academic performance, they should be screened early and provided mental health support through institutional mechanisms.

Declaration:

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Conflict of Interest: Nil

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Perception about the Role of Biostatistics in Medical Curriculum: A Cross-Sectional Study among Medical Students

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Abstract:

Introduction: A good understanding of biostatistics can improve clinical thinking, decision-making, evaluations, and medical research. Undoubtedly, medical professionals are becoming aware of the importance of learning and applying biostatistical methods in their research. This study was done to assess the knowledge and attitude among medical graduates regarding the role and application of biostatistics in medical science. **Method:** The study was a cross-sectional study conducted in a tertiary care teaching hospital among 120 medical students pursuing MBBS third and final year. Systematic random sampling was used to select the study participants. A pretested validated semi-structured questionnaire was used for data collection. **Results:** Majority of the study participants, strongly agree that the subject helps in interpretation (75.8%), and is important in medical practice (61.7%). However, 85% of the study participants feel that software is difficult to use. 90% of the study participants find the subject hard to understand. The mean score of subject content, understanding, the current impact was significantly higher among the fourth-year students than the third-year students. There was no significant difference between the genders. **Conclusion:** Introduction of data collection sessions and appraisal of excerpts in published articles can provide practical knowledge and accentuate the role of bio statistics in health care.

Keywords: Biostatistics, Medical curriculum, Medical students, Research.

Introduction:

The principle of biostatistics refers to the handling of quantitative data andfurther application of the concepts to the testing of a hypothesis. The statistics include data related to estimates of disease or health burden, mortality, morbidity, health coverage and health systems.[1]

Medical knowledge has witnessed enormous advances due to the healthcare technology revolution.[2] These rapid advances in biomedical research have indeed stimulated the development of numerous efficacious medical technologies, but their translation into clinical use has raised several issues. There has been increasing controversies, extensive bias, and diversity in medical information.[3] Biostatistics plays an integral role in modern medicine. Almost all medical researches use biostatistics from beginning to end. Statistics helps medical researchers to design their studies, decide what data to collect, analyse data from their medical experiments, help them to interpret the results of the analyses, and collaborate in writing articles to describe the results of their medical research.

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Inadequate use of statistics in biomedical research and its subsequent false results can lead to serious consequences that might not only affect science but also harms human beings.[4] This makes learning biostatistics pivotal. But clinicians and medical students show unsatisfactory knowledge in Biostatistics and poor ability to apply its concepts in medical research.[5] This has led to difficulty in understanding the statistics of published articles and medical guidelines and also reduce their ability to critically appraise the literature.[6]

Biostatistics modules are challenging so it has to be taught uniquely.[7] Despite being important for future careers, biostatistics modules are still perceived negatively by medical students.[8] It is assumed that inappropriate teaching methods are found to be the reason behind poor knowledge in biostatistics among medical students. Hence the present study was planned to assess the knowledge among medical graduates regarding the role and utility of biostatistics in medical science. The objective was to assess the knowledge and attitude among medical graduates regarding the role and application of biostatistics in medical science.

Methods :

The study was a cross-sectional study conducted in a tertiary care teaching hospital, in Chennai, Tamil Nadu. The study population was medical students pursuing MBBS third and final year. The study was conducted from January 2021 to June 2021.

Sample size calculation

The sample size is calculated using the formula $4*p*q/l^2$ (p = proportion of adequate knowledge on biostatistics, q = 1- p, l=allowable error). The prevalence of adequate knowledge on biostatistics among medical students from the previous study was taken as 70% [9] with 8% allowable error, the sample size calculated from the formula was 126. Thus in the present study, a total of 120 students were included.

Sampling and Study tool

Systematic random sampling was used to choose students from each year students were chosen from each year- third and final year. The students within each class were chosen by a table of random numbers method. The students undergo biostatistics training from the second and third-year curriculum of MBBS. A study questionnaire was used to assess the perception of the utility of medical statistics among medical students. The study tool was pretested, a validated self-administered questionnaire. The questions assessed the knowledge on biostatistics, interest in the subject, understandability, software and prospects of biostatistics in the practice of medicine. The questionnaire consisted of 20 items under four domains such as course content, understanding, current impact and prospects. The assessment was done on a five-point Likert scale – Strongly agree-5, Agree-4, Neutral-3, Disagree-4 and Strongly disagree-5.The key study outcomes were perception – attitude towards biostatistics.

Table 1 : Baseline characteristics of the study participants. (n=120)

No.	Variables	n (%)
1.	**Academic year**	
	Third MBBS	60(50)
	Final MBBS	60(50)
2.	**Sex**	
	Male	74(61.7)
	Female	46(38.3)
3.	**Stay**	
	Hosteller	86(71.7)
	Day Scholar	34(28.3)
4.	**Education of the Father**	
	Graduate and above	63(52.5)
	Below graduate	57(47.5)
5.	**Education of the Mother**	
	Graduate and above	44(36.7)
	Below graduate	76(63.3)
6.	**Researcher in family members**	
	Yes	27(22.5)
	No	93(77.5)

Table 2 : Distribution of the study participants according to domains. (n=120)

Sr. No.	Domains	Strongly agree/ Agree	Neutral	Strongly disagree/ Disagree
1.	**Subject content**			
	The subject helps in interpretation rather than just numerical	91(75.8)	26(21.7)	3(2.5)
	The subject content was important in medical practice	74(61.7)	36(30)	10(8.3)
	Only the diagrammatic representation of data is easy	11(91.7)	10(8.3)	99(82.5)
	The concepts of data are interesting	89(74.2)	27(22.5)	4(3.3)
	Software is difficult to use	102(85)	11(9.2)	7(5.8)
2.	**Understanding**			
	Some topics under the subject are hard to understand	108(90)	3(2.5)	7(5.8)
	I can understand published papers	54(45)	6(5)	60(50)
	The method of teaching needs a change	42(35)	8(6.7)	70(58.3)
	The subject should be made mandatory in the medical curriculum	10(8.3)	104(86.7)	6(5)
	More training classes are required	21(17.5)	42(35)	57(47.5)
3.	**Current impact**			
	I gained skills to do research	72(60)	8(6.7)	40(33.3)
	For evidence-based practise, the subject is necessary	77(64.2)	32(26.7)	11(9.2)
	I am conducting scientific research now	34(28.3)	23(19.2)	63(52.5)
	My orientation towards medical practice is changed	14(11.7)	26(21.7)	80(66.7)
	I read the subject only to pass the exam	56(46.7)	52(43.3)	12(10)
4.	**Prospects**			
	The biostatistics will be the future of medical practice	83(69.2)	24(20)	13(10.8)
	I wish to carry on many types of research in future	64(53.3)	21(17.5)	35(29.2)
	I wish to pursue a research career	23(19.2)	54(45)	43(35.8)
	I will not be using biostatistics in my medical practice	11(9.2)	31(25.8)	78(65)
	I will teach biostatistics to medical students	45(37.5)	21(17.5)	54(45)

Data entry and analysis

Data were entered and analysed with statistical software- SPSS IBM version 22.0. The data sheets were checked for completeness and cleaning was done before analysis. Means and proportions were calculated. Normality checks were made. Tests of significance were applied and a p-value of less than 0.05 is considered significant. Written informed consent was obtained from all the study participants before recruiting in the study. The study was approved by the Institutional Ethics committee.

Results:

The majority of the study participants were males. Only 22.5% of the study participants had a researcher in the family. (Table 1)

The majority of the study participants, strongly agree that the subject helps in interpretation (75.8%), and is important in medical practice(61.7%). However, 85% of the study participants feel that software is difficult to use. Upon assessing the understanding, 90% of the study participants find the subject hard to understand (Table 2).

Table 3 : Mean difference between the scores

No.	Variable	Subject Content Mean ±SD	Understanding Mean ±SD	Current impact Mean ±SD	Prospects Mean ±SD	Total score Mean ±SD
1.	**Academic year**					
	Third-year	13.1(±5.7)	10.3(±3.4)	11.5(±2.5)	13.3(±3.3)	66.1(±11.7)
	Fourth-year	18.2(±6.3)	13.2(±4.1)	16.4(±3.4)	12.1(±5.1)	78.2(±12.3)
	p value*	**0.014**	**0.032**	**0.022**	**0.123**	**0.021**
2.	**Sex**					
	Male	12.1(±3.6)	12.3(± 2.5)	13.2(±2.1)	13.2(±1.5)	64.3(±13.2)
	Female	11.3(± 2.9)	12.8(± 1.1)	12.2(±2.3)	14.3(±1.2)	62.1(±12.2)
	p value*	**0.123**	**0.365**	**0.239**	**0.443**	**0.429**

*Independent t-test applied

The mean score of subject content, understanding, the current impact was significantly higher among the fourth-year students than the third-year students. There was no significant difference between the gender (Table 3).

Discussion:

The results of the present study about the medical student's perception towards biostatistics showed that the majority of the students had a positive perception of the importance of biostatistics. This is contrary to the study done by Mostert P, which stated that the significance of biostatistics is appreciated well only by the qualified medical practitioners than the medical students.[10] Similarly in a study done by Ahmad F et al, which showed that the majority of the medical students had a positive perception of the importance and relevance of biostatistics in the medical curriculum.[8] This result correlates with the study done by Hren D[11] reporting majority of the study participants showed a higher perception towards the importance of biostatistics.

Literature has shown that biostatistics is mostly disliked by medical students because of its complex mathematical calculation which is confusing.[9] A possible recommendation for this could be to give a more frequent workshop or short term courses, small group discussion and introduction of more practical sessions for data collection and analysis. The result of the present study showed that the majority of the study participants perceived that only the diagrammatic representation was easy to understand and they also perceived that mathematical calculation is of secondary importance as the focus is more on the interpretation of results. The finding of the present study showed that some topics of biostatistics are difficult to understand. This could be attributed to the method of teaching, no prior exposure to biostatistics. Lecturers come from varied backgrounds and teaching skills and approaches to teaching. Knowledge and awareness of biostatistics as a tool for analytical reasoning and biomedical research is significant for health professionals to comprehend medical research, analysis of new information and translate the scientific knowledge gained to clinical practice. Thus, the inclusion of biostatistics in the medical curriculum is important.

Recommendation: This study is an attempt to assess the level of biostatistics knowledge and assess the biostatistics curriculum prevalent in medical college. Though majority students agreed that knowledge of biostatistics helps in interpretation, the need to learn biostatistics should be emphasized in beginning period of MBBS curriculum. Hands on workshops could help in fluency of handling the statistical softwares.

Limitation: Present study carried out in a single centre with a small sample size owing to financial and operational reasons.

Conclusion:

Biostatistics is an important subject in the medical curriculum and is closely related to medical and health care. The need to understand the diversity of the biostatistics syllabus and the integration of different teaching methods is a necessity.There is need to sensitize the syllabus on biostatistics and hands-on exercises should be incorporated in teaching for better use of biostatistics knowledge in medical practice.

Declaration:

Funding: Nil
Conflict of Interest: Nil

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