ISSN-0976-0245 (Print) • ISSN-0976-5506 (Electronic)

Volume 9 | Number 7 | July 2018

Indian Journal of Public Health Research & Development

An International Journal

SCOPUS IJPHRD CITATION SCORE

Indian Journal of Public Health Research and Development Scopus coverage years: from 2010 to 2017 Publisher: R.K. Sharma, Institute of Medico-Legal Publications ISSN:0976-0245E-ISSN: 0976-5506 Subject area: Medicine: Public Health, Environmental and Occupational Health
CiteScore 2015- 0.02
SJR 2015- 0.105
SNIP 2015- 0.034

Covered by Scopus
EMBASE
Approved by MCI

Website:
www.ijphrd.com

Indian Journal of Public Health Research & Development

Print-ISSN: 0976-0245-Electronic-ISSN: 0976-5506, Frequency: Monthly

Indian Journal of Public Health Research & Development is a double blind peer reviewed international journal. It deals with all aspects of Public Health including Community Medicine, Public Health, Epidemiology, Occupational Health, Environmental Hazards, Clinical Research, and Public Health Laws and covers all medical specialties concerned with research and development for the masses. The journal strongly encourages reports of research carried out within Indian continent and South East Asia.

The journal has been assigned International Standards Serial Number (ISSN) and is indexed with Index Copernicus (Poland). It is also brought to notice that the journal is being covered by many international databases. The journal is covered by EBSCO (USA), Embase, EMCare & Scopus database. The journal is now part of DST, CSIR, and UGC consortia.

Website : www.ijphrd.com

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Printed, published and owned by

Dr. R.K. Sharma
Institute of Medico-legal Publications
501, Manisha Building, 75-76, Nehru Place,
New Delhi-110019

Published at

Institute of Medico-legal Publications
501, Manisha Building, 75-76, Nehru Place,
New Delhi-110019

Indian Journal of Public Health Research & Development

www.ijphrd.com

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Volume 9, Number 7 July 2018

Obesity as an Actual Problem: Spatial Research in Kazakhstan (2011-2016)

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ABSTRACT

Background: Obesity is a growing problem. The dynamics of this disease spreading is changing in different regions, it is poorly investigated and, therefore, contradictory.

Objective: To scrutinize the spatial rates of obesity in various regions of Kazakhstan.

Methodology: The operation of preventive medicine clinics, family health centers on the study of obesity rates was investigated. Furthermore, the relationship between the growth of diabetes and obesity with population growth rates, demographic indicators in cities and rural areas was considered.

Results: Investigations demonstrated an epidemiological picture of obesity, diabetes and other pathologies related to nutrition. The activities of 4 050 medical organizations has been studied since 2011.

Conclusions: The investigation revealed a stable growth in obesity, diabetes, metabolic and nutritional disorders. The rates of diabetes and obesity according to the data of preventive medical observations in the city are higher than in rural areas. The annual increase in obesity rates during the study period amounted to 3.9%. South-Kazakhstan, Astana and Almaty were identified as the regions with the highest obesity rates.

Keywords: *Spatial research, Obesity, Diabetes, Demography, Family Health Centre*

INTRODUCTION

To decrease the morbidity in the Republic of Kazakhstan (RK), the state has strengthened financial support for preventive treatment medical organizations for the last 5 years.[1] The main function is to coordinate medical specialists of Kazakhstan in the field of diagnostics and prevention of various diseases.[2,3]

Introduction/general information: Our observations on the development of the healthcare system in Kazakhstan indicate that the coordination of efforts has not yet reached the required level.

The results of national statistics are significantly variable including international data. For example, the findings of the 5th national research in Kazakhstan indicate that 31.2% of adults suffer from obesity[4] whereas the statistics of international observers indicate: "Obesity Adult incidence rate - 23.5%".[5] However, obesity rate in interconnection with endocrinological diseases, nutrition deficiencies in respect of demographic and geographical features of the country, has not been investigated yet.

OBJECTIVES OF THE RESEARCH

To scrutinize the spatial rates of obesity in various regions of Kazakhstan. To study the dynamics of these indicators' growth for the last 5 years, in comparison with diabetes mellitus.

METHODS OF THE RESEARCH

Investigations are epidemiological, continuous (covering the entire territory of the state). They are carried out by means of mass medical examination. In addition, the studies are descriptive (descriptive-evaluative) and analytical.

The body of data included the total number of population living in the country in respect of the demographic growth. Cases of morbidity on the studied nosology and in the regions of Kazakhstan came to be in the test group. The morbidity was investigated by means of retrospective and prospective method. The analysis of the dynamics of the epidemiological process was carried out selectively with respect to obesity and diseases related to malnutrition, diabetes.

The objectives of the analysis: Statistic data has been selected in accordance with the following criteria: the diagnosed cases of obesity, diabetes, morbidity related to malnutrition in accordance with the International Classification of Diseases (ICD-10); The demographic survey in the country during the last 5 years; the morbidity rate per 100 000 population.

Statistical analysis: The processing of information was carried out with the help of "Medstat" and "Statistica 10" software. The information was taken into account from the statistic registers of all governmental and non-governmental medical outpatient hospitals and clinics, hospitals. During the statistic processing of information, quantitative and qualitative statistical features were identified.

Continuous variables are expressed as the mean ± standard deviation. The chi-square test was used to test differences in categorical variables between the cases and controls, and analysis of variance (ANOVA) or the Student's t-test was used for comparisons of continuous variables. Spearman's rank correlation and univariate regression analysis were used to determine the strength of the relationship between obesity and diabetes. A significance level of $P<0.001$ was used in this test.

Methodological approaches to achieve the aim: For the implementation of the State Healthcare Development Program (SHDP) in the primary division of Healthcare (namely, outpatient and polyclinic organizations), Family Health Centres (FHC) were established.[2,6,7,8] Their basic mission is to improve the coordinated efforts of the medical community in identifying and preventing risk factors of diseases.

In section №3 of the SHDP, it was deduced that the man's health 50% depends on his or her lifestyle. This provision is recommended to be taken into account by medical staff while dealing with the population of the country promoting sanitary knowledge. The above mentioned principles were pursued in our investigation very consistently and precisely.

RESULTS

According to the research, in respect of the state statistics in 2016, 4 050 medical organizations were registered in Kazakhstan including outpatient – polyclinics – 3 149 and hospitals - 901.

Based on the results of the first year of Program realization, we have selectively conducted an experienced pilot analysis of medical staff activity in medical organizations in Astana and the surrounding suburbs. By means of questioning, the opinion of 1 000 patients and 125 doctors was inquired in the HFC. The research group was interested in a mutual opinion (patients and doctors) on the motivating aspects of their intercommunion, on the principles of medical staff activities and prospects of its realization. It was clarified that the medical staff of HFC preventive branches defined the main challenges of their initial stage activities. They pursue the following principles: determiners of diseases related to the lifestyle depend on the social environment. However, mostly they depend on the behavior of a person and, hence, can be changed and the risk of morbidity development will be significantly reduced.

Based on the questionnaire results, the majority of patients (85%) turned out to have common interests with doctors' principles. Besides this, in 77.2% of cases they supported participate in preventive activities, and even involve other interested patients. The rest of patients were skeptical in success of medical staff intercommunion with patients in the framework of the prevention program.

93.1% of medical staff is sure in close intercommunion and only 6.9% doubted in its effectiveness, particularly, in patients' discipline, for instance, refusal to harmful habits, behavior changing, etc. However, the main result of the pilot analysis reported the support and successful realization principles of HFC preventive measures.[7]

Three basic methods were used to investigate the general morbidity:

- Data on patient treatment (actual morbidity or primary morbidity, spread of diseases, sickness or general morbidity);

- Data on medical examinations (pathologic lesion);
- Data on causes of death.

In some cases, the fourth additional method (survey of population, questioning) was used. The primary treatment of the patient in a medical institution and a morbidity identified by home sick call was considered as the observation element in measuring the total morbidity in each year. To calculate the total incidence rate (TM), the following formula was used: TM=the total number of registered diseases in the reporting year×100 000/average annual population.

During the investigation, the demographic survey (total population) of the country was analyzed. Besides this, the dynamics of demographic growth in Kazakhstan and its relationship with the population health rates was determined. It was revealed that the number of population by January 1, 2011 amounted to 16 442 000 whereas this rate increased to 16 675 400 by January 1, 2012.[9]

However, at the end of 2016, the population reached over 17 754.1. Urban population (54.1%) prevails over rural (45.9%).[10,11,12] In addition, the population increase over 5 years of the research turned out to be over 1.2 million people or 7.47%. The annual growth rate, on average, amounted to 1.5%.

The total morbidity (in absolute numbers) for all classes of diseases listed in "ICD-10" over the five-year period increased only by 1%. However, a morbidity related to endocrinological disorders, malnutrition and metabolic disorders (E00-E89) increased significantly by 19.7%. If this rate is compared with the population growth, it turns out that it exceeds it by almost 2.6 times (7.47% to 19.7%). Moreover, with further analysis of the statistical results (in terms of 100 000 people), it turned out that the endocrine morbidity with malnutrition and metabolic disorders increased by 13% namely from 3 745.1 to 4 232.7.

The data analysis received from various regions of Kazakhstan illustrated that the morbidity of diabetes (the number of diseases registered for the first time, per 100 000 people) is gradually increasing. In addition, the same is noted with obesity. (Table 1.)

Table 1. Morbidity of diabetes and obesity in Kazakhstan (the number of diseases registered for the first time per 100 000 people in 2011 and 2016)

Category of population	Total morbidity*		Diabetes*		Overweight and obesity*	
	2011	2016	2011	2016	2011	2016
Rural	**575.4** (11.2)	**575.8** (10.0)	**116.1** (8.1)	**138.4** (7.2)	**115.9** (7.4)	**140.3** (5.3)
(% from total morbidity)	*(100%)*	*(100%)*	*(20.2%)*	*(23.5%)*	*(20.1%)*	*(24.4%)*
Urban	**1269.5** (23.1)	**1104.8** (17.1)	**193.5** (5,2)	**198.7** (3.2)	**197.4** (2.4)	**203.1** (2.6)
(% from total morbidity)	*(100%)*	*(100%)*	*(15.2%)*	*(18.0%)*	*(15.5%)*	*(18.4%)*

Note to Table 1:

* - number of diseases SD, registered for the first time, per 100 000 people of the population with a confidential interval of 95% and a statistical significance level, $p \leq 0.05$

It was revealed that the number of patients with diabetes mellitus, registered five years after the start of the investigation, significantly and authentically increased: in rural areas by 19.2%, in cities by 2.7%. Moreover, the investigation demonstrated the similar growth with obesity. In addition, the dynamics of obesity growth in cities was significantly higher than in rural areas. Conversely, the specific gravity of diabetes and

obesity in relation to the total morbidity (in percentage) among urban population turned out to be lower than that of rural areas.

According to the official data (published in the statistical volume on health in 2015), the average morbidity of diabetes in Kazakhstan was 168.6 (per 100 000 people). However, the morbidity of obesity in relation of overweight people was 171.7 (per 100 000). These incidence rates of diabetes and obesity in the regions of Kazakhstan were calculated and presented by the regional boards. According to the results of our additional analysis in relation of 2016, the incidence rates turned out to be somewhat higher. For instance, the incidence rate of diabetes in early 2016 was 180.7 (per 100 000 people). But the morbidity of obesity, without consideration of overweight patients, rose to the level of 91.2 (per 100 000 people). (Table 2.)

Table 2. Incidence rate of obesity and diabetes in the regions of Kazakhstan from 2011 to 2016

№	Regions of Kazakhstan, cities	Obesity*			Diabetes*		
		2011	2016	R., %	2011	2016	R., %
1	Akmola	56.1 (0.01)	69.6 (0,01)	4.8	183.0 (0.01)	203.8 (0.01)	2.3
2	Aktobe	71.2 (0.01)	75.3 (0.01)	1.2	107.1 (0.01)	127.4 (0.01)	3.8
3	Almaty	46.3 (0.01)	53.9 (0.01)	3.3	192.5 (0.01)	207.0 (0.01)	1.5
4	Atyrau	63.0 (0.01)	82.1 (0.01)	6.1	138.5 (0.01)	144.7 (0.01)	0.9
5	East-Kazakhstan	63.5 (0.02)	101.2 (0.01)	11.9	192.7 (0.02)	132.2 (0.01)	-6.3
6	Zhambyl	32.9 (0.01)	56.3 (0.01)	14.2	140.6 (0.01)	177.9 (0.01)	5.3
7	West-Kazakhstan	56.3 (0.01)	75.6 (0.01)	6.9	112.2 (0.01)	171.9 (0.01)	10.7
8	Karaganda	61.2 (0.01)	63.4 (0.01)	0.7	190.3 (0.01)	244.0 (0.02)	5.6
9	Kostanay	70.2 (0.01)	82.3 (0.01)	3.4	175.7 (0.01)	140.1 (0.01)	-4.1
10	Kyzylorda	62.1 (0.01)	66.9 (0.01)	1.5	100.7 (0.01)	190.8 (0.01)	17.9
11	Mangystau	129.1 (0.01)	109.9 (0.01)	-3.0	118.3 (0.01)	134.3 (0.01)	2.7
12	Pavlodar	132.8 (0.01)	108.5 (0.01)	-3.7	162,2 (0.01)	174,7 (0.01)	1.5
13	North-Kazakhstan	85.3 (0.01)	102.1 (0.01)	3.9	266.8 (0.01)	271.6 (0.01)	0.4
14	South-Kazakhstan	96.7 (0.01)	145.8 (0.01)	10.2	133.7 (0.01)	213.1 (0.01)	11.9
15	Almaty city	119.8 (0.01)	122.8 (0.01)	0.5	174.9 (0.01)	182.1 (0.01)	0.8
16	Astana city	136.4 (0.01)	143.2 (0.01)	1.0	153.6 (0.01)	176.1 (0.01)	2.9

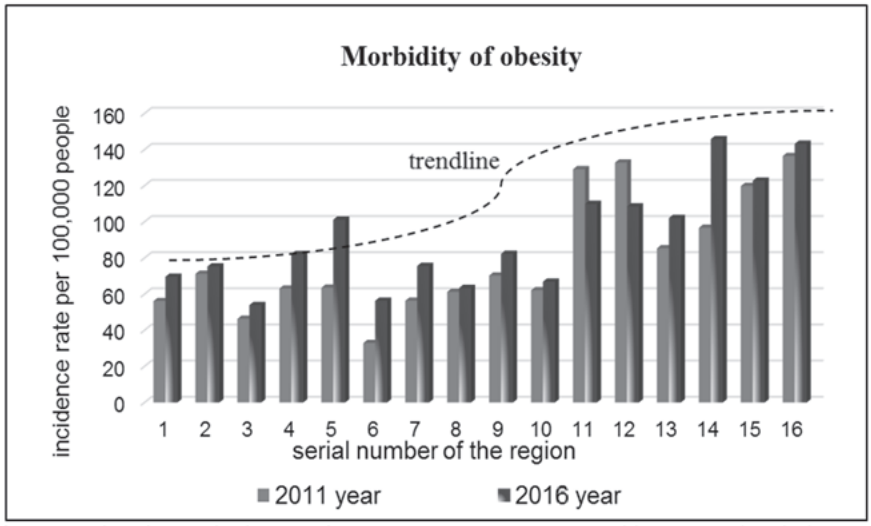
Note to Table 2:

* - number of diseases SD, registered for the first time, per 100 000 people of the population with a confidential interval of 95% and a statistical significance level, $p \leq 0.05$;

R., % - the annual increase in obesity; (….) - SD.

The results are indicated for comparison at the beginning and at the end of the investigation. Besides this, the rate increase of morbidity in percentage in each region during the observation period was determined (R., %).

The results of the analysis are visually represented in color mapping (Fig. 1, Fig. 2).



Regions: 1. Akmola 2. Aktobe, 3. Almaty, 4 Atyrau, 5. East-Kazakhstan, 6. Zhambyl, 7. West-Kazakhstan, 8. Karaganda, 9. Kostanay, 10. Kyzylorda, 11. Mangystau, 12. Pavlodar, 13. North-Kazakhstan, 14. South-Kazakhstan, 15. Almaty city, 16. Astana city.

Fig. 1: Morbidity of obesity in different regions of the Kazakhstan (2011-2016)

Regions: 1. Akmola 2. Aktobe, 3. Almaty, 4 Atyrau, 5. East Kazakhstan, 6. Zhambyl, 7. West Kazakhstan, 8. Karaganda, 9. Kostanay, 10. Kyzylorda, 11. Mangystau, 12. Pavlodar, 13. North Kazakhstan, 14. South Kazakhstan, 15. Almaty city, 16. Astana city.

Fig. 2: Regions with a high incidence of obesity (2016 year)

DISCUSSION

The results of a five-year investigation, such as the incidence rate distinction in rural and urban areas, uneven correlation of diabetes rate with the obesity growth, the different rates of obesity growth in Kazakhstani regions can be estimated as somewhat paradoxical. However, to explain it, it is necessary to take into consideration the following peculiarities of state's development.

Firstly, the specific gravity of identified patients in rural areas is increasing as a result of the extensive and

intensive activities of HFC medical staff. Moreover, it is because of the active identification of overweight people and their inclusion in statistical reports (where many patients were not registered).

Secondly, this process occurs because of intensive migration of the population from rural areas to large cities and it increases the total number of people (including healthy and sick people) in absolute numbers.[13,14]

Furthermore, the treatment rate of patients to medical organizations in the cities is traditionally higher, which also affects the statistical data. Population involvement in preventive activities, prevention of morbidity development, the enhancement of healthy lifestyle increased the treatment of obesity patients to doctors in regions and changed our analyzed medical reports. The results of studying correlation Pearson depicted that obesity rates are closely related to diabetes mellitus. The highest correlation (r) was in 2011 (0.97). In 2016, it decreased slightly (0.96). Moreover, comparing the level of obesity correlation in regions and observation years, the rate (r) turned out to be 0.83. Calculation and comparison of the obesity rate (r) showed an unexpected result with the growth of diabetes as for the years from 2011 to 2016 and regions. This correlation was less expected at the level of (0.58).

The regions with the highest incidence of obesity by the end of 2016 were South-Kazakhstan (146.2), Astana (144.0) and Almaty (123.8). Kostanay and Atyrau regions were registered in average (82-83.0). At the lowest levels were Almaty (54.3), Zhambyl (57.1) and Karaganda (64.2).

Comparing the results obtained in a similar investigation, it can be noted that the situation of some regions at that time were somewhat different on the territory of Kazakhstan (from 2004 to 2008). [15]

Regions with high rates in 2008 (from 94.9 and higher) - Almaty (118.5), Astana (135.5), Mangystau (139.7) and Pavlodar (143.0). With average rate (from 57.9 to 94.9) - Kyzylorda (59.0), Karaganda (60.6), Kostanai (67.4), Aktobe (69.3) East Kazakhstan (74.0) and North-Kazakhstan (80.6). Regions with low rate (up to 57.9) are Zhambyl (28.4), West Kazakhstan (41.2), Almaty (45.8), Atyrau (50.6), Akmola (52.0) And South Kazakhstan (56.9).

Alongside, other statistical results should be indicated. According to the research of G.A. Musina and co-authors from the Republican Center for Development of Healthcare, rates are noticeably different.[16] Should Almaty, Pavlodar and Astana are referred to cities with a high extensive rate of obesity - 13.7%, the lowest extensive obesity rates, according to the data of the authors, are registered in Atyrau (2,2%). Moreover, researchers note that the main part of examinees are not aware of their exact weight and level of fatness. In their conclusions, the authors of the report urge the medical organizations of Kazakhstan: to strengthen preventive measures among the population; to organize activities explaining the harm of this disease for health; to instruct with regular nutrition and form a healthy lifestyle.

CONCLUSIONS

The rates of diabetes and obesity according to the data of preventive medical observations in the city are higher than in rural areas. It can be accounted for intensive internal migration of the population from rural areas to large cities. The annual increase in obesity rates during the study period amounted to 3.9%. The highest correlation (Pearson) of obesity value and diabetes is (r, 0.96). However, the correlation with the growth of diabetes from 2011 to 2016, as well as in respect to specific regions was not expressed (in some cases, it decreased to 0.58). South-Kazakhstan, Astana and Almaty were identified as the regions with the highest obesity rates. The reasons for such obesity rating in Kazakhstan should be clarified.

Disclaimer: The content is solely the responsibility of the authors and does not necessarily represent the official views. This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Author contributions: FRA and FAB conceived and designed the study, OOB and FRA carried out studies of patients with visits to cities and regions. FAB and MA prepared the project. All authors collected and processed statistical information. All authors made significant intellectual contributions in finalising the manuscript, and read and approved the final version for submission.

Ethical considerations: The proceeding paper for investigation related to obesity problems was approved by the Ethics Research Committee of the Medical University (№1, Jan. 25, 2014 and №3, Dec. 24, 2015).

The permission for receiving statistical information from the regional Health Departments of the Republic

of Kazakhstan was not required. The reason is that data on demographic changes in the country, the population treatment to medical institutions, morbidity classification are published in free access. This data does not point out patient's personal information in accordance with inviolability of private life (Article 142 of the Criminal Code of the Republic of Kazakhstan, dated 9.11.2011, No. 490-IV).

Conflict of Interest: No

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Medication Errors in Critical Care Units in a Tertiary Hospital

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ABSTRACT

Medication errors in critical care are frequent, serious, and predictable. Critically ill patients are prescribed, twice as many medications, as patients outside of the intensive care unit (ICU) and nearly all of them suffer, a potentially life-threatening error at some point during their hospitalization.

Today, in the health care profession, all types of medication errors including missed dose, wrong dosage forms, wrong time interval, wrong route, etc., are a big deal, for quality patient care. Problems related to medications, are common in the healthcare profession, and are responsible for significant morbidity, mortality, and cost. Several recent studies have demonstrated that patients frequently have difficulty in reading and understanding medication labels. According to the Institute of Medicine report, "Preventing Medication Errors", cited poor labeling as a top most cause of medication errors in the USA. Evidence suggests that specific content and format of prescription drug labels, facilitate a better communication to minimize apprehension by patients regarding medication errors.

Although majority of these errors are without any serious adverse outcome but some of them are associated with increased morbidity and mortality leading to prolonged hospital stay, high cost of treatment and potential for litigation.

The aim of this study was undertaken to know the basic points of medication errors in the ICU set up, to identify risk factors for medication errors, and suggest strategies to prevent errors and manage their consequences.

Keywords: *Medication errors; prescription audit; prescription errors; patient medication safety*

INTRODUCTION

Health care delivery is not infallible. Errors are common in most health care systems and are reported to be the seventh most common cause of overall death[1]. The 1999 Institute of Medicine (IOM) report, "To Err is Human. Building a Safer Health System", drew public attention to the importance of patient safety .The Institute of Medicine (IOM) report highlights that 44000 - 98000 patients die each year as a result of medical errors, a large portion of these being medication related.[2]

This was followed with considerable interest by the medical community However, to date, there is little evidence that patient safety has improved [3]. In the Intensive Care Unit (ICU), on average, patients experience 1.7 errors per day[4] and nearly all suffer a potentially life-threatening error at some point during their stay. Medication errors account for 78% of serious medical errors in the ICU[5]

A hospitalized patient with a single dose of a single medication requires many right steps [6]. This hospital medication use process can be categorized into five broad stages: prescription, transcription, preparation, dispensation, and administration.[7]An error can occur at any point in this process. A medication error is any error in the medication process, whether there are adverse consequences or not.[8]

AIM

To study the medication errors in critical care in a tertiary care hospital and determining the areas where

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errors occur in order to take measures to prevent recurrence of errors.

OBJECTIVES

- To rectify the medication errors occurring in the ICU and other critical care units in hospitals.
- To prepare guidelines for correct method of giving medication and patient medication safety.

Limitations of this study: Those patients who were discharged from hospital against medical advice before the study could be completed and those who were transferred to another healthcare facility for treatment were excluded from the study.

REVIEW OF LITERATURE

Medication error is a major cause of morbidity and mortality in medical profession, and critical care areas are no exception. Man, medicine, machine and modus operandi are the main contributory factors.[9]

In India, a proper reporting of medication errors in the hospital is not available. Drugs worth crores of rupee are consumed every year but a substantial part of these drugs are irrationally prescribed[10] In order to promote rational drug usage, standard policies on use of drugs must be set, and this can be done only after the current prescription practices have been audited.[11]

The main purpose of conducting a prescription audit is to enhance the quality of care in the hospitals. Improvement in the prescribing practices of doctors working in hospitals is one of the initiatives taken up, to improve the quality of care.[12]

A prescription audit is considered appropriate to improve the usage of drugs by the doctors.[13]

The World Health Organization (WHO) proposed core-prescribing indicators [14] for prescription audit and drug utilization studies. The focus of Indian studies has mainly been on the WHO core-prescribing indicators such as the range and number of drugs per prescription. Another study reported that half of the patients received more than one antibiotic. [15]

Chemist- and hospital pharmacy–based studies reported that, poly-pharmacy was the norm and about 75 percent of the prescriptions contained Fixed Dose Combinations (FDCs) ·An analysis of prescriptions for diarrhea also revealed that about 60 percent contained FDCs. Another study of 292 prescriptions for diarrhea reported use of 63 different drugs.

Medication errors, defined as any error in the medication process regardless of whether a patient experiences an adverse consequence, can occur at any step. It is important to have an understanding of the risk factors for medication errors and the evidence base for preventing medication errors and disclosure norm must be there, should an error occur.

Although the medication process is similar for all patients in hospital, we have restricted our study to focus on critically ill adult patients because the environment, patient characteristics, and because of types of medications used in the ICU, are substantially different from those in other hospital units. The ICU brings together high-risk patients who require urgent, complex interventions from multiple health care professionals in a complex environment where patients are exposed to twice as many medications as those in general wards. In addition, critically ill patients differ from most other hospital patients because they have limited ability to participate in their medical care and lack the physiologic reserve to tolerate additional injury.

Critically ill patients admitted to an ICU experience, on average, 1.7 medical errors each day and many patients suffer a potentially life-threatening error during their stay. Medication errors are the most common type of error and account for 78% of serious medical errors in the ICU. Providing a critically ill patient with a single dose of a single medication requires correctly executing many steps. The medication process involves 5 broad stages: prescription, transcription, preparation, dispensation and administration.

The earlier in the medication process an error occurs, the more likely it is to be intercepted. Administration appears to be particularly vulnerable to error because of a paucity of system checks, as most medications are administered by a single nurse. Nurses and pharmacists cause up to 70% of prescription errors Preparation errors occur when there is a difference between the ordered amount or concentration of a medication and what is actually prepared and administered. The industry standard for pharmaceutical preparations is

a concentration difference of less than 10%.However, approximately two thirds of infusions prepared by nurses are outside industry-accepted standards and 6% contain a greater than two-fold concentration error. Transcription errors are usually attributed to handwriting, abbreviation use, unit misinterpretation ('mg' for 'mcg'), and mistakes in reading. James Reason developed a well-recognized system for human error classification based on observations from industries that have become highly reliable such as aviation and nuclear power. He states that errors arise for two reasons:1) active failures and 2) latent conditions.

Types of Medication Errors:

- Prescribing error : Incorrect drug selection (based on indications, contraindications, known allergies, existing drug therapy, and other factors), dose, dosage form, quantity, route, concentration, rate of administration, or instructions for use of a drug product ordered or authorized by physician(or other legitimate prescriber)
- Illegible prescriptions or medication orders that lead to errors that reach the patient
- Omission error: The failure to administer an ordered dose to a patient before the next scheduled dose, if any.
- Wrong time error: Administration of medication outside a predefined time interval from its scheduled administration time (this interval should be established by each individual health care facility).
- Unauthorized drug error: Administration to the patient of medication not authorized by a legitimate prescriber for the patient.
- Improper dose error: Administration to the patient of a dose that is greater than or less than the amount ordered by the prescriber or administration of duplicate doses to the patient, i.e., one or more dosage units in addition to those that were ordered.
- Wrong dosage-form error: Administration to the patient of a drug product in a different dosage form than ordered by the prescribers.
- Wrong drug-preparation error: Drug product incorrectly formulated or manipulated before administration.
- Wrong administration-technique error: Inappropriate procedure or improper technique in the administration of a drug.
- Deteriorated drug error: Administration of a drug that has expired or for which the physical or chemical dosage-form integrity has been compromised.
- Monitoring error: Failure to review a prescribed regimen for appropriateness and detection of problems, or failure to use appropriate clinical or laboratory data for adequate assessment of patient response to prescribed therapy.
- Compliance error: Inappropriate patient behavior regarding adherence to a prescribed medication regimen.
- Other medication error: Any medication error that does not fall into one of above predefined categories.

METHODOLOGY

The cross sectional study was carried out at a tertiary care hospital in the critical care Departments like ICU and High dependency units and in the neurosurgery wards. The patient records were checked with due permission from the hospital authorities.

Both prospective study as well as retrospective studies was carried out.

Prospective studies were done by checking the patients' medication charts and retrospective studies were carried out by checking medical files in the medical records department.

Place and Duration of the study: The study was carried out for duration of 3 months in a tertiary care hospital in Pune in the critical care departments.

Study Sample: The convenient sample of 294 patients in critical care units as well as OPD patients in the hospital receiving follow up were selected.

Observation and discussion: 294 prescriptions were analyzed, in which, prescriptions were 1058. Therefore average number of drugs/prescription is 4.22. Of 294 patients 65.3%were males and 34.7% were females. A total of 72 medication errors were identified from 44 cases, 32(73%) were males and 12(27%) were females. Our study showed a high incidence of medication errors in males (16.6%) over females (11.7%). It showed (41%) of medication errors in patients between 20-40 years of age. Drugs were prescribed by generic names in 3.79% of cases, drugs from EDL were; 53.25% and fixed dose

combinations are 26.87% of total drugs. Dosage forms used were mostly oral -93.51%. Injectable were only 6.19% and topical forms were least 0.299%. Doctors profile indicates that maximum number i.e. 93.67% were general practitioners. Basic information of patient was written in 72.57% prescriptions.

Out of 294 patients, 44 (15%) patients showed 72 medication errors. The omission error was the most frequently (40.3%) occurring error, followed by prescribing (19.4%) and wrong time error (18 %).Majority of errors were due to nurses 78% followed by physicians 22%. Errors that did not reach patient were 19.6% which comes under sub-category A and B, and errors that reach patient but cause no harm adds to 80.4% which comes under subcategory C.

Complete diagnoses were written in 70.04% prescriptions. Only 88.61% prescriptions were legible and only 76.79% prescriptions were complete in terms of dose, route, strength, frequency and dosage forms. Disease pattern seen was variable. Diseases of respiratory system were maximum 44.72 % followed by infectious and parasitic diseases. 16.03 % and diseases of digestive system - 13.92 %. The most common drug groups prescribed were NSAIDs± serrati peptidases, antibiotics, antihistaminic, multivitamins, minerals, enzymes and expectorants & bronchodilators. The incidence of poly-pharmacy was also common with maximum number of drugs which were prescribed per prescription were four in 39.24% of prescriptions. The prescriptions also had other minor anomalies.

This study showed that there is scope for improvement in prescribing patterns in areas of writing generic names of drugs, essential drugs, writing legible and complete prescriptions.

Overall, it is clear that prescribing errors are a common occurrence, affecting 2% of patient days and 50% of hospital admissions. However, the reported rates of prescribing errors varied greatly and this could be partly explained by variations in the definition of a prescribing error, and the methods used to collect error data. Furthermore, a lack of standardization between severity scales prevented any comparison of error severity across studies.

In recent years, the extent and impact of adverse events in healthcare settings has made patient safety, a key aspect of healthcare policy.

The higher prevalence of these errors in the prescribing process indicated a need for improvement in ordering stage of the medication use process. None of the errors identified were fatal, but approximately one-third was assessed as being potentially significant or serious.

RECOMMENDATIONS

- This study has proven that there is an urgent need of clinical pharmacist in specialized units like MICU, where poly-pharmacy is practiced.
- The results of our study are important not only for safety of patients and the economics of health care system, but future role of pharmacy personnel in ICU.
- The present results point to the establishment of a medication error reporting system at each hospital and to share data with other healthcare settings to prevent further occurrence of same.
- And the clinical pharmacist, initially, could only confine to identification of the errors before the medication is administered to the patient by checking over all the charts in
- each critical care unit.
- Improved medication safety can be accomplished by optimizing the safety of the medication process, eliminating situational risk factors, and providing strategies to both intercept errors and mitigate their consequences.
- Several interventions have been shown to decrease medical error in the ICU.
- Establishment and implementation of appropriate clinical guidelines, use of essential medicines list, public education about medicines and regular update to the clinicians will help in implementing the principles of rational use of drugs.

CONCLUSION

Medication errors occur frequently in ICUs of tertiary care hospitals. Therefore it is essential to establish medication error reporting system at each hospital.

It was found that there was marked prevalence of medication errors related to antibiotics in ICUs. Omission errors were most frequent one.

Most of errors in MICU were not measurable and result in harmful consequences for the patients.

This study had presented a pattern of types of medication errors related to antibiotics in ICUs in tertiary care hospital and suggested areas for quality improvement. This study has proven that there is an urgent need of clinical pharmacist in specialized units like ICUs, where poly-pharmacy is practiced.

There is an urgent need for establishing of a medication error reporting system at each hospital and to share data with other healthcare settings to prevent further occurrence of the same.

Conflicts of Interest: There is no conflict of interest.

Financial support and Sponsorship: Study is not funded by any agencies.

Ethical Approval: The study was under taken as a part of summer internship of management studies. There was no direct/indirect intervention on medication study of any human beings or animals and hence there was no ethical issues involved.

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Knowledge, Perception and Psychosocial Preparedness for Menarche among Adolescent Girls of Udupi District, Karnataka

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ABSTRACT

Background: Adolescence is a crucial phase of growth extending from puberty to adulthood spanning much of the second decade. It is the critical period of biological and psychosocial changes. They lack adequate knowledge about the physical changes during the pubertal period and which in turn leads to undue anxiety.

Objectives: The objectives of the study were to assess the knowledge, perception, psycho social preparedness for menarche and the problems experienced by the adolescent girls.

Methods: A descriptive survey study was conducted among 200 adolescents aged 11-13 years from 10 higher primary schools of Udupi district. Adolescents who met the sampling criteria were selected by purposive sampling. Structured questionnaire was used to assess the knowledge on menarche. A rating scale was used to assess the perception, psychosocial preparedness towards menarche and predesigned questionnaire was used to assess the problems experienced at the time of menstruation. Descriptive and inferential statistics were used for data analysis.

Results: Results shows that, out of 200 adolescents, 88% of the adolescents had average knowledge, 95.5% had negative perception, most of them 52.5% were well prepared for menarche. The most common problems experienced by the adolescents were abdominal pain (75%), heavy bleeding (73.5%) and white discharge few days before menstruation.

Conclusion: Social prohibitions and restrictions from attaining religious rituals have created a negative impact on adolescents and have blocked the access to the right kind of information. Therefore much more efforts are needed to curb the misbeliefs and taboos among the adolescent school girls.

Keywords: *Menarche, knowledge, perception, psychosocial preparedness.*

INTRODUCTION

Menarche is a normal physiological process in the reproductive phase of woman's life that occurs at regular monthly intervals. Menarche typically occurs around the age of 12 years. Menarche marks the onset of physical and sexual maturation in adolescent girls known as puberty[1].

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India has the largest population of adolescents in the world which comprises about 243 million aged 10 -19 years of age. Adolescence is regarded as unique phase of human development [2]**.** Adolescence is a period where vital physical and psycho- sexual changes take place. In this regard, the older child that is the pre adolescents between the age of 10 and 12 years should also receive adequate attention as a preparation for pubertal changes and menarche[3].

The gap between problems during menstruation among adolescents is due to lack of knowledge and proper guidance[4]. Young adolescents experience significant physical and emotional difficulties during menstruation which stem from poor information and the reactions of

their peer group to menstrual activity. Role of school nurses in imparting education on pubertal changes is significant and schools should explore the manner in which nurses can contribute to this area of health education [5]. Hence the present study focuses on assessing the knowledge, perception, psychosocial preparedness for menarche and the problems experienced by the adolescent girls in selected schools of Udupi district.

MATERIALS AND METHODS

A descriptive survey was conducted among 200 adolescent girls in the age group of 11-13 years from selected schools of Udupi district, Karnataka. Udupi district is located in the coastal region of Western Ghats about 60 kms from Mangalore and has many prominent educational centers. All adolescent girls who were studying in VI and VII standard, who had attained menarche one year prior to the data collection and willing to participate were included in the study.

Sample size was calculated based on pilot study results. Psychosocial preparedness towards menarche (one of the objectives of the main study) was 66.7%. This proportion was considered as the key variable in sample size determination. Out of 226 higher primary schools of Udupi district, ten schools were selected randomly to get the required number of adolescents. From these schools the adolescents who met the inclusion criteria were selected by purposive sampling.

Four tools were used to collect data from the participants. Demographic proforma was used for the purpose of collecting background information of the adolescents. Structured knowledge questionnaire on menarche was used to assess the knowledge of adolescents. Knowledge scores were classified as poor knowledge (0-15), average knowledge (16-21) and good knowledge (22-30). A five point rating scale was used to assess the perception of adolescent girls towards menarche. Inferences were drawn according to the scores obtained: Positive perception score towards menarche was (31-50), and negative perception towards menarche was (10-30). To find out the psychosocial preparedness for menarche a five point scale was prepared by the researcher. Inferences were drawn according to the scores obtained: well prepared (37-60) and poorly prepared (12- 36).To identify the problems experienced by the adolescent girls at the time of menstruation, a questionnaire was used, which mainly focused on common problems faced by adolescent girls. The tools were validated, translated into Kannada and pretested. The reliability of knowledge questionnaire was computed by split half method and the value was 0.81.The tool on perception towards menarche and psychosocial preparedness towards menarche was computed using Cronbach's formula and the reliability scores were 0.88 and 0.89 respectively. The test re test reliability coefficient was 0.96 for the tool on health problem experienced by the adolescents during menstruation. The statistical software SPSS 16.0 version was used for data analysis.

The main study was conducted among 200 adolescents after obtaining the ethical approval from Institutional Ethical Committee, Kasturba Hospital, Manipal (IEC794/2016) and permission from the selected schools of Udupi District, Karnataka. The purpose of the study was explained to the adolescents and informed consent from the parents and informed assent from adolescents was taken. Anonymity and confidentiality were ensured throughout the study.

RESULTS

Description of sample characteristics: It was found that, out of 200 adolescents, 45% belonged to the age group of 12 years. Concerning mother's educational status nearly, 38.5% of mothers had secondary education and 66% of adolescents' mothers were house wives. Majority of the adolescents 73.5% belonged to nuclear family. The major source of information were mothers. (Table 1)

Table 1: Frequency and percentage distribution of sample characteristics related to adolescents N = 200

Sample characteristics	Frequency	Percentage
Age in years		
11	50	25
12	90	45
12	60	30
Mother's educational status		
No formal education	13	6.5
Primary (I-VII standard)	19	9.5
Secondary VIII- X standard)	39	19.5
Higher secondary	37	18.5
Diploma	15	7.5
Degree	77	38.5

Contd…

Mother's occupation		
House wife	132	66
Skilled	60	30
Semi-skilled	8	4
Type of family		
Extended	2	1
Joint	51	25.5
Nuclear	147	73.5
Mother's explanation about menarche		
Yes	179	89.5
No	21	10.5
Source of information		
Mother	170	85
Sibling	6	3
Friends	15	7.5
Teacher	6	3
No information	3	1.5

Description of knowledge, perception and psychosocial preparedness for menarche among adolescents

Majority of the adolescents 176 (88%) had average knowledge, whereas, 21 (10.5%) had good knowledge and only 3 (1.5%) had poor knowledge on menarche (Table 2).

Majority of the adolescents 191 (95.5%) had negative perception towards menarche whereas, only 9 (4.5%) of the adolescents had positive perception towards menarche. (Figure 1)

The study findings on psychosocial preparedness for menarche among adolescents shows that majority of the adolescents 105 (52.5%) were well prepared for menarche, whereas 95 (47.5%) of the adolescents were poorly prepared for menarche. (Figure 2)

Table 2: Frequency and percentage distribution of knowledge on menarche N = 200

Knowledge score	Frequency	Percentage
Good (22-30)	21	10.5
Average (16-21)	176	88
Poor (0-15)	3	1.5

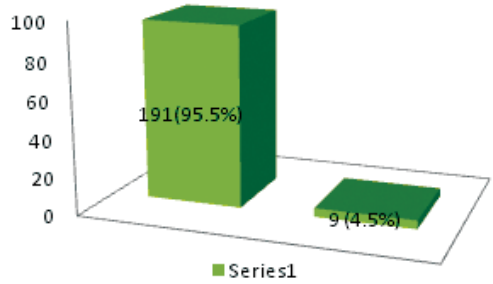

Figure 1: Bar diagram showing frequency and percentage distribution of perception towards menarche.

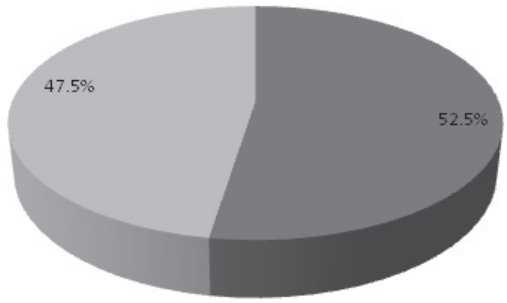

Figure 2: Pie diagram showing percentage distribution of psychosocial preparedness for menarche among adolescents.

Description of health problems experienced by the adolescents during menstruation: The description of health problems experienced by the adolescents during menstruation is depicted in table 3.

Table 3: Frequency and percentage distribution of health problems N = 200

Health problems	Frequency	Percentage
Regularity of menstruation (n = 200)		
No	78	39
Yes	122	61
Abdominal pain/cramping (n = 200)		
No	50	25
Yes	150	75
Backache (n = 200)		
No	111	55.5
Yes	88	44.5
Often feeling tired (n = 200)		
No	80	40
Yes	120	60
Bleeding more than seven days (n = 200)		
No	161	80.5
Yes	39	19.5

Contd…

Heavy bleeding (n = 200)		
No	53	26.5
Yes	147	73.5
If yes, changing of sanitary pads (n = 147)		
Hourly	6	3
Every 2 hourly	30	15
Every 3 hourly	38	19
Every 4 hourly	73	36.5
Missing school due to heavy menstruation (n = 200)		
No	155	77.5
Yes	45	22.5
Itching over genital region few days before menstruation (n = 200)		
No	108	54
Yes	92	46
White discharge (n = 200)		
No	68	34.5
Yes	131	65.5
Breast tenderness (n = 200)		
No	164	82
Yes	36	18
Nausea/vomiting (n = 200)		
No	184	92
Yes	16	8
Diarrhoea (n = 200)		
No	180	90
Yes	20	10
Headache (n = 200)		
No	112	56
Yes	88	44

The study findings on health problems experienced by the adolescents during menstruation shows that, most of the adolescents (61%) had irregular menstruation. Majority of the adolescents (75%) had experienced abdominal pain during menstruation, out of which 10.5% had severe abdominal pain. Forty four percent of the adolescents experienced back pain during menstruation. Most of the adolescents (60%) felt tired during menstruation. Bleeding for more than seven days accounted for 19.5% where, 73.5% had heavy bleeding during menstruation and the data showed 22.5% of the adolescents missed their school due to heavy menstruation. About 3% of the adolescents had to change their pads hourly due to heavy bleeding, 15% of the adolescents had to change the sanitary pads every 2 hourly. As per the data, 18% of the adolescents had breast tenderness, nearly 8% of the adolescents experienced nausea/vomiting, 10% had diarrhoea and 44% had experienced headache during menstruation.

DISCUSSION

There is a substantial lacuna in the knowledge about menstruation among adolescent girls. The present study revealed that majority of adolescents 62% had average knowledge on menstruation. Whereas, 33% had poor knowledge and only 5% had good knowledge on menstruation which is in consistent with findings of the study conducted by Thakre, Reddy in 2011, disclosed that 36.95% of the girls had good knowledge on menstruation, whereas, 63.05% had poor knowledge on menstruation [6]. Mothers were the major source of information regarding menstruation/pubertal changes for majority of the adolescents[7].

Social prohibitions and restrictions from attaining religious rituals have created a negative impact on adolescents and have blocked the access to the right kind of information. Present study revealed that majority of the adolescents 95.5% had negative perception towards menarche and only 4.5% had positive perception towards menarche. The findings of the present study are in harmony with the results of the study conducted by Sowmya & Sequeira in 2016.It was found that 82% of adolescents were not offering pooja, 66% were taking special food items during menstruation, 83% were restricted from visiting religious places, 41% were sleeping in a separate room during menstruation and 64% of the adolescents reported that menstruation is unclean and they followed different practices [8]. The findings of cross sectional study disclosed that 84.9% of adolescents thought that swimming and running during menstruation is dangerous, 53% had false belief that girls get cranky during menstruation, 66% believed that blood loss during menstruation makes them weak[9].

Lack of preparedness for menarche will lead to undue anxiety in adolescents. Present study showed that majority of adolescents (52.5%) were well prepared for menarche and (47.5%) were poorly prepared for menarche. The findings are in agreement with the cross sectional study which showed that 25.5% of the adolescents expressed anxiety when they had their first menstruation, 18.78% expressed fear, 10.3% experienced

ashamed and embarrassment feelings, 14.24% had concerns about abnormality of menstruation, 10% of them were crying along with their first menstruation and 21.5% felt excited [10].

Most of the adolescents suffer from health related problems during menstruation and experience menstrual problems for one or more occasions. Present study showed that majority of the adolescents (75%) experienced abdominal pain, whereas 44% of the adolescents experienced back pain during menstruation. The findings are in agreement with the findings of which showed that, about 70.1% of adolescents had problems related to menstruation; of which dysmenorrhea was the major problem (88.8%) other problems were menorrhea, polymenorrhea (11.2%). Nearly 23% had missed school days for 1-3 days [11]. Dysmenorrhoea was the common problem experienced by 87.87% of adolescent girls. Other associated physical symptoms were headache, sleeplessness, fullness and tenderness of breasts, feeling of heaviness in the lower abdomen and swelling of face[12].

The findings of the study would provide a baseline data for the health professionals to create awareness among the adolescents regarding menstruation and its management as menstrual problems among girls are highly prevalent among adolescent girls, an action to promote a healthy reproductive life amongst the girls is required. There is an urgent need to create awareness of menstrual problems and safe menstrual practices among girls as well as mothers.

CONCLUSION

The findings of the study showed that majority of the adolescents had negative perception and misconception regarding menstruation. The common problems experienced by the adolescents during menstruation were abdominal pain, back pain, tiredness, heavy bleeding, and white discharge few days before the onset of menstruation. Therefore this suggests that there is a need for accurate education programme among adolescents and their parents on menstruation and the associated misconception and adolescent girls should be offered possible treatment options with adolescent friendly approach.

Conflicts of Interest: None

Source of Funding: None

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Measles Rubella Immunization Campaign: Challenges Faced in an Urban Area of Chennai

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ABSTRACT

Background: Like other countries in Asia, measles-rubella (MR) vaccine coverage in India is suboptimal whereas 90–95 % coverage is needed for elimination of these diseases. The Ministry of Health and Family Welfare (MOHFW) of the Government of Tamilnadu implemented MR campaign in February 2017 to increase MR vaccination coverage. Strategically, the MOHFW used both routine immunization centres and educational institutions for providing vaccine to the children aged 9 months to <15 years. This evaluation was carried out to assess the MR vaccination coverage.

Objectives: To assess the MR vaccination coverage and barriers of vaccine coverage in the community

Methods: A community based cross-sectional study was carried out in March and April 2017. Household visits were made to collect the data from 330 children using a pre-structured questionnaire. The data was analyzed by SPSS 20 using Proportions and Chi square tests.

Results: Of the total 330 children surveyed, MR immunization coverage was 77.2% (255). Among the 255 vaccinated children 6.3% of them had mild fever after vaccination. 74.5% and 25.5% of them got the vaccination in their schools and government health centres respectively. Among the 75 non-immunized children, 62.8% and 29.4% were denied vaccination due to inflated information about the adverse events following immunization shared in television and social media respectively

Conclusion: The results of our evaluation indicated that the campaign was suboptimal in terms of Measles Rubella immunization coverage. Achieving measles and rubella elimination worldwide will be an important milestone in public health, and every effort toward elimination, including vaccination campaigns should be of high quality and ensure adequate information regarding immunization and its effects to the community.

Keywords: *Campaign, Coverage, Measles, Rubella, Barriers*

INTRODUCTION

Measles is one of the most infectious human diseases and can cause serious illness, long term complications and death. Prior to the availability of measles vaccine, the virus infected over 90% of children before they reached 15 years of age[1]. Immunization is one of the most effective public health tools reducing the infant and childhood morbidity and mortality, caused by vaccine preventable diseases worldwide. However, outbreaks of vaccine preventable diseases continue to occur in developing countries[2,3]. Good routine immunization levels and campaigns to vaccinate children are thought to be behind the figures. The WHO says measles is still a global threat and some populations remain unprotected. We need to move beyond 84% global routine immunization coverage. It's also vital that parents are fully aware of the benefits of immunization and the risks associated with not vaccinating children[4].

The World Health Organization estimated that global deaths from measles dropped 78% between 2000

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and 2015. New figures from the WHO suggest that around 13.8 million deaths were prevented during this time and reported cases declined by 77%.The Measles and Rubella Initiative wants to reduce measles deaths by 95% by 2015 and get rid of measles and rubella in at least five regions of the world by 2020[5].The GAVI Alliance is investing more than US$ 600 million in the fight against measles and rubella through large-scale campaigns. The Alliance targets over 700 million children in 49 countries aged 9 months to 14 years to immunize against measles and rubella.

High level of herd immunity is required for the elimination of measles. Studies on sero prevalence of measles suggest that vaccine coverage in the range of 90–95 % is needed. Early vaccination is also suboptimal, because children who receive the measles vaccination too early are at increased risk for vaccine failure. Low measles vaccination coverage in a community can also have a deleterious effect on children who have been adequately vaccinated, putting them at elevated risk for contracting measles[6].Measles and rubella are vaccine-preventable diseases with similar symptoms and are frequently confused with each other. Both viruses cause rash and fever. Measles can be deadly for children with poor nutrition and weakened immune systems[7, 8].

Rubella is also very contagious but causes relatively mild disease in children; in pregnant women, rubella can lead to miscarriage or severe birth defects congenital rubella syndrome (CRS), including blindness, deafness, and heart problems[9, 10]. Rubella can become a major public health issue when infection occurs during first trimester of pregnancy. Most anomalies occur if rubella infection occur before 11 weeks of pregnancy; however studies show that up to 25% of congenital cataract follows rubella infection in pregnancy[11, 12].

Rubella and measles are a public health problem in poor countries in Africa and Asia, where uptake of the measles and rubella vaccine is relatively low and increasing access to immunization through large scale vaccination campaigns can significantly reduce deaths and illnesses[13].In India, places like Delhi, Goa, Puducherry and Sikkim have higher vaccine coverage since they have taken the initiative and lead to the two dose schedule of measles mumps and rubella (MMR) at 9 months and at 15 months respectively. Now a days there is a distinct change in the measles and mumps disease pattern due to measles and MMR vaccination[14]. Maintaining high levels of routine immunization coverage each year reduces the accumulation of susceptible populations, thereby lengthening the interval needed between Supplementary Immunization Activity and conceivably eliminating the need for them altogether if validated routine coverage with two doses of measles vaccine were to exceed 90–95% for at least three consecutive years[15]

A higher level of education and increased parental awareness would facilitate increased vaccination coverage because they ensure increased awareness of health issues and provide individuals with increased access to services, information, and the skills to interact with professionals and health care services[16, 17, 19]

METHODOLOGY

A community based cross-sectional study was carried out in Anakaputhur, urban field practice area of Sree Balaji Medical College Hospital & Research Centre, Chennai. The required sample size of 236 children was obtained from the global coverage of 82% for MR vaccine. A total of 218 households with 330 children were included in the survey.

A house to house survey was done immediately after the MR vaccination campaign which was conducted all over Tamilnadu in the month of February 2017 in order to reduce the recall bias. Data was collected in the month of March and April.The mothers were interviewed individually to collect the data regarding the details of their children's MR vaccination status, demographic information like birth order, parent's education, their attitude, occupation, place of vaccination, source of information about vaccination and the reasons for not vaccinating their children.

Research tool used was a pretested and semi structured questionnaire. The data was collected and then analyzed using SPSS 20 version. The results were expressed in proportion and association by applying Chi square test.

RESULTS

A total of 330 children was included in the study, of whom171 (51.8%) were males and 159 (48.2 %) females.50% of children were aged between 9 months and 6 years.237 (71.8 %) of mothers had attained only secondary level of education.

Table 1: Demographic characteristics of the participants n = 330

Age in years	No	Percent %	MR coverage (%)	Chi square 'p'value
< 3	82	24.8	58(22.7)	0.46
3-6	81	24.5	66(25.9)	
6-9	79	23.9	64(25.1)	
9-12	60	18.1	45(17.6)	
>12	28	8.4	22(8.6)	
Total	330	100		
Sex				
Male	171	51.8	135(52.9)	0.45
Female	159	48.2	120(47.1)	
Total	330	100		
Mother educational status				
< Secondary level (10thstd)	237	71.8	183(71.8)	0.97
> Secondary level	93	28.2	72(28.2)	
Mother occupation status				
Employed	219	66.4	180(70.6)	0.003
Unemployed	111	33.6	75(29.4)	
Father educational status				
< Secondary level (10thstd)	253	76.7	195(76.5)	0.87
> Secondary level	77	23.3	60(23.5)	

The MR vaccine coverage rate in the present study was 77.2% (255). Among the vaccinated children, 190 (74.5%) and 65 (25.5%) received their vaccination in educational institutions and government health centres respectively.

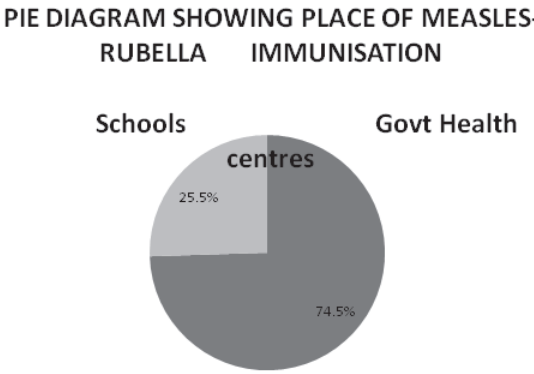

Fig. 1

Among the 255 vaccinated children 6.3% had mild fever following immunization. Among the 22.8% of non-immunized children, 57.4 % were not immunized because of the fear of side effects and major source of information was through television (62.8%). About 77.5% of the mothers had taken special advice before getting their children vaccinated.

Table 2: Source and Barriers (reasons) of Non Immunization according to respondents

Sources	n = 75	Percent %
Television	47	62.8
Social media	22	29.4
Neighbours	2	2.6
Friends	2	2.6
Healthcare professionals	2	2.6
Reasons for not vaccinating		
Fear of side effects	43	57.4
Child was sick	17	22.6
Child refused	5	6.7
Absent on vaccination day	4	5.3
Child is young to receive	3	4
Mother had no time	3	4
Mother is not aware of the place of vaccination	2	2.6

Only 18.4% of the mothers had known that rubella vaccine is available already as optional vaccine. Only few mothers (9.1%) of the were aware of the Congenital Rubella Syndrome.

Table 3: Attitude and Knowledge of mothers on MR immunization

Awareness	n = 330	Percent %
Already available vaccine as optional one	61	18.4
Newly introduced vaccine	269	81.5
Congenital Rubella Syndrome		
Aware	30	9.1
Not aware	300	90.9
Attitude		
Vaccine will benefit my child	239	72.4
Will be of no benefit	91	27.6

DISCUSSION

The study found that the MR immunization coverage rate was 77.2%which is lower than the WHO target coverage of 90-95% for elimination of Measles. The strategy of inclusion of educational institutes as campaign centre for giving vaccine to the school children showed significant positive impact on MR vaccine coverage. However the estimate is less but still it is comparable with the rates in Delhi[17]. This sub optimal coverage of 77.2% might lead to an epidemic in future. Rubella occurs as epidemics every 5 to 9 years. The WHO estimates incidence of CRS between 0.5–2.2/1000 live births during epidemics in developing countries

In the present study, the various reasons for non-immunization were evaluated. The most common reason for non-immunization was the fear of side effects (57.4%) following immunization which is similar to a study in Bangaladesh[18]. The other reasons for not immunizing were child refusal, mothers thought that the measles vaccination is done already, their child is too young to receive it and even few mothers stated that their child was sick (22.6%) were absent on the day of vaccination in spite of adequate announcement regarding the availability of vaccine in the nearby government health centres for the entire month of February. In the present study, mother's occupation was one of the factors significantly associated with the immunization coverage.

The exaggerated information about the adverse events that occurred in few children and in few places were shared in television and social media extensively which had significant negative impact about the immunization campaign and the vaccine coverage.

Though the attitude of the mothers were found to be positive, two hundred and ninety five (90.9%)of the mothers were not aware of the benefits like prevention of Congenital Rubella Syndrome. Hence elaborate information about the eligible age of recipients, place of vaccination, mass immunization duration and alternate places from where they can get vaccinated if they miss in their schools has to clearly reach the community

Majority (81.5%) of the participants were not aware that measles and rubella vaccines are already in the immunization schedule of some states like Delhi, Puducherry, Sikkim and Goa. For the rest of the states the same measles and rubella vaccines are available as optional vaccines[8]. The participants are still in belief that MR vaccine is a new vaccine which is tried on people for the first time. Correct and detailed information about the vaccine has to be provided to the public which will really make a difference in their attitude and practice.

About 77.5% of the mothers had sought second opinion from health care professionals after witnessing vomiting and faint attacks which were shared in television and social media. This reflects the amount anxiety and negative impact created by the media. The media can be used effectively to spread the correct facts about the immunization campaign. The responses to the frequently asked questions by the community covering the particular mass campaign clearing all possible doubts about the concerned vaccination should actually reach the community before the campaign.

Government has to be prepared with adequate ground work anticipating wrong propagandas through television and social media which could virally spread to thousands of people within a fraction of time ultimately affecting the success of the mass campaign.

Earlier the mother's literacy level and the media communication was not as good as now and those were main reasons for immunization coverage[19].But now both literacy level and media communication have improved and if the media is used appropriately, the vaccine coverage rate can even surpass the WHO target of 95% coverage which is mandatory for elimination of measles and rubella.

CONCLUSION

The results of our evaluation indicated that the

campaign was suboptimal in terms of Measles Rubella immunization coverage. This is the first mass campaign of a rubella containing vaccine and was only recently introduced into the routine EPI system. Enhancing population awareness about rubella disease and prevention of congenital rubella syndrome is an important mechanism for increasing understanding of the rationale of the MR vaccine over traditional measles vaccine. The possibility and the nature of adverse events should also be explained to the community during the pre-campaign activities to avoid such suboptimal coverage.

STUDY LIMITATIONS AND STRENGTHS

The present study had few limitations. It was conducted locally, among families of low and middle income and is, therefore, not representative of the whole city. The coverage was estimated based the mother response instead of direct examination by the investigator. However the reach of the media is so viral and uniform throughout the state, the reasons for non-immunization can be generalized. Therefore it could be used as a model for designing strategies in order to improve the content and quality of pre vaccination campaign.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Obtained from the ethical committee

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Factors Influencing the Sleep Quality among the Undergraduate Nursing Students of Udupi District

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ABSTRACT

Background: Sleep is a physiological phenomenon and is very essential for the healthy functioning of the individual. Many factors like study habits, personal factors, life style, mass media, usage of electronic media, academic schedules can influence the quality of sleep.

Objective: To find association between sleep quality and factors influencing sleep quality.

Material and Methods: The study was done among undergraduate nursing students who were in the age of 19 to 24 years from Udupi District, Karnataka**.** The study used a cross sectional design. Pittsburg Sleep Quality Index and a semi-structured questionnaire was used to obtain the data.

Result: There was an association between sleep quality and selected factors like duration of sleep at night, did not often wake up at night, no difficulty in falling asleep, good environment, studying till late at night after 11 pm, writing assignments late at nights, did not work continuously the whole night, get enough sleep before examination, performance in the current year II Sessional examination, not engaging in social activities late at nights ($p<0.05$).

Conclusion: Sleep quality was dependent on selected factors influencing sleep quality. Interventions promoting heath awareness for the undergraduate students to adopt good study habits and to manage the time effectively is utmost recommended for developing good sleep habits.

Keywords: *Factors influencing sleep quality, undergraduate nursing students, sleep quality, Udupi*

INTRODUCTION

Sleep is a function of physical and mental restoration and is a physiological phenomenon. Sleep, which is inadequate, causes emotional instability, daytime sleepiness and decreased concentration leading to memory loss. Mood dysregulation, increased dissatisfaction in daytime functioning, decrease in cognitive functions and obesity are caused by sleep deprivation, which in turn affects the academic performance.[1]

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Increasing sleep problems in adolescents are an obstacle in the learning process of an individual, which in turn negatively affects their behavior, accomplishment of societal capability and excellence of life.[2] Many factors affect the quality of sleep in the individual. A descriptive survey done among 400 undergraduate students of Hong Kong showed that 57.5% had poor quality of sleep, and had an association with the factors such as sex, class of study, and sufficient sleep in the former month.[3] Students had slept 7.95±1.34 hours at night, and (12.3%) students had sleep less than 6.5 hours and a majority were poor sleepers. Poor sleep quality among 540 undergraduates had an association with inadequate sleep which was prevalent among the undergraduates in Lebanon.[4]

The incidence of poor sleep quality among 2854 undergraduates of Thailand was 48.1%. Poor sleep quality had a significant association with a maximum (58.0%) of students who took beverages.[5] Also, a cross

sectional study done in Peru among 418 undergraduates showed a significant association with dependence of Facebook and poor quality of sleep by dysfunction at daytime.[6]

Students of a medical college (19.17%) had poor quality of sleep. There was no difference in the sleep quality among the genders (p>0.05) but a difference was found among the year of study. Anxiety and depression among the students also had a significant correlation. Many factors like stress, health condition, relationship with classmates, irregular work/rest, late to bed, environment of the place of stay, worry of examination and sleep had a significant association with sleep quality.[7] Irregular bedtimes, average sleep in day and inadequate sleep resulted in poor sleep quality.[8]

Inadequate sleep indeed does, however, disturb the roles of the central nervous system. Persistent sleeplessness is frequently related with progressive failure of the thought processes and occasionally even leading to unusual behavioral activities. Increased sluggishness of thought occur heading the end of a lengthy sleepless period, but in adding, an individual can become short tempered or even psychotic after enforced sleeplessness.[1]

Literature review showed different results between the sleep quality and its selected factors influencing sleep quality, and hence an attempt was made to assess an association.

METHODS

Two hundred twenty four undergraduate nursing students were surveyed using a semi-structured questionnaire on factors influencing sleep quality and Pittsburg Sleep Quality Index (PSQI). All the students of second, third and fourth year from a selected college of nursing from Udupi district, Karnataka state, who have given the informed consent and willing to participate in the study were included. The study used a cross-sectional design. The students were in the age group of 19 to 24 years. Ethical clearance was taken from the Institutional Ethical Committee. Formal administrative permission was taken from the concerned authorities.

The data were collected by using valid, pretested and reliable questionnaires. The sleep quality was assessed using PSQI (r=0.70) and a tool on factors influencing sleep quality (r=0.75) was used to assess the factors. The tool assessed the various factors such as, personal factors, familial factors, environmental factors, academic schedules and study habits, performance in the examination, usage of electronic media, and peer influence. The questionnaires were given to the participants and were asked to fill all the items.

The data were categorized and analyzed using SPSS version 23.0. Descriptive statistics was used for sample characteristics and the inferential statistics to find the association.

RESULTS

Out of 224 undergraduate students, majority 206 (92.0%) were females and 175 (78.1%) of the students were hostelites. Eighty two (36.6%) students from fourth year and 71 (31.7%) students each from second and third year respectively. Majority 144 (64.3%) students followed Christianity, 14 (18.3%) were Hindus and 1 (0.4%) was Muslim. Maximum 80 (35.7%) students were in the age group of 21 years. Maximum 80 (35.7%) and 70 (31.3%) of students had their mother's and father's education as higher secondary.

Majority 123 (54.9%) of the students had poor sleep quality and 101 (45.1%) had good quality of sleep. The mean sleep quality was 4.98 ± 2.705. Majority of students 130 (58%) can get to sleep within 30 minutes in the last month, 50 (22.3%) did not get sleep less than once a week, 29 (12.9%) once or twice a week and 15 (6.7%) three or more times a week. Maximum of students 108 (48.2%) did not wake up in the middle of night in the last month, 42 (18.8%) woke up less than once a week, 53 (23.7%) once or twice a week and 21 (9.4%) three or more times a week.

The sleep quality is influenced by various factors. The factors influencing sleep quality that are included in the study are the demographic factors, environmental factors, personal factors, familial factors, academic schedules and habits, performance in previous examination, usage of electronic media and peer influence. The association of these factors with the sleep quality was computed by chisquare test and is given in table 1, 2,3 and 4.

Table 1: Association between sleep quality and the demographic factors using Chi square test

Demographic factors	Good sleep quality	Poor sleep quality	χ2	df	p value
Age in years					
19	23	15	5.644	3	0.227
20	29	45			
21	36	44			
>=22	13	19			
Gender					
Male	4	14	4.134	1	0.042*
Female	97	109			
Class of study					
II Year BSc Nursing	33	38	0.114	2	0.945
III Year BSc Nursing	31	40			
IV Year BSc Nursing	37	45			
Current place of stay					
Home	25	24	0.891	1	0.345
Hostel	76	99			

* - Significant; ($p<0.05$)

Table 2: Association of sleep quality with the personal factors and familial factors using Chi square test

Personal Factors	Good sleep Quality	Poor sleep Quality	χ2	df	p value
Sleep peacefully at night					
No	2	18	10.921	1	0.001*
Yes	99	105			
Get enough sleep at night					
No	2	26	18.611	1	0.001*
Yes	99	97			
Duration of sleep at night					
>7 hours	55	11	72.301	3	0.001*
6-7 hours	42	60			
5-6 hours	4	47			
< 5 hours	0	5			
Often wake up at night					
No	92	90	11.688	1	0.001*
Yes	9	33			
Difficulty in falling asleep					
No	96	103	7.155	1	0.007*
Yes	5	20			
Drinking beverages at night					
No	91	111	0.001	1	0.971
Yes	10	12			

Contd…

Late evening physical activity					
No	95	106	3.738	1	0.053
Yes	6	17			
Familial Factors	**Good sleep quality**	**Poor sleep quality**	**χ2**	**df**	**p value**
Family problems					
No	98	117	0.523	1	0.469
Yes	3	6			
Financial concerns					
No	96	115	0.245	1	0.621
Yes	5	8			

* - Significant; ($p<0.05$)

Table 3: Association between sleep quality and the academic schedules, study habits and performance in previous examination computed using Chi square test

Academic schedules and study habits	Good sleep quality	Poor sleep quality	χ2	df	p value
Studying late night after 11 pm					
No	39	29	5.931	1	0.015*
Yes	62	94			
Writing assignments at late nights					
No	48	37	7.166	1	0.007*
Yes	53	86			
Work continuously the whole night					
No	88	88	8.000	1	0.005*
Yes	13	35			
Get enough sleep before examination					
No	22	59	16.473	1	0.001*
Yes	79	64			
Lack of confidence during examination					
No	73	73	4.084	1	0.043*
Yes	28	50			
Performance in the previous university					
Not satisfactory performance	33	48	0.969	1	0.325
Satisfactory performance	68	75			
Performance in the current I sessional					
Not satisfactory performance	45	64	1.241	1	0.265
Satisfactory performance	56	59			
Performance in the current II sessional					
Not satisfactory performance	22	48	7.674	1	0.006*
Satisfactory performance	79	75			

* - Significant; ($p<0.05$)

Table 4: Association between sleep quality and usage of electronic media, peer influence and environmental factors using Chi square test

Usage of electronic media	Good sleep quality	Poor sleep quality	χ2	df	p value
Listen to music till late at night					
No	49	69	1.279	1	0.258
Yes	52	54			
Chat with friends till late night					
No	60	66	0.744	1	0.388
Yes	41	57			
Peer Influence	**Good sleep quality**	**Poor sleep quality**	**χ2**	**df**	**p value**
Engage in social activities at late nights					
No	92	100	4.339	1	0.037*
Yes	9	23			
Extracurricular activities late at nights					
No	84	94	1.546	1	0.214
Yes	17	29			
Environmental Factors	**Good sleep quality**	**Poor sleep quality**	**χ2**	**df**	**p value**
Good environment for sleep					
No	2	19	11.839	1	0.001*
Yes	99	104			
Put on lights when going to bed					
No	80	103	0.762	1	0.383
Yes	21	20			
Noise disturbance at night					
No	71	79	0.924	1	0.337
Yes	30	44			
Snoring of roommate at night					
No	96	116	0.060	1	0.807
Yes	5	7			

($p<0.05$); * - Significant

The data presented in table 1 and 2 showed a significant association of sleep quality with the selected factors like, gender ($p=0.042$), sleep peacefully at night ($p<0.001$), get enough sleep at night ($p<0.001$), duration of sleep at night ($p<0.001$) and did not often wake up at night ($p<0.001$). Studying late night after 11pm ($p=0.015$), writing assignments late at nights ($p=0.001$), get enough sleep before examination ($p<0.001$), lack confidence during examination ($p=0.043$), performance in the current year II Sessional examination ($p=0.006$) were the academic factors which were dependent on sleep quality (Table 3). The table 4 shows that sleep quality had a significant association with good environment for sleep and engaging in social activities late night ($p<0.05$).

DISCUSSION

Sleep is a very essential physiological process in the human being. Many factors could distort this sleep process which inturn can affect the health and wellbeing of the individual. Undergraduate students in the nursing profession also could face the problems related to sleep due to their academic schedules, poor management of time, study habits and other environmental factors, which could influence them. The present study revealed that sleep quality was dependent on certain academic, personal and environmental factors and was found to have a statistical significant association with these selected factors. It could be due to that, most of the students, inspite of having a good environment of living and sleep, they are continuously exposed to a rigid curriculum pattern whereby, the students start adapting themselves slowly according to their schedules in order to excel themselves.

The findings of this study are supported by few studies. In the present study, gender had an association with sleep quality. A cross-sectional survey conducted among 2,551 University students in which, the female students of second and third year had poor sleep quality. The students had apparent anxiety level which had a strong association with sleep quality.[9] Another study was conducted in examining the risk factors associated with poor sleep quality among 4318 students in Taiwan which showed that, poor sleep quality had a significant association with

the undergraduates, among the females, who had skipped breakfast and had the habit of drinking tea, frequent users of internet and those who had a poor social support.[10]

In a study done by Shelly D H and Ronald D C revealed that, most college students (70.6%) were deprived of sleep, of having less than eight hours of sleep, which led to the negative impact in their academic performance.[11] Another cross-sectional study conducted among 1,444 students in China also revealed that, more than half of the students who used social media exhibited poor sleep quality. These studies contradict the findings of the present study, which showed that quality of sleep was independent of usage of social media.[12]

The results of this study, enables us to identify and explore the factors which influences the sleep quality among the undergraduates, by which we could prevent the risk factors or the areas where a student feels uncomfortable or hazardous in their perspectives of health and education in their everyday lives.

CONCLUSION

Sleep quality was dependent on the selected factors like gender, academic schedules, study habits, sleep habits of the undergraduate students. Nursing students should manage their time effectively and adopt good study habits to improve the sleep quality. Health care professionals should focus their intervention to empower and motivate the undergraduate nursing students to manage their time effectively and balance between the academic schedules, clinical schedules and study habits, thereby adopting healthy sleep habits to improve the quality of sleep.

Conflict of Interest: Nil

Source of Funding: Nil

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Identification of Positive Deviant Behaviours Regarding Infant and Young Child Feeding (IYCF) among Rural Mothers for Improving Child Health and Nutrition-A Cross Sectional Study

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ABSTRACT

Aims: The present study aimed to identify positive deviant behaviour (PDB) regarding IYCF practices among mothers and correlate with the nutritional status of children (<5y).

Methods: Cross sectional study conducted in 2 rural clusters of Vadodara district, Western India, covering all mothers with children (<5y), enrolled in the ongoing ICDS program. Data regarding IYCF practices based on UNICEF guidelines, were elicited by interviewing mothers using semi structured questionnaires, scored using a10-point scale, categorized as Positively Deviant (PD) (scored ≥6) and Negatively Deviant (ND) (scored<6) and correlated with the current nutritional status of children determined by anthropometric assessment.

Results: Overall poor IYCF practices were observed in the study area as incidence of timely initiation of breastfeeding was 48%, colostrum feeding 72%, exclusive breastfeeding (EBF) 32%, pre-lacteal, water and top milk feeding for 1st 6m 50%, 61% and 20% respectively, timely initiation of complementary feeding 64%, continued breast feeding upto 2 years 36%, breastfeeding during illness 88% and active feeding 37% only. Among 96 mothers, 47 **(**48**.**9**%)** were identified as positively deviant **(**PD**)** who practiced ≥6 PDBs**.** Incidence of child undernutrition was significantly ($p<0.05$) higher among ND mothers (44% wasted, 61% stunted, 61% underweight) as compared to PD mothers (40% wasted, 53% stunted 61% underweight)**.** EBF had the highest impact on PD score according to OR value at 95**%** CI**.**

Conclusion: Improving child nutrition using Positive deviance approach by mobilizing community mothers can be an effective, replicable and sustainable strategy if properly planned and implicated.

Keywords: *IYCF practices, Positive Deviant Behaviours, stunting, wasting*

BACKGROUND

Globally approximately 162 million children under the age of 5 years are affected by stunting and 52 million children are severely wasted **(**WHO, 2012**).** UNICEF 2013[1] report made it very clear that irrespective of the regions rural people in all over the world are much more affected by malnutrition than urban people**.**

Nearly half of the stunted children live in south Asia **(**WHO, 2012**)** and though India has made progress towards the international hunger targets, its progress in improving nutrition is unacceptably slow and it still has the second-highest estimated number **(**194**.**6millions**)** of undernourished people in the world **(**FAO 2015**).**

Many programs do not give sufficient attention to the constraints that can prevent caregivers from feeding their children properly, like beliefs that colostrum is bad for a new born baby, family pressures to feed water instead of exclusive breastfeeding, or a heavy workload

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that gives mothers little time to prepare appropriate and nutritious complementary foods (USAID). In India about 44.2% 0-23months children were breastfed within 1hr of birth, 65.1% 0-5months were exclusively breastfed, 47.1% 6-8months were fed complementary food.

It is often seen that in communities there are a few 'deviant' individuals whose uncommon behaviors or practices enable them to outperform their neighbors with whom they share the same resources. Identification of these "positive deviants" can be crucial to bring sustainable change as their behaviors are likely to be affordable and acceptable by the wider community. Identification of positive deviant behaviour helps to understand the psychosocial environment that effects behaviour change and the valuable role of self-efficacious Positive deviant mothers/family members as counselors[2].

Therefore, the present study aimed to identify positive deviant behaviours (PDB) regarding Infant and Young Child Feeding (IYCF) among rural mothers for improving child health and nutrition.

MATERIALS AND METHODS

Ethical clearance: Ethical approval was obtained from the ethical committee of the Food and Nutrition Department of the university (Approval No: IECHR/2015/16). Local community leaders were informed about the aim and procedures of the study. All study participants gave their verbal consent to participate after the study objectives were explained to them.

Study design: It was a cross sectional study conducted for 6months at Ekalbara village of Padra taluka, rural Vadodara, western India. Two clusters of Ekalbara village were selected for the study location. All the children who were less than 5 years old along with their mothers were selected (N=96) as target group and enrolled in the study after giving consent.

Experimental procedure: Data collection occurred in the year 2015 from July to December (6months duration). Mothers were interviewed personally using a pre-tested semi structured questionnaire to elicit data on IYCF practices. Details of IYCF practices were noted down as they align with current, age-specific feeding recommendations for young children (World Health Organization 2010).

Anthropometric measurement (Height and weight) of children was taken and z-scores were calculated for weight/age (Underweight), height/age (Stunting) and weight/height (Wasting) using WHO Anthro software (WHO, 2006).

Using the UNICEF guidelines for IYCF, the identification of the positive deviant behaviours was done. The mothers were scored using a 10 point scale, categorized as PD (≥6) and ND (<6) and correlated with nutritional status of their children

Statistical analysis: Collected and calculated data was entered in excel 2010 datasheet and SPSS23 datasheet and analysed to determine the survey results as per the objectives. Graphs and tables were made to show the results clearly for better understanding.

RESULTS

The study showed that the IYCF practices in the area were very poor and 48% positive deviant mothers were identified who practiced 6 or more than 6 positive IYCF practices.

Table 1: 10 ideal IYCF practices in the study area and their impact on overall IYCF score of PD and ND

Code No.	Criteria	N = 96	PD (≥6) = 47 ND (<6) = 49	N value	%	OR value at 95% CI
PDB1	Timely initiation of breastfeeding	46 (48%)	PD	32	68	5.33
			ND	29	29	
PDB2	Colostrum Feeding	69 (72%)	PD	41	87	5.12
			ND	28	57	
PDB3	No Pre-lacteal feeding of honey or patasa water	498 (50%)	PD	39	83	21.67
			ND	9	18	
PDB4	No Practice of providing water at 1st 6 months	37 (38.5%)	PD	35	74	68.54
			ND	2	4	

Contd…

PDB5	No Practice of providing top milk at 1st 6 months	76 (79%)	PD	45	96	13.06
			ND	31	63	
PDB6	Exclusive breastfeeding practice	31 (32%)	PD	31	66	100
			ND	0	0	
PDB7	Continued breastfeeding upto 2 years	35 (36.5%)	PD	23	49	2.95
			ND	12	24	
PDB8	Breastfeeding during illness	85 (88.5%)	PD	45	96	5.06
			ND	40	82	
PDB9	Timely initiation of complementary feeding	62 (64.5%)	PD	39	83	5.51
			ND	23	47	
PDB10	Active feeding	36 (37.5%)	PD	26	55	4.83
			ND	10	20	

Table 1 shows only 48% mothers initiated breastfeeding within 1 hour after birth. Colostrum feeding rate in the area was comparatively better as 71% mothers fed colostrum to their children after birth. Pre-lacteal feeding was carried out in case of 50% children; water and top milk were provided to 61% and 20% children respectively within 1st 6 months after birth. As a result only 32% children were exclusively breastfed which was not at all satisfactory. Only 36% mothers continued breastfeeding upto 2years and 64% mothers initiated complementary feeding after 6 months. Only 37% mothers practiced active feeding but the rate of breastfeeding during illness was quite high (88%). Table 1 also shows exclusive breastfeeding; practice of pre-lacteals and water feeding were main PDBs identified among PD mothers which had higher impact on the PD score according to their respective OR value at 95% confidence interval (CI). Therefore, these practices can be easily promoted through PD approach as they are the major PD behaviours present among the study population.

Figure 1

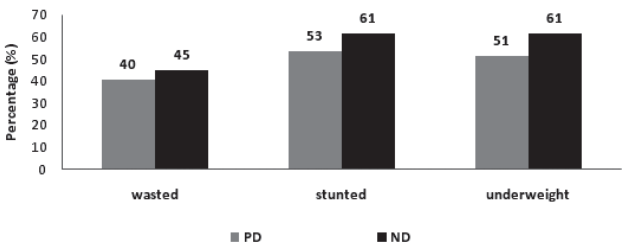

Figure 1: Incidence of child undernutrition among PD and ND groups

Figure 1 shows incidence of child undernutrition was higher among ND mothers (44% wasted, 61% stunted, 61% underweight) as compared to PD mothers (40% wasted, 53% stunted 61% underweight). Statistical analysis in SPSS23 software showed significant correlation between PD score and weight for age (Underweight status) of the children.

DISCUSSION

Previous studies in rural India, In villages of UP[2], West Bengal[3] , and Tamil Nadu[4], *positive deviance* and normal growth of children was enhanced under conditions of small family size (<5), parity below 3, family support to mother, timely initiation of breast feeding, higher frequency of breastfeeding.

Desirable IYCF practices such as frequent breast feeding, timely initiation of Complementary Food (CF), active feeding, giving foods of thicker consistency etc[5] are some major factors contributing better nutritional status.

Viewed collectively, available evidence shows that whether rural or urban, key child feeding and hygiene healthcare practices contributing to normal child growth are similar in most regions. Following the recommendations is not only important for child growth and development, but evidence from observational studies suggests that sub-optimal infant and young children feeding practices can increase the risk of morbidity and mortality in young children[6].

Another study done in Indonesia stated that PDA could be a community based solution to improve child's nutritional status. Nutritional surveys are needed to identify most significant malnutrition determinants to

see adoption of new behaviours and sustainability of outcomes[7]. Study done in rural Uttar Pradesh, India stated using PD helps in promoting indigenous positive correlates of child growth by using community wisdom through people who promote positive practices in concern with technical interventions[8].

Considering the programmatic applications of the findings of this study and make the approach sustainable and replicable, CDPO, supervisors, Anganwadi workers and other grass-root level community workers need to be sensitized so that they can promote the identified positive deviant behaviours among the negatively deviant households. Our previous study suggested that it is necessary to make the community mothers and other family members of a child to understand the direct correlation of wrong IYCF practices with occurrence of infectious diseases and rapid growth faltering of their children[9].

CONCLUSION

Promotion of PDBs can be crucial to bring sustainable change as these behaviours are likely to be affordable and acceptable by the wider community. Interaction of similar cohorts is important for promotion of PDBs. Positive deviance behaviours regarding quality and quantity of complementary foods, dietary diversity, sanitation and hygiene, quality of care, health care access and stimulations for various domains of development are also need to be identified and promoted. Service, delivery and utilization of the existing government programme need to be studied and empowerment of community workers has to be initiated to bring a sustainable change in the situation

Source of Funding: The study was supported by University Grant Commission (Junior research fellowship provided by UGC) and CSR cell of Transpek Silox Industries Private Limited, Vadodara, Gujarat, India

Conflicts of Interest: The authors declare that they have no conflicts of interest.

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The Compliance to Occupational Radiation Safety to the Baggage Fluoroscopy System in International Airport

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ABSTRACT

Background: Radiation safety program applied on the X-ray fluoroscopic screening baggage unit at Airport is important to detect and identify any of the prohibited goods or things that thread the aviation's world. This study aims to evaluate on site dose rates and occupational dose when the fluoroscopic screening baggage is on duty.

Method: A total 25 sample of dose measurements obtained from the population by purposive random sampling. The radiation dose rates and occupational doses selectively monitored with the TLD incorporated with Survey meter. Descriptive statistics and interactive models were blended in analyzing the acquired data.

Results: The X-ray baggage unit at gate-1 contributes the minimum dose rates at 0.00017 mSv/h. The gate-5 shows the highest maximum value at 0.00133 mSv/h. Occupational doses (operator and metal detector personnel) were within the safe limit at 0.00001 mSv. The estimated occupational dose received by each worker/year was made up of 0.95 mSv.

Conclusion: Most employees who work in the X-ray baggage section had lack understanding about radiation safety and its biological effect on human cells. Possible biological effects could be reduced amongst responsible personnel in duty if they create the safety radiation program based on this study recommendations

Keywords: *Radiation safety program, dose rate, occupational dose, X-ray fluoroscopic baggage*

INTRODUCTION

The application of X-ray in radiography industry is closely similar to that of the medical field. One of the requests of industrial radiographic technic is the utilization of baggage fluoroscopy as X-ray device for passengers and crews' luggage safety at the airport. The implementation of X-ray used to baggage fluoroscopy is intended to detect passengers' baggage before entering the airport. Nevertheless, caution should be exercised when using baggage fluoroscopy due to its utilization of relatively high electromagnetic radiation (140 – 180 kV) which can cause biological effect toward the people surrounding the device[(1)]

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High doses of ionizing radiation apparently produce deleterious consequences in humans, including cancer induction[(2)]. Similarities in cellular effects lead to the assumption of a common mechanism and the DNA double strand break is identified as the severe radiation-induced lesion. A cancer model extends the cellular consequences of the main radiation risk confirming the dose effect for cancer at low doses[(3)].

Ahmad Yani International Airport of Semarang has six baggage X-ray devices, 2 for baggage and 4 for cabin materials wherein they are operated to monitor incoming things to the aircraft. These devices are operational from 06:00 AM WIB to 21:00 WIB, causing a big amount of radiation but the monitoring of the measurement of exposure and dosage rates is not yet to be optimized. Therefore this research is highlighting the compliance to the safety as regulated.

METHODOLOGY

This study was performed in quantitative and qualitative ways. The quantitative approach is used to measure the exposure rates on baggage cabin fluoroscopy and operators' occupational radiation doses. Radiation exposure rates of the five units of baggage fluoroscopy (two baggage X-ray, two domestic Cabin X-ray, and one international Cabin X-ray) were measured by survey meter (Babyland, USA) and occupational doses of 25 operators on duty were measured by personal dosimeter of Thermo Luminescence Dosimetry (TLD) Chip. The qualitative method was performed by conducting a deep interview to assess workers' knowledge about X-ray utilization. Five respondents were involved in giving information concerning operators' knowledge about X-ray use. The analysis outcome of exposure and dose rates of radiation workers was compared to an international publication[4] and national value of Dose Reference Limit (DRL) standard[5].

RESULTS

Dosage Exposure Rate: The measurement of radiation exposure was done on 5 scanner fluoroscopy devices with the following detail: 2 Baggage X-ray, 2 domestic Cabin X-ray, and 1 international Cabin X-ray. In Gate 1, the lowest exposure rate happened to F (passengers) which amounts to 0.00017 mSv/h and the highest exposure rate happened to E (scanner operators of outgoing goods) which amounts to 0.00067 mSv/h. The average of the five measurement points is 0.00047 mSv/h with a standard deviation of 0.00021 mSv/h resulting in the lowest average rate of 0.00038 mSv/h and highest average rate of 0.00088 mSv/h.

In Gate 2, lowest exposure rate happened to E (scanner operators of outgoing goods) which amounts to 0.00013 mSv/h, and the highest exposure rate happened to B (scanner operators of incoming goods) which amounts to 0.0008 mSv/h. The average of the five measurement points is 0.00041 mSv/h with a standard deviation of 0.00027 mSv/h resulting in the lowest average rate of 0.0004 mSv/h and highest average rate of 0.00107 mSv/h.

In Gate 3, the lowest exposure rate happened to C (scanner operators of outgoing goods) which amounts to 0.00010 mSv/h, and the highest exposure rate happened to D (scanner operators of incoming goods) which amounts to 0.00077 mSv/h. The average of the five measurement points is 0.00039 mSv/h with a standard deviation of 0.00026 mSv/h resulting in the lowest average rate of 0.00036 mSv/h and highest average rate of 0.00103 mSv/h.

Gate 4 is used for scanning hand-carries such as handbags, souvenirs, and hand-carried items.

The lowest exposure rate happened to A (baggage X-ray operator) which amounts to 0.00013 mSv/h, and the highest exposure rate happened to D (scanner operators of incoming goods) which amounts to 0.00093 mSv/h. The average of the five measurement points is 0.00036 mSv/h with a standard deviation of 0.00031 mSv/h resulting in the lowest average rate of 0.00044 mSv/h and highest average rate of 0.00124 mSv/h.

Gate 5 is the international flight scanner. To sum up, the summary of all measurement is shown in Table 1.

Table 1: Summary of the lowest and the highest exposure rates

No.	Measurement Location	Lowest Rate (mSv/h)	Highest Rate (m Sv/h)	Remark
1.	Gate 1	0.00017	0.00067	Baggage X-ray, 1-meter distance from X-ray source
2.	Gate 2	0.00013	0.00080	Baggage X-ray, 1-meter distance from X-ray source
3.	Gate 3	0.00010	0.00077	Domestic cabin X-ray 1-meter distance from X-ray source
4.	Gate 4	0.00013	0.00093	Domestic cabin X-ray 1-meter distance from X-ray source
5.	Gate 5	0.00010	0.00133	International cabin X-ray 1-meter distance from X-ray source

The average exposure rates at seven measurements are shown in Table 2.

Table 2: Exposure rate average

Location	
Gate 1	0.00047 ± 0.00021
Gate 2	0.00041 ± 0.00027
Gate 3	0.00039 ± 0.00026
Gate 4	0.00036 ± 0.00031
Gate 5	0.00039 ± 0.00053

The mean and standard deviation values resulting from the highest exposure rate measurement at Gate 1 (Astrophysics Baggage X-ray) show the value of (0.00047 ± 0.000212) mSv/h. The mean and standard deviation values resulting from the lowest exposure rate measurements at Gate 4 (Fiscan Domestic Cabin X-ray) show the value of (0,00036 ± 0,00031) mSv/h. Deviation value resulting from the measurement is quite low between (0,00021 ± 0,00053) mSv/h.

Table 1 shows that the Astrophysics Baggage X-ray (Gate 1) gets the highest minimum score of 0.00017mSv/h as compared to other gates (0.00010 – 0.00013 mSv/h). Gate 5 obtains the highest maximum score of 0.00133 mSv/h as compared to other gates (0.00067 - 0,00093 mSv/h). The highest mean and standard deviation of the exposure rate measurement at Gate 1 shows the value of 0,00047 ± 0,00021 mSv/h. The effective dosage outcome of the monitor and the metal detector operators using TLD dosimeter is 0,00001 mSv.

The minimum exposure rate of Gate 1 gets a high score because it has a device with voltage specification of 165-180 kV. Gate 1 scanner is utilized to check materials that are inside numerous items of baggage. Therefore a higher X-ray energy is required to penetrate them. Higher voltage produces potentially higher penetrating power so that the shield of the device is not sufficiently effective to protect the radiation scatters.

The measurement of exposure rate conducted at the area of 1-meter distance from the radiation source shows a leak of the X-ray around at a distance. Therefore, the operators should not stand too close to the scanner device. The mean of exposure rate as compared to the standard is 1 mGy/h which is still within the safe boundary. The effective radiation doses of the monitor and the metal detector operators worked for 1 month shows a much too small a value where the result of the effective dose score for Dosage Limit (DL) of 20 mSv/year [6] is still within a safe boundary.

Personnel Dosage: Personnel Dosage is measured using Thermo Luminescence Dosimetry (TLD) for 1 month toward 12 staffs of licensed operators and 13 outsourced (supporting) metal detector personnel, altogether 25 personnel. Based on the TLD reading of the airport 1274 001 T up to 1274 025 T series on staff using TLD on their waists.

The above result is collected by Safety Guide Test Method[6], and the element was read by TLD reader BARC type TL 1010. The reading was converted into the radiation dose based on appropriate calibration curve/factors.

Airport operators work daily for 8.5 hours for the morning shift and 7.5 hours for the afternoon shift, and the radiation collected is accumulative. Within 168.5 hours a month and 2022 hours a year under the mean score of 0.00047 mSv/h, the accumulated annual dosage is 0.95 mSv/year, and it is still below the safe boundary.

Operators Knowledge in X-ray Utilization: The operators' opinion during their work with X-ray so far are they work according to schedule, but they are not aware of the impact of the danger of X-ray to health. According to respondent, operator for X-ray monitor must have a license of Junior Av Sec while metal detector operator must have Basic Av Sec. Medical check-up for baggage and cabin X-ray operators is given once a year for each employee, consisting of blood and urine test, yet there is no first check-up for X-ray operators. Formerly radiation dosage Monitor was given to operators in the form of a filmed badge to be put on their trousers, but it has been 5 years they don't use it anymore because the company does not provide it anymore.

From the interview result it was found that operators' knowledge about radiation is still lacking, yet from the measurement outcome of the exposure rate and personal effective dosage, their dose levels are still within the safe boundary.

By the regulation [6] if a radiation operator receives excessive dosage, he/she should be given a break or transferred to radiation-free section. One of the efforts is by scheduling the work shift for each operator beginning with morning shift, afternoon shift and then taking an off day, in the attempt to minimize radiation dose received by the operator. Despite the existence of shield protection within the fluoroscopy device, new

Pb protection curtain should be provided for X-ray operators. Besides, at present situation operators are not using a radiation monitoring tool. This practice is against the regulation[6] that every radiation worker must use radiation monitoring tool and be periodically monitored.

CONCLUSION

The baggage X-ray at gate 1 (domestic passengers) of Ahmad Yani Airport, Semarang, Indonesia shows the highest level of average dose rates per hour (0.00047 ± 0.00021) compared to that of the rest baggage X-rays at gate 2-5. For all baggage X-rays, however, their average dose rates per hour are declared still within the safe boundary. Similarly, the effective personal dose of monitor and metal detector operators using TLD dosimeter device is 0.00001 mSv, which is also still within a safe edge.

Shortly, although all domestic and international baggage X-rays are run within recommended radiation dose limit, a relatively small radiation dose received by the operators would still have a potential danger to the human cells as it accumulates, absorbs and is deposited in the human tissues in the long term. Additional protective barriers should be placed appropriately around the baggage X-rays so that the low energy radiation levels would be absorbed by the barrier and protect the operators from stochastic biological effects.

Conflict of Interests: The authors have no conflict of interests related to the conduct and reporting of this research.

Source of Fundings: The authors would like to thank Polytechnic of Health Ministry of Health located in Semarang, Central Java, Indonesia for funding.

Ethical Clearance: The research received permission of ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Semarang, Indonesia.

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The Nutrition Care Process (NCP) Impact to the Dietary Behavior of Diabetes Mellitus Patients

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ABSTRACT

Background: The regulation number 24 in 2015 obliging the Community Health Center or *Pusat Kesehatan Masyarakat* in Indonesia to handle Diabetic patients affects the changing in nutritional care system including the Diabetes Mellitus management.

Objective: The purpose of the study is to know the effect of the Nutrition Care Process (NPC) on knowledge, attitude, behavior and blood glucose of patients with DM.

Method: This experimental study used the Pre and Post Test Control Groups Randomized Design to 44 diabetic patients of treatment and control groups. The treatment group was given the NCP and the data of knowledge, altitude, and behavior and blood glucose were measured twice. The independent T-Test was applied to analyze the effect of NCP.

Result: The study found that no differences between control and treatment group at the beginning of the survey. The independent T-Test showed that the NCP affect attitude and behavior of Diabetic patients significantly, but the knowledge did not produce any different result between control and treatment group. Fasting blood glucose level was significantly different while the 2-hour postprandial blood glucose level shows no difference.

Conclusion: It is concluded that NCP should be applied in the Community Health Center as one of procedures to provide the high-quality nutritional care.

Keywords: *NCP, Behavior, Diabetes Mellitus*

INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease that cannot be cured, but blood sugar levels can be stabilized to normal. Maintaining blood sugar levels require medication adherence and diet as a self-management process [(1)]. Useful independent DM management is possible if individuals have the knowledge, skills to perform DM control behaviors independently [(2), (3)]. Compliance of DM patient diet in many studies conducted was still small, for example, the research carried out in Banyumanik Sub-district of Semarang showed the high percentage of respondents who did not become obedient in the implementation of DM diet achieving 91.4% [(4)]. Another study conducted on 100 Indonesian DM patients visiting the Diabetes Polyclinic, who adhered to the implementation of diabetes mellitus diet only 37% of patients and non-adherent to the implementation of DM diet as much as 63%[(5)].

The Nutrition Care Process (NCP) is a comprehensive and individualist approach to increased awareness and behavioral change. The role of nutritionists is crucial in helping the process of healing the patient through nutritional services. Effective, efficient, and integrated nutrition services through Nutrition Care Process (NCP) are proven to reduce disease complications [(6)]. The application of NCP has so far had a positive impact on the patient's nutrition service system at the Hospital. Research at Sultan Agung Semarang Islamic Hospital showed that there was an increase of energy and protein

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intake of chronic renal failure patients after nutritional intervention following NCP procedures at 12% average. Increased intake of nutrients will positively affect improving the nutrition of patients so that it may help speed up the healing process of patients [7].

This study is to determine the effect of food treatment through NCP on changes in attitude knowledge, diet compliance and blood sugar levels in patients with Diabetes Mellitus in Community Health Centers.

METHODOLOGY

This experimental study used pre and post randomized controlled randomized design. The study was conducted at two health community centers in Genuk sub-district, Semarang city. The test was performed on forty four participants under chronic disease service program who have met the inclusion criteria of Diabetes Mellitus. The selected samples were then randomly assigned to the control and treatment groups. The data collected include identity data, knowledge, attitude, diet behavior and blood sugar level of patients taken before and after treatment by interview method. In the treatment group after the data were taken at the next stage 1, Nutrition Care Process (NCP) was given a treatment of nutritional care service. NCPs included nutrition assessment, diagnosis of food, dietary interventions based on the diagnosis of nutrition and evaluation monitoring. Nutrition intervention includes nutrition education, nutrition counseling. In the other hand, the control group only gets the standard service of chronic disease service program. Hypothesis test employed the independent t-test analysis with 0.05 confidence level.

RESULTS

Nutrition service standards at Community Health Centers, especially in patients of chronic disease service program of Diabetes Mellitus patient at Bangetayu and Genuk Health Center, include assessment of patient's nutritional status, investigation (blood pressure and blood glucose level) and nutritional counseling. Thus, the nutritional services undertaken have not been based on the nutritional problems experienced by patients but based on medical therapy. The nutrition services using Nutrition Care Process model (NCP) given to the treatment group in this study are:

1. Assessment: i.e., identification of nutritional problems related to nutrient intake and bioactive substance, clinical aspects (observing the results of nutritional status measurement, laboratory examination, and support), behavioral and environmental issues and causes.
2. Diagnosis of nutrition: determining the nutritional problems based on assessment results.
3. Interventions: given nutritional counseling according to the patient's nutritional diagnosis and nutrition education about DM diet.
4. Monitoring and evaluation: results of the interventions provided are monitored and evaluated through diet after the intervention, laboratory outcomes and changes in knowledge, attitudes, and behavior.

The treatment group of women mostly equal to 36,4% and in control group mostly women as big as 34,1% Scores of nutritional knowledge, attitudes and dietary compliance of study subjects before treatment presented in Table 1.

Table 1: Knowledge, attitudes, and adherence to treatment

Variables	Treatment (n = 22)		Control (n = 22)		p
	Mean	SD	Mean	SD	
Knowledge	8	3.8	10.6	6.0	0.095
Attitude	26.5	2.8	27.3	4.3	0.481
Dietary compliance	26.9	3.9	27.1	4.3	0.885

The mean score of knowledge before treatment in control group was higher than treatment group that was 10.6 + 6.0, but statistically there was no difference (p = 0.095). Similarly, the mean scores of attitudinal and obedience scores were also greater in the control group with the mean of 27.3 + 4.3 and 27.1 + 4.3 respectively. These results show the sample at the beginning of the study was not different between control and treatment groups (homogeneous). Blood sugar levels of the subjects of the study before treatment were presented in Table 2.

Table 2: Fasting blood sugar and blood sugar Levels before treatment

Variables	Treatment (n = 22)		Control (n = 22)		P
	Mean	SD	Mean	SD	
Fasting blood sugar	186.8	62.3	150	59.9	0.060
Blood sugar 2 hours postprandial	186.5	66.7	158.4	58.8	0.145

Table 2 shows the mean fasting blood glucose level in the treatment group was higher than the control group that was 186.8 g / dl + 62.3. Similarly, the average blood glucose level of 2 hours postprandial was also greater in the treatment group with the mean of 186,5 + 66,7. However, statistically there was no difference (p = 0.060 and p = 0.145). Research subjects both in the treatment and control group were re-measured for nutritional knowledge, attitude, and diet compliance after being treated where the results were presented in Table 3.

Table 3: Knowledge, attitudes and diet compliance of study subjects after treatment

Variables	Treatment (n = 22)		Control (n = 22)		P
	Mean	SD	Mean	SD	
Knowledge	10.36	3.7	10.36	5.6	1
Attitude	30.86	2.4	26.86	3.7	0.040
Dietary compliance	31.22	2.97	28.18	4.69	0.014

Table 3 shows that the mean score of knowledge was almost the same score of 10.36 + 3.7 and in the treatment group and 10.36 + 5.6 in the control group. Statistical analysis showed no difference in both groups (p = 1). The average score of attitudes and diet compliance was higher than the control group that was 30.86 + 2.4, and 31.22 + 2.97 Statistical analysis showed that there was a difference in both groups after treatment (p = 0.04 and p = 0.014).

The influence of nutrition service model NCP on group treatment knowledge increased compared to control group that decreased. There was an increase in the mean of knowledge scores in both control and treatment groups after receiving treatment of nutritional services with NCP. The result of the statistical test showed inconsistent results where the result is not significant at P-value = 1.00. These results contradict previous studies that found a significant relationship between counseling and knowledge [(3)]. The influence of nutrition service model NCP on the attitude of treatment group increased more than with control group. There is an increase in the normal view stance in case and control groups after receiving NCP nutritional services. The result of hypothesis test shows that there is a significant influence of attitude on control group and treatment after receiving Nutritional Care with NCP model (P Value = 0.04) Hypothesis test demonstrated a major impact of the provision of NCP with dietary compliance of DM patients in the Health Community Center with P value = 0.014. Table 4 shows the mean fasting blood glucose level and 2 hours post prandial blood glucose concentrations in the lower treatment group after being given NCP model nutrition services compared to controls that received the standard nutritional services of the Health Community Center.

Table 4: Fasting blood sugar and 2 hours postprandial blood sugar

Variables	Treatment (n = 22)		Control (n = 22)		P
	Mean	SD	Mean	SD	
Fasting blood glucose	126.09	32.7	175.63	66.07	0.04
Blood glucose 2 hours postprandial	180.82	76.89	198.64	76.09	0.44

The mean fasting blood glucose level of the treatment group was 126.09 g / dl + 32.7 lower than the control group, and there was statistically different in both groups. The mean blood glucose level of 2 hours postprandial treatment group was 180,82gr/dl + 76,89 lower than the control group, and statistically, there was no difference in both groups.

The results of statistical tests showed a significant effect of NCP nutrition service on fasting blood glucose level (P Value = 0.04) while at 2-hour polyurethane postprandial level although there was a decrease in gum sugar statistically did not show a significant effect (p-value = 0.44).

DISCUSSIONS

The results of the study found that chronic disease service system performed in the two Health Community Centers is a medical service in the form of drug services and medical examination. Nutrition services that run in the kind of group services are counseling. Food services in the form of NCP should be applied to patients with chronic diseases that are more individual. This personal service will give positive results both on knowledge, attitude, and behavior. There is one fundamental difference between the standard of the nutritional service of the Health Community Centers and the NCP. The level of nutrition services in Health Community Centers is located on "what should be done" and is a component of care in certain diseases. Nutrition Care Process (NCP) is a standardized process, further demonstrating "how nutritional care is done." In essence, the NCP accurately displays the nutritional care spectrum that emphasizes the consistent and accurate steps of dietitians when delivering nutritional care, as well as guidelines in nutrition education and other preventive nutrition care venues.

Although the results of the study were statistically no difference between the control group and the treatment of knowledge, there was an increase in the mean of knowledge scores between the baseline data and the final data. Experience as an individual's cognitive part is influenced by adequate information from anyone. An increase in the knowledge scores provides evidence of the development of disease-related information obtained by the sample.

The NCP which is a standardized nutrition service begins with a nutritional assessment to find nutritional problems in samples that are technically made in a nutritional diagnosis. The Nutrition intervention given is based on the etiology present in the nutritional diagnosis, so the approach is so specific and individual that it will encourage a change of attitude. According to the theoretical model of persuasion communication with the cognitive theoretical approach, that stimulus that produces cognitive responses such as nutrition education will produce behavioral changes. Inadequacy with previous studies is possible because the interventions given in NCPs depend on approaches and objectives where the emphasis is focused on behavior change rather than on knowledge change. This occurrence is in line with a finding [8] that with the NCP service can improve changes in drug-taking behavior in Diabetes Mellitus patients.

According to Theory of Reasoned Action (TRA), individual attitudes and norms towards a disease affect dietary adherence. Decision theory also mentions the patients themselves make decisions about what to do in the treatment business. This notion is related to the communication that exists between the patient and the health professional. If patients are well informed about procedures, risks, and effectiveness of the engagement as done in the NCP intervention, then they will make the right decision. In the NCP nutrition assessment carried out not only leads to the proper enforcement but also in nutritional diagnoses.

CONCLUSIONS

1. There is an increase in attitude score, knowledge, dietary behavior after being given a nutritional service model NCP. Also, there is an improved dietary adherence after being given a nutritional service of NCP model.
2. There is a decrease in fasting blood glucose levels after being given a dietary service model NCP, and also there is a reduction in fasting blood glucose levels after being given a nutritional service of NCP model.
3. There is an influence between the application of NCP in chronic Diabetes Mellitus patients with knowledge, attitude and dietary behavior as well as increased blood sugar after being given NPC model of nutrition service.

Nutrition officers of Community Health Centers are recommended to provide food services as echoed by NCP model, especially in patients of chronic disease service program because it proved to increase knowledge, attitudes and dietary compliance of Diabetes Mellitus patients. Given these changes will have an impact on the achievement of healthy blood sugar levels.

Conflict of Interest: The author has no conflict of interests related to the conduct and reporting of this research.

Source of Funding: Source of the fund for this project was by Politeknik Kesehatan Kementrian Kesehatan Semarang.

Ethical Clearance: Before conduct of the study written permission was obtained from Politeknik Kesehatan Kementrian Kesehatan Semarang, Indonesia. Consent and willingness were established from all the subjects who meet inclusion criteria of this study.

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Association Between Maternal Folate Intake and Polymorphism MTHFR A1298C as Risk Factor of Non-Syndromic Cleft Lips

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ABSTRACT

Background: Methylenetetrahydrofolate reductase (MTHFR) is often associated with the incidence of orofacial clefts. Folic acid deficiency has gained considerable attention because of its promising role in modulating diverse clinical condition such as cleft. The objective of the study is to describe the association of MTHFR A1298C polymorphism and maternal folate intake with an orofacial cleft in Sasak Population.

Method: This study used control case design, the number of the subjects were 148 who were divided into case groups and their mother (70 issues) and control groups and their mother (78 items). The detection of Polymorphism MTHFR A1298C used PCR-RFLP and sequencing for confirmation. The information on the dietary pattern and folic acid intake used FFQ (Food Frequency Questionnaire).

Results: MTHFR A1298C polymorphism was associated with maternal folic acid intake in Sasak (p = 0,001), OR = 14,7 CI 95% (2,49-85,53) for cases and (p= 0,041), OR = 4,4 CI 95%(0,9-19,16) for control group. Maternal folic acid intake was associated with cleft (p=0,037) OR= 2,7 CI 95% (1,06-6,94) in Sasak Population.

Conclusion: Maternal folic acid was as the risk factor cleft lip/palate in Sasak population and association with MTHFR A1298C Polymorphism.

Keywords: *Polymorphism MTHFR A1298C, folic acid, orofacial clefts*

INTRODUCTION

The incidence of nonsyndromic cleft lip with or without cleft palate (NS CL/P) remains high in all over the world. In Indonesia, there will be 3000 to 6000 new cases of cleft lip annually accounting for 2.4% or 1.7 per 1,000 live births [(1)]. In Asian countries such as India, the incidence of cleft lip is high in which 35. 000 babies were born with the cleft [(2)]. In Africa, the number of people with cleft lip tends to be less (1: 2,500 births) [(3)]. Multifactorial factors including genetic and environmental are contributing in cleft lips [(4)]. Methyltetrahydrofolate Reductase (*MTHFR*) A1298C is *MTHFR* genotype variants that are thought to contribute to cleft lip, or palate [(5)]. *MTHFR* is an enzyme that converts 5, 10-methylenetetrahydrofolate from folic acid into 5-methyltetrahydrofolate in folate cycle, The endogenous folate cycle is a predominant methyl donor to remethylate homocysteine (Hcy) into methionine [(6)]. Pregnant women with MTHFR polymorphism have a higher risk to get folate deficiency [(7)]. The food sources that rich in folate are liver, fish, and meat, mushroom, green leafy vegetables such as spinach, bean leaves, nuts, and yeast. Food processing can destroy 50-90% of folate content by heating, oxidation, and exposure to ultraviolet light [(8)]. Dietary folates are conjugated by Gamma-*glutamyl hydrolase*/folate into monoglutamate assisted by Zink [(9)]. Folate deficiency and abnormal metabolism of folic acid and Hcy play a significant role in the incidence

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of neural tube defect (NTB), facial cleft, congenital heart disease, pregnancy complications, and other congenital abnormalities [10]. Because of foods high in folic acid are found from an animal source that is quite expensive for most Indonesian including Sasak population.

To ensure that pregnant women folic acid intake is sufficient a folic acid supplementation program began after 2002. The supplementation programme has just been set by the government in 2014 but still lack of monitoring report. Hence, this study assessed the relationship between maternal genetic background and folate status with or without supplementation.

MATERIALS AND METHOD

Study design: The study design was a case control. Subjects were 70 children and their mother from Sasak Tribe population with a non-syndromic cleft lip with or without cleft palate. The control population was enrolled from 78 healthy normal children and their mother. The clinical examination of the subjects was done by Lips - Alveolar - Hard palate - Soft palate - Alveolar – Lips (LAHSAL). Inclusion criteria that obtain in this study were the mother and her child less than five years old, average weight and body length at birth, without other congenital abnormalities associated with cleft lip/ palate syndrome. The exclusion criteria were orphaned children, and the mother had undergone chemotherapy or radiotherapy.

Blood Sampling: Blood Ethylenediaminetetraacetic Acid (EDTA) samples were withdrawn for 5 ml from all of the study subjects for salting out DNA (Deoxyribonucleic Acid). Extraction.

Genotyping: The *MTHFR* were amplified with three-step Polymerize Chain Reaction (PCR) followed by Restriction Lenght Fragment Polymorphism (RFLP). The PCR RFLP was done at Cebior Laboratory Faculty of Medicine Diponegoro University, Semarang Indonesia. MTHFR A1298C forward primer 5'-CAA GGA GCG GCT GAG GAA GA-3 'and reverse primer 5'-CCA CTC CAG CAT CAC TCA CT-3 '. *MboII*, restriction enzymes were used in the identification of *MTHFR* genotype. The enzyme will digest the PCR product of 128 bp into two fragments measuring 100 bp and 50 bp.

Folate status: data were obtained with the administration of Frequency Questionnaire (FFQ) [10] and analyzed by Nutrisoft 10.1 software.

Statistical analysis: The relationship between *MTHFR* gene and cleft lip were analyzed by using a Chi-Square test and the Odd Ratio (OR), Confidence Intervals 95%. If the relationship between folate status and cleft lip had normally been distributed, data were analyzed by T-independent Test. Otherwise, Mann Withney analysis was performed.

RESULTS

The distribution of variant cleft for case subjects was unilateral cleft lips (31.4%), bilateral cleft lips (21,5%), cleft palates (28.5%) and cleft lips with palates (18,6%). The FFQ data analysis with Nutrisoft Software was used to determine the Odd Ratios (OR) of folic acid in 2.7 (95% CI: 1, 1-6,9). Mann Whitney test was applied to determine the difference between the subjects with the cleft lip the control resulting in $p = 0.037$ which (<0.05) meaning that there was a significant difference in folic acid between the case and oversight group.

Table 1: Genotype distribution of MTHFR A1298C gene

Genotype	case (n = 70) N (%)	control (n = 78) N (%)	P value	OR (CI 95%)
A1298C/AA	30(42.9%)	27 (34.6%)	--	--
A1298C/AC	31 (44.3%)	41(52.6%)	0.036	2.7(1.1-7.0)
A1298C/CC	9 (12.9%)	10 (14.3%)	0.041	2.7(1.0-7.0)

CI: Confidence Interval, N: Number, OR: Odd Ratio

Table 1 showed the distribution of *MTHFR* A1298C genes. In the MTHFR A1298C gene showed a uniform distribution of genotype between the common allele, mutant heterozygotes, and mutant homozygotes and there was a significant difference between cases and controls.

Table 2: The relationship between maternal folate status during pregnancy and polymorphism MTHFR A1298C

MaternalFolate Status	MTHFR A1298C gene		P Value	OR (CI:95%)
	Polymorphism	Normal Allele		
Case				
Poor	16 (88.9%)	6 (35.3%)	0.001	14.7 (2.49-85,53)
Good	2 (11.1%)	11 (64.7%)		
Control				
Poor	7 (63.6%)	8 (28.6%)	0.046	4.4 (0.9-19.16)
Good	4 (36.4%)	20 (71.4%)		

CI: Confidence Interval, OR: Odd Ratio

Table 2 shows that in the protective case group (mothers of children with cleft lip), folate status (both poor and good), there was a significant relationship between the maternal folate status and the occurrence of polymorphism MTHFR A1298C in both case and control group.

Table 3: Relationship between maternal folate status during pregnancy and cleft lip

Maternal folate status	Cleft lip/palate		P Value	OR (CI: 95%)
	case(celah)	control (normal)		
Poor	22(62.9%)	15(38.5%)	0.037	2.7 (1.06-6.94)
Good	13(37.1%)	24(61.5%)		

CI: Confidence Interval, OR: Odd Ratio

Table 3 showed that the number of women with poor and good folate status 22 subjects (62.9%) and 13 subjects (37.1%) respectively, in cases compared to 15 subjects (38.5%) and 24 subjects (61.5%), respectively among the control group.

DISCUSSION

Non-syndromic cleft lip with or without palate is caused by multifactional factors both intrinsic and extrinsic. Intrinsic factor includes genes and heredity, external factors include nutrition during pregnancy, smoking and drinking alcohol in the mother during pregnancy, drinking herbal medicine during pregnancy, environmental pollution[11]. The results of the study showed that the most common maternal age during pregnancy was more than 35 years old, a hight age for pregnancy, the maternal age was not a risk factor for cleft lip in Sasak population. in women aged more than 35 years, biological and environmental changes occur[12,13]. Besides the failure of vascularization of the uterus during pregnancy, that can affect the transfer of nutrients to the fetus[14,15] also, the pregnant woman above 35 years old are at a higher risk of preeclampsia, chronic hypertension, placental abnormalities[16]. Under 19 years is a high risk for pregnancy due to immature biological organs besides socioeconomic factors and the lack of responsibility leading to the development of fetal disorders [17]. Low educational and economic level of the elderly on the Sasak population can be risk factors for cleft lip. The low level of education may lead to poor parental knowledge on the importance of maternal and fetal health, and low socioeconomic factors may lead to the inability to provide proper nutrition to the fetus[18].

We found that the maternal folate status during pregnancy was associated with cleft lip development. There was a significant difference between maternal folate status in both cases (p = 0.001) and control subjects and *MTHFR* A1298 gene polymorphism (p = 0.046). Folic acid deficiency can be detected by a decrease in *MTHFR* (methyltetrahydrofolate reductase), causing deficient remethylation of homocysteine into methionine and reducing the production of SAM (S-adenosylmethionine) [19]. This results in disruption of the methylation reaction leading to disturbance of that

DNA methylation. Methylation defect causes disruption of the expression with the result of inhibited fetal development and the of some malignancies[20].

Table 3 shows that the maternal folate status during pregnancy affects cleft lip incidence in the Sasak population in Lombok (p: 0.037) in which poor maternal folate status during pregnancy tend to have a 2.7 times higher risk to cause cleft lip compared to that of real maternal folate status. This incidence shows that the maternal diet during pregnancy affect the state and health of the fetus and can modulate their offspring through epigenetic mechanisms [21]. Folic acid is required for the metabolism of carbon playing a role in several cellular reactions including in the metabolism of amino acids, the biosynthesis of purine and pyrimidine, the formation of agent methylation primer S-adenosyl-methionine (SAM) which is a methyl donor DNA, histones, proteins, and fats. Natural dietary folic acid is absorbed in the intestine or liver and metabolized to *5*-methyltetrahydrofolate (5-methylTHF) resulting in polyglutamate for cell retention. However, the fortified folic acid can reduce the dihydrofolate by the enzyme dihydrofolate reductase in the liver and converted into tetrahydrofolate, a substrate for synthesis polyglutamate[22].

Deficiency of folic acid as an epigenetic nutrient, a co-factor of one-carbon metabolism, during pregnancy can have an effect on the fetal program and can modulate the genome, a pattern of DNA methylation and lead to dysregulation of gene expression. The administration of folic acid supplements is often combined with other vitamins (multivitamin) causing a difficulty in analyzing whether the effects are due to folic acid or other vitamins. Thus, studies on the administration of supplemental folic acid alone are needed[23].

A different area may show a different result in the relationship between folate status and polymorphism. This is because the diverse population has a different allele variation and different gene involved in folate metabolism[24].

Conflict of Interests: The authors have no conflict of interests related to the conduct and reporting of this research.

Source of Funding: The authors would like to thank Sultan Agung Islamic University, Semarang, Indonesia and Minister of Research and Higher Education of Republic Indonesia for funding.

Ethical Clearance: Informed consent was obtained from all of the participants. The research protocol was approved by Medical Research Ethics Commission Faculty of Medicine, Diponegoro University and Dr. Karijadi Hospital, Semarang Indonesia No. 023/EC/FK-RSDK/2016.

CONCLUSION

In Sasak population living in Lombok Indonesia, *MTHFR* A1298C gene polymorphism is a risk factor for cleft lip, and maternal folic acid status during pregnancy is associated with the cleft lip and polymorphism of the *MTHFR* A1298C gene.

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Prevalence of Postural Problems among the Nurses in Chennai

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ABSTRACT

Aim & Objective: The aim of the present study was to evaluate the postural problems arising due to the working posture among nurses in Chennai, with an objective to determine the prevalence of musculo skeletal disorders.

Materials and Methods: The study was conducted on 176 nurses working in different hospitals. The randomly selected subjects were given the Standardized Nordic Questionnaire to find out the perception of musculoskeletal symptoms. Ergonomic assessment tools such as Rapid Upper Limb Assessment (RULA) Rapid entire body assessment (REBA) was used to assess the type of unpredictable working postures. The data were analyzed with Binary Logistic Regression using the Mini Tab (14) statistical software.

Results: The RULA score for most of the subjects (84%) were left, 4 & 5 and right 6 & 7. The REBA score for 85% of the subjects were 7 and above which indicates the risk level is medium to high. There were significant association with socio demographic variables like age, work experience, patients attended per day, height, weight and BMI with the musculo skeletal disorders.

Conclusion: The study revealed that various socio demographic variables contributed to the musculoskeletal symptoms experienced by the nurses.

Keywords: *Musculoskeletal disorders; Standardized Nordic Questionnaire; Posture; REBA; RULA;*

INTRODUCTION

Musculoskeletal disorders (MSD) refer to more than 200 conditions that affect the body causing ache, pain and functional impairment[1]. Since the beginning of 18th century, it has been shown that MSDs may have occupational causes.[2] In recent years investigations of work- related musculoskeletal disorders (WRMSD) has attracted considerable attention because of its importance in assessing ergonomics risk factor involved in workplaces. Occupational risk factors such as force, posture, movement and vibration can affect the WRMSD[3]. Physical factors such as height of equipments used in work affects the posture[4]. The risk of work related upper limb disorders (WRULD) may be caused by the postural stress and demands of work.[5]

Nursing profession focused on the care of individuals, families and communities to attain optimal health and quality of life. Work hours in healthcare often involve long work hours, on-call work, compulsory overtime and shift work to meet the patient care round the clock[6]. Nursing profession is established as a physically and psychologically demanding profession with high prevalence rate of musculoskeletal complaints[7]. Working condition of the nurses differs from corner to corner around the world[8]. In India some healthcare organizations have the modern infrastructure facilities, most of the healthcare unit personnel have to work without proper infrastructure. There is always heavy demand for medical services in both the government and private hospitals[9].

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The present study aimed at evaluating the working posture and the different ergonomical problems among nurses.

MATERIAL & METHODS

Randomly selected 176 nurses employed in different hospitals in Chennai participated in the study. The study proposal was submitted to the Institutional Ethics Committee and due clearance was obtained. Persons within 20-45 years with a work experience of 3-20 years experience were included. Persons with systemic diseases and pregnant women were excluded from this study.

Body weight and height of the subjects were measured with the help of a properly calibrated weighing scale and Freemans measuring tape. Body Mass Index (BMI) was calculated from the stature and body weight of the respective subjects.

A self-administered questionnaire was used to collect data after obtaining a written consent from the participant. The method for answering the questionnaire was explained in a general meeting of nurses before dissemination of the questionnaire. A pilot study was performed among the nurses before commencing the study. The instrument used in this study is the Standardized Nordic Questionnaire (SNQ) (License No. 3316900588799). SNQ consists of structured, forced, binary or multiple choice variants. After completion of the questionnaire, the candidates were interviewed to clarify any confusion and to furnish any missing data. We assigned '1' to each positive response to each question and a '0' to each negative response.

Rapid Entire Body Assessment {REBA}: Rapid entire body assessment (REBA) was developed to assess the type of unpredictable working postures found in health-care and other service industries. Data were collected about the body posture, forces used, type of movement or action, repetition, and coupling. A final REBA score was generated to give an indication of the level of risk & urgency with which action should be taken.

Rapid Upper Limb Assessment (RULA): The RULA ergonomic assessment tool considers biomechanical and postural load requirements of job tasks/demands on the neck, trunk and upper extremities. After the data for each region were collected and scored, tables on the form are then used to compile the risk factor variables generating a single score that represents the level of MSD risk.

The reliability of Nordic questionnaire for MSD measured by Cronbach's alpha test was 89.5%.

The collected data were thoroughly screened and entered into MS-Excel spread sheets and statistically analyzed. Descriptive statistics were reported for socio demographic variables. The prevalence of postural problems in the study population was computed as percentages. Binary logistic regression was done as pain in different regions as the dependent variable. The independent variables entered were age, height, weight, BMI, work experience, working hours per day and number of patients attended per day. The acquired data was statistically analyzed by using the Mini Tab statistical software version 14. A value of $P < 0.05$ was considered as statistically significant.

RESULTS

The study population included 176 with an average age of 30 years and average work experience of 8 years working in different hospitals in Chennai. The general characteristics of the study population are shown in Table 1.

Table1: Demographic characteristics

Age	30 ± 3.589
work experience	8 ± 3.707
working hr/day	8 ± 0.237
Height	158 ± 6.281
Weight	63 ± 5.252
BMI	24.836 ± 2.18

n = 176, data are mean ± Standard deviation

Table 2 and Table 3 represent the REBA and RULA score of the subject group respectively. The REBA score for the nurses group were 6 and above. RULA score ranges between 4 and 7.

Table 2: Reba Score of Nurses

REBA SCORE OF NURSES N = 176	
Number of Persons	**SCORE**
2	11
23	10
54	9
59	8
37	7
1	6

n = 176

Table 3: Rula Score of Nurses

RULA		
No. of Persons	**Left Score**	**Right Score**
16	3	4
35	4	5
97	4	6
15	5	6
13	5	7

n = 176

The association between the frequency of pain and discomfort in different regions of the body for the past 12 months, trouble causing prevention of work and the trouble in the last seven days shows there was a significant association between age (*P*=0.03), patients attended per day(*P*=0.038) and wrist pain for the past one year data (Table 4).

The intensity of elbow pain which caused the prevention of work was having statistically significant association with the work experience (*P* =0.05) (Table 4).The wrist pain which caused the prevention of work and the socio demographic variables like age (*P* =0.01), work experience (*P* =0.02), patients attended per day (*P*=0.008), height (*P* =0.04), weight (*P* =0.05) and BMI (*P* =0.03) were having significant association (Table 4). It was also found that there was statistically significant association between the upper back pain which prevented the nurses from work and the patients attended per day (*P* =0.04) (Table 4).

Patients attended per day by the nurse (*P* =0.037) and elbow pain experienced during the past seven days were having significant association (Table 4). The socio demographic variables like age (*P* =0.01) work experience (*P* =0.02), height (*P* =0.04), weight (*P* =0.05) and BMI (*P* =0.05) were having significant association with the knee pain for the last seven days (Table 4).

Table 4: Association between the frequency of pain and discomfort in different regions of the body in respect to the past 12 months, trouble causing prevention of work and the trouble in the last seven days

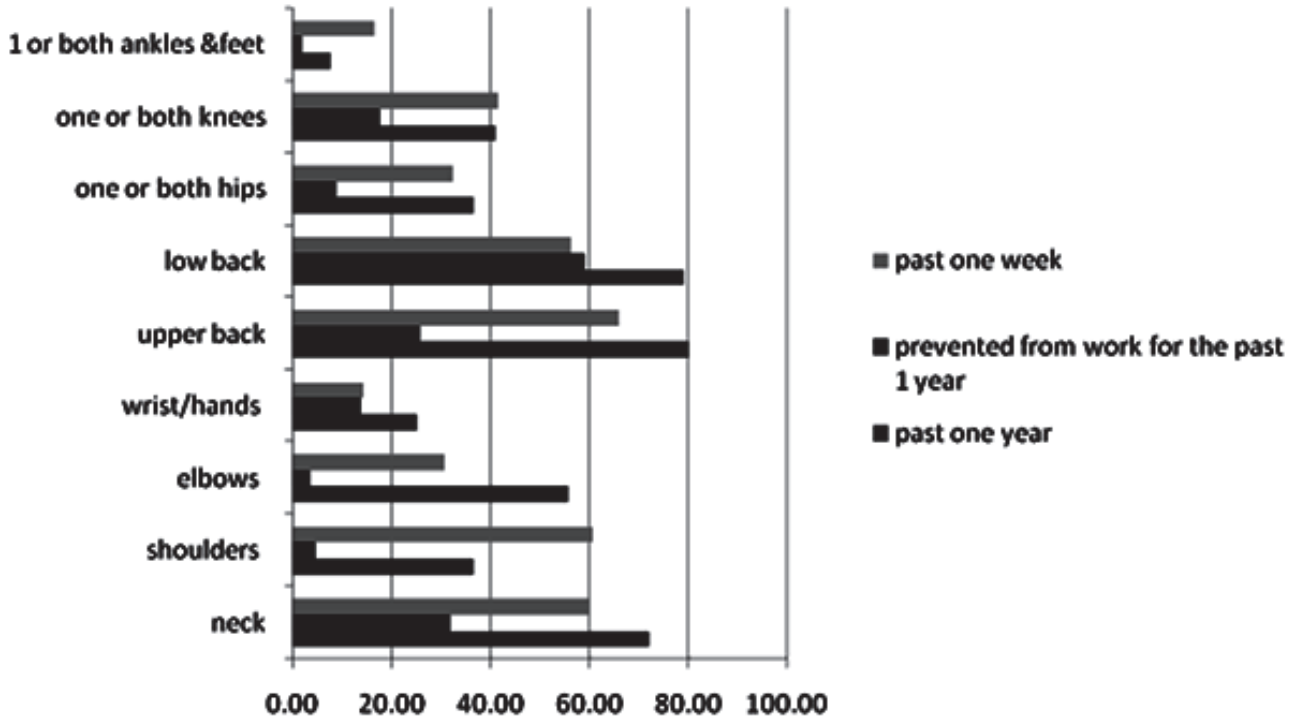
Variables	**Past 12 months**								
	Neck	**Shoulders**	**Elbow**	**Wrist/ hand**	**Upper back**	**Low back**	**One or both hips**	**One or both knees**	**Ankles**
Age	0.168	0.4	0.13	0.03*	0.7	0.8	0.31	0.18	0.21
Gender	0.34	0.16	0.71	0.8	0.89	0.45	0.29	0.16	0.99
Work experience	0.19	0.34	0.12	0.06	0.62	0.97	0.41	0.17	0.19
Working hours/day	0.301	0.99	0.33	0.7	0.67	0.633	0.72	0.99	0.66
Patients/day	0.66	0.12	0.48	.038*	0.44	0.21	0.2	0.01	0.22
Height	0.17	0.09	0.9	0.071	0.5	0.26	0.18	0.44	0.3
Weight	0.18	0.11	0.8	0.075	0.5	0.25	0.21	0.47	0.34
BMI	0.19	0.11	0.94	0.066	0.49	0.245	0.18	0.46	0.34
Prevented from work									
	Neck	**Shoulders**	**Elbow**	**Wrist/ hand**	**Upper back**	**Low back**	**One or both hips**	**One or both knees**	**Ankles**
Age	0.49	0.03*	.03*	.01*	0.5	0.45	0.65	0.68	0.9
Gender	0.28	0.33	0.14	0.6	0.28	0.66	0.11	0.21	0.9
Work experience	0.76	0.04	.05*	0.02*	0.75	0.42	0.47	0.55	0.99
Working hours/day	0.75	0.45	0.52	0.5	0.58	0.29	0.68	0.82	1

Contd…

Patients/day	0.49	0.72	0.81	.008*	.04*	0.76	0.26	0.53	1
Height	0.952	0.29	0.16	.04*	0.69	0.7	0.44	0.21	0.99
Weight	0.9	0.26	0.14	.05*	0.72	0.87	0.42	0.21	0.99
BMI	0.98	0.3	0.17	.03*	0.61	0.77	0.49	0.31	0.99
Last 7 days									
	Neck	**Shoulders**	**Elbow**	**Wrist/ hand**	**Upper back**	**Low back**	**One or both hips**	**One or both knees**	**Ankles**
Age	0.73	0.36	0.68	0.43	0.65	0.8	0.23	.002*	0.16
Gender	0.37	0.44	0.94	0.39	0.92	0.69	0.44	0.44	0.51
Work experience	0.82	0.25	0.91	0.41	0.89	0.88	0.3	.005*	0.34
Working hours/day	0.56	0.9	0.72	0.19	0.07	0.976	0.75	0.27	0.27
Patients/day	0.28	0.77	.037*	0.37	0.63	0.622	0.3	0.25	0.019
Height	0.7	0.44	0.4	0.75	0.31	0.3	0.88	.021*	0.23
Weight	0.69	0.39	0.39	0.7	0.32	0.33	0.9	.022*	0.238
BMI	0.63	0.38	0.49	0.68	0.36	0.34	0.95	.024*	0.196

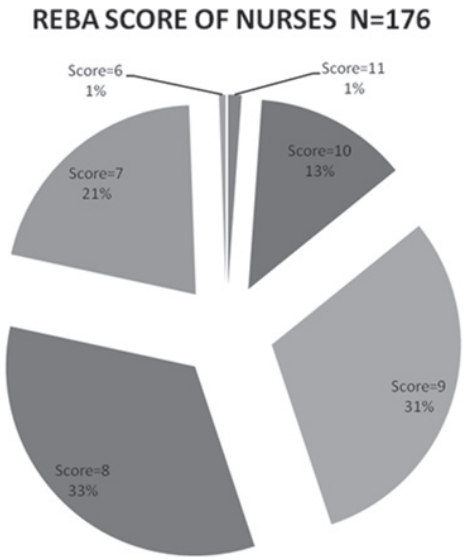
Statistically significant $p < 0.05$

The percentile of subjects having the persistence of the pain for the past 12 months, persistence of pain which prevented the subjects from work , and the persistence of pain for the past 7 days were shown in Graph1. Frequency of pain in the neck, lower back and hip were independent of the socio demographic variables.

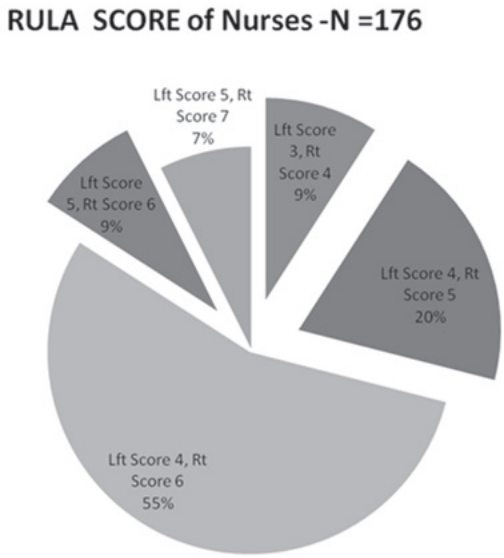


Graph 1: Distribution of MSDs reported in different sites during past one year, prevented from work for the past one year and during the past one week.

Graph 2 and graph 3 depicts the percentile distribution of REBA and RULA score respectively.



Graph 2: Percentile distribution of REBA score



Graph 3: percentile distribution of RULA score

DISCUSSION

Nurses perform a wide range of clinical and non-clinical functions necessary to the delivery of health care and therfore musculoskeletal disorders (MSD) represent a significant problem among nurses[13]. The reported prevalence of the present study was very high, as 80% of the subjects were reported with at least one MSD in the last one year which is less than 90% reported by K. R. Shafiezadeh[14].

Silverstein et al reported repetitious movement, awkward postures and high force levels as the three primary risk factors that have been associated with WRMSD[15]. Ando et al reported the prevalences of low back, shoulder,neck and arm pain among hospital nures to be 54.7%, 42.8%, 31.3% and 18.6% respectively[16]. Larese and Fiorito found that 48% of ward nurses and 33% out patient nurses reported back pain due to work, 29·4 and 16·1% respectively have had X-ray or orthopaedic examinations, 19·2% and 9·1% had been absent from work because of back pain[17]. In another study among nurses in India by Goswami et al studied the occurrence of symptoms of the neck pain, shoulder pain, hand pain and knee pain and was reported that 73% of nurses complained about pain after returning back home and 21% during work [13].The results of the present study were similar as the reported prevalence of pain and discomfort during the last one year were found to be high in the upper back(80.11%),low back (78.98%) neck (72.3%) and knee (40.25%) (Graph 1). The present study also indicates the the pain was continous as the last seven days data shows comparitively higher prevalence in some regions like neck (60%), upper back (65.91), low back (56.25%) and knee (41.48%). Pain in different body parts of nurses were related to different ergonomic risk factors at work, namely, bending and twisting of the waist and standing for extended periods of time. Similar observations were made by Hou JY e in Taiwan among nurses.[18]

The REBA score for 85% of the subjects were 7 and above which indicates the risk level is medium to high. The RULA score for most of the subjects (84%) were left, 4 & 5 and right 6 & 7. This score indicates investigation and changes were required soon in their posture. Transferring and changing the body position of the patients were set up to be the most physically challenging and postural strenuous task.

Daraiseh et al reported that MSD in various body regions of nurses were influenced by stressful working conditions[19]. It was reported that low back pain of the nurses was not only associated with physical factors but also with a complex interaction of working conditions.[9,13,20].

The Pan-European research suggests that early detection and intervention of MSD, eventually reduces the burden on governments' health and disability budgets[21]. Intervention and management of work place and outside work place risk factors can reduce the

prevalence of MSD and their consequences. There are some evidence which indicate that some simple and practical participatory action-oriented training can prevent or reduce the prevalence of MSD[22]

CONCLUSION

The goal of ergonomics is to reduce work related musculoskeletal disorders by adapting the work to fit the person, instead of forcing the person to adapt to the work. Design of successful work methods requires the use of ergonomic principles that best match human capabilities with job demands.

Conflict of interest: Nil

Source of Funding: Self

Ethical clearance: Institutional Ethical Committee

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Applications of Internet of Things in Non-Communicable Disease Prevention and Management: A Review

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ABSTRACT

Objectives: The gravity of the burden of Non-Communicable Diseases (NCDs) has been recognised globally. India has introduced the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular disease & Stroke (NPCDCS) to tackle NCDs which accounts for 60% of all deaths. However, there are major constraints in the implementation of the programme which significantly can be overcome by the adoption of the Internet of Things (IoT) in healthcare delivery. The paper aims to looks at IoT as a viable option for remote health monitoring of patients with NCDs, giving room to more effective and timely treatment which leads to better health outcomes.

Methods: Content analysis of textual data from multiple sources such as journals, reports and electronic source was applied in the paper.

Results: Given the nature and outcome of studies conducted, benefits of IoT in NCD management is indicated.

Conclusions: In the context of India, the advancement of the digital technologies coupled with the growth of the health care sector raise the scope for enhancing healthcare services, with ample opportunities for the development of IoT for healthcare. With regards to NCDs, this would mean access to better coverage, surveillance and monitoring, and disease prevention.

Keywords: *Internet of Things, Non-Communicable Diseases, digital healthcare, India.*

INTRODUCTION

The burden of NCDs is sweeping the entire globe, with an increasing trend in developing countries. In 1990, 47% of all mortality related to NCDs was in developing countries[1]; in 2005 an estimated 35 million deaths were caused by NCDs representing 60% of all deaths globally, with 80% of deaths due to NCDs occurring in low- income and middle-income countries.

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India, following 2011 High Level Meeting convened by the United Nations General Assembly began to recognise NCDs as issues of development and launched the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular disease & Stroke in 2010.

Despite these attempts there has been major drawbacks in terms of diseases surveillance and management. To point out a few, firstly the public health system faces enormous constraints in terms of financial and human resources. Secondly, the NCD surveillance system is significantly weak, case reporting follows no protocols or guidelines which limits the effective use of data for decision making. Thirdly, coverage is a clear problem as NPCDCS emphasis on facility based opportunistic screenings. Referrals, treatments and follow up of patients diagnosed with NCDs is a major hurdle that need to be addressed.

To counter some of these issues, the introduction and implementation of the Internet of Things (IoT) can be a viable option. The IoT has potential to give rise to many medical applications, up-to-date healthcare networks driven by wireless technologies are expected to support chronic diseases, early diagnosis, real time monitoring, medical emergencies and elderly care. Gateways, medical servers, and health database are instrumental in creating health records and delivering on-demand health services to authorised stakeholders. IoT based healthcare services are expected to reduce costs, increase the quality of life, and enrich the user's experience. From the perspective of healthcare providers, the IoT has the potential to reduce device downtime through remote provision. Furthermore, the IoT can correctly identify optimum times for replenishing supplies for various devices for their smooth and continuous operation. IoT provides for the efficient scheduling of limited resources by ensuring their best use and service of more patients[2].

METHODOLOGY

Content analysis with conventional approach was used.

Data collection: the paper incorporated multiple sources of data such as journal articles, reports, conference proceeding and electronic sources.

Data analysis: the analytical strategy used is that of Coffey & Atkinson, 1996; Miles & Huberman, 1994 and Sandelowski, 1995 whereby the approach is to divide the content analysis into three phases: immersion, reduction and interpretation[3].

DISCUSSION

IoT Architecture: in remote health monitoring, most proposed frameworks leverage a three-tier architecture a perception layer, gateway/network layer and service layer.

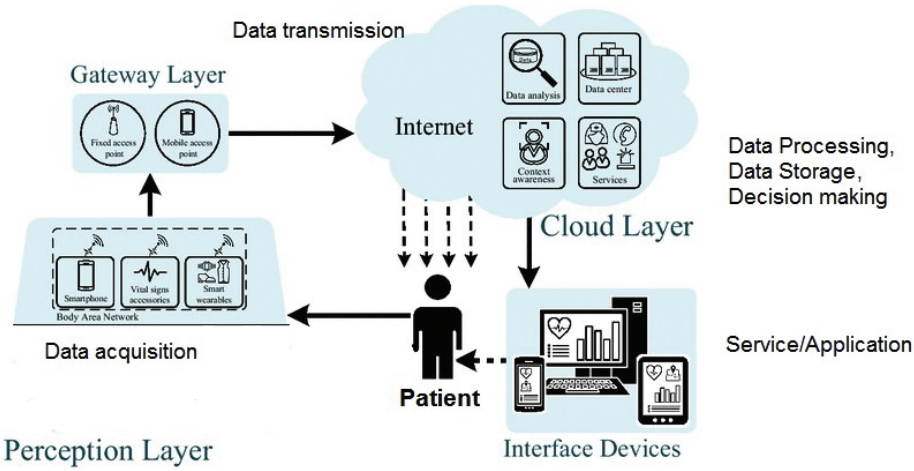

Figure 1: IoT Architecture for remote health monitoring

To understand the architeture, here a wearable IoT network is proposed. A Wireless Body Area Network (WBAN) consisting of werable sensors measure physiological markers such as heart rate and respiratory rate, the data acquired is then connected the data aggregator or concentrator usually a smartphone through Zigbee or low power Bluetooth. The agrregated data is then transmitted to healthcare server using internet connectivity on the aggregator, via the smartphone WiFi or cellular data connection. The server then turns the data into an observation and measurement file for processing and later stores the data in a remote server or cloud which can be retrived by health professionals, family members of patients who may alert emergency services professionals should need arise forming the service layer. Here sensors form an IoT based architecture as each indicidual sensor's data can be acessed through the internet via the concentrator[4].

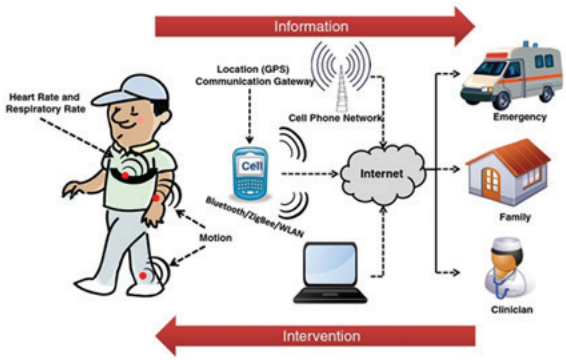

Figure 2: Wearable IoT network

Islam et al. in their publication The Internet of Things for Health Care: A comprehensive survey give an in-depth look at the subject of IoT applications in the health care setting. In their paper, they survey advances in IoT- based health care technologies and review the state-of-the-art network architectures/platforms, applications, and industrial trends in IoT-based health care solutions[2]. Similarly, Gomez, Oviedob and Zhuma, 2016[5] and Maia et al. 2014[6] among other scholars have also discussed IoT architectures and platforms.

Numerous studies have explored IoT applications for NCD management. The following pilot studies examine the utility of IoT in NCD management:

1. **Smartphone Enabled Heart Monitoring System:**

   Composition: The real-time heart monitoring system comprises of wearable device known as the Zephyr HxM-BT device (Zephyr Technology Corporation), a heart rate monitor and smartphone or tablet and a web portal.

   Working: The data acquired by the heart rate monitor is processed on a smartphone to (i) provide detailed test reports about the user's health state; (ii) store report records; (iii) generate emergency calls or SMSs; and (iv) connect to a remote telemedicine portal to relay the data to an online database. The system uses sophisticated algorithms to detect stress states, detect and classify arrhythmia events, and calculate energy consumption.

   Results: Application usability and usefulness was tested. The 10-item System Usability Scale (SUS), which is a platform-independent model widely used in subjective software evaluation was administered to 20 participants. They scored the application at 75.625 percent, corresponding to a B grade which is satisfactory[7].

2. **Smartphone enabled glucose monitoring:**

   Composition: The glucose monitoring system comprises of a smartphone, CareSens-LINK blood glucose monitor (i-SENS, Wonju, Korea), and S(M)BPM-1 blood pressure monitor (Samsung Electronics).

   Working: Thirty-five patients were provided with a smartphone device, and self-measured blood glucose data were automatically transferred to the medical staff through the smartphone application over the course of 12 weeks. The medical staff analyzed the data and sent recommendations and feedback tailored to the patient an average of once per week.

   Result: In the smartphone group, the mean HbA1c decreased after 3 months from the baseline level of 7.7%±0.7% to 7.5%±0.7% (P=0.077). In the control group, there was no change from baseline (7.7%±0.5% to 7.7%±0.7%) over the same period thus showing no intergroup difference after 3 months[8].

3. **CHRONIOUS wearable system in patients with chronic disease:**

   Composition: The CHRONIOUS system consists of a wearable shirt that integrates several body sensors, external devices (weight scale, glucometer, blood pressure monitoring device, spirometer, air quality sensor), a portable smart device and a central sub-system that is responsible for the long-term storage of the collected patient's data.

   Working: CHRONIOUS addresses a smart wearable platform, based on multi-parametric sensor data processing, for monitoring people suffering from chronic diseases in long-stay setting. It is constantly monitoring their activity using audio observation methods and activity sensors while at the same time tracking their medical condition via vital signs sensors. Any trait of abnormal health status and possible alerting incidents are detected by CHRONIOUS Intelligence. The system generates alerts in case of invalid medical data or if current activity and behaviour lay outside the well-established activity patterns and locomotion behaviour.

   Results: The COPD trial involved 30 patients, while the CKD trial involved 28 patients. Inference from analysis suggest that a large percentage of COPD and CKD patients are generally satisfied or have a positive thinking of CHRONIOUS platform. Due to the limited time period (only 4 months) that the system supports chronic disease patients, the judgment about the reduction of the patient's medical visits as well as their health status improvements couldn't be clearly evidenced. From the clinical point of view,

although some of the user's feedbacks referred to small systems contribution on clinicians every-day schedule, the consensus is that the utilization of the system in larger target groups will highlight systems' clinical value[9].

Further, systematic review undertaken by Vegesna et al. reported numerous positive health outcomes specifically in terms of reduction in symptoms severity and hospital visits or stay of NCD patient through remote monitoring using digital technologies[10]. Similarly, Goldman Sachs Global Investment Research have examined pilot studies to illustrate IoT efforts that have succeeded in engaging patients, providing key data to physicians resulting in lower rates of hospital admissions and overall costs[11].

The integration and management of IoT into remote health monitoring of NCDs comes with significant challenges. Major challenges include:

- **Managing device and their interoperability:** wearable devices poses challenges to the design of sensors. Sensor ought to be light, small, energy efficient and cause minimum hindrance to the patients' movement and mobility. Further, approved standards and certifications may not be followed by vendors in their products (devices) which is required in the interface between sensors, the aggregated devices and the backend database. This results in significant interoperability issues and increase system integration costs.
- **Data integration:** to create intelligent and meaningful applications there is a need to integrate data from multiple sources such as medical devices that monitors blood pressure, weighing scales, glucometers etc. as well as social network feeds and other web sources for patient – specific contextual data. Here, the problem lies in understanding the structure and syntax of data, understanding of semantics will enable the creation of intelligent application and mashups using techniques such as correlation, complex event processing and automated reasoning with semantics technology. The semantics of the data must be part of the data itself and not be locked up within the application logic in different application silos[12].
- **Data volume and performance:** Easy to imagine the amount of data to be taken in, stored and analysed is enormous. This will make standard architecture and platforms inadequate which calls for scaling up of applications and the backend database to adapt to the complexity of operations.
- **Data privacy:** data securitisation is of utmost importance and numerous challenges arise in the IoT device design, development and scalability of security schemes. Islam et al. in their paper address security issues analysing distinct IoT security and privacy features, as well as proposes an intelligent collaborative security model to minimise security risk[2].
- **Network capacity constraints:** Challenges may arise in developing initiatives to sustain uninterrupted networks with capacities to cater to heavy mobile data traffics.

CONCLUSION

In the context of India, factoring the Digital India Programme, India's Global Innovative Index ranking and India's growing health care sector; the deployment of IoT in remote health monitoring of NCDs in India may not be a distant dream. India is ranked 6th in income with 0.66 in efficiency ratio in the Global Innovation Index 2017 ranking[13]. India's healthcare sector is considered as one of the fastest growing industries, expected to advance at a CAGR of 22.87 per cent during 2015–20 to reach US$ 280 billion by 2020. Further, conducive policies for encouraging FDI, tax benefits, favourable government policies coupled with promising growth prospects have helped the industry attract private equity, venture capitals and foreign players. The sector registered 88 funding deals amounting to US$ 397.41 million as of September 2016[14]. In terms of internet usage, reports from the Internet and Mobile Association of India (IAMAI), titled 'Mobile Internet in India 2016', predicted that the country was estimated to have 371 million mobile Internet users by June 2016. While 71% of this number will belong to urban areas, rural India is said to hold the potential to further fuel the growth of mobile Internet in the years to come. Another notable fact that there has been growth driver for mobile internet: content in Indian languages, the number of consumers of online content in regional languages in June 2015 was pegged at 127 million, a 47% increase from the previous year[15]. This will enable more people to effectively and critically navigate devices making optimal use of the digital technology.

With the advancement of the digital technologies coupled with the growth of the health care sector, the scope for enhancing healthcare services has increase significantly with ample opportunities for the development of IoT for healthcare. In the context of NCDs, this would mean access to better coverage, surveillance and monitoring. Real time visibility of patients' conditions, activities, context and physiological parameters; compliance monitoring of treatment, diet and exercise regime; real time feedback for patients, family and health professionals to implement corrective action for better patient outcomes.

In conclusion, the paradigm shift in the healthcare system from conventional healthcare (whereby patients with symptoms or ailments makes appointments with physicians and receives treatment), to that of digital healthcare (whereby healthcare providers take the initiative to alert potential patients of imminent health issues and provide medical interventions before disease progress) will unlock the future of development in India. To truly leverage the potential of digital healthcare numerous issues such as untapped potential, infrastructural constraints, government policies etc. need to be tackled and effectively addressed. However, considering India's leadership and capacity for collaborative innovation, digital healthcare may be a reality sooner than expected.

Competing Interest: No conflict of interest to report.

Funding Disclosure: Funds have not been received for any aspect of the submitted work.

Ethical Clearance: Written permission was obtained from NASSCOM to reproduce data.

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Mandibular Canine Index(MCI) Not an Accurate Tool for Gender Identification:Results From A Systematic Review and Meta-Analysis

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ABSTRACT

Objective: Mandibular Canine Index(MCI) is being used by many researchers for gender identification, however the accuracy shows variations in the results. The aim of this review is to estimate the diagnostic accuracy of MCI in gender identification.

Methods: An electronic search of literature was carried out in pubmed MEDLINE database and Google scholar. 26 observational studies published from January 2000 to May 2016 in English were shortlisted using PRISMA guidelines. Study characteristics were entered in excel sheet and quality assessment was done using modified QUADAS 2. The diagnostic accuracy was assessed using sensitivity (males correctly identified) and specificity (females correctly identified) values.

Results: 37.9% percentage of the articles followed the Rao et al. guidelines in calculating MCI and rest modified the guidelines using mean of right and left canine width, right and left canine width separately and only right canine width. 25% of the studies showed high risk bias in patient selection and index test domain. In applicability, 50% of the studies showed high risk bias in patient selection domain. Overall summary measures of sensitivity was 0.65 and specificity 0.63. On subgroup analysis, high heterogeneity (I^2 >90%) was observed.

Conclusion: Few authors have already refuted the use of MCI in gender identification. The results of the present systematic review and meta-analysis showed lack of homogeneity in the data across the studies and concludes that MCI is not an accurate tool in gender identification.

Keywords: *MandibularCanines. Forensic Odontology. Gender Determination .Mandibular Canine Index. Sexual Dimorphism.*

INTRODUCTION

Gender identification plays a vital role in forensic medicine. There are various methods to correctly determine the sex of an individual, particularly in postmortem cases. Among these methods, DNA examination is regarded as an accurate and reliable technique, but is considered as a last resort due to operational complexity and high cost [1]. Anthropological measurements on the cranial and pelvic bones are helpful for gender estimation in forensic cases [2,3]. However, in massive disaster cases, the gravely damaged and disfigured corpses may restrict measurements on the skull and pelvic bones. Under such circumstances, odontometric analysis may be a good adjunct because teeth and jaws are often intact when recovered [4,5]. Thus, teeth have become increasingly significant for addressing forensic concerns as they are strong anatomical structures which have the ability to endure various insults, such as thermal, microbial degradation , air disasters, hurricanes or conflagration[6,7]. It has been found that the mandibular canines consistently exhibit greater sexual dimorphism

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in mesio-distal crown width and inter-canine distance. These teeth erupt by the age of 12 years and are least affected than other teeth by dental caries and periodontal diseases. Also, canines are the last teeth to be extracted with respect to age.

Rao et al. considered canine to be the 'key tooth' for the purpose of personal identification[8] and explored its application in gender identification. He introduced the "Mandibular Canine Index" which was calculated by obtaining the ratio of greatest mesio-distal (MD) dimension of the permanent mandibular canine and the inter-canine arch width (measured in mm). A cut-off value to differentiate the sexes was then calculated from the MCI, which was termed as the 'Standard MCI'[9].If the MCI value was less than or equal to the standard MCI, the individual was categorized as female and vice versa as male.

Rao et al., first used this MCI for gender determination in a heterogeneous sample that originated from the state of Karnataka in Southern India and obtained an accuracy of ~86% (7). Later, MCI was employed in numerous studies in large populations as it was simple, reliable, inexpensive, and easy to perform[10]. However, controversies regarding this index emerged, when a few studies proved that MCI is practically unreliable and questioned the reliability of MCI and revealed that this index was not sufficiently sensitive[7,9].

Therefore, in view of this controversial background, the present review was undertaken to systematically review the published evidence and to estimate the summary measures of diagnostic accuracy of the Mandibular Canine Index (MCI) as a tool for gender identification in adult humans.

MATERIALS AND METHOD

Search strategy: The review protocol was registered in PROSPERO (CRD42016046949). We conducted a search for relevant studies evaluating the accuracy of Mandibular Canine Index (MCI) for gender identification in a given population. The electronic search was initially conducted on the MEDLINE via PUBMED database with the following keywords: 'mandibular canine index', 'mandibular canine index AND gender determination', 'canine index AND sexual dimorphism' and 'canine index AND forensic odontology'. In addition to PUBMED, Google Scholar was also searched. We also manually searched the reference lists of eligible studies to ensure identification of relevant published and unpublished studies. We also contacted study authors to provide full text articles, wherever necessary.

Inclusion and exclusion criteria: Eligible study designs included observational studies published between 1 January 2000 and 31 May 2016 in English which evaluated the diagnostic accuracy of Mandibular Canine Index. Both, in-vitro and in-vivo studies, where percentage accuracy of gender identification was given with respect to MCI were included. We excluded studies which clearly did not mention the MCI value and the accuracy of gender identification.

Assessment of relevant studies: Two reviewers (E.CD and M.GS) independently performed the first stage of screening by titles of all the identified studies. Round 2 included screening by the abstracts. Round 3 was full text assessment.

Data extraction: A standardized, pre-piloted form was used to extract data from the included studies for evidence synthesis and assessment of study quality. One review author (E.CD) extracted data independently and second author (M.GS) cross checked the data. Discrepancy if any, was identified and resolved through discussion with a third author (P.VK) where necessary.

Quality assessment: Two review authors (E.CD and M.GS) independently assessed the quality of the included studies, where disagreements occurred, these were either resolved by discussion or by consulting a third review author (P.VK). QUADAS-2 checklist for studies of diagnostic accuracy was modified and used to assess risk of study bias.Under the **"Patient selection**":Was random sampling method employed for patient selection?, Did the study include a narrow age-range of patients?, Did the study avoid inappropriate exclusions? In **"Applicability concern**" "Was a native sample considered?"In **"Index Test":**Was the MCI calculated based on greatest canine width?, "If a threshold was used, was it pre-specified?", "Is the alignment of teeth in the study population likely to affect the Std. MCI?", "Was digital Vernier calipers used for measuring MCI?" In**"Reference standard"**: "Is the reference standards likely to correctly classify the target condition?, Were the reference standard results interpreted without knowledge of the results of the index

tests? and In **"Flow and timing of participants"**: Did all patients receive the same reference standard?, Were all patients included in the analysis? Each question were assessed as 'yes', 'no', or 'unclear'.

A 'Risk of bias' judgement ('high', 'low' or 'unclear') was made for each domain. If the answers to any two signaling questions within a domain were judged as 'yes' , it indicated low risk of bias and hence the domain was judged as low risk of bias. If any two signaling question were judged as 'no', it indicated a high risk of bias and hence the domain was scored as a high risk of bias. In case of equal distribution of 'yes' or 'no' in a domain, then the decision of high and low risk was taken by considering the questions, which can comparatively have more relevance with MCI calculation.

STATISTICAL ANALYSIS

The diagnostic accuracy was determined by assessing the sensitivity and specificity values. True positive (TP) represented the number of males identified correctly and true negative (TN) were the number of females identified correctly . Using the TP and TN values and the total number of males and females participating in the respective study, the values of false positive (FP) and false negative (FN) were ascertained. OpenMeta(analyst) software was used to present a combined forest plot. Subgroup analysis was carried out to investigate the differences in summary measures across categories of covariates. Sensitivity analysis was carried out to investigate how the risk assessment of studies affected the summary measures. A p value of <0.05 was considered to be statistically significant.

RESULTS

Table:1 PRISMA Flow chartof search results and study selection

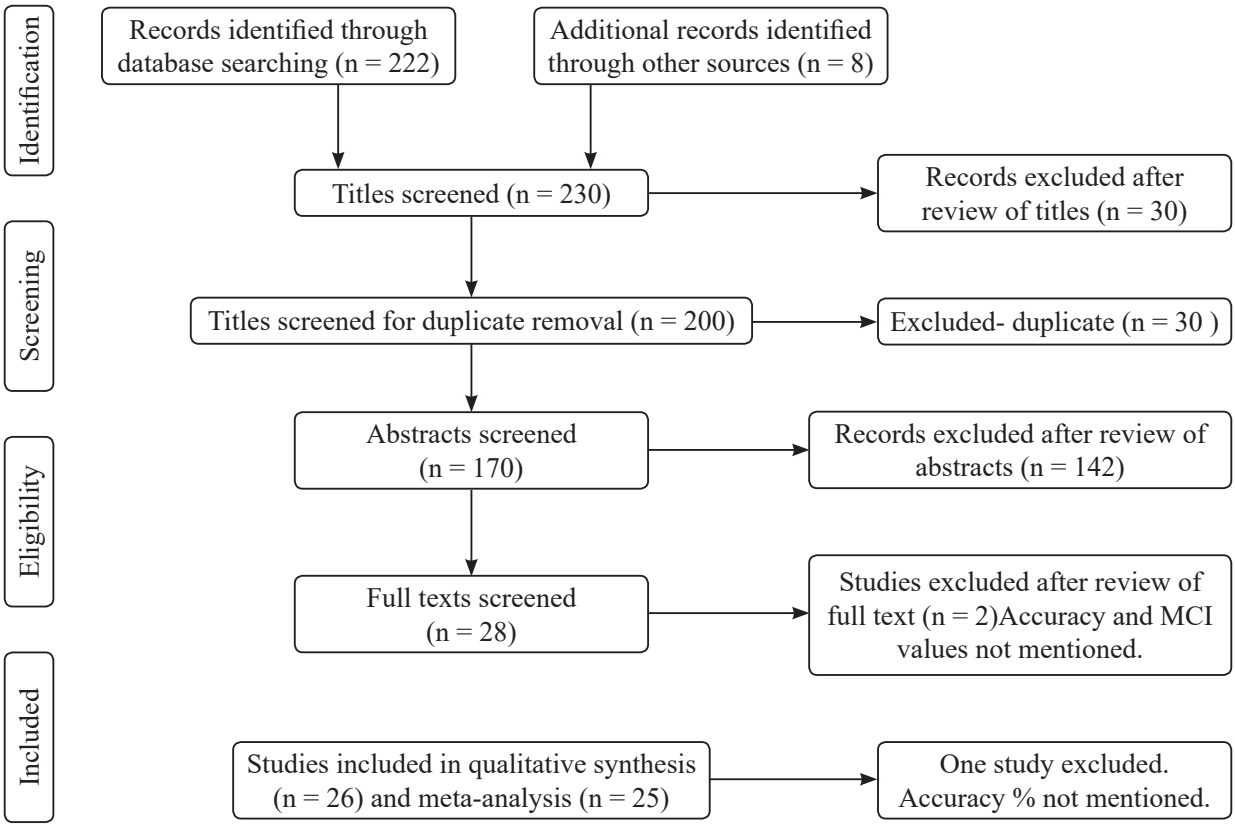

Table:1 shows the PRISMA flowchart of search results and study Finally a total of 26 articles were considered for the systematic review and 25 articles (29 estimates) for meta-analysis. Table 2, summarizes the characteristics of the individual studies. Overall, risk of bias was high in less than 25% studies for "Patient Selection" and around 25% for "Index Test. 100% studies were assessed as low risk for both the reference standard and Flow and timing. In applicability concerns, more than 50% studies reported high risk in the "Patient selection" domain. (Fig.1)

Table 2: Study Characteristics

Author name	Country	Age group(yrs)	Sample size	Population	Type of study	Method of MCI calculation	MCI used to predict gender	STD.MCI
Acharya AB et al (A)[8]	Nepal	19-28	117	Dental students	invitro	Greater canine width	MCI of greatest canine width	0.26
Acharya AB et al(B)[9]	India	19-32	203	General population	invitro	Right canine	Right MCI	0.244
Ahmed HMA[11]	Iraq	17-23	200	Dental students	invitro	Greater canine width	MCI of greatest canine width	0.26
Bakkannavar SM et al[12]	India	15-25	500	General population	invivo	MCI of both right and left canine	Rt and Lt MCI used seperately	0.281(R) ; 0.283(L)
Chukwujekwu et al[13]	Nigeria	17-30	400	Medical students	invivo	MCI of both right and left canine	Rt and Lt MCI used seperately	0.205(R); 0.215(L)
Dayananda et al[14]	India	18-22	200	Engineering students	invivo	MCI of both right and left canine	Unclear	0.270(R) ; 0.276(L)
Edibamode EI et al[15]	Nigeria	18-35	184	General population	invivo	Mean of MD of right and left canine	Mean MCI	0.21
Hosmani JV et al[16]	India	15-21	100	General population	invitro	Greater canine width	MCI of greatest canine width	0.27513
Iqbal R et al[10]	China	18-25	216	Medical students	invitro	Greater canine width	MCI of greatest canine width	0.247
Kakkar T et al[17]	India	17-25	250	General population	invitro	Greater canine width	MCI of greatest canine width	0.1921
Kaushal S et al[18]	India	17-21	60	Medical students	invivo	MCI of both right and left canine	Rt and Lt MCI used seperately	0.273(R) ; 0.28(L)
Krishnan RP et al[19]	India	18-25	50	University students	invitro	Mean of MD of right and left canine	Mean MCI	0.25
Latif M et al[20]	India	17-40	150	General population	invitro	Mean of MD of right and left canine	Mean MCI	0.257
Mughal IA et al[21]	Pakistan	18-25	200	General population	invivo	Greater canine width	MCI of greatest canine width	0.2504
Muller M et al[22]	France	17-24	424	University students	invitro	Greater canine width	MCI of greatest canine width	0.268
Nagalaxmi et al[23]	India	20-30	60	General population	invivo	MCI of both right and left canine	Right MCI	0.245
Narang RS et al[24]	India	20-40	410	General population	invitro	Greater canine width	MCI of greatest canine width	0.249
Paramkusam G et al[25]	India	18-25	120	General population	invitro	Mean of MD of right and left canine	Mean MCI	0.26
Parekh D et al[26]	India	18-24	368	Medical students	invivo	MCI of both right and left canine	Right MCI	0.205
Rajarathnam BN et al (A)[27]	India	18-25	200	General population	invitro	MCI of both right and left canine	Unclear	0.255(R); 0.25(L)
Rajarathnam BN et al (B)[27]	India	18-25	200	General population	invivo	MCI of both right and left canine	Unclear	0.26(R); 0.25(L)
Reddy VM et al[28]	India	17-25	200	General population	invitro	Greater canine width	MCI of greatest canine width	0.256
Sassi C et al[29]	Brazil	21-60	112	General population	invitro	Greater canine width	MCI of greatest canine width	0.267
Silva AM et al[30]	Portugal	16-30	120	General population	invitro	Right canine	Right MCI	0.282
Singh SK et al[31]	India	20-30	100	General population	invitro	MCI of both right and left canine	Unclear	
Srivasatava PC[32]	India	17-21	400	students	invivo	Greater canine width	MCI of greatest canine width	0.257
Yadav S et al[33]	India	15-21	360	Dental students	invitro	Greater canine width	MCI of greatest canine width	0.298

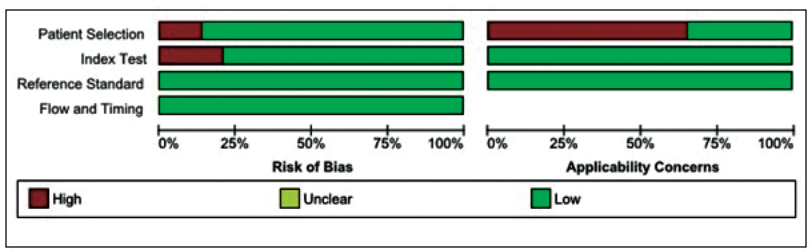

Fig. 1: Results of QUADAS-2, Risk of bias and concerns regarding applicability

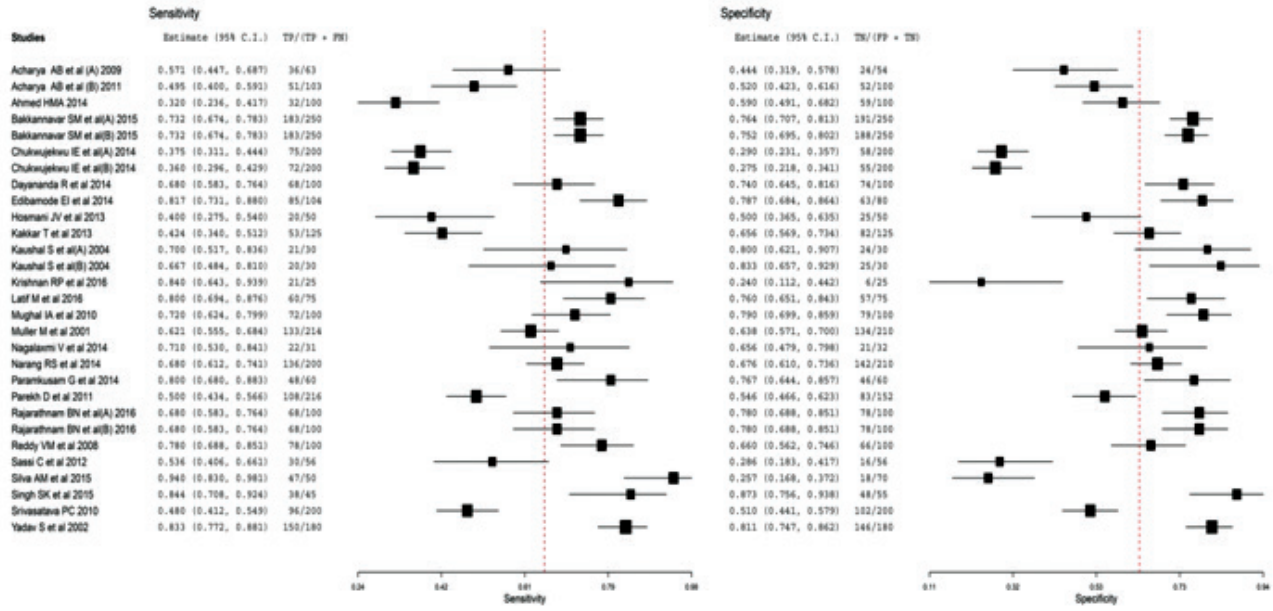

Fig. 2: Forest plot of sensitivity and specificity estimates

The forest plot is presented along with the estimates of sensitivity and specificity for each study (Fig. 2). Sensitivity refers to the percentage of males identified correctly and specificity to the percentage of females identified correctly. Overall, the summary measure of sensitivity was 0.65 (0.59,0.71) and specificity was 0.63 (0.56,0.69).

Table 3: Summary measures of accuracy for Mandibular Canine Index (MCI) for sex identification [Subgroup analysis]

	Study estimates	Summary accuracy: Sensitivity	Q value, Het p value, I^2	Summary accuracy: Specificity	Q value, Het p value, I^2
All studies	29	0.65 (0.59,0.71)	339.092, < 0.001, 91.74%	0.63 (0.56,0.69)	408.321, < 0.001, 93.14 %
Country					
India	20	0.67(0.61, 0.73)	165.726, < 0.001, 88.54 %	0.69(0.63, 0.74)	127.771, < 0.001, 85.13 %
Others	9	0.59(0.49, 0.71)	127.066, < 0.001, 93.7%	0.48 (0.33,0.63)	163.321, < 0.001, 95.1 %
Region within India					
North India	9	0.65 (0.55, .74)	155.726, < 0.001, 88.39%	0.69 (0.61,0.75)	125.726, < 0.001 89.54 %
South India	10	0.71 (0.65, .77)	148.726, < 0.001 77.08 %	0.71(0.64, 0.77)	145.726, < 0.001, 88.54 %
Study Population					
College students	12	0.57(0.47, 0.67)	145.035, <0.001, 92.42%	0.56 (0.44,0.67)	193.247, < 0.001, 94.31 %
General population	17	0.69 (0.63,0.75)	116.525, < 0.001, 86.27%	0.67(0.60, 0.74)	139.509, < 0.001, 88.53 %
Type of study					

In vitro	16	0.67 (0.58,0.57)	162.235, < 0.001, 90.75 %	0.60 (0.52,0.68)	145.099, < 0.001, 89.66 %
In vivo	13	0.63 (0.53, .71)	171.012, < 0.001, 92.98 %	0.66 (0.54,0.77)	260.377, < 0.001, 95.39 %

I2 - measure for heterogeneity.

Table 4: Sensitivity analysis

Subgroup	No. of study estimates included	Summary accuracy: Sensitivity	Summary accuracy: Specificity
ROB criteria 1			
High risk	4	0.71 (0.59, 0.81)	0.64 (0.43, 0.80)
Low risk	25	0.64 (0.57, 0.70)	0.63 (0.55, 0.70)
ROB criteria 2			
High risk	6	0.59 (0.52, 0.66)	0.66 (0.57, 0.74)
Low risk	23	0.66 (0.58, 0.73)	0.62 (0.53, 0.70)
ROB criteria 3			
High risk	18	0.69 (0.61, 0.76)	0.65 (0.54, 0.74)
Low risk	11	0.59 (0.48, 0.68)	0.61(0.52, 0.68)
ROB criteria 4			
High risk	19	0.68(0.61,0.74)	0.70(0.64,0.76)
Low risk	10	0.59(0.48,0.70)	0.48(0.36,0.60)
ROB criteria 5			
High risk	23	0.67(0.61,0.72)	0.68(0.62,0.73)
Low risk	6	0.58(0.42,0.72)	0.42(0.27,0.58)

Note: ROB – risk of bias, criteria 1 – risk of bias in patient selection, criteria 2 – risk of bias in measurements using the index test (MCI), criteria 3 – risk of bias in using the greatest canine width, criteria 4- risk of bias using nativity of the population, criteria 5- Overall risk of bias

All the covariates (Table 3) investigated showed a significant heterogeneity. Sensitivity analysis is showed in (Table 4). Comparison of the summary measures could not be done because of high heterogeneity present between the two risk groups.

DISCUSSION

Gender determination of damaged or mutilated dead bodies or from skeletal remains constitutes a major challenge in medico-legal examination [26].Although the use of DNA gives robust results, the fact is that biological samples are not always available or suitable for DNA fingerprinting [30]. Osteometry is considered the preferred technique because it is more effective in determining

sex [34].In the case of adult, when a 90% skull and 95% pelvic bones are present, determination of sex accurately by an expert is of the order of 98%. If only long bones, such as femur and humerus are present, determination of sex accurately by an expert is of the order of only 80%. During disaster, these bones easily get fragmented, which may be major hindrance for assessment of sex using osteometry.

In such cases, teeth can be especially useful, since they are known to resist a great variety of physical, chemical and biological insults [30].Canines are the ideal teeth for identification of sex, due to its sexual dimorphism and durability in the oral cavity [29].

Hence, this review was undertaken to estimate the diagnostic accuracy of MCI in gender identification. Our review summarized the evidence from 26 studies where MCI was used as a tool for gender identification for a given population. The results of this meta-analysis

showed that MCI yielded a total sensitivity of 65% (0.59, 0.71) and total specificity of 63% (0.56, 0.69).

Overall, the identification accuracy varied from 32% to 94% for the males and 24% to 87% for females indicating a wide variation.. To explain this heterogeneity/ variation subgroup analysis and sensitivity analysis were undertaken. However, both the analysis could not explain the variation as the subgroups itself did not demonstrate homogeneity.

The varying degree of diagnostic accuracy could be probably explained on the basis of lack of sexual dimorphism with regards the mesio-distal canine width and intercanine distance. This is further explained with an example: In a study by Hosmani JV et al [16], the sensitivity reported was 0.40 (40% males identified correctly) and specificity was 0.50 (50% females identified correctly). The measurement of their study participants were: mesio-distal width of the canine in males was 7.18(6.02,8.34) and in females was 6.95 (5.37, 8.53) and the inter-canine width of males was 27.17(22.03, 32.31) and females was 26.25 (21.58 , 31.31) respectively. Observing the values closely, one can appreciate that there is an overlap indicating lack of sexual dimorphism. All those participants falling in this overlap region are misdiagnosed (False positives =50% and False negatives=60%). From this example one can interpret that only 40% males have unique bigger measurements and 50% females have unique smaller measurements and hence they have been identified correctly. While those in the overlap region, the 60% males have smaller measurements and are misdiagnosed as females and 50% females have bigger measurements of their teeth similar to males and hence are misdiagnosed as males. This accomplishes that only when there is distinct sexual dimorphism , MCI can have better accuracy in gender identification [8,30,32,33].

A varying range of Std MCI (cut off point values) from a minimum of 0.19 to a maximum of 0.3 has been observed across the different studies. Each study showed its own unique Std MCI value. This variation in the cut off points is the result of the varying mesio-distal canine width and the inter-canine distance of the population indicating that there is no one standard MCI value which is applicable to all the people from different geographical location. This can pose to be a major drawback while choosing of a cutoff point (Std MCI) value for making a decision while utilizing MCI as a tool for gender identification for a victim (from unknown geographical location) in mass disasters.

All the 26 studies considered in the review have used MCI as a tool for gender estimation in a living population with known gender. No studies could be retrieved where MCI has been used for victim identification in mass disasters or in post mortem cases. The actual application for which MCI is designed has never been tested.

Rao et al[7] proposed that MCI should be calculated in the well aligned mandibular arch. Three studies [8,9,22] have performed these calculations in the mal-aligned teeth. Such malocclusion can affect the accuracy of the MCI. More-so, this again limits the application of MCI in mass disasters, where there is a slender chance that the victim would have well aligned mandibular teeth available for estimation. Mandibular arch with missing teeth, rotated or crowed teeth limits the application of MCI.

The unique feature of this review is that, probably this is the first largest systematic review and meta-analysis with 26 studies. Because of lack of homogeneity in the data across the studies complex meta-analytic statistics could not be performed. Since only two databases were searched there is a possibility to miss on some more relevant articles.

CONCLUSION

The fact that several studies[13,16,19,30] have already refuted the application of MCI in sex estimation and synergistically the results of this systematic review and meta-analysis along with the explanation of its limitation in the above section clearly indicates that Mandibular Canine Index is not an accurate tool for gender identification.

Acknowledgement: The authors would like to acknowledge Dr.Rizwan SA, for guidance during systematic review.

Ethical Clearance: Not required.

Source of Funding: Self

Conflict of Interest: None

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Histopathological Evaluation of White Lesions– An Institutional Observational Study

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ABSTRACT

The most common oral manifestation of tobacco use is in the form of white lesions.They may reflectas benign, pre−malignant or malignant condition. There are no clinical signs and symptoms which canpredict whether a pre−malignant lesion or a condition will undergo malignant change or not.An institutional based cross−sectional study was conducted including total of 344 casesreporting to the outpatient wing from 2004 - 2016. Demographic details of various white lesions of oral cavity along with histopathological findings were studied. Results showed the habit of tobacco quid placement and Gutkha chewing was followed maximum.The most common white lesion was leukoplakia andout of 344 cases 125 (36.33%) had dysplasia. 8 (2.32%) cases in our study did not have correlation between clinical and histopathological diagnosis. The aim of the study was to clinicopathologically correlate the white lesions.

Keywords: *Oral pre-malignant disorders, dysplasia, leukoplakia, lichen planus.*

INTRODUCTION

White lesion is a non-specific term used to describe any abnormal area of oral mucosa that on clinical examination appears whiter than surrounding tissue & is usually slightly raised, roughened or of different texture from adjacent normal tissue. White lesions appear white due to many reasons such as production of abnormal keratin which imbibe fluid far more readily, coagulation of surface tissue & formation of pseudo membrane, traumatic, chemical, infectious or immunologic injury and reduced vascularity of subjacent connective tissue.[1]

Chronic irritation from all forms of tobacco represents the most common cause of white mucosal lesions. Ill-fitting dentures, rough teeth, and dental restorations are also irritants.[2] White lesions in non-habit cases such as stress also reported.White lesions in the oral cavity may be benign, pre−malignant or malignant. On the other hand, suspicious looking lesions can be pursued and a definitive diagnosis made through subsequent biopsy.

Identifying and recognizing a premalignant lesion or a frank malignancy in the early stages will go a long way in averting the development of a malignancy and will provide an excellent prognosis with minimal disfiguration and functional handicaps.[4]The purpose of this study is to analyze the clinical and histopathological patterns of white lesions in the oral cavity.

MATERIALS AND METHOD

An institutional based cross−sectional study was conducted in the Department of Oral Pathology and Microbiology, Dr D Y Patil Dental College, Pimpri Pune, from 2004 to 2016. All the lesions with differential diagnosis as oral potential malignant diseases, clinically presenting as non-scrapable white lesions (leukoplakia, lichen planus, oral submucous fibrosis) were included in the study.

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The total of 344 cases during the period of 13yrs.were retrieved from the records. A detailed demographic data and clinical history recording of age, gender, occupation, chief complaint, duration, risk factors associated personal habits,location, extent, size and type of lesions,past medical and dental history and family history were entered in Microsoft excel. The histopathological diagnosis was then correlated with the clinical data and provisional diagnosis.

RESULTS

Table 1: Distribution of cases based on habits

Type of habit	Total no. of cases N-344	Percentage
Tobacco chewing	46	13.37
Tobacco quid placement	108	31.39
Gutkha chewing	120	34.88
Combination of smoking and nonsmoking habit	28	8.13
Smoking	30	8.72
Stress	08	2.32
Trauma	02	0.58
Non habit	02	0.58

Three hundred and fortyfour cases were included in the study. 280(81.39%) were males and 64(18.6%) females in the study population. On basis of personal habit,list of non- tobacco habits and tobacco habits are summarized in table 1. Commonest found was tobacco quid and Gutkha chewing. Out of 108 (31.39%) cases of tobacco quid placement, maximum was in left buccal mucosa 60(55.5%) followed by right buccal mucosa 30(27.7%) and labial vestibule 18(16.6%). There were only 8 (2.32%) cases without habit and categorized as non-habit related white lesions.

Table 2: Clinical type of white lesions

Type of white lesion	Total no. of cases N-344.	Percentage
Leukoplakia	192	55.8
Oral Submucous fibrosis	66	19.18
Oral Lichen Planus	80	23.25
Frictional keratosis	06	1.74

Table 3: Clinical presentation of the white lesions

Clinical presentation white lesion	Total no. of cases N-344	Percentage
Homogenous	304	88.37
Non-homogenous	40	11.62

Clinically the white lesions were diagnosed as leukoplakia (55.8%), lichen planus (23.25%) and along with the white lesion in the oral cavity, pain or burning sensation, difficulty in opening mouth was present in 66 cases with fibrotic bands seen maximum on buccal mucosa following retromolar area and soft palate were diagnosed as OSMF (19.18%), and frictional keratosis (1.74%) [Table2]. According to the appearance of the lesions most of the lesions were homogenous (88.37%) and few non-homogenous (11.62%) [Table 3].The leukoplakic patches were homogenous in most cases (64) and erosive in 11 cases.

Table 4: Age-wise distribution of white lesions

Age Years	Leukoplakia		Oral Lichen Planus		Oral Submucous fibrosis	
	M	F	M	F	M	F
10-30	38	02	26	08	40	04
31-50	64	16	20	12	12	04
51 and above	68	10	10	04	02	04
Total	**170**	**22**	**56**	**24**	**54**	**12**

All male and female patients were grouped separately depending on type of white lesion i.e leukoplakia, lichen planus & oral submucous fibrosis under different age groups. Findings stated that OSF and OLP were common in 2nd decade and leukoplakia was mainly found in 5th decade both in males and females [Table 4].

Table 5: Prevalence of dysplasia among white lesions

Type of white lesion	Mild dysplasia	Moderate dysplasia	Severe dysplasia
Leukoplakia	33.7%	14.6%	6.7%
Oral Lichen Planus	-	4%	-
Oral Submucous fibrosis	-	-	-

Histopathological examination of these lesions was done by two pathologists to rule out the interobserver bias. Leukoplakia histopathologically was categorized as hyperkeratotic complex 46(75%) and hyperkeratotic simplex 29(25%) respectively. Biopsy specimens which showed parakeratosis, elongated rete pegs, and submucosal lymphocytic infiltration were diagnosed as OLP. Out of 80(23.25%) cases with diagnosis of OLP only 4 (5%) patients showed dysplasia and rest were without dysplasia which is the consistent feature with OLP (Table 5).The histopathologic picture of oral submucous fibrosis showed atropic epithelium, flat reteridges, dense fibrous connective tissue and subepithelial hyalinization.

DISCUSSION

The oral cavity is vulnerable to a limitless number of environmental insults because of its exposure to the external stimuli and can be host to a multitude of pathological lesions which may be neoplastic, premalignant, or reactive.[5] Lesions in oral cavity are generally regarded as a strong indicator of general health.[6]Chronic irritation from all forms of smoking represents the most common cause of white mucosal lesions. The direct contact of tobacco with the oral mucosa is responsible. Snuff dipping is a potent irritant and carcinogen. Ill-fitting dentures, rough teeth, and dental restorations are also irritants.[2]Suspicious looking lesions can be pursued and a definitive diagnosis made through subsequent biopsy. There are very few studies, especially from developing countries such as India, which have evaluated the clinical and pathological diagnostic factors of white lesions in the oral cavity.

Out of 344 study population 70% (274) were males and 30% (116) were females, with a male to female ratio being 2.36:1, which was in accordance to Chaturvedi et al in India.[7] We observed that half the study population was in the age group of second decade, which was in contrast to age group that of Ranganathan et al.[8] Male predominance in our study can be due to easy accessibility for males to use areca nut and its products more frequently than females in our society and changing lifestyles of the youngsters.

In the present study the major diagnosis of oral white lesions was Leukoplakia. There is male preponderance (170:22). According to study by Swati Parikh et al gave the ratio of 2.74:1.[7]In the study of Nadia Zaib et al, male to female ratio was 1.1:1.[9] In our study, the peak incidence of OSF and OLP were common in 2nd decade and leukoplakia was mainly found in 5th decade both in males and females. In study by Swati Parikh et al, the peak incidence of oral cavity lesions was between 4th to 6th decades while in the studies undertaken by Al-Khateeb TH&Pudasaini S et alit was between 2nd to 4th decades.[9, 11,12]

Commonly used non-smokeless tobacco forms were pan masala, tobacco chewing, gutka chewing, betel quid placement, non-habit such as stress, trauma was found as a significant risk factor for white lesions in the current study. In the present study 78% of patients had habit in form of chewable tobacco or gutka. Only 8% had the habit of smoking. As against the study of Laronde DM et al. in which 75% of users had habit of both tobacco and alcohol.[13] We found chewable form of tobacco is common in our study and can be justified by the group of lower socioeconomic people, orthodox group of society so, smoking was not so common in our particular study.

The most common site in the present study was buccal mucosa (52.9%) as, as chewable form of tobacco was common and general human tendency of placing it in buccal region for a long duration. Hard palate was found to be the least common site. Similar findings was found in the studies by Simi SM et al ,Axell et al and by Silverman et al.[3, 14, 15]In contrast to these studies,Al-Khateeb TH and Pudasaini S et al showed palatal and lip lesions predominance respectively.[11, 12]

However, clinically to classify lesions as premalignant is difficult because they vary in appearance and are likely to be interpreted subjectively by the clinician. A histopathologic diagnosis is generally more

definitive of premalignant change than clinically apparent alterations.[2]In the present study histopathologically leukoplakia was categorized as with dysplasia and without dysplasia. Majority of cases were of minimum dysplasia 33.7%, moderate dysplasia with 14.6% and few were showing severe dysplasia of 6.7% which is in accordance with the study by Bisht RS et al.[16]Even the superimposed candidal infections was found in few cases histopathologically which was not noted in clinical history. Only four cases with dysplasia in OLP were found. Though OLP known to undergo transformation through genetic pathways other than that of dysplasia. Which facilitates us to consider it as pre-malignant lesions.[17] Only 8 cases did not have correlation between clinical and histopathological diagnosis. Four cases were diagnosed clinically as malignant but invasion was not evident except for severe dysplastic features. Two cases had clinical provisional diagnosed as speckled leukoplakia but histopathological diagnosis was OLP. Out of 344 patients 125 (36.33%) had dysplasia which was not in accordance with Simi SM et al study in which only 8.9% were dysplastic. The clinical and histopathological diagnosis may vary and also the degree of dysplasia may not correlate with the clinical types of white lesions, so biopsy is recommended in cases of white lesions.

CONCLUSION

The white lesions affecting the oral cavity constitute a diverse group of pathologies. Of all the oral biopsies reported in the present study, 36.33% dysplastic features was reported. This makes it an emerging threat to the community and clinician. There is dire need to take effective measures to increase public awareness about the risk factors and consequences of this pathology.

Measures should be designed to encourage the population to have routine oral examination which will make an early detection of any pathological change very easy. This may contribute in reducing the oral cancer burden of our population.

Conflict of Interest: No

Ethical Clearance: Ethical clearance was obtained from Institutional Subethics Committee

Source of Funding: No funding required

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A Study on Factors Influencing Competency of Pharmacists in a Tertiary Care Hospital

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ABSTRACT

Enhancing the performance standards of employees with competency assessment has become a cutting-edge development among the industries. It is more vital for the organization to recruit the right people for the right job so as to ensure continued stability and growth. In the recent past, health organizations have stepped forward to map competencies for their nursing department, which is considered to be back bone of health care organizations. Likewise, pharmacists are most often neglected in the healthcare delivery system, but are a key component as they are the sole providers of medications for treatment. Identifying competencies among pharmacists will help provide a better platform for them to grow in their profession with utmost diligence, dedication and patient centered care which eventually contributes towards the organizational goals.

The main aim of this study was to identify the factors influencing competency with respect to pharmacists in a tertiary care hospital and provide recommendations for future training needs.

The total population size of 153 Pharmacists were considered for this study. Initially, pilot study was conducted to identify the contemporary knowledge, attitude and skills of the pharmacists. This was done through a checklist, so as to understand their roles and responsibilities and identify major competency factors. Based on this input, a survey questionnaire was developed to capture data for further investigation. The analysis was carried out using SPSS tools such as: Descriptive statistics, Correlation and Two-way Analysis of Variance (ANOVA) followed by Hypotheses testing.

The result shows that, there is scope for improvement by providing training with respect to technical knowledge and technical skills to the pharmacists. It suggested to incorporate interpersonal relationship training module in vernacular languages, so as to attain superior customer satisfaction.

Keywords: *Competency, Competency mapping, Competency framework, Competencies among pharmacist*

INTRODUCTION

The concept of competency mapping has been vital to organizations around the world. Apart from the different fields that have adopted competencies, the healthcare sector has slowly been catching up with competency mapping and developing frameworks. Although many research studies have been conducted, only a few competency frameworks have been implemented in the healthcare sector. A few fields who have adopted the framework includes nursing, laboratories and pharmacies.

The term competency was initially used in 1972 by David Mc Clelland[1] who described that the real predictors of a job performance are a set of underlying personal characteristics or performances. According to Mulholland 1994, Wright 1998; competency is defined as the minimum standard necessary to perform a job[2,3].

With plans to improve the structure, processes, and outcomes, competencies have also become a contributory factor in the development of the employees' performances in an organization. Development of competency

frameworks have been widely used in every sphere but is still growing in the Indian healthcare industry.

Lack of standards in healthcare has led to poor performance (WHO, 2006)[4]. Thus, various performance standards came into the picture. Eventually, competency frameworks were being designed to meet the standards in various fields within the healthcare sector. Encouragement of healthcare professionals to achieve the standards with the framework will help in continuous quality improvement. The main aim of this study was to identify the factors influencing competencies required by the pharmacists to achieve their utmost level of performance. The factors which were identified were narrowed down further according to the hospital's requirements and nature of the organization.

OBJECTIVES

- To study the job roles and responsibilities of the pharmacists to understand the present level of knowledge, attitudes and skills
- To investigate the factors influencing roles and responsibilities with respect to technical competencies, behavioural competencies, leadership competencies and organization specific competencies
- To analyse the identified factors and
- their impact on effectiveness of technical, behavioural, leadership and organization specific competencies in the department
- To analyse the effectiveness of the identified competencies and suggest suitable recommendations for the organizational growth

MATERIALS AND METHOD

The study was quantitative and adopted a descriptive research design in a Tertiary Care Hospital. The research was conducted in the department of pharmacy for a period of six months.

Data Collection: Face-to-face interview, checklists and department procedure manual were used to study and understand the roles and responsibilities of the pharmacists.

Through literature survey i.e. research papers, journals, books along with expert advice, the various competency factors that have to be studied among the pharmacists were identified. With the identification of factors, a questionnaire was formulated. The data was collected with a customized questionnaire wherein the items(questions) were classified under five broad categories namely, Demographic profile, Technical Competency, Behavioral Competency, Leadership Competency and Organization Specific Competency in a 5-point likert scale. Open Ended questions were included in the questionnaire. Each employee was given the questionnaire by the researcher in person and collected to avoid bias and to address any clarifications in the questions.

Sampling: The total population who were 153 pharmacists were taken for the study.

FINDINGS

From the outcome of the study, it was noted that 61.4% were males and 38.6% were females. And out of these respondents the maximum numbers of individuals were undergraduates i.e. 79.1%. Majority of the employees (38.6%) belong to the age group of 31 to 40 years. The total percentage of the employees who are permanent is 85.6%.

All the 'R' values for technical, behavioral, leadership and organization specific competencies are not above 0.7 and there is no concern for multicollinearity. This means that all the variables are measuring its own question and there is no need for grouping them as there are no similarities or homogeneity among the items. This shows that all the items (competencies) taken for the study can be considered.

Hypotheses Testing: Hypotheses testing was done using two-way analysis of variance(ANOVA).

H_o: Null Hypothesis: There is no significant relationship among the technical, behavioral, leadership and organization specific competencies.

H_1: Alternate Hypothesis: There will be a significant relationship among the technical, behavioral, leadership and organization specific competencies.

Since the p value is lesser than 0.05, null hypothesis is rejected and alternate hypothesis is accepted which means that there is a significant relationship among the technical, behavioral, leadership and organization

specific competencies. Thus, these competencies are independent of each other.

H_o: Null Hypothesis: There is no significant relationship between occupation and technical, behavioral, leadership and organization specific competencies among pharmacists.

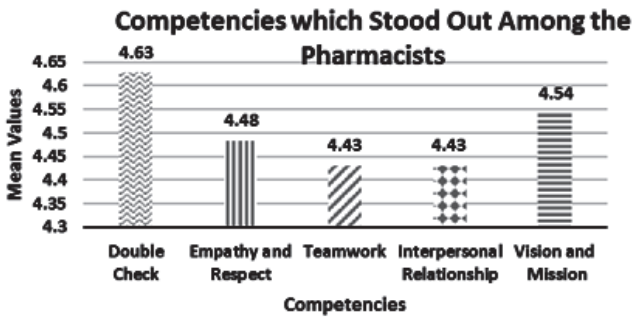
H_1: Alternate Hypothesis: There will be a significant relationship between occupation and technical, behavioral, leadership and organization specific competencies among pharmacists.

Since the 'p' value is higher than 0.05, the test is not significant. Therefore, null hypothesis is accepted and alternate hypothesis is rejected which means that there is no significant relationship between occupation and technical, behavioral, leadership and organization specific competencies among pharmacists. Therefore, there is a possibility to increase the quality of the employees through these competencies irrespective of the occupation of the pharmacists.

Thus, it can be concluded that the identified competencies after analysis can be used for the development of a customized competency framework for the pharmacy.

From the two-way analysis of variance and hypotheses testing, it was found that there is a significant relationship among the main competency domains. Whereas, null hypothesis was accepted only in case of occupation (Permanent Employee, Probation Employee, Temporary Employee, Trainee) of Pharmacists.

Table 1.1: Competencies which stood out among the Pharmacists



From the table 1.1, the mean values that were analyzed, the highest mean values were for the following competencies: The pharmacists are conscious and take precautions by double checking before dispensing the medications; their immediate boss is considerate, has empathy and respects others; the respondents agreed that the organization encourages team work to achieve organizational goals and good interpersonal relationship.

DISCUSSION

In this research study, the factors influencing competency of pharmacists in a tertiary care hospital were analyzed. The most popular languages of the patients who visit the tertiary care hospital are Hindi, English, Bengali, Malayalam, Tamil and Telugu. Implementation of a competency based system will encourage individuals to achieve performance standards and contribute towards continuous quality improvement.

Competency Practice Based Research: Competencies in the current study, have been classified into four main domains for the overall development of the individual. The domains which were identified are technical competencies, behavioral competencies, leadership competencies and organization specific competencies. According to the Organization for Economic Co-operation and Development (OECD) framework, "Sustainable development and social togetherness depend critically on the competencies of all our population–with competencies understood to cover knowledge, skills, attitudes and values." Core competencies were divided into three main groups: delivery related competencies, interpersonal competencies and strategic competencies [5]. Kumari and Sita, (2010) have examined the importance of different aspects of competency domains which are: talent acquisition, talent development and talent retention [6]. Whereas, this research study has brought about a wholistic approach in the development of the individual to achieve patient centered care.

In the process of grouping competency, factors in accordance with the organization's perspective has been included. All the items taken for the study are independent of each other and can be incorporated into the analysis of factors influencing competencies. The outcome of the analysis of variance shows that there is a possibility of improvement in the employees' quality through the identified competencies. The hypotheses testing shows that there is no significant relationship between occupation and technical, behavioral, leadership and organization specific competencies among pharmacists.

From the literature survey that has been carried out so far, this research study has analyzed various categories of employees with respect to age, gender, qualification and occupation in accordance to the various competency domains.

There exists a strong linear relationship among the various competencies that were identified. All the 'R' values for technical, behavioral, leadership and organization specific competencies were not above 0.7 which indicates a strong linear relationship which is in accordance with research acceptance limits. Research studies have shown that there exists a strong correlation between the competencies and employees' performance levels. Therefore, this confirms that competencies comprise of the knowledge, skills and attitudes of individuals to improve individualistic performance [7].

The male pharmacists are more in number than the females in the country which is also evident from the current research study. In one of India's largest pharmaceutical company, Dr. Reddy's labs, out of 17,000 employees, only 15% of females are present[8]. Therefore, from this study it is evident that there still exists a variation in the male to female ratio in the industry.

The importance of this study was that the identified and analyzed competency factors can be used for individual and organizational growth. The gaps identified among the competencies can be used to develop training modules for better performance of the employees. According to Bhojraj et al, (2016) the study states the current facts of the pharmacy situation in India wherein for optimal functioning of pharmacists the necessary knowledge, skills and abilities should be considered. As there are more number of pharmaceutical colleges arising in the country, the outcome of pharmacists with the necessary competence and motivation is less[9]. Therefore, to address this, a competency based education system will help by exposure of the right competencies that is necessary for growth and development in the field.

In addition to it, the customized competency tool which has been developed can be used across various health organizations by making changes to the technical competency domain in accordance with the job description. The rest of the domains can be retained. Thus, this tool provides a platform for the organization to develop individual competencies across the health disciplines.

RECOMMENDATIONS

There is a need for management to encourage the employees to share their views to the top management about their needs and grievances.

- Modules for training employees in languages such as Hindi, Bengali, Telugu, Malayalam is recommended for the employees to communicate better with the patients. Workshops on development of interpersonal relationships is of vital importance as the maximum number of respondents have stated lack in this area.
- Although a survey questionnaire was used for collection of data through the feedback from the respondents, including participants who represent the academic side and professional practice across the various disciplines in the health sector will add more value to the study.
- The inputs from this research for the development of the competency framework can be used in the other health disciplines also.
- Since the study was for a short period of time, survey questionnaire for self-assessment was adopted for the study. Further other qualitative techniques such as interviews, focus group discussions, Delphi techniques etc. can be used for the study.
- Based on this study, the research can delve deeper into identifying competencies at various levels within the department and across various other departments within the hospital.

FUTURE DIRECTIONS

The questionnaire which was formulated can be used to assess the employees over a period of 6 months or one year after training has been incorporated with respect to effective interpersonal communication and language training in Bengali, Telugu, Malayalam and Hindi.

CONCLUSION

The main outcome of this research was to identify factors influencing competencies for pharmacists. From the analysis through descriptive statistics i.e. through mean and inter correlation, it was found that the items present in the four variables i.e. technical competencies, behavioral competencies, leadership competencies and

organization specific competencies, were independent of each other and there was no concern for multicollinearity. All the correlations were positive and showed that there is a possibility of the employees' competence to improve through the various variables that were identified. The identified competency factors will help every individual employee to assess their own competencies and further to work towards their own development and contribute towards the organizational goals.

Conflict of Interest: Nil

Source of Funding: It was self-funded.

Ethical Clearance: Taken from MSRUAS Research Committee.

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Demographic Profile of Blood Donors: A Study of a Tertiary Care Medical College Hospital Ambala Facility Based Study

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ABSTRACT

Introduction: An integrated strategy for blood safety is required for the provision of safe and adequate blood. Recruiting a sufficient number of safe blood donors is an emerging challenge. The shortage of blood in India is due to an increase in the demand, with fewer voluntary and limited number of replacement blood donors. A study on the Demographic profile of Blood Donors: A Study of a tertiary care medical college Hospital Ambala facility based study was done.

Material and Methods: A hospital based cross-sectional design was conducted among 800 blood donors. The statistical analyses were done by using the SPSS software. The associations between the demographic factors were analyzed by using the Chi square test.

Results: Mean age of replacement group was 28 ± 7.392%. Majority (82.4%) knew about their blood group.

Conclusion: Creating an opportunity for blood donation by conducting many blood donation camps may increase the voluntary blood donations.

Keywords: *voluntary, replacement, blood donors, age, religion*

INTRODUCTION

Blood is the only oxygen transporter in the body and is crucial in saving lives. Even years of extensive research failed to find a true substitute for blood and blood components may not be available for many years.[1] Therefore, blood donation by humans will continue to be the major source for blood and blood components. Blood donation is truly 'a gift of life' that a healthy individual can give to others in their community, who are sick or injured. In any blood bank blood and the component units available for everybody's requirements should be sufficient. With the advent of modern transfusion medicine the therapeutic use of specific portions–components of blood, e.g. factor VIII concentrates, packed red cells or platelets rather than whole blood is important. But, non-availability of sufficient basic blood units is a problem throughout the country.

The hospitals rely on the relatives of a patient to donate the necessary blood as there are not enough voluntary blood donations to help the needy patients. Maximum blood donation in our blood banks is on replacement basis. Blood banks pressurize the doctors, the nurses and the relatives of the patient and urge them to send replacement donors to maintain their stock. This is not a good practice as the relatives of the patients are compelled in to finding donors. Professional blood donors are brought to donate blood in guise of being replacement donors. This is a very risky situation as professional donors constitute a group with high-risk behavior leading to greater chances of transfusion-transmitted diseases.[2]

Like in any developing country in India too, there is a dependency on family replacement and remunerated donors. Though the World Health Organization advocates that member states should establish national

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blood transfusion services that will operate on the basis of voluntary, non-remunerable basis[3], family/ replacement donors still provide more than 45% of the blood collected in our blood banks.[4]

MATERIAL AND METHOD

Study Area: The study was conducted in the Blood Bank in the Department of Pathology of Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, district Ambala, Haryana.

Study Population: The participants coming to the department of Blood Bank. These participants were both voluntary and replacement donors.

Inclusion criteria: Willing to give consent for the study and heamoglobin ≥12gm%

Exclusion criteria: Age <18years and >65years, Weight <45kgs, Suffering from any disease or on medication, Professional/Commercial/Paid donors.

Study period: For a period of 12 months i.e. from January 2015 to December 2015.

Study design: A hospital based cross-sectional design

Method of sampling: Systemic random sampling technique was used for sample collection.

Sample size: The sample size was decided taking into account the **$n=4pq/L^2$**

Where, n= Minimum sample size required, p= Expected prevalence rate, q=100-p, L=Allowable error (10 %). Literature review reveals that the overall prevalence was 35.65%, in a study by **Manikandan** et al (2013)[5] in Tamil Nadu. So keeping this study into consideration, the sample size was calculated assuming a prevalence of 35% and the sample size for the study came out to be **743** and the sample size was rounded off to **800** donors.

Sampling technique: Approximately 2000 donors attend the Blood Bank in a year. Considering sample size of 800, sampling fraction was calculated, therefore, in the current study every 3rd donor was included for the study, and till the sample size completed. However, 6.6% of the blood donors refused to participate and therefore, a total **747** donors participated in the study.

Study tools: A self designed, pre-tested, semi-structured, open and close ended questionnaire was used for collecting relevant information

Data analysis: The data were analyzed using SPSS version 21. Percentages and means were calculated for the data. Chi- square test of significance was used. A p value of <0.05 was considered to be statistically significant.

RESULTS

In the present study it was found that male were more in both the group. Mean age of replacement group was 28 ± 7.3925 and for voluntary group it was 27 ± 8.3068. Majority belongs to 21-30 year of age in both the group as seen in figure I.

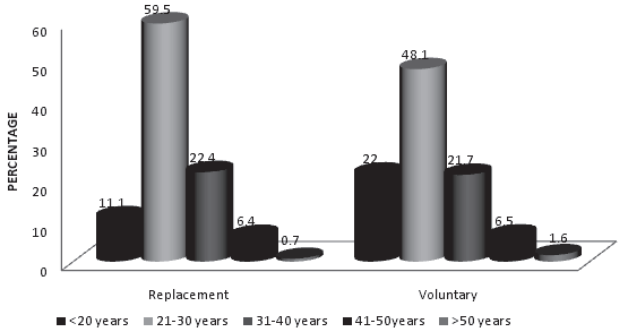

Figure I: Distribution of Donors According To Their Age

Figure II shows sex wise distribution of Replacement & Voluntary donors. Majority (89.4%) of study subjects in replacement group were males and females were 10.6%, similarly in voluntary group also the majority (92.2%) were males and females were 7.8%.

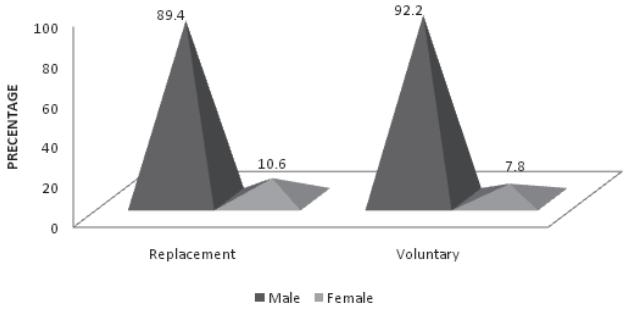

Figure II: Distribution of Donors According to Their Gender

Table 1 represents religion wise distribution of Replacement and Voluntary group donors. Majority (66.1%) of study subjects were Hindus and belonged to

replacement group, followed by Sikhs (16.5%), Muslims (10.4%), Others (7.1%) respectively, similarly in voluntary group also the majority (63.0%) were Hindus, followed by Sikhs (21.4%), Others (12.4%), Muslims (3.1%) respectively. The difference was found to be statistically highly significant.

TABLE 1: Distribution of Donors According To Their Religion

Religion	Replacement		Voluntary		Total	
	n = 425	%	n = 322	%	n = 747	%
Hindu	281	66.1	203	63.0	484	64.8
Muslim	44	10.4	10	3.1	54	7.2
Sikh	70	16.5	69	21.4	139	18.6
Others	30	7.1	40	12.4	70	9.4

χ^2=21.622, df=3, p value < 0.001

Table 2 shows distribution of donors according to their educational status among Replacement and Voluntary group donors. Majority (51.8%) of study subjects in replacement group have studied up to graduation, followed by secondary school 29.9%, similarly in voluntary group the majority (38.5%) have studied up to graduation with, followed by secondary school with 38.5%.

TABLE 2: Distribution of Donors According to Their Educational Status

Educational Status	Replacement		Voluntary		Total	
	n = 425	%	n = 322	%	n = 747	%
Illiterate	15	3.5	5	1.6	20	2.7
Primary	8	1.9	5	1.6	13	1.7
Middle School	4	0.9	3	0.9	7	0.9
High school	43	10.1	40	12.4	83	11.1
Secondary School	127	29.9	124	38.5	251	33.6
Graduate	220	51.8	140	43.5	360	48.2
PG	8	1.9	5	1.6	13	1.7

χ^2=10.446, df=6, p value 0.107

About their diet, majority (57.6%) of study subjects in replacement group and 53.7% in voluntary group were non-vegetarians. About their smoking behaviour 53.9% of study subjects in replacement group and 64.3% in voluntary group were non-smokers and 73.2% of study subjects in replacement group and 71.4% in voluntary group were non-alcoholic.

DISCUSSION

On analyzing the socio-demographic data, it was seen that the majority of the donors who participated in the present study belonged to the age group of 21-30 years (54.6%) which was similar (35.48% and 41.7%) to the studies done by Choudhury et al (2014) and Shidham et al (2015).[6,7]

In the present study, majority (90.6%) of donors were males as compared to the females 9.4%, the reasons for less percentage of female donors could be temporary deferral conditions like low haemoglobin, low weight, etc. These findings were found similar to the studies done by Uma et al (2013) and Kasraian et at (2015), where majority of donors were found to be males (93.0% and 93.74% respectively) as compared to females which were 7.0% and 6.26% respectively.[8,9]

In another studies done by Shenga et al (2008), Singh et al (2015) and Siromani et al (2016) distribution of donors belonged to Hindu community (44.7%, 66.0% and 78.3% respectively) followed by Budhist, Muslims and others which was found similar to the present study where Hindus were 64.8%, followed by Sikhs and

others. This may be because Hinduism is the dominant religion in India.[10,11]

Abderrahman et al (2014) and Nigatu et al (2014), in their studies showed that the majority of respondents were living in the rural areas (83.2% and 55.4% respectively) which was found similar to the present study which was 60.0%.[12,13]

In the present study, majority of donors were married (50.5%) which was similar to the studies conducted by Kulkarni et al (2014) and Shenga et al (2008) which was 73.6% and 89.5% respectively.[14,10]

In the studies done by Dubey et al (2014) and Uma et al (2013) majority of donors (43.58% and 60.3% respectively) were graduates which was found similar with the present study (48.2%).[15,8]

In the present study, the distribution of donors according to occupation was found to be students (33.3%) which was found similar (28.01%) to the study done by Unnikrishnan et al (2011).[16]

In the present study, the majority of donors belonged to class I (79.8%) of socio-economic status according to modified BG Prasad classification 2016 which was found similar (49.0%) to the study done by Kurian et al (2016).[17]

Most of the blood donors in the present study were non-vegetarians (56%) and 44% were vegetarians, 41.6% of the donors were smokers while 27.6% were alcoholic whereas in the studies done by Ahuja et al (2009) and Ray S et al (2005) the results were quite opposite as the majority of donors were vegetarians 92% and 65%, while 38% and 5.9% were smokers and 37.6% and 5.2% were alcoholic. Cultural factors might be responsible for these differences.[18,19]

CONCLUSION

It is important to create opportunities regarding blood donation but it is equally important to spread the awareness of voluntary blood donation. Awareness or knowledge can only change behaviour, if the facilities for adopting such practices are readily available. Availability of "Blood Donor Diary" at every blood bank containing the details of prospective blood donors could also go a long way. Non- monetary incentives for blood donation like Appreciation Certificates may lead to the achievement of goal of 100% non-remunerated voluntary blood donation.

Ethical Clearance: The study was approved by Institutional Ethics Committee. The present study did not impose any financial burden to the participants and an informed and written consent was taken

Conflict of Interest: Nil

Source of Funding: Self

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Analysis of Factors Affecting Stunting Events in Underwrapped in Cempaka Velocity Mining Area Kota Banjarbaru in Year 2017

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ABSTRACT

Poor nutrition status can result in stunting in children. Children with stunting conditions, will become a human adult with low quality. If this condition occurs in children aged 0-2 years, then most likely the child can not reach the expected potential height, the child will experience brain development is not perfect. Based on riskesdas in 2013, prevalence of baduta stunting nationally is 37.2%, while prevalence of baduta stunting in South Kalimantan is 45%. Based on the results of research Rahayu, et al., (2013) in Cempaka, Banjarbaru found that prevalence baduta stunting is 50.9%. These data indicate that the stunting problem belongs to a very poor category of public health because of the prevalence of stunting at ≥ 40%. This research is an analytic observational study with cross-sectional approach. The subjects of this study were all children under five and parents of children under five living in the mining area of Cempaka Urban Village. The results showed that there was no correlation between father education, maternal education, maternal employment status, number of family member, income, with stunting incident in Toddler in Kelurahan Cempaka Kota Banjarbaru. As for suggestions that can be given is the need for monitoring the nutritional status of children under five with follow-up as a preventive form of stunting incidents, supplementary feeding for improved nutritional status, and stunted toddlers identified should receive more intensive attention from health workers.

Keywords: *stunting, education, employment, number of family members, income*

INTRODUCTION

The development of a nation aims to improve the welfare of every citizen. The measure of the quality of human resources can be seen from the human development index (HDI), while the size of the welfare of the community can be seen, among others, from the level of poverty and nutritional status of the community (IBRA, 2007). The main problem faced by the Indonesian nation today is the low quality of human resources (HR). The problem of lacking protein energy (PEM) as one of the major nutritional problems occurring in baduta (under five years) (Husaini, et al., 2003). Nutrition status means a state of physical health of a person or group of persons determined by one or two combinations of specific nutritional measures. Suhardjo (1986: 15) says that nutritional status is a state of the body caused by consumption of food absorption and use. One of the main factors that influence the nutritional status of children under five is mother's upbringing pattern. Parenting directly affects the consumption of toddlers[1]

In Indonesia, there are still four major nutritional problems that need to be overcome with nutrition improvement program, that is protein energy problem (PEM), vitamin A deficiency problem, nutritional anemia problem, and iodine deficiency problem. Viewed from the etiology, the nutritional status of the population is influenced by various complex factors, such as: social, economic, cultural, health, natural environment, and people who are related to each other. The occurrence of economic crisis, there has been an increase in malnutrition cases, and even cases of malnutrition in Indonesia that can actually be overcome early with regular monitoring every month[2]

Poor nutrition status can result in stunting in children. Children with stunting conditions, will become a human adult with low quality. If these conditions occur

in children aged 0-2 years, it is likely that children can not reach the expected height of potential, children will experience imperfect brain development, resulting in difficulties in meeting academic value[3].

The period of the first two years of life is a time very sensitive to the environment and this period is very short and can not be repeated again, then the baduta period is called the "golden period" or the "Window of Opportunity or critical period" (critical period). The toddler period is a period of rapid growth and development, and is the foundation that determines the quality of the next generation[4].

Basic on Riset Kesehatan Dasar (Riskesdas) 2007 stated that the prevalence of baduta stunting in Indonesia is 36.8%. In 2010, the prevalence of baduta stunting was 35.6%. In 2013, prevalence of baduta stunting was 37.2%, which means an increase compared to 2010 and 2007. Prevalence of baduta stunting in 2013 based on the data can be said public health problem with bad category, because stunting prevalence of ≥ 30%[5].

Data from Riskesdas 2007, stated that prevalence of baduta stunting in South Kalimantan was 41.8% .In 2010, prevalence of baduta stunting in South Kalimantan was 35.3%. In 2013, the prevalence of baduta stunting in South Kalimantan was 45%, which means an increase compared to 2010 and 2007. The prevalence of baduta stunting in South Kalimantan in 2013 based on the data can be said to be a very bad public health problem because of the prevalence of stunting by ≥ 40%[5].

Based on the results of research Rahayu, et al., (2013) in Cempaka, Banjarbaru found that the prevalence of baduta stunting is 50.9% each (Rahayu A, et al., 2013). These data indicate that nutritional problems (stunting) are included in public health problems with very poor category because of the prevalence of stunting by ≥ 40% (Agency for Health Research and Development, 2013). The magnitude of this prevalence shows that nutritional problems, especially the problem of malnutrition is included in the category of severe problems, so it is important to do research to determine the factors that affect stunting.

METHOD

This study is an analytic observational study that aims to analyze the factors that influence the stunting status of children under five in the mining area of Kelurahan Cempaka Kota Banjarbaru. The research design used a cross-sectional approach that collects data on dependent variable and independent variable is done at one time point of the phenomenon being studied is during one period of data collection. The independent variable (independent variable) in this research consist of parent education, parent job, family member number, and family income. While the dependent variable (dependent variable) in this research is stunting status. The subjects of this study were all children under five and parents of children under five living in the mining area of Cempaka Urban Village. In this analysis the statistical test used is a chi-square test with 95% confidence level, since the variables studied are nominal and use more than two groups of unpaired samples. However, if the test is not met then use alternative test that is fisher exact test test.

RESULTS AND DISCUSSION

1. Univariate Analysis

Table 1: Frequency Distribution of Factors Affecting Stunting Occurrence in Toddlers in Cempaka Mining Areas

No.	Variable	Category	Frequency	Percentage (%)
1.	Education of Father	Low (≤ SMP), High (> SMP)	28, 2	93,3, 6,7
2.	Education of Mother	Low (≤ SMP), High (> SMP)	27, 3	90, 10
3.	Job Status of Mother	Not Work, Work	27, 3	90, 10
4.	Number of family members	Large (> 4 peoples), Small (≤ 4 peoples)	5, 25	16,7, 83,3
5.	Family income	Low (< 1.500.000), High (≥ 1.500.000)	23, 7	76,7, 23,3
6.	Stunting status	Stunting, Not Stunting	7, 23	23,3, 76,7
	Total		30	100

Based on table 1, it is known that the education history of the father who has a low education of 28 (93.3%) of respondents. Low education in question is no school, did not complete primary school, finished primary school and finished junior high school. While mothers who have low education as many as 27 (90%) of respondents. Parents' education, especially from fathers, has a role in getting more jobs and more income for the family. This will also affect the family's ability to meet every household's needs, including the need to meet nutritious consumption. The level of parental education influences parents' knowledge of nutrition and parenting patterns[6].

Based on the employment status of the mother of toddlers, mothers who do not work as many as 27 (90%) of respondents. Working moms will find it easier to get more information than just at home as housewives. Mothers who do not work and just stay home alone, they can get health information one of them through television[7]. Based on the number of family members, the family has a small number of family members of 25 people (83.3%) and there are 5 people (16,7%) who are in big family environment. The amount of family can affect the consumption of family members. The growing number of family members and not offset by rising incomes will lead to a more uneven distribution of food consumption[7]

Based on income status, it is known that families with low income are 23 (76.7%) of respondents. Family income affects the provision of family meals. In addition, family income can affect the parenting pattern of children, so it also affects the nutrition of children under five in the family. Poor child nutrition will have an impact or affect child growth. Nutritional status can be influenced by the direct factors of food intake and infection and not directly in the form of food security in the family, child care patterns and the right health environment. Food consumption also affects the nutritional state of a person[8].

2. Bivariate Analysis:

Table 2. Correlation between independent variables with stunting events

No.	Variable	Category	Stunting Status		P-value
			Stunting	Not Stunting	
1.	Education of Father	Low (≤ SMP) High (> SMP)	7 (25%) 0 (0%)	21 (75%) 2 (100%)	1,000
2.	Education of Mother	Low (≤ SMP) High (> SMP)	6 (22,2%) 1 (33,3%)	21 (77,8%) 2 (66,7%)	1,000
3.	Job Status of Mother	Not Work Work	4 (14,8%) 3 (100%)	23 (85,2%) 0 (0%)	0,009
4.	Number of family members	Large (> 4 peoples) Small (≤ 4 peoples)	1 (20%) 6 (24%)	4 (80%) 19 (76%)	1,000
5.	Family income	Low (< 1.500.000) High (≥ 1.500.000)	6 (26,1%) 1 (14,3%)	17 (73,9%) 6 (85,7%)	1,000

Based on the result of statistical test to know the correlation between father education and stunting incidence in toddler, it can be seen p-value = 1,000 (> 0,05) which means Ho accepted so there is no correlation between father education to stunting event in balita. This is in line with research conducted by Aryu Candra (2010) that there is no correlation between father education with stunting events. This condition can be influenced because the father is usually outside the home so that parenting is entirely left to the mother. Both college and college dad have never been involved in child feeding activities. In addition, the education level of the father also does not reflect his nutritional knowledge[9].

Based on the result of statistical test to find out the correlation between mother education with stunting event in balita, it can be seen that p-value = 1,000 (> 0,05) which means Ho accepted so there is no relation between mother education with stunting incident in toddler in Cempaka Mining. In line with research conducted by there

is no correlation between education level with stunting status (Ni'mah C & Muniroh L, 2015). This may be because the TB / U indicator reflects past nutritional history and is less sensitive to changes in nutritional input where the mother's role is so important. Unlike the weight that can rise, fixed or decreased while the height can only rise or stay within a certain period. Under normal circumstances, height increases with age. High level of maternal education does not guarantee children avoid malnutrition because the level of higher education does not mean that mothers have sufficient knowledge of good nutrition[10].

Parental education is not a risk factor for stunting events because of the many factors that can lead to stunting children, such as parenting and family care, as well as the history of other infections and family food intake. Research in Tangerang in 2011 found that father education is closely related to changes in stunting child height at 6-12 months of age to be non-stunting at age 3-4 years (Rahayu, 2011). Parents with better education tend to have knowledge and ability to implement knowledge better than parents with low education. But it also does not close the possibility of poorly educated parents are able to raise children better than those who have a high education and good work[11].

Based on the result of statistical test to know the relation between status of job of mother with stunting incident in toddler, it can be seen that p-value = 0,009 (<0,05) which means Ho is rejected so there is relation between status of job of mother to stunting incident in toddler in mining area Cempaka (Fikrina, 2017). These results are in line with research conducted Novita S (2013) that there is a correlation of mother work with stunting on p-value 0.04 (Siahaan, 2013). Based on the result of statistical test to know the relation between the number of family member and the occurrence of stunting in toddler, it can be seen that p-value = 1,000 (<0,05) which means Ho accepted so there is no relation between family size and stunting incident in balita. This research is in line with research of Novita S (2013) that there is no significant correlation between family size and stunting in p-value 0,059[12].

Based on the result of statistic test to know the relation between family income and stunting incidence in balita, it can be seen that p-value = 1,000 (<0,05) which means Ho accepted so there is no relation between family income with stunting incident in balita at Cempaka Mining Area . This research is in line with research of Princess A (2012) which states that there is no relation between family income with stunting event with p-value 1,000 (Anindita, 2012). This can be because the income received is not entirely spent on staple food, but for other needs. A high level of income does not necessarily guarantee good nutritional status in infants, as income levels may not necessarily be allocated sufficiently for food purposes. Although family income is low, but good childcare, the stunting will be reduced[13].

CONCLUSION

There is no correlation between father education, maternal education, maternal employment status, number of family members, income, with stunting incident in Toddler in Kelurahan Cempaka Kota Banjarbaru. As for suggestions that can be given is the need for monitoring the nutritional status of children under five with follow-up as a preventive form of stunting incidents, supplementary feeding for improved nutritional status, and stunted toddlers identified should receive more intensive attention from health workers.

Ethical Clearance: this study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for etchical clearance and informed consent. The informed consent included the research tittle, purpose, participants's right, confidentiality and signature.

Source Funding: This study done by self funding from the authors.

Conflict of Interest: The authors declare that they have no confict interest.

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Analysis of Impact of Use of Incident Thickness in Pregnant Woman in Area of Malaria (Gunung Raja Mentawe Village Districts of Tanah Bumbu South Borneo)

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ABSTRACT

Malaria is an infectious disease caused by parasites. Plasmodium that lives and breeds in human red blood cells. The disease is naturally transmitted through the female Anopheles mosquito bites. Transmission of malaria is similar to infectious disease transmission in general that is determined by factors called host (human and Anopheles mosquitoes), agent (parasite plasmodium) and environment (physical, chemical, biological and social). Malaria is a world health problem, especially for tropical countries and subtropics, the World Health Organization (WHO) says 40% or more than 2,400 million people live in malaria endemic areas and estimates of prevalence between 300-500 million clinical cases each year, reported deaths of 1-1.5 million people per year. Malaria infection especially in pregnancy is very detrimental to the mother and fetus it contains, because this infection can increase the incidence of morbidity and mortality of mother and fetus. Complications of malaria in pregnant women such as anemia, hypoglycemia, cerebral malaria, pulmonary edema, placental infection, acute renal failure, puerperal sepsis and post partum bleeding, can even lead to death. The mortality rate of malaria in pregnant women with complication of hypogklikemia is 45-75%, whereas malaria of celebral have mortality 20-50%. South Kalimantan is among the top 10 provinces with the highest API. One of the districts in South Kalimantan that includes malaria endemic area is Tanah Bumbu Regency with an API of 7.4%. In Kabupaten Tanah Bumbu there are 2 sub-districts that are still malaria endemic namely Mentewe sub-district (API 12,2%). Respondents from this study were pregnant women who used insecticide-treated bed nets. The results showed that the use of insecticide treated bed nets in pregnant women was influenced by the attitude of pregnant mother (sig.0,033), while knowledge (sig 0,614), body weight (sig.0,163) and maternal anemia status (Sig 0,362) against the use of mosquito nets

Keyword: *Malaria, mosquito nets, pregnant women*

INTRODUCTION

Malaria is an infectious disease caused by Plasmodium parasites that live and multiply in human red blood cells. The disease is naturally transmitted through the bite of Anopheles female mosquitoes. Malaria is a world health problem especially for tropical and sub-tropical countries, the World Health Organization (WHO) says that 40% or more than 2,400 million people live in malaria endemic areas and estimates of prevalence between 300-500 million clinical cases each year, with the reported mortality rate reaching 1-1.5 million people per year. Malaria is one of the infectious diseases that contribute to infant and under-five mortality, and pregnant women, ie malaria in pregnancy causes 5-12% of total low birth weight infants and contributes 75,000 to 200,000 to infant mortality[1]

Malaria infection especially in pregnancy is very harmful to the mother and fetus it contains, because this infection can increase the incidence of morbidity and mortality of mother and fetus. The mortality rate of malaria in pregnant women with hypoglycemic complication is 45-75%, whereas cerebral malaria has 20-50% mortality[1]

Year 2013 The number of cases of malaria in the world as many as 198 million cases with an incidence

rate of 30% and a mortality rate of 40%. Association of SoutheastAsian Nations (ASEAN) including Indonesia stated the number of malaria cases of 28 million with the number of deaths of 584 thousand people, especially children under five (78%) each year with 42.6 million babies born from mothers at risk of malaria falciparum and / or malaria vivax. Pregnant women are exposed to the risk of malaria every year around 125 million worldwide and there are 200,000 infant deaths due to malaria infection in pregnancy. The Asia-Pacific region contains 54.4 million pregnant women at risk of malaria with deaths ranging from 75,000-200,000 infant deaths each year[2]

Malaria morality in a region is determined by Annual Parasite Incidence (API) per year. API is the number of malaria positive cases per 1,000 population in one year. National API trends in 2011 to 2015 continue to decline (from the API of 1.75% in 2011 to 0.85% by 2015). This demonstrates the success of malaria control programs undertaken by central, local, community and related partners. Looking at provinces by 2015, it appears that eastern Indonesia still has the highest API figures. The 2015 API figure in South Kalimantan is 0.68% (as much as 0.68% of the malaria positive population per 1,000 population in South Kalimantan during 2015). Malaria positive rates in Indonesia in vulnerable groups such as pregnant women and children aged 1-9 years are quite high (1.9%) compared to other age groups[3]

South Kalimantan is among the top 10 provinces with the highest API. One district in South Kalimantan that includes malaria endemic area is Tanah Bumbu Regency with an API of 7.4%. In Tanah Bumbu District there are two sub-districts which are still malaria endemic, Mentewe sub-district (API 12,2%) and Teluk Kepayang (API equal to 7,7%) including positive pregnant mother and infant. The rise of gold mining in the region became one of the factors causing the development of malaria vector. This is because the mining activity caused the holes of excavation of mine which became the breeding place of malaria vector[4]

One of the malaria preventive measures that can be carried out in accordance with the causes of malaria cases is by using insecticide treated bed nets or bed nets in bed, as recommended by the World Health Organization (WHO) since November 2004. Based on research data from R & D Center P2B2 Tanah Bumbu in 2016 the use of insecticide-treated bed nets in Mentewe Sub-District of Tanah Bumbu Regency resulted in a positive impact on malaria cases, namely the decrease in the number of malaria cases with API 10.2%. This is supported by the results of research conducted by Aisyah (2014) which states that .here is a relationship between the use of insecticide treated bed nets with the incidence of malaria. According to Soro (2014) results, 12 households (35.3%) of non-adherent respondents used insecticide treated mosquito net, while in the group of KK obedient in using inseccide treated mosquito net, as many as 30 families (100%) experienced the incidence of malaria[5]

MATERIALS AND METHOD

This study design was observational analytic with croos sectional design. The populations in this study were all pregnant women. Samples were determined using accidental system in research period.

FINDINGS

Table 1: Results of Univariate Analysis

No.	Variable	Category	Frequency	%
1.	Knowledge	not so good	4	13,3
		Good	26	86,7
2.	Attitude	Negative	10	33,3
		Positive	20	66,7
3.	Weight	Less	16	53,3
		Normal	8	20,0
		Excess	8	26,7
4.	Status of Anemia	Light	8	26,7
		Normal	22	73,3

Based on table 1 can be seen knowledge of respondents at most is good that is as much as 26 people (86,7%), respondent attitude at most is positive as much 20 people (66,7%). Status of anemia of the respondents at most is normal as many as 22 people (73.3%). The weight of respondents at most in the category less as much as 16 people (53.3%).

Table 2: Results of Logistic Regression Estimation on Variables Affecting Respondents in Behavior of Insecticide Netting Used

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Weight	.758	.544	1.946	1	.163	2.134
	Status of Anemia	.516	1.049	.242	1	.623	1.675
	Knowledge	-.809	1.603	.254	1	.614	.445
	Attitude	2.863	1.339	4.570	1	.033	17.519
	Constant	-3.152	2.124	2.202	1	.138	.043

From table 2 it can be seen that only attitude variable (sig.0,033) has real effect on behavior of inseccide treated mosquito net, while knowledge (sig 0,614), BB (sig 0,163) and maternal anemia status (sig 0,3623) did not significantly influence the use of mosquito nets.

DISCUSSION

Respondents in this study mostly did not experience anemia (73.3%). Respondents were dominated by non-primary school graduation (66.7%). Despite low educational backgrounds, the respondents' knowledge of malaria, including knowledge about malaria understanding, causes, mode of transmission, malarial signs, malaria prevention, and malaria treatment were categorized as good. Most respondents' attitudes toward malaria are categorized positive (66.7%).

Based on the bivariate analysis there is only one variable that is the attitude variable that has a real effect on the behavior of the use of insecticide treated bed nets. In terms of use of insecticide treated bed nets, most respondents did not use the mosquito net (56.7%), whereas the use of mosquito net was one of the efforts to prevent malaria transmission. The use of insecticide-treated bed nets can reduce the contact between vectors and humans, so it can be a protective tool for the community against malaria transmission[6].

Human behavior is the result of all kinds of experience as well as human interaction with the environment manifested in the form of knowledge, attitudes and actions. In other words, behavior is the response or reaction of an individual to the stimulus that comes from outside or from within himself. Behavior of the community can influence the success of using insecticide-treated bed nets, because inseccide-treated bed nets are only used at night while while not sleeping, many people interact with the causes of mosquito bites Anopheles sp so that even when sleeping at night already using mosquito net insecticide but still there is a possibility to be exposed to malaria due to the community's[6].

The results showed that pregnant women who have a positive attitude towards the use of insecticide treated bed nets. The attitude process is still in the stage of receiving, responding and appreciating, but not yet in the responsible and behavioral stages so that the current attitude condition has not implicated the behavior. Many other factors that cause the formation of such behavior, for example because of lack of family support, especially husband, or habit factors and so forth. The number or type of mosquito repellent exposure can be used and chosen so that the practicality becomes a consideration not to use insecticide treated mosquito net.

The results of the same study were conducted by Rianto (2009) which showed that there was a relationship of mother attitude with the use of insecticide treated bed nets (p = 0,000). Mothers who have a positive attitude means supporting the use of mosquito nets. The findings are in accordance with the opinion Notoatmodjo, (2007), attitude is a closed reaction of a person to the stimulus or object. Attitudes of various levels, namely receiving, responding, appreciating and responsible. As Green (2005) explains that behavioral changes can occur from predisposing factors in which one of these predisposing factors is a person's attitude.

To anticipate this and to achieve the main objectives of health education in shaping health behavior, the steps and efforts that can be taken by health institutions other than distribution of inseccide treated bed nets are ANC services regularly, continuous consultation and includes continuous health promotion and promotion program by providing knowledge about the importance of using mosquito nets for pregnant women in particular and carrying out prevention efforts of mosquitoes as a whole and integrated[7]

CONCLUSION

The use of insecticide treated bed nets in pregnant women was influenced by the attitude of pregnant mother (sig.0,033), while knowledge (sig 0,614), body weight (sig.0,163) and maternal anemia status (Sig 0,362) against the use of mosquito nets

Ethical Clearance: this study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for etchical clearance and informed consent. The informed consent included the research tittle, purpose, participants's right, confidentiality and signature.

Source Funding: This study done by self funding from the authors.

Conflict of Interest: The authors declare that they have no conflict interest.

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Organ Failure and Quality of Life: A Study among Patients undergoing Maintenance Hemodialysis

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ABSTRACT

Background: Organ failure becomes a complicated health issue which creates a significant threat to a large section of the population. The burden of disease is very higher among the patients with an organ failure. The present paper looks into the quality of life and depression among the patients undergoing maintenance hemodialysis.

Methods: Patients who were above 18 years and who have a history of 6 months dialysis are selected as samples for the study. The total samples for the study were 64. The information was directly collected from the patients in the hospital setting itself through the interview.

Results: It is evident from the study that diabetes remains one of the prominent reason for kidney related problems. Different levels of depression are evident among the participants of the study. This study underlines that the Quality of life remains a challenge for the patients undergoing hemodialysis. A strong association has found between socio-demographic variables, illness related measures and sub-dimensions of the quality of life.

Keywords: *Organ Failure, Quality of life, Hemodialysis.*

INTRODUCTION

The incidents of renal diseases and other organ failure issues become very common in the recent times. Epidemiology of such issues has risen ever before in the history. The changes in the lifestyle and occurrence of co-existing diseases are viewed as the crucial reason for the same. The occurrence of a life-threatening disease not only affects the patient but will have significant implications for the family too. Azeez[1] reports that organ failure has significant implications on the familial, economic, physical, psychological and social dimensions of life. Kidney related problems are one among the major health challenges persists considerably in the category of organ failure. A large number of patients are diagnosed with kidney (renal) related problems every year and become vulnerable. Apart from being the state of physical vulnerability, kidney patients often required to avail extra medical care, especially dialysis in most cases. The physical complications of the renal failure and its consequent treatment modalities are substantial reasons for creating poor psychosocial well-being. Psychosocial issues are often identified with the patients undergoing maintenance hemodialysis[2, 3, 4]. The presence of psychosocial problems creates potential risks to the mental health as well as the physical health of the patient. Depression is one of such concern widely seen among the patients with end-stage renal diseases. Current pieces of pieces of evidence implicate the higher magnitude of depression among different groups[5, 6, 7].

It is evident from the available literature that patient on end of stage renal disease is vulnerable to mild and severe mental health problems. This could be a potential reason for poor prognosis. Organ failures, especially renal diseases are potential threat to have low quality marital, familial, cognitive functioning and sexual relations[8, 9, 10]. The consequent results of physical and co-existent mental health issues among the renal patients have a significant impact on the overall quality of life of the patients. It is evident from the everyday clinical practice and current literature that poor quality of life is a very real among the patients who are diagnosed with renal diseases and undergoing maintenance hemodialysis[11, 12]. A number of factors, directly and indirectly, influence the quality of life of the patients undergoing hemodialysis. Along with psychosocial, familial and economic factors, treatment-related factors also play a crucial role in the quality of life

of the patient. Duration of the illness, treatment modalities adopted yet, caregiving and other demographic variables are very influential on the quality of life.

MATERIALS AND METHOD

The present study was conducted among the patients who are undergoing maintenance hemodialysis at Muljibhai Patel Urological Hospital, Nadiad, Gujarat, India. The hospital is exclusively treating patients with Urological problems. Samples for the study were chosen purposively among the patients undergoing hemodialysis. Patients who were above 18 years and who have a history of 6 months dialysis only selected as samples for the study. The total samples for the study were 64. The information was directly collected from the patients in the hospital setting itself. An informed consent was taken from the patients and researcher explained them the aims of the study along with the potential benefits or threats.

TOOLS

Apart from the detailed socio-economic data sheet, two other standardized tools were administered to explore the core variables under investigation.

1. **KDQOL-SF™:** KDQOL Version: 1.3, a generic health-related questionnaire developed by the Ron D et al (1994). The KDQOL-SF™, Version 1.3 has been widely used in the studies with End Stage Renal Diseases patients. The tool contextually measures the Quality of Life of patients with renal diseases.
2. **PHQ-9:** This tool is widely used for diagnosing depression among the Kidney Patients undergoing maintenance hemodialysis. The tool is developed by Kroen et al (2001). The nine items of the PHQ-9 are based on the nine diagnostic criteria for major depressive disorder in the DSM-IV.

RESULTS

Table 1: Socio-demographic Profile

Sex	**Frequency**	**Age Group**	**Frequency**
Male	46 (71.9)	20- 40 Years	8 (12.5)
Female	18 (28.1)	41 to 60 years	30 (46.9)
		Above 60	26 (40.6)
Marital Status	**Frequency**	**Education**	**Frequency**
Married	48 (75)	Illiterate	2 (3.1)
Unmarried	6 (9.4)	Primary	5 (7.8)
Widow	5 (7.8)	Secondary	20 (31.3)
Widower	5 (7.8)	Higher Secondary and above	37 (57.8)
Education	**Frequency**	**Income**	**Frequency**
Unemployed	26 (40.6)	Below Rs. 10000	20 (31.3)
Farming	4 (6.25)	Rs.10001 to Rs.30000	26 (40.6)
Government service	9 (14)	Above Rs.30000	18 (28.1)
Private Sector	8 (12.5)		
Retired	17 (26.5)		

(N = 64)

Men constitute the majority of participants with 72 percent. This was a real reflection of the patients admitted to the hospital for dialysis as men account larger in number. Nearly Half (46.9%) of the respondents belongs to the age group of 41 to 60 years, almost same percent (40.6%) come under the age category of above 60 years. As a positive

indication, respondents in the youthhood (below 40 years) constitute a minority of respondents (12.5%).

A majority of the participants in the study were married (75%) while almost 10 percent of the respondents are still unmarried. A major portion of the respondents had a Higher secondary or above qualification while 31 percent of the respondents had secondary education.

Only three percent of the participants were illiterate. The employment status of the respondents indicates that around 41 percent of them were unemployed, a major portion of them was jobless due to illness and others were housewives. Around 27 percent of the respondents reported that they are retired from service and 14 percent are government employees. It was evident that 41 percent of the respondent are earning below Rs. 10000 per month while less than one-third (31.3%) of the respondents are earning between Rs. 10001 to Rs. 30000. Around 28 percent of the respondents are earning more than Rs. 30000 per month.

Table 2: Disease related information

Duration of illness	**Frequency**	**Frequency of Dialysis**	**Frequency**
Up to 2 years	20 (31.3)	Once in a week	1 (1.6)
3 to 7 years	27 (42.2)	Twice in a week	16 (25)
Above 8 years	17 (26.6)	Thrice in a week	47 (73.4)
Care Giver	**Frequency**	**Usage of Wheel Chair**	**Frequency**
Family Member	60 (93.8)	N o	31 (48.4)
Others	4 (6.3)	Yes	33 (51.6)
Causes of Disease	**Frequency**	**Insurance**	**Frequency**
Don't know	7 (10.9)	No insurance	28 (43.8)
Hypertension	21 (32.8)	Mediclaim	21 (32.8)
Diabetes	19 (29.7)	Reimbursement	4 (6.3)
Other	17 (26.5)	Other	11 (17.2)

(N = 64)

Patient participated in this study reported that 42.2% of them are victims of the illness between 3 to 7 years while 31 percent become within 2 years of time period. Around 27 percent of the patients have started their treatment before eight years. When asked about the dialysis frequency, 73.4 percent of the respondents reported that they are undergoing maintenance hemodialysis thrice a week whereas 25 percent reported that twice in a week. It is evident that majority of the patients are in need of availing dialysis very regularly.

Showcasing the scenario of Indian caring system, around 94 percent of the participants are reported that they are being cared by one of their family members while 6 percent reported that caregiving was provided by someone else. In most of the cases, when probed, it was a nurse. It is evident that a majority (51.6%) of the patients undergoing maintenance hemodialysis are using a wheelchair. The researcher tried to explore the probable reasons for the Kidney disease. It is reported by 32.8% of the respondent that Hypertension is the cause of their Kidney Disease whereas 29.7 percent reported Diabetes as a cause of their Kidney Disease. Around 27 percent of the respondents stated that they are not aware of the cause of the kidney failure. Diabetes and hypertension remained the crucial reason for kidney disease among the samples of this study too.

Table 3: Level of Depression

Level of Depression	**Frequency**	**Percent**
No Depression	4	6.3
Minimal Depression	32	50
Mild Depression	11	17.2
Moderate Depression	3	4.7
Severe Depression	6	9.3

(N = 64)

The impact of being a kidney patient and undergoing dialysis has evident from the results of the study. It is

reported that half of the respondents (50.0%) are having Minimal Depression while 17 percent of respondents are having Mild. Around 10 percent of the respondents are identified with Severe Depression. The state of being subjected to dialysis has made many of them feel helpless and hopeless. This further leads to depression and other mental health problems.

The same negative trend has also evident in the case of Quality of life. A majority of the respondents are identified with the poor quality of life.

Table 4: Gender, depression and different dimensions of quality of life

Gender		N	Mean	Std. Deviation	t	P
Depression	Male	46	5.33	5.420	1.974	.053*
	Female	18	8.33	5.636		
Symptom	Male	46	79.1667	12.35253	2.242	.029*
	Female	18	70.7176	16.31792		
Quality of Social Interaction	Male	46	76.5217	24.89441	.073	.942 (NS)
	Female	18	77.0370	26.98072		

(*Significant, = $p<0.05$) (NS: Not Significant)

It is evident from the present study that there are significant differences among male and female participants in some variables. Depression was seen to be more in Female when compared to Males. The t ratio for Depression is significant (t=1.974, p=0.05) which indicates that there is a significant difference in depression among Males and Females. Symptoms are another variable that shows a significant difference in the grounds of gender. Remaining sub-dimensions in the quality of life have shown no significant difference.

The present study indicates that frequency of dialysis doesn't have any influence on the different sub-dimensions of the quality of life and depression. Patients in different categories of frequency have shown an almost same level of quality of life and depression, a statistically relevant difference was not traced. In the same manner, age group also doesn't make much difference in the case quality of life among the respondents. The case of income and quality of life also remains same as lower or higher income doesn't make a significant difference in the quality of life of the patients.

Table 5: Duration of dialysis, depression and other variables in quality of life

Duration of Dialysis		N	Mean	Std. Deviation	F	P
Depression	Up to 2 Years	20	5.70	5.507	4.308	.018*
	3 to 7 Years	27	6.33	6.403		
	Above 8 Years	17	6.47	4.543		
	Total	64	6.17	5.605		
Effect of Kidney Disease	Upto 2 Years	20	66.7188	18.92123	3.190	.048*
	3 to 7 Years	27	72.6852	19.83239		
	Above 8 Years	17	68.5662	18.06937		
	Total	64	69.7266	18.97905		
Burden of Kidney Disease	Upto 2 Years	20	44.3750	37.10870	4.118	.021*
	3 to 7 Years	27	43.2870	35.56405		
	Above 8 Years	17	51.1029	36.59289		
	Total	64	45.7031	35.89272		
Cognitive Function	Upto 2 Years	20	80.3333	22.63103	5.859	.005*
	3 to 7 Years	27	72.0988	25.28721		
	Above 8 years	17	85.0980	17.40521		
	Total	64	78.1250	22.92442		

Contd…

Quality of Social Interaction	Up to 2 years	20	75.0000	22.77528	4.954	.010*
	3 to 7 Years	27	78.2716	27.46202		
	Above 8 years	17	76.0784	25.82622		
	Total	17	86.2729	23.00134		
Social Support	Up to 2 years	20	81.6648	22.23037	5.689	.005*
	3 to 7 years	27	85.8007	16.47701		
	Above 8 years	17	86.2729	23.00134		
	Total	17	84.6337	19.98893		

DISCUSSION

It is evident from the study that duration of dialysis has an impact on the other variables. The respondents' group which is on dialysis more than 8 years is having a Mean (M= 6.47), higher depression in comparison to two other groups. The same trend is visible in the case of 'effects of kidney diseases' too. The respondent receiving dialysis since 3 to 7 years are having a Mean = 72.68, which depicts that they have much bothered with the effects of kidney disease in comparison to two other groups.

Duration of dialysis made a significant impact on the patient's perception on the 'Burden of kidney diseases'. The respondent receiving dialysis since more than 8 years have a Mean= 51.10 which results that they are having the maximum burden of Kidney Disease. Further, the respondent group undergoing dialysis up to 2 years, having Mean= 44.37 which shows that they are feeling less burden of kidney disease while comparing to other groups. Cognitive functioning is another variable that shows significant variation among the respondents according to the duration of illness.

This study underlines the physiological and psychological problems are very commonly identified with the patients undergoing maintenance hemodialysis. Care and Caregiving become a complicated issue among the patients undergoing hemodialysis. Activity limitation is common among the patients and half of them are using a wheelchair. Showcasing the poor health insurance system in India, it is evident from the study that more than 40 percent of the patients do not have any insurance. This creates a significant financial burden on the patient, especially when a proportionate of them is unemployed.

Psychological variables in the study also manifest the negative implications of the organ failure. A considerable number of patients are identified with severe and mild depression. A large number of them have the feeling of helplessness and hopelessness while facing with the complexities of organ failure and frequent dialyzes. The level of depression has shown a significant relationship with other variables. As like much previous literature, the present study also indicates higher depression among females while compared to males. The duration of dialysis and depression is also established a strong connection. Patients with higher duration had a high level of depression while comparing to the patients with lower duration.

A considerable percentage of patients who are undergoing maintenance hemodialysis reported a lower level of quality of life. Variations also found in connection with the different sociodemographic and illness-related variables. The severity of symptoms is high among females than males. Other gender-related variables don't show much difference. Duration of dialysis is a variable that has a significant connection with the overall quality of life and its dimensions. Patient with higher dialysis duration reported higher effects and burden of kidney diseases. It is evident that Cognitive functions also decreases when the duration of dialysis increases. The same trend is visible in the case of quality social interactions. Patient with fresh dialysis history reported higher social interaction while comparing to a patient with long history of dialysis. Patient's felt higher social support in the initial years of dialysis while comparing to other categories.

CONCLUSION

Replicating the previous researchers, this study also reveals that end-stage renal disease patients receiving dialysis treatment have a lower quality of life than people in general population. The patients receiving longer years of dialysis are shown a much better quality of life

than patients with a new history. This is an indication which highlights the patient's ability to cope-up with the life realities rationally. Further investigations could focus on the factors contributed to the higher quality of life among patient with long history of dialysis. Like many other studies, this study also underlines the presence of depression among the patients. Psychosocial intervention programmes for the patients and their families have to be mandated for professionals and institutions. This would help in minimizing disease and treatment related psychosocial complexities.

Conflict of Interest: The author declares that there is no conflict of interest.

Source of Funding: No funding was received for writing this study.

Ethical Clearance: The study was approved by Institutional Ethic Committee of Muljibhai Patel Urological Hospital, Gujarat, India.

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Legal Challenges in Blood Transfusion Process in India

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ABSTRACT

In recent times, the technical and legal standards of blood transfusion in US and European nations have undergone significant change but in India, the quality and standardization of blood transfusion have not changed much and thereby the patients are exposed to risks. The present paper considers incidents of blood transfusion process errors in India, identification of causes of errors, and presents an overview of Indian laws relating blood transfusion and the judicial approach towards errors in blood transfusion process.

Keywords: *Blood Transfusion, Errors, Law, Judicial approach, Drugs and Cosmetics Act*

INTRODUCTION

Blood transfusion is a contested health care service and it is a most preferred practice under emergent situations. Since 1975, the World Health Assembly has been focusing on the global need for blood safety and has passed several resolutions [1] for that purpose. In 2016, the Global Status Report on Blood Safety and Availability [2] points out that there exist significant variations in the availability, safety and use of blood and blood components between developed and developing countries. Blood transfusion safety has been a major concerned in low and middle income countries, where the risk of transfusion-transmissible is high and in the absence of proper blood screening facilities such risk is often maximized. Therefore, the report calls for strengthening the national blood collection and screening systems so as to ensure sufficient and safe blood supplies worldwide, especially in low and middle income countries.

Reports of Error in Blood Transfusions in India: It is reported that in India 60% of blood transfusion take place due to anemia, 42 percent is due to surgery, and 26 percent for acute hemorrhage and 16percent is for pregnancy. 74 percent of adult blood transfusions are inappropriately done without following the government transfusion guidelines. The possible nearby reason for these inappropriate transfusions are due to unnecessary transfusion for volume replacement and for iron-deficiency anemia cases [3]. The BBC News reported that at least 2,234 Indians have contracted HIV while receiving blood transfusions in hospitals during 2015-16[4]. In the state of Kerala a heart patient dies allegedly after wrong blood transfusion [5].The incidence of death due to wrong blood transfusion are also not uncommon in India [6]. Further, one can find several litigations connected with transfusion errors.[7]

Causes of Error: The transfusion chain includes proper donor selection, blood collection, component separation, infection screening, issue, cold chain transport and final transfusion to patient. In India, transfusion errors take place due to (i) Error in screening the Donors (ii) Pre-analytical errors and (iii) Errors due to inadequacy in legal standardization.

Error in screening the Donors: It is estimated that in India, about 30,000 patients are annually infected due to unsafe blood transfusion. The viruses range from HIV-AIDS, Hepatitis-B or Hepatitis-C[8]. Carney [9] and Ishrath Humairah [10] enumerate how 'Blood Factories' operate and thrive in India. The Ministry of Health and Family Welfare, Government of India reports that during 2014-15 the blood supply has improved in India but it

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still faces a deficit of 10 % [11]. India, with its population of 1.25 billion people, needs 12 million units of blood annually but collects only 9 million that amount 25% deficit [12]. The commercialization of blood is a big 'underworld' market. This market not only attracts new and professional donors but also entertains unqualified donors indiscriminately without proper screening. The Supreme Court of India attempted to ban professional blood donation and promote replacement donation system [13]. At times, over confidence on relative or replacement donors can cause errors. HIV seroprevalence is generally higher in blood sellers and even in the so called replacement or relative donors than amongst regular voluntary donors.[14] The gap between demand and supply not only precipitates corrupt practices in transfusion chain but also promote reckless collection of blood samples.

Pre-analytical Errors: In the total testing process, pre-analytical phase is the most accessible part and this phase is considered as the greatest threat to the laboratory professionals. *Satyavati* V.*Rana* [15] reports the types of pre-analytical errors that includes (a) Patient Identification and Preparation (b) Sample Collection Procedures, Handling, and Processing: proper venipuncture technique, order of draw, proper tube mixing, and correct specimen volume (c) Specimen Transport (d) Errors in Laboratory Tests and (e) Other Errors: (Missing sample and/or test request, contamination from infusion route, insufficient samples, and inappropriate containers).

Errors due to inadequacy in Legal Standardization: The pre-analytical activities, management of unsuitable specimens and reporting policies are not fully standardized, nor harmonized worldwide [16].

Blood Transfusion Services and Indian Law: Blood transfusion services in India are primarily regulated by the Drugs and Cosmetics Act, 1940 and its subsequent amendments. The Central Govt. through Drugs Controller General of India has formulated a comprehensive legislation to ensure better quality control system on collection, storage, testing and distribution of blood and its components. Human blood is covered under the definition of 'Drug' under Sec. 3 (b) of Drugs and Cosmetics Act, 1940. The Central Government of India in the year 1967 accomplished a separate provision Schedule F Part XII B of the Drugs and Cosmetics Rules. This part includes various requirements essential for the operation of blood bank such as technical staff, equipments, accommodation etc. State Drugs Controllers were empowered to issue the licenses for blood banks. The standards for 'Whole Human Blood' were dissuaded in Indian Pharmacopoeia.[17]

Due to the wide spread pervasiveness of HIV AIDS, in 1989, Government of India (the Ministry of Health and Family Welfare) issued a notification under the Drugs and Cosmetics Rules and made the test HIV 1and 2 antibodies of Whole Human Blood as mandatory requirement before transfusion . The Rules from 122F to 122P explain the various procedure of making applications by a blood bank, fees to be paid for grant/renewal of license by the applicant and conditions of license to be followed by the applicant after grant/ renewal and conditions of license to be followed by the applicant after grant/renewal of license. However, the Supreme Court order extensively revised the rules on 5.4.1999. The National Blood Policy in 2002 closely followed the inclusion of hepatitis C testing in blood; other improvements included the standardization of blood storage centers, National Plasma Policy, and recently the baseline assessment of all blood banks in India in 2016.

Judicial Approaches towards Errors in Blood Transfusion: In *Common Cause* v. Union of India and Others [18] the Supreme Court of India stated that "Blood is an essential component of the body which provides sustenance to life. There can be no greater service to the humanity than to offer one's blood to save the life of other fellow human-beings. At the same time blood, instead of saving life, cannot lead to death of the person to whom the blood is given if the blood is contaminated. Medical errors with respect to blood transfusion are dependent on several aspects which have been discussed earlier. But, most medical errors are either treated as civil or criminal negligence".

Judicial Interpretation of Error: In agreement of the A.F. Ferguson Report,1990 the Supreme Court of India took notice of levels of errors in blood transfusion process and observed that many unauthorized Blood collection centers indiscriminately collect blood through untrained and unqualified technicians and without specialized screening and store them in unhygienic conditions. [19]

Human beings ordinarily make judgment either on the basis of their sensorial data which they perceive or

on the sensorial data that are stored in memory. Incorrect processing of sensorial and stored data can lead us to commit error. For example, cognitive biases can lead to systematic deviations from a standard of rationality or good judgment.

Medical Professionals can commit error if,

(a) There is error in inductive reasoning or

(b) There is error in deductive reasoning

The term 'Error' is often interpreted as mistake, accident, or misfortune .A mistake is an omission made not by design, but by mischance [20]. Ordinarily, an accident means an unintended and unforeseen injurious occurrence; something that does not occur in the usual course of events or that could not be reasonably anticipated.[21] On the contrary, negligence means a material deviation from the normal standards due to breach of duty.

In *PoonamVerma* v. *Ashwin Patel and Others* [22] the Supreme Court of India considered several forms of negligence. It is true that 'no sensible professional would intentionally commit an act or omission which would result in loss or injury to the patient as the professional reputation of the person is at stake'[23].

As a consumer a patient reasonably expects reasonable degree of knowledge and skill from his doctor [24]. The degree of knowledge and skill of doctors might differ but must not fall below minimum standard. [25] However,' law does not require of a professional man that he be a paragon combining the qualities of polymath and prophet' [26].A doctor cannot assure cure [27].Sometimes a doctor does take risk [28] but such risk must not be reckless. At times both doctors and patient suggest for alternatives from several options [29].But, each alternative must be assessed from the minimum safety standards.

In blood transfusion process never trust either donor or the recipient. Sometimes, documents on donors and recipient can be deceptive. Unauthorized collection of unscreened blood and reckless transfusion can cause disaster. In *Ravjibhai Ramabhai Sondarwa and Others* v. *State of Gujarat and Others* [30] the Court considered the cases of 23 minor children who used to get treatment for severe Thalassemia in Government hospital were infected with HIV+ due to reckless blood transfusion collected from an unauthorized blood collection center which pretended to be an official blood bank.

Due to lack of screening facilities the recipients undertake risk. In a case it was reported that in the absence of Antizen Test conducted through Polymer Chain Reaction (PCR) method, the HIV+ virus cannot be identified during the Window Period. Therefore, the certificate given by the blood bank about the quality of blood becomes redundant.

It is internationally well-accepted that even after screening through a reliable test like the ELISA test, there is still a possibility of the Hepatitis virus not being detected in the blood if it is in the early stages of incubation which may have happened in the instant case. In this connection, we note that for screening of blood, two tests are in use: (i) ELISA test; and (ii) Radio Immunoassay test. It is also worth noting that ELISA test is not considered conclusive in detecting the HIV viruses and its results usually have to be confirmed by a subsequent test like the Western Blot Test.[31]

At times, doctors and technician are harassed by patients and police on the allegation of negligence. However, the Apex court observed that without obtaining a credible medical opinion from an expert, Investigating Officer is not justified in submitting the charge sheet against the doctor [32]. This ruling brought relief towards many doctors from police action.

It is settled law that the hospital is vicariously liable for the acts of its doctors and the State would be also vicariously liable for the damages on account of negligence of its doctors or other employees[33].

In *Dr. K. Vidhyullatha* v. *R. Bhagawathy* [34] it was viewed that there could be no doubt that administering blood of 'A' positive group to a patient having 'O' positive blood group would certainly amount to deficiency in service and the acute renal failure occurred due to intra-vascular haemolysis.

In *Post Graduate Institute of Medical Education and Research, Chandigarh* v. *Jaspal Singh and others* [35] the Supreme Court of India observed that the where internal imbalance of liver and kidney and haemoglobin levels deteriorated after wrong blood transfusion the doctors of the Hospital cannot disown absolve from their liabilities.

CONCLUSION

Precaution is better than undertaking risk. Law always expects professionals to follow minimum prescribed standards right from collection to transfusion of blood. The health technology in India has considerably improved, but the benefits of technology are yet to percolate to the rural level.

In order to minimize errors in blood transfusion both doctors and technicians must observe *inter alia* few important things in mind. (i) Doctors and technicians should ensure their professional competency and update training (ii) Doctor must record the justification of transfusion (iii) Donor and recipient should be properly identified and their informed consent be obtained and recorded.(iv) Donor and recipient's blood should be screened with minimum prescribed standard and be recorded.(v)Prescribed classification of blood products should be record (vi) The blood products under prescribed standards be stored and transported with proper records (vii) Issue and receipt of blood products be recorded (viii) Cross check status of blood of the recipient before transfusion and monitor during and after transfusion.(ix) procedural details of transfusion should be recorded.

We donate blood to give someone a second chance and let us not spoil the objectivity of philanthropy by wrong transfusion.

Conflict of Interest: No conflict of Interest

Source of Funding: Self

Ethical Clearance: This manuscript entitled as "Legal Challenges in Blood Transfusion Process in India" has been prepared by Rubi Talukdar and Prabir Kumar Pattnaik for review and publication in the Journal "Indian Journal of Public Health Research and Development". This manuscript has neither been submitted to any other journal nor being considered by any publisher for publication.

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Substance Use among Students in A Private Medical College, Southern India-A Cross Sectional Study

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ABSTRACT

Introduction: Substance abuse and its associated problems are a global concern. A recent WHO estimate shows a burden of worldwide psychoactive substance use of around 2 billion alcohol uses, 1.3 billion smokers and 185 million drug users. The doctors are vulnerable to substance abuse/addiction due their ready accessibility to the substance of abuse.

Aims & Objective: To study the prevalence, duration, reasons and type of drug use among medical students.

Materials And Methods: A cross sectional study among 300 randomly selected medical students was carried out in private medical college during August to September 2016. After seeking administrative approval and verbal consent of the participants, questionnaire was prepared, distributed and data were collected from the students (of 1st year to 5th year).Questionnaire was designed to elicit information on the use cigarettes, alcohol, illegal purchase of drugs as well as reasons and age at first use.

Results: Among 300 participants 86% were males and 14% were female students. The prevalence of substance abuse among medical students was about 52% and among them 57.85% of them was staying in hostels. 40% and 36% of them started using it as for experimentation and for fun respectively and 17% of them used for stress relief. The present study also reveals that above 65% were well aware of their side effects.

Conclusion: The problem of substance abusers among medical students should gain attention and it's time to evolve on comprehensive intervention approach to promote a healthy and safe life style practices.

Keywords: *Prevalence, substance use, alcohol, cigarette, medical students.*

INTRODUCTION

Use of tobacco, alcohol, and other substances is a worldwide problem and affects many children and adolescents. [1] Early initiation of substance use is usually associated with a poor prognosis and a lifelong pattern of deceit and irresponsible behavior. [2]Substance abuse and its associated problems are a global concern. A recent WHO estimate shows a burden of worldwide psychoactive substance use of around 2 billion alcohol uses,1.3 billion smokers and 185 million drug users.[3]The doctors are vulnerable to substance abuse/addiction due their ready accessibility to the substance of abuse. There is higher percentage use of alcohol, tranquilliers and psychedelics among medical students and a dependence rate is 5%. [4] Medical students are significantly more likely to use prescription stimulant medications to boost academic performance. Medical training is a demanding endeavour; students often are pushed to limit to succeed and must find ways of copying and adapting. Three fourths of medical students reported that they believe stimulants could enhance cognitive performance and had used them typically for performance enhancement [5]. Substance use changes the way people approach and experience interactions. The adolescents' psychological and social development is compromised as in formation of a strong self identity. Half of the students who drink

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have reported binge drinking, according to the report by national institute on alcohol abuse and alcoholism. Baldwin et al (1991) investigated the problem among senior medical students at 23 medical schools in USA and reported the frequency of life time use of variety of substance as follows alcohol 98% cannabis 66% tobacco 55% cocaine 32% amphetamine 22% tranquilliers 19%. Adolescence is the critical period when the first initiation of substance use takes place. Among the youth, students are particularly involved due to increasing academic pressures. The encouragement by peer groups, the lure of popularity and easy availability of many such substances like alcohol, tobacco (cigarettes and gutkha) and other drugs make a teenager an easy prey. In India approximately 5500 children and adolescents start using tobacco products daily, some as young as 10 years old. The majority of users have first use tobacco prior to the age of 18 years [6]. Present study was undertaken to estimate prevalence of substance abuse medical students.

MATERIALS AND METHODS

A cross sectional study was done among 300 randomly selected medical students which were carried out in a private medical college during August to September 2016. After seeking administrative approval and verbal consent of the participants, a pre-tested and pre-designed questionnaire was used to collect the data. The data was collected from the randomly selected students(1st year to 5th year).Questionnaire was designed to elicit information on the use of cigarettes, alcohol, self prescription of drugs, including sedative, hypnotics ,minor and major opiates and illicit drugs such as cannabis, cocaine, heroin and others as well as reasons for use and age at first usage. The subjects were asked whether they had used the substance during their lifetime. The participants had to provide information on how often they use its quantity and type of consumption. The students were asked to choose the reason for substance use from a list including to obtain due to peer pressure, relaxation, for fun, and experimentation. The results were analyzed using suitable statistical package and chi square test was used per the requirements.

RESULTS

The present study was carried out in a private medical college of south India. 300 medical students were randomly selected and the data was collected and analyzed. Among the participants majority were male students 86% (257) and (43) 14% were female students. 64.6% of the students were following Hindu religion, 12% Christianity and 9% were Muslims. 87% of the study participants were hostlers and 13% were day scholars. Among them 57.85% of the hostlers and 25.64% of the day scholars are substance users. The variety of substances used by the students was alcohol 31.66%, cigarette 20% and drugs 2% respectively. The study showed only 48% of the students was non users of any type of substances.

Table 1: Gender wise distribution of substance use (n = 300)

Gender	Smoke		Alcohol		Drug	
	Yes	No	Yes	No	Yes	No
Female	8	35	12	31	0	43
Male	52	205	83	174	6	251
Total	60	240	95	205	6	294
	Chi Square: 0.061 df: 1 p-value: 0.805		Chi-Square: 0.328 df: 1 p-value: 0.567		Chi-Square: 1.024 df: 1 p-value: 0.311	

It was observed in the present study that consumption of alcohol is more in male students when compared to smoking. This may be because; smoking is strictly prohibited in the college and hostel campus. No statistical significance was observed when compared with gender and drug usage.

Table 2: Resident wise distribution of substance use (n = 300)

Stay	Smoke		Alcohol		Drug	
	Yes	No	Yes	No	Yes	No
Day Scholar	6	33	4	35	0	39
Hostler	54	207	91	170	6	255
Total	60	240	95	205	6	294
	Chi-Square:0.597 df: 1 p-value: 0.440		Chi-Square: 9.496 df: 1 p-value: 0.002		Chi-Square: 0.915 df: 1 p-value: 0.339	

Statistical significance was observed by the place of stay and alcohol consumption of the students.

Table 3: Year wise distribution of substance use (n = 300)

Year of Study	Smoke		Alcohol		Drugs	
	Yes	No	Yes	No	Yes	No
1st Year	10	102	40	72	1	111
2nd Year	30	87	30	87	4	113
3rd Year	9	32	15	26	1	40
4th Year	5	8	4	9	0	13
CRRI	6	11	6	11	0	17
Total	60	240	95	205	6	294

The present study shows, drug usage is common among first and second year students of the course. Regarding the usage of the substances, 27.5% and 28.9% were regular use of alcohol and smoking respectively. Two percent of the students who used were only occasional users. Majority of the substance users were using them only for the duration of past 6months to 1 year. This may be because, the students stay away from their parents during recent period only. The present study shows 40% of the substance users were doing it for experimentation and 36.4% were using it for fun as shown in table 4.

Table 4: Reason for substance use among the participants

Reason For Substance Use	Number	%
For Fun	124	36.4
Experimentation	136	40
Stress Relief	58	17
Forced By Friends Or Others	22	6.4

Questions were asked about the feeling after the use of the products. Nearly 40% of all substance users say no feeling and same percentage of individuals says that, they are relieved off stress after using them. In spite of knowing the side effects of the products, 70% of them still continue to use them.

DISCUSSION

The present study shows 31.66% use alcohol, 20% smoke and 2% use drugs respectively. Similar findings have been recorded by Arora et al in his study done at Meerut [3]. It was also observed that 57.85% of the hostlers are substance users, which was also similar to the study done by Juyal et al, [7]and Naskar et al,[8] where 66.7% of the substance users stay away from home.

Regarding the usage of the substances, it was reported 27.5% and 28.9% were regular use of alcohol and smoking respectively. These findings were supported by DN Sinha, on prevalence of regular use of smoking among male students to be 43%.[9]

Many studies done in India [10-12] and other countries show similar prevalence of substance use among the medical students of various years. [13-15] The main predisposing factor for increase of substance use upto 50% is due to the stress undergone by the medical graduates. Same observation was made by P Kumar and D Basu, were the drug usage was mainly to overcome stress. [4]

The present study shows more than 70% of the substance users know well about their side effects. The findings were similar to the study done by Gopiram et al, among adolescents and young adults. [16]

CONCLUSION

Despite of knowing the harmful use of the substance use, it has been noticed that the adolescents initiate and still continue to use. To conclude, psychological stress seems to be the major cause for substance use. Health planners and educationalists have to be informed, for the corrective action which should be taken on time to reduce the morbidity and decrease the usage of substances among the medical students.

Conflict of Interest: Nil

Source of Funding: Self

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Nutritional Status of Children Residing at An Orphanage in Puducherry

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ABSTRACT

Introduction: Orphanages are a vulnerable group in any socio-economic setting simply because they are deprived of one or both of their primary care givers. The level of vulnerability they face however increases significantly with the level of poverty. The practice of placing deprived children having minimum or no emotional and material resources, in orphanages has since long been prevailing in socio-economically poor Asian countries.

Aims: To assess the nutritional status of children residing at an orphanage.

Methodology: A cross section study was conducted with 75 children with pre structured questionnaire including clinical examination and biometric assessment.

Result: Mean age of children residing at orphanage was 11.2 3.1 years, while 58.7 percentage children were male. The malnutrition was graded by calculating Z score for BMI - Age. It was found that no children having severe malnutrition, but 5.3 percent children were diagnosed as moderate and 18.7 percent children were diagnosed as mild. Children were mainly seems to be deprived socially, rather than physically. Apart from, these children have scabies 12% and Hook worm infestation 5 %, anemia about 8 % and refractory error 3%.

Discussion: A study conducted by Sadik (2010) shows low intake of both micro and macro nutrients except protein by orphanage children in Ghana. Nutritional status indicated that 10% and 15% of the children were severely stunted and wasted respectively. Similar findings were reported by Bhuvanesh Shukla et al (2011), DrNaheedVaida (2013)

Conclusion: About 24 percentage of children residing at orphanage have mild or moderate malnutrition, even though none of them are severely malnourished based on BMI.

Keywords: *Nutritional status, Orphanage, BMI*

INTRODUCTION

An orphanage is an institution dedicated to the care and upbringing of children who have lost their parents. Orphans are a vulnerable group in any socio-economic setting simply because they are deprived of one or both of their primary care givers. The level of vulnerability they face however increases significantly with the level of poverty[(1)]. The evidence from the pediatric and child psychiatry literature makes clear that orphanages are neither an effective nor a humane mode of assistance to infants and families. After the independence the government of India has launched number of schemes for welfare of orphan and destitute children. Such as "Scheme for welfare of orphan and destitute children'' The sole motive of this program is to prevent destitution of children. Under this provision the destitute and

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orphan children are provided shelter, in order to provide good healthy atmosphere and good nutrition. Most common problems faced by orphans include loss of home, high dropout rate from school, lack of health care and problems with immunization, social downfall, child labors and drug abuse.

It has been seen worldwide that every person, every family, every institution recognizes the need for looking after its children. Particularly orphans, destitute or abandoned children who are looked after primarily through child care institution run by government and non-government organization and in some cases through fosters families. The national nutrition survey (1995-1996) report illustrates that about 62% of the children aged 6-9 years are malnutrition's, 43.4% of the children are stunted but not wasted and 9.3% of the children are wasted but not stunted. In addition, 9.1 % of the children are both stunted and wasted [(2)]. In the developing world, 43% of the children are stunted and 9% are wasted [(3)]. Directly or indirectly malnutrition contributes to more than 60% of 10 million child deaths each year[(4)].

Hence the present study is a humble effort to generate relevant information and data on health and nutritional status of destitute children living in the establishment voluntary body in Puducherry.

AIMS AND OBJECTIVES

- To assess the nutritional status of the children dwelling at an orphanage
- To identify the morbidity pattern among orphan children

METHODOLOGY

After obtaining IEC clearance, we obtained permission to conduct Cross sectionalstudy at a Private orphanage through proper channel. The Home for orphan children situated around 5 kilometer from the Institution. Prior to the examination day, the researcher arranged the logistics at the Home including Registration, Anthropometric Measurement and clinical examination and also a Pharmacy. Date was fixed on 3rd Sunday November 2016 based on the convenience of the facilitators at orphanage. On the day of examination out of 120 children, 75 children were available since remaining pupils were attending their schools, so we included all the 75 children available during examination day. Anthropometric measurements were collected based on standard methods[(9)]. Age of the subjects under study was determined by interrogation and confirmed through probing if the birth certificate or the health cards were unavailable. Measurements of weight and height were obtained from all subjects. The subjects were weighed wearing minimal cloths and bare footed. Three weight measurements were obtained using a bathroom weighing scale and the average was calculated and recorded to the nearest 0.5kg. the height was measured with a wooden measuring board without shoes and the average was calculated and recorded to the nearest 0.1cm Clinical finding were recorded on Individual Case sheet by a General Physician and a Pediatrician. Diet History was recorded by using 24hrs recall method followed by health education. Children those who need investigations and follow up were referred to the Institution, and children who need simple medication were provided on the spot. Mass Deworming was instructed though the warden, on the day of examination after Dinner. Data was then analyzed by using Microsoft Office Ex-cell 2010 and SPSS software version 20. Descriptive analysis was done by using Percentage and Frequencies.

RESULT

Figure 1: Depicts the gender distribution of study subjects that is about 59% were male and remaining 41 where female children. Table 1 describes the characteristic features of our study samples. It shows the mean age of study subject as 11.2 years with standard deviation of 3.1 years. Mean duration of stay was found about 68.8 months with Standard deviation of 34.7 (approximately 5 years of mean stay at home). Whereas the mean height and weight was recorded as 130.84cm (SD-16.51) and 31.43 Kg (SD 10.15) respectively

Fig 1: Gender-wise distribution of study subjects

The malnutrition was graded by calculating Z score for BMI – Age and it was found that no children having

Grade III malnutrition, but 5.3 percent children were diagnosed as Grade II and 18.7 percent children were diagnosed as Grade I(Fig 2). Children were mainly seems to be deprived socially, rather than physically.

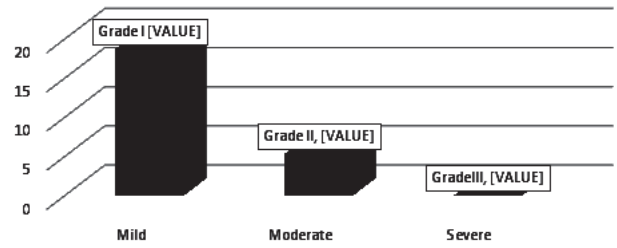

Fig 2: Prevalence of anemia among study subjects

Apart from, these children have scabies 12% and Hook warm infestation 5 %, anemia about 8 % and refractory error 3%.(Fig 3)

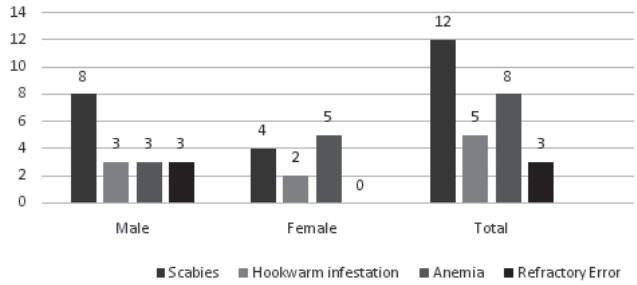

Fig 3: Health Issues among Study Subjects

Table 1: Description of study subjects

Distribution of study sample		
Variable	**Mean**	**SD**
Age in year	11.2	3.1
Height in cm	130.84	16.51
Weight in Kg	31.43	10.15
Duration of stay in month	68.8	34.7

DISCUSSION

A study conducted by Sadik (2010)[5] shows low intake of both micro and macro nutrients except protein by orphanage children in Ghana. Nutritional status indicated that 10% and 15% of the children were severely stunted and wasted respectively. Similar findings were reported by Bhuvanesh Shukla et al(2011) [6], DrNaheedVaida (2013)[7]

Another study at Bangladesh by A.K.ObidulHuqet al has stated thatNutritional statuses of the orphans are very poor. About 12.0%, 14.3% and 6.3% of the orphans were severely malnourished i.e. underweight, stunted and wasted respectively[8]

Bhuvanesh Shukla in his study on to Assess Physical Health Status of Children at Selected Orphanage in Salem, Chennai – India reported that Orphanage children skin problems shows that 3.84% of them had skin patches, 1.96% of them had skin rashes, 7.70% of then had infected wound and 3.84% of them had other skin problems. Most of the (83%) children had dandruff, 25% of them had pediculosis. children's has 4.8% blindness and only 1.96% of them had Bitot's spot. Orphanage children show that 50% of them had dental carries, 33.50 of them had gingivitis and 4% of them had glosistis. Orphanage children show that 57.70% of them were malnourished. Dandruff and pediculosis are most common in children. Mouth conditions are very poor in orphanage, mal nutrition is prevailing among orphan children.

CONCLUSION

Our study concludes that the nutritional status was not that bad when compared with different standards. Even though none of them are severely malnourished based on BMI about 24 percentage of children residing at orphanage have mild or moderate malnutrition.But still we would like to recommend for periodic medical checkup for early diagnosis and for a balanced diet distribution to reduce the complication and prevalence of malnourishments.

Ethical Clearance: Obtained before the commencement of study

Source of Funding: Self

Conflict of Interest: Nil

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Study on Prevalence of Whatsapp Addiction among Medical Students in A Private Medical College, Pondicherry

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ABSTRACT

Background: The world is dynamically changing due to the advancement in the mobile technology. These days it is almost impossible to avoid the presence of Mobile Apps. Whatsapp is one among the major change in mobile apps communication in the recent past, it users is growing very fast. Whatsapp addiction syndrome is a part of internet addiction disorder. This study focuses on the prevalence of whatsapp addiction among medical students.

Aim and Objective: To study the prevalence, pattern, reasons, advantages and disadvantages of whatsapp addiction among medical students.

Methods: This is a cross sectional descriptive study which was done among the medical students present in the medical college. The pretested questionnaire is used for collecting the data. Questions regarding the duration of usage, reasons, to whom, its advantages and disadvantages are asked. The data was collected and analyzed by using suitable statistical methods.

Results: Of the 200 medical students who took part in the study, 108 (54%) were male and 92 (46%) were female. The prevalence of whatsapp addiction among medical students is 51%. Reason for whatsapp usage is for chatting with friends is 87% .The benefit of using whatsapp is easy way of communication is 30.5%. The drawback of whatsapp use is no face to face interaction is 24.5%. Inspite of knowing the harmful effect of whatsapp usage, 32.5% of them are using it and unable to control it.

Conclusion: The whatsapp addiction problem among medical students should gain attention and it is time to evolve a comprehensive intervention approach to promote a healthy and safe whatsapp use.

Keywords: *Whatsapp addiction, medical students.*

INTRODUCTION

The world is dynamically changing due to the advancement in the mobile technology. These days it is almost impossible to avoid the presence of mobile applications or called Mobile Apps. Most of the People can praise the various mobile applications that they use in their everyday lives. Several people are heavily dependent of the usage of such applications for their day to day activities. [1]

WhatsApp is one among the major change in mobile apps communication in the recent past, it users is growing very fast on mobile phones and also on the computers.[2]

Whatsapp was created by Jan Koum and Brian Acton in 2009 for easy communication and faster multimedia messaging. Communication through mobile phones has become easier, faster and cheaper with the help of whatsapp messenger. It is cheaper when compared to the normal phone messaging. Whatsapp messenger is a cross platform mobile messenger which is being worked

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through internet data plan. Whatsapp provides users to send and receive media's like audio, video and images.[3]

Addiction is considered by WHO as dependence, as the continuous use of something for sake of relief, comfort, or stimulation, which often causes cravings when it is absent. [4] Mobile phone addiction /abuse/ misuse is one of the forms of compulsive use of "a mobile phone" by youth across the world. A new kind of health disorder in this category among smart phone users, "WhatsApp's addiction/ abuse/ misuse" is now challenging health policy makers globally. Medical students are also affected by this high smartphone engagement.[5]

Whatsapp addiction syndrome is a part of internet addiction disorder. Internet addiction disorder may be broadly defined as "the inability of individuals to control their internet use, resulting in marked distress and/or functional impairment in daily life". One of the study conducted in South Korea on Internet addiction disorder showed that Internet addiction disorder influence suicide related behavior. Gray matter volumes of the dorsolateral prefrontal cortex (DLPFC), rostral ACC, the supplementary motor area (SMA), and white matter focal anisotropy (FA) changes of the posterior limb of the internal capsule (PLIC) were significantly correlated with the duration of internet addiction in the adolescents with internet addiction syndrome.[6]

The application is highly addictive and creates a great impact on regular users, and apart from that it becomes difficult to control and cure. They can do the positive and negative with what's app.[3] This study focus on the prevalence of whatsapp addiction among medical students.

MATERIALS & METHOD

This is a cross sectional descriptive study which was done among the final year and CRRI students of the medical college. The Pre – tested, self administered, anonymous questionnaire were provided to the individual students. Verbal consent and ethical committee clearance was obtained from the students and management respectively, before handing over the questionnaire.

They were requested to fill the Performa with full assurance about the confidentiality and anonymity that data would be used only for scientific purpose. The questionnaire was then administered to 200 students. Students not available during the study and not willing to participate were excluded from the study. Questions regarding the duration of usage of whatsapp, reasons, to whom, its advantages and disadvantages are asked The data is collected by asking the students to fill the profoma. The data is analyzed by using suitable statistical methods.

RESULTS

Of the 200 medical students who took part in the study, 108 (54%) were male and 92 (46%) were female. The prevalence of whatsapp addiction among medical students is 51%.

In the present study 8%, 15%, 21%, and 56% of students felt irritable, depressed, happy and calm respectively, when not using whatsapp.(refer figure 1) The benefits of using whatsapp was told by students were, easy way of communication, building friendship, long distance communication, improve interpersonal relationship and fast & speedy way of communication as shown in table 1.

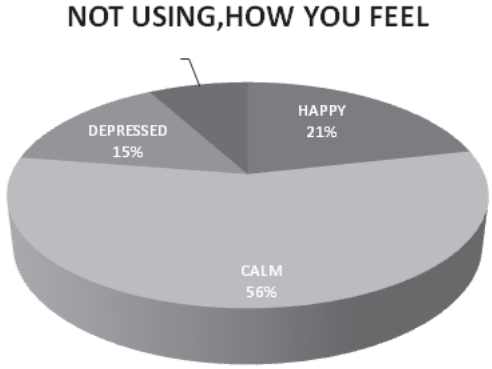

Figure 1: When Not Using, How Do You Feel?

Table 1: Benefits of Using Whatsapp

Variables	Number	Percentage
Long Distance Communication	44	22
Interpersonal Relations	28	14
Building Friendship	49	24.5
Fast & Speedy	18	9
Easy Way of Communication	61	30.5

The students responded as drawback of using whatsapp were, no face to face interaction, ignoring

people around them, less interaction with the society, unwanted relations and reduced attachment with parents. (refer table 2) The whatsapp is mainly used for chatting (66%), current updates (17%), photo & video sharing (14%) and others (3%) respectively as in figure 2. The participants reported, the usage of Whatsapp is mainly to chat with their friends (87%), relatives (8%), and with group (5%). (Refer figure 3)

Table 2: Drawbacks of Using Whatsapp

Variables	Number	Percentage
Unwanted Relations	39	19.5
Less Interaction with Society	40	20
No Face to Face Interaction	49	24.5
Ignoring People around Us	44	22
Reduced Attachment with Parents	28	14

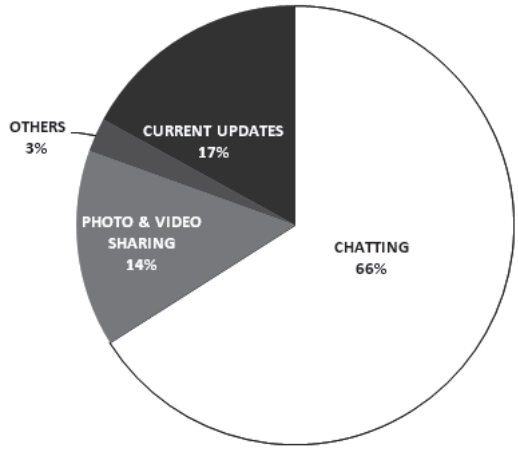

Figure 2: Whatsapp is Mainly Used for

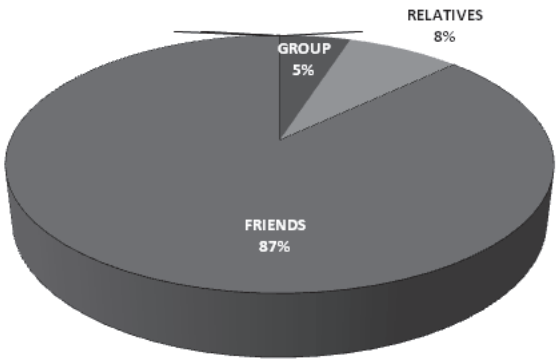

Figure 3: Whatsapp is Mainly Used to Chat with

Purpose of using whatsapp were for their personal work (73%), education (11%) and for other purposes (15.5%). Monthly data recharge done by students was approximately 0-100 Rs. (28%), 100-300 Rs. (58%) and more than 300 Rs. (14%). Whatsapp usage per day by medical students was 0-1 hour (28%), 1-2 hours (29.5%), 2-3 hours (23.5%) and more than 3 hours (17.5%).

DISCUSSION

Globally there have been a lot of advances in the field of technology and communication. Now-a-days many electronic gadgets are available with lots of facilities along with internet connectivity which has changed the way of communication and lifestyle. Use of Whatsapp can be a boon or a bane. The relationships created in this virtual world of Whatsapp builds new friendships and improve communication among people. At the same time participants in this study also opined that the use of Whatsapp also leads to lesser face to face interactions, lesser understanding, false impressions, materialistic and unwanted relations.[7] This was justified by the findings of the present study.

Students were asked the reasons why they most often use whatsapp on their mobile phones. The researchers were amazed at their responds. The results shows that majority of the students use the application for chatting with friends on different issues rather than academic work on campus, and this is represented by 72% of the total number of respondents. This also indicates the link between usage of the application and poor academic performance among the majority of the students. The more friends a student has on whatsapp, the more time he/she spends on the application" according to most students interviewed. A student who has a lot of friends on whatsapp is most likely going to be responding to more people and thus spending more time chatting. The study looked at students engaged in the use of the application for other purposes including academic work, general information, and family.[8] In our study, Purpose of using whatsapp responded by students were for their personal work (73%), education (11%) and for other purposes (15.5%).

In another study 43% of students use whatsapp for chatting, 24% of them for sharing photos and videos, and 30% of them for current updates and remaining 3% for other purposes.[3] But the present study shows, 66% of students use whatsapp for chatting, 14% of them for sharing photos and videos, and 17% of them for current updates and remaining 3% for other purposes.

In our study, students use Whatsapp mainly for 87% chatting with friends and 8% of them with their relatives,

5% of them in groups. Similar findings were reported by Karthikeyan, in his study that students use whatsapp mainly for chatting with friends 83% and 7% of them with their relatives, 5% of them in groups respectively.[3]

In a study done at Coimbatore, 54% of them use below 100 rupees for monthly data recharge 33% of them use up to 300 rupees and the remaining 13% uses more than 300 rupees monthly for data recharging. [3] But in our study monthly data recharge done by students was approximately 0-100 Rs. (28%), 100-300 Rs. (58%) and more than 300 Rs. (14%).

In a study done among college students at Coimbatore, 29% of students use 0-1 hours daily, 30% of them use 1-2 hours daily, 19% of them use 2-3 hours daily and remaining 22% use more than 3 hours in a day.[3] But our study shows whatsapp usage per day by medical students was 0-1 hour (28%), 1-2 hours (29.5%), 2-3 hours (23.5%) and more than 3 hours (17.5%).

CONCLUSION

The prevalence of whatsapp addiction is high, were in more than half of the study group show some form of whatsapp addiction pattern. The whatsapp addiction problem among medical students should gain attention and it is time to evolve a comprehensive intervention approach to promote a healthy and safe whatsapp use.

Conflict of Interest: Nil

Source of Funding: Self

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Prevalence of Stress in Young Urban Population in A City of Northern India

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ABSTRACT

Stress is not a mental disorder itself but rather an early sign & symptom of under lying psychological condition. Not all stress is bad. Some amount of stress is necessary for optimal functioning; However chronic stress can lead to metabolic dysfunction. Stress has been linked to inappropriate eating, overweight, obesity for a long time. However it is not clear whether the stress causes metabolic dysfunction or itself is an effect of metabolic dysfunction.

A community based Cross-sectional study was conducted to find out the prevalence of stress among the young 18-40yrs of urban population and its association with overweight, obesity. 150 study subjects, aged 18 to 40 years of both sexes were recruited using simple random sampling. Data was collected using WHO's STEPS criteria and using modified close ended questionnaire. Pearson's Chi-square test & Fisher's exact test was applied for finding the statistical association.

Overall prevalence of psychological stress was high. As much as 28.4% of males & 24.2% of females were having "severe stress" and 60.2% males & 64.5% females were having "moderate stress", whereas the prevalence of obesity was 38.6% in males & 45.2% in females. But the association between stress & obesity was not statistically significant.

Conclusion: The prevalence of both 'psychological stress' & 'obesity' was high among the study participants. However, the association was not statistically significant

Keywords: *Psychological stress, Obesity, overweight, BMI.*

INTRODUCTION

According to American psychological association stress can be defined as "any uncomfortable emotional experience accompanied by predictable biochemical, physiological and behavioural changes". Sometimes stress can be beneficial providing boost & energy to get through situations, but extreme stress can have health consequences affecting immune, cardiovascular, neuroendocrine & central nervous system.[1]

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Association between stress and obesity has been suspected for many years. Scientific evidence in support of such link also has been established.[2]

Studies have established the relationship between chronic stress, HPA (Hypothalamic-pituitary-adrenal axis) and obesity. In addition of typical traits of over nutrition, sedentary life style and sleep deprivation, chronic exposure to environmental stress potentially contributes to the development of obesity.[3]

Taub-Dix, RD of New York city, a weight loss expert has noted that very often, when people are stressed they may eat inappropriately. If that causes them gain weight, that can cause even more stress.[2]

There are considerable evidence from population based and clinical studies indicating significant and positive association of high uncontrollable stressful

event and chronic stress states with adiposity, BMI and weight gain. This relationship also appears to be strongest among individuals who are overweight and those binge eat.[4]

Some studies found poor mental health (depression, anxiety) and childhood physical abuse , sexual and verbal abuse associated with overweight and obesity among university students/young adults. Numerous epidemiologists linked social stress with obesity and metabolic dysfunction. However they found it difficult to determine whether stress contributes to development of metabolic dysfunction or is a result of metabolic dysfunction itself.[5]

AIM

The study was carried out to find out the prevalence of stress among the young 18-40yrs of urban population and its association with overweight/obesity.

MATERIALS & METHOD

A community based cross-sectional study was conducted in semi-urban population of Meerut, to assess the burden of diabetes. Sample size was calculated to be 150 adults of 18-40 years of both sexes. 150 families were selected randomly from total 350 registered families of the UHTC. Home visits were made. Only one subject was selected from each family randomly by using lottery method.

Data was collected by using a pre-tested, semi structured questionnaire using WHO's STEPS criteria. Information was collected regarding socio-demographic profile, educational status, socio-economic status. Modified Kuppuswamy's classification of socio economic status was used for assessing the socio economics status of the study subjects.[6]

Anthropometric measurements (height, weight) were recorded & body mass index (BMI) was defined according to WHO's criteria for Asian adults underweight (<18.5 kg/m2), normal (18.5 -22.9 kg/m2), overweight (23-24.9 kg/m2) and obese (>25 kg/m2).[7] Perceived Stress Scale (10 item version) was used to assess subjective stress in participants under study. It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable and uncontrollable respondents find their lives. The questions in the PSS ask about feelings and thoughts during the last month.[8]

Data was analysed using Statistical Package for Social Sciences (SPSS) software version 19.0. . Pearson's Chi square test was applied to find out significance of association between independent and dependent variables.

RESULTS

Socio-demographic distribution of the 150 study participants showed, 58.7% were males with mean age 30.7(± 7.03) years while 41.3% were females with mean age 29.8 (± 8.22) years. 24% of them were graduate/post-graduates, followed by 22% intermediate/post high school diploma holders, 14.7% high school certificate holders, 12.7% middle school certificate holder, 12% primary school certificate holder and 12.7% were illiterates. Only 2% were professionals/honours graduate (Table 1).

Table 1: Distribution of Study participants according to their demographic profile

Variables		n = 150	%
Age	18-19 years	22	14.7%
	20-24 years	17	11.3%
	25-29 years	20	13.3%
	30-34 years	29	19.3%
	35-40 years	62	41.3%
Sex	Male	88	58.7%
	Female	62	41.3%
Religion	Hindu	148	98.7%
	Others	2	1.4%
Education	Professional/ Honours	3	2%
	Graduate/Post-graduate	36	24%
	Intermediate/ Post High school diploma	33	22%
	High school certificate	22	14.7%
	Middle school certificate	19	12.7%
	Primary school certificate	18	12%
	Illiterate	19	12.7%

Contd…

Occupation	Professional	6	4%
	Semi-professional	9	6%
	Clerical/Shop owner	32	21.3%
	Skilled worker	17	11.3%
	Semi-skilled worker	8	5.3%
	Unskilled worker	10	6.7%
	Unemployed/ Housewife	68	45.3%
Socio-economic Status	Upper	3	2%
	Upper middle	69	46%
	Lower middle	46	30.7%
	Upper lower	32	21.3%

45.3% of the participants were Housewives/ Unemployed(mostly females), followed by 21.3% doing clerical job, 11.3% skilled workers and 10% professional and semi-professionals. Majority (46%) of the participants belonged to upper-middle class, 30.7% belonged to lower-middle class, 21.3% belonged to upper-lower middle class and only 2% were from upper class (Table 1).

The prevalence of obesity & overweight was quite high in this study, 38.6% males & 45.2% females were obese, but this relation between sex & BMI was not significant. Also, the prevalence of stress was high, with 28.4% males & 24.2% females were having "severe stress" and 60.2% males & 64.5% females were having "moderate stress". But this association was statistically not significant (Table 2).

Table 2: Prevalence of body mass index & psychological stress in males and females

Variables	Males (n = 88)	Females (n = 62)	Total (n = 150)
BMI			
Underweight	5 (5.7%)	5 (8.1%)	10 (6.7%)
Normal	26 (29.5%)	20 (32.3%)	46 (30.7%)
Overweight	23 (26.1%)	9 (14.5%)	32 (21.3%)
Obese	34 (38.6%)	28 (45.2%)	62 (41.3%)
$\chi 2 = 3.074$, df = 3, p = 0.380			
Psychological stress			
No stress	10 (11.4%)	7 (11.3%)	17 (11.3%)
Moderate stress	53 (60.2%)	40 (64.5%)	93 (62.0%)
High stress	25 (28.4%)	15 (24.2%)	40 (26.7%)
$\chi 2 = 0.350$, df = 2, p = 0.839			

Among the obese persons, 27.4% participants were having 'severe stress' & 62.9% were having 'moderate stress', while among the overweight participants, 15.6% were having 'severe stress' & 68.8% were having 'moderate stress'. Similarly, among the normal & underweight participants the prevalence of both 'severe stress' & 'moderate stress' was high respectively. But this association between BMI and "psychological stress" was not significant. (Table 3).

Table 3: Association of psychological stress and body mass index (BMI)

Variables	Psychological stress						Total	
	No stress		Moderate stress		Severe stress			
BMI	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Underweight	1	10%	4	40%	5	50%	10	100%
Normal	5	10.9%	28	60.9%	13	28.3%	46	100%
Overweight	5	15.6%	22	68.8%	5	15.6%	32	100%
Obese	6	9.7%	39	62.9%	17	27.4%	62	100%
Total	17	11.3%	93	62.0%	40	26.7%	150	100%
$\chi^2 = 5.290$, df = 6, p = 0.507								

DISCUSSION

In our study the prevalence of psychological stress was quite high, 28.4% of males and 24.2% of females were suffering from severe stress, 60.2% of males and 64.5% of females from moderate stress. Similar finding were reported by, Gomez et-al in Brazil reporting an overall high prevalence of stress among the study participants.[9] Bobyjeet reporting, 51.9% males & 48.1% females having 'severe stress' & 52% males& 48% females having 'moderate stress' respectively[10] and Darshan et al in their study among IT professional reported high prevalence of 'severe stress' 51% in males & 51.7% in females[11].

On the contrary, Sahoo et al reported lower prevalence of both 'severe stress'& 'moderate stress' in young adult males,8% & 13.1% respectively.[12] Similarly, Gupta et al[13] and T.N. et al[14]also reported lower prevalence in their respective studies.

The relation between 'psychological stress' & BMI was not statistically significant, even though high prevalence of both stress & BMI was noted among the participants. Gomez *et-al* reported a significant association between stress & BMI, but post-management the relation between stress & BMI was not significant. On the contrary, Bobyjeet reported strong association between stress & BMI which was statistically significant.

Even though the prevalence of stress is increasing all around the world but not many studies have been done to find out the actual prevalence.

CONCLUSION

High prevalence of stress was found in the study subjects. Higher prevalence of BMI, overweight and obesity was found among those having stress than those not having stress, though the association was not statistically significant.

Limitations: Other variables influencing weight gain, obesity was not included in study.

Conflict of Interest: Nil

Source of Funding: NA

Ethical Clearance: Ethical clearance taken from institutional ethical committee.

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Effects of Socio-Demographic Factors on Prelacteal Feeding Practices among The Lactating Mothers in Meerut City

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ABSTRACT

Background: In many countries across the world, the practice of giving new born babies other substances (pre lacteal feeding) even before lactation is a common cultural practice. Prelacteal feeding is an underestimated problem in a developing country like India, where infant mortality rate is quite high.

Aim and objective: To know the prevalence and effects of socio-demographic factors on prelecteal feeding practices among the lactating mothers in Meerut city UP.

Material and Methods: A cross-sectional study included 322 women who had a live birth during last one year. A pre-designed and pre- tested questionnaire was used for data collection.

Statistical Analysis: Data was analyzed using appropriate statistical tests by (SPSS) version 21.0 for Windows and data were analyzed using the chi-square test.

Results: Study findings showed that 232 (72.05%) of the mothers had given pre-lacteal feedings to their newborn. Ghutti (47.8%), honey (13.4%) and others (10.9) like tea, artificial milk, Gur (Jeggary) etc . had given as Prelacteal feed.

Conclusion: The problem of prelacteal feeding is still prevalent in India. In our study, (72.05%) of the mothers had given pre-lacteal feedings to their newborn.

Keywords: *Pre lacteal feeding, Socio-demographic factors , Urban Slum area*

INTRODUCTION

Pre lacteal feeds that are usually given include honey, sugar water, ghee or other herbal even before lactation has been initiated, it is called pre-lacteal feeding, and the fluids are called pre-lacteal feeds. [1]. It is common in our Indian society due to different customs and misbelieves. [2,3] According to NFHS-3 (2005-2006); the pre-lacteal feeding is most common in Bihar (90.6%), Uttar Pradesh (86.0%), Rajasthan (71.6%) and Jharkhand (66.3%). [4]. It is also observed in many countries like South Nepal (55.6%) and Pakistan (87.6%) . [5,6] Prelacteal feeds are commonly given in many developing countries including India which carries potential risk of infection and aspiration. [7]. WHO/UNICEF strongly discourages the traditional practice of pre-lacteal feeding unless medically indicated.[8]

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AIMS AND OBJECTIVE

To know the prevalence of prelacteal feeding practices and its effects of socio-demographic factors among the lactating mothers in Meerut city UP.

MATERIALS & METHOD

The present cross-sectional study was conducted in the catchment area of urban health and training center (UHTC), Multan Nagar which is the field practice area of the department of Community Medicine, Subharti Medical College, Meerut. 322 Lactating mothers having

child 0-12 months were included for the study. The period of study was from September 2013 to August 2014. After obtaining the ethical clearance from the institutional ethical committee of Subharti Medical College, Meerut, the required sample was taken using simple random sampling technique. A pre-designed and pre- tested questionnaire was used for data collection. For the collection of data, a personal visit was made to each selected family after verbal consent. Data was analyzed using appropriate statistical tests by (SPSS) version 21.0. For all the tests, a p-value of less than 0.05 was considered significant. Appropriate tables were used to show the results.

RESULTS

Table 1: Socio Demographic Characteristic of the Family

Characteristics of the family		Frequency	Percentage
Type of family	Nuclear Family	198	61.5
	Joint Family	124	38.5
Socio economic status of family	Upper	1	0.3
	Upper middle	25	7.8
	Lower middle	128	39.8
	Upper lower	144	44.7
	Lower	24	7.5
Religion of the Family	Hindu	280	87.0
	Muslim	40	12.4
	Others	2	.6

Table no. 1 shows that 198 (61.5%) mothers belongs to nuclear families. while 124 (38.5%) mothers were in Joint families. Majority 144 (44.7%) of women belongs to upper lower class. Majority of mothers 280 (87.0%) belongs to Hindu families and only 40 (12.4%) mothers were in Muslim families.

Table 2: Socio Demographic Characteristic of The Mothers

Characteristic of the mothers		Frequency	Percentage
Age of mother	≤20 years	25	7.8
	21-25 years	167	51.9
	26-30years	119	37.0
	31-35 years	11	3.4
Education of mother	Illiterate	74	23.0
	Primary	50	15.5
	Junior school	52	16.1
	High school	53	16.5
	Intermediate	41	12.7
	Graduate & Post Graduate	49	15.2
	Professional	3	.9
Occupation of mother	House Wife	311	96.6
	Unskilled	3	.9
	Skilled	5	1.6
	Clerk	1	.3
	Semi professional	1	.3
	Professional	1	.3
Parity of the Mother	Primipara	89	27.6
	Multi para	233	72.4

Table no. 2 shows that half of mothers167 (51.9%) belonged to age group of 21-25 years. 74 (23%) mothers were illiterate. Majority of mothers were house wife 311(96.6%). Only 1(0.3%) mother was professional in her occupation. Most of the mothers were multipara 233 (72.4%).

Table 3: Demographic Characteristic of the Child

Characteristic of the infants		Frequency	Percentage
Sex of Child	Female	142	44.1
	Male	180	55.9

Contd…

Age of the Child	0-6 months	100	31.1
	6 -12 months	222	68.9
Weight of the child at the Time of Delivery	Below average	75	23.3
	Average	212	65.8
	Above average	32	9.9
	Not known	3	0.9

Table 4: Prevalence of prelacteal feeding practices and types of prelacteal feeding

Variables	Frequency and Percentage
Types of prelacteal feeding	
Ghutti	154 (47.8%)
Honey and water	43 (13.4%)
Other Like Tea, Artificial Milk, Gur (Jeggary) etc.	35 (10.9%)
Total	232 (72%)

Contd…

Table no. 3 shows that more than half children were male 180(55.9%) and 142(44.1%) were female. Most of the children were between 6-12 months of age 222(68.9). 75 children (23.3%) were below average body weight at the time of delivery.

Table no. 4 shows that 232 (72.%) of the mothers had given prelecteal feedings to their newborn. Ghutti/ (47.8%), honey (13.4%) and others (10.9%) like tea, artificial milk, Gur (Jeggary) etc. had given as prelacteal feed.

Table 5: Association between Prelacteal Feed Given and Various Characteristic of Family, Mother and Child

Variables		Prelacteal Feed Given				Total		X^2 –Value	P-Value
		Yes (N = 232)		No (N = 90)		(N = 322)			
		Freq	%	Freq	%	Freq	%		
Sex of Child	Female	104	73.2	38	26.8	**142**	**100.0**	**0.179**	**0.673 (NS)**
	Male	128	71.1	52	28.9	**180**	**100.0**		
Socio-Economic Status of Family	Upper middle	14	56	12	44	**25**	**100.0**	**6.28**	**0.98 (NS)**
	Lower middle	96	75	32	25	**128**	**100.0**		
	Upper lower	107	74.3	37	25.7	**144**	**100.0**		
	Lower	15	62.5	9	37.5	**24**	**100.0**		
Age of Mother	=<25 YEARS	138	71.9	54	28.1	**192**	**100.0**	**0.01**	**0.92 (NS)**
	> 25 YEARS	94	72.3	36	27.7	**130**	**100.0**		
Education of Mother	Illiterate	53	71.6	21	28.4	**74**	**100.0**	**5.25**	**0.386 (NS)**
	Primary	40	80	10	20	**50**	**100.0**		
	Juniour school	39	75	13	25	**52**	**100.0**		
	High school	40	75.5	13	24.5	**53**	**100.0**		
	Intermediate	28	68.3	13	31.7	**41**	**100.0**		
	Graduate & pg	32	61.5	20	38.5	**52**	**100.0**		
Religion of Mother	Hindu	198	70.71	82	29.29	**280**	**100.0**	**1.90**	**0.168 (NS)**
	Muslim	34	81	8	19	**42**	**100.0**		
Parity of Mother	Primipara	53	59.5	36	40.4	**89**	**100.0**	**9.54**	**0.002(SIG)**
	Multi para	179	76.8	54	23.2	**233**	**100.0**		
Type of Delivery	Normal	192	73.6	69	26.4	**261**	**100.0**	**1.57**	**0.211(NS)**
	Operation	40	65.6	21	34.4	**61**	**100.0**		

Contd…

Place of Delivery	Home	102	79.7	26	20.3	**128**	**100.0**	**6.15**	**0.01(SIG)**
	Institutional	130	67	64	33	**194**	**100.0**		
Education of Mother In Law	Illiterate	113	73.4	41	26.6	**154**	**100.0**	**0.036**	**0.850 (NS)**
	Literate	15	71.4	6	28.6	**21**	**100.0**		
Child Sick Last Six Month	Once	45	73.8	16	26.2	**61**	**100.0**	**3.43**	**0.33 (NS)**
	Twice	41	69.5	18	30.5	**59**	**100.0**		
	More than 2	93	76.9	28	23.1	**121**	**100.0**		
	Nothing	53	65.4	28	34.6	**81**	**100.0**		
Reason Child Sick	Diarrhoea	39	83	8	17	**47**	**100.0**	**7.31**	**0.06 (NS)**
	Pneumonia	38	69.1	17	30.9	**55**	**100.0**		
	Fever	51	66.2	26	33.8	**77**	**100.0**		
	Two or more reason	51	82.3	11	17.7	**62**	**100.0**		

Table no. 5 shows that that prelacteal feeding practice was found (72.05%) of respondents. Mothers who had female child, 73.2% gave prelecteal feed to their babies in comparison to those mothers who had male child 71.1%. The association was found not statistically significant. (44.0%) mothers of upper middle class of families had good practice of not given prelecteal feed to their babies. The association was found not statistically significant. Mothers who were less than 25 years of age, (71.9%) of them gave prelecteal feed to their babies in comparison to mothers who were above 25 years of age (72.3%). There is no association between age of mothers an d prelacteal feeing practices . Mothers who were primary passed & illiterate (80.0% & 71.6%) of them gave prelecteal feed to their babies respectively. While mothers with high school, intermediate, graduate, & post graduation qualification, (75.5%, 68.3% & 61.5%) of them had given prelecteal feed to babies. The association was found not found statistically significant.

Prelecteal feed was given by 81.0% mothers who belonged to Muslim religion,while mothers who were hindu 70.71% given prelecteal feed. The association was found not statistically significant.

Mothers who were multipara, 76.8% of them gave prelecteal fed to their babies than primipara mothers (59.55%). With increase in parity, there is increase in prelecteal feeding practices. The association was found statistically significant. Mothers who had normal delivery, (73.6%) of them gave prelecteal feed to their babies. It means that in institutional deliveries less prelacteal feeding practices was adopted. The association was found not statistically significant. (79.7%) of mothers gave prelecteal feed who had delivery at home which was more than those who had delivery in a hospital (67.0%). The association was found statistically significant.

(73.4%) of illiterate mothers in law advised prelecteal feed to their grandchild as compared to literate mothers in law (71.4%). The association was found not statistically significant. Children who became sick for more than two times in last six months, (76.9%) of them had received prelecteal feed after birth in comparison to those children who became sick once and twice (73.8% and 69.5% respectively). The association was found not statistically significant.

Children who had two or more reason for their sickness, (82.3%) of children who had two or more reason for their sickness had received prelacteal feed in comparison to the children who had only one reason for their illness. This association also was not found statistically significant.

DISCUSSION

In our study prelecteal feeding practice was found (72.%) among mothers. A study done by Satapathy *et al*. (1984) reported that practice of prelacteal feeding was found (73%) among mothers in South Orissa.[9]

In our study, Ghutti (47.8%), honey (13.4%) and others (10.9) like tea, artificial milk, Gur (Jeggery) etc . had given as prelacteal feed. A study done by Gupta P. *et al* (2012) revealed that mugli ghutti/gripe water 55.1%,

and boiled water 49.4%, cow/buffalo's milk 4.7%, and honey 22.6% percent had given as Prelacteal feed.[10]

This study shows that among mothers who had female child, (26.8%) did not give prelacteal feed to their babies in comparison to those mothers who had male child (28.9%) which is also documented in studies by Gupta RK. et al.(2012).[11]

Lower socioeconomic group (37.5%) found to be practicing prelacteal feed to their baby as compared to the upper lower & lower middle class in our study. . A study done by Salve Dawal *et al. (2014)* revealed that lower socioeconomic group found to be practicing prelacteal feed to their baby as compared to the 11(42%) out of 26 in the upper socioeconomic class. Mothers who were less than 25 years of age, (28.1%) of them did not give prelecteal feed to their babies. The age group with highest number of respondent that practiced prelacteal feeding was 21-25 years (59.4%), while the age bracket of respondents with least practice of the prelacteal feed was 35-40 years.[12]

In our study, no statistical significant of mother & prelecteal feed practices was observed. A study conducted by Raval *et al*. (2011 found that (85.2%) illiterate mothers practiced more prelacteal feeding than literate mothers (50.9%).[13]

This study shows that the prelecteal feed was given by (81.0%) mothers who belonged to Muslim religion, which were more than 70.71% mothers of Hindu religion. A study done by Ahmad S et al.(2014) reveled that (32.00%) mothers initiated breast feeding after 24 hours.[14]

This study shows that among mothers who had normal delivery, (73.6%) of them gave prelecteal feed to their babies. A study done by Prior *et al*.(2012) in a meta-analysis concluded that cesarean delivery is associated with lower rates of early breastfeeding initiation.[15]

This study shows that (79.7%), mothers who had delivery at home, gave prelecteal feed which is more than those who had delivery in a hospital (67.0%). Giving birth at home create a favorable environment for different socio-cultural factors, like family influence and birth attendants that can influence mothers to practice prelacteal feeding. In addition, mothers who gave birth in health institution might be advised by health professionals about the risks associated with prelacteal feeding.

In our study, mother in laws who were less educated, less informed about the current practice of the breastfeeding were the main influence (73.4%) for the prelacteal feed. A study done by Khanal *et al*. (2011) revealed that the mother in laws who were less educated, were the main advocator (59.1%) for the prelacteal feed.[16].

This study shows that (76.9%) children who became sick for more than two times in last six months had received prelecteal feed after birth. Prelacteal feeding is discouraged because it limits the infant's frequency of suckling and exposes the baby to the risk of infection. [17] In Ethiopia children who received prelacteal feeding were 1.8 times more likely to be stunted than children who were not subjected to prelacteal feeding.[18]

This study shows that (82.3%) children who had two or more reason for their sickness had received prelecteal feed. It is a common misbelieve that milk comes only on the second or third day of life.[19]

CONCLUSION

This study revealed that there are very common prelacteal feeding pattern among infant in urban area of Meerut. These practices of prelacteal feeding do affect the growth parameters of a child. False beliefs and myths attached to child's feeding deeply rooted in all strata of community; need to be replaced by sound and scientific messages. It is suggested that mothers should be educated about adverse effects of prelacteal feeds. BCC should be targeted for tackling these traditional practices.

Source of Funding: Nil

Conflicts of Interest: None

Ethical Clearance: Permitted by the Ethical committee

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A Cross Sectional Study to Estimate Prevalence and Maternal Risk Factors with Term Low Birth Weight Babies

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ABSTRACT

Background: WHO defined Low birth weight (LBW) as birth weight less than 2500gms.Intra uterine growth retardation (IUGR), preterm birth or combinations of both are the common causes of LBW. In India two thirds of LBW cases are due to small for date. Infants with IUGR have greater morbidity and mortality than the appropriately grown infants. Also LBW is a major determinant of malnutrition in infancy, as 40% of LBW babies are malnourished at 1 year of age.

Methodology: 300 subjects were randomly selected from the department of obstetrics and paediatrics for measuring the prevalence of LBW and to correlate it with maternal risk factors.

Results: Prevalence of term LBW babies was found to be 36.30%. Mean birth weight was 2.52 kg. Lower socio economic class led LBW babies 82(52.9%), upper lower class 24(28.6%), and lower middle class 3(4.9%). Majority of the LBW babies were born to short stature(<145cms) mothers, which was statistically significant.

Keywords: *low birth weight, maternal risk factors, maternal morbidities*

INTRODUCTION

WHO defined Low birth weight as birth weight less than 2500grms.[1] In developing countries like India LBW is a serious problem. According to WHO, 20 million LBW patients are born each year, of which 95% are from developing countries, while India alone accounted around 40% i.e., 8 million infants. Of the 37 per 1000 IMR, LBW constituted 28%, while mortality rate in LBW babies being 57%.[2]

LBW is caused by Intra uterine growth retardation (IUGR) or preterm birth or combination of both, majority of them in developing countries being due to pre term birth. While in India two thirds of LBW are due to small for date.[3]

Infants with IUGR have greater morbidity and mortality than do appropriately grown, gestation matched infants. LBW is also a major determinant of malnutrition during infancy, as 40% of LBW babies are malnourished at 1 year of age. These babies have 2.3 times increased risk of mortality due to infections compared to normal birth weight babies after controlling the confounding variables. It is also a significant determinant of infant and childhood morbidity, particularly neuro developmental impairments such as mental retardation and learning disabilities.[4]

Recent evidence indicates that obesity, type 2 diabetes, and cardiovascular diseases are more common among adults who had IUGR at birth. Studies suggest that these may represent an example of "programming," in which an insult, when applied at a critical or sensitive stage in development, may result in a lifelong effect on the structure or function of the organism. There are numerous factors contributing to LBW, including both maternal and foetal factors.

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MATERIAL AND METHOD

Objectives:

To measure the prevalence of LBW

To correlate LBW with maternal risk factors

A hospital based cross sectional study was conducted on randomly selected 300 subjects in the department of obstetrics and paediatrics. All live babies born at term and singleton pregnancy were included. Pre-term and Post-term babies, Intra-uterine deaths, Still-births, multiple pregnancies, newborns with congenital malformations were excluded from the study.

After taking Informed consent from all study subjects, pre tested questionnaire was introduced. Haemoglobin levels were recorded 15 days prior to delivery. Birth weight was measured within 1hr of birth with an electronic weighing machine. Preterm babies are excluded by assessing gestational age with the help of USG scan reports, EDD, and examination of the baby using new Ballard scoring system. Chi square tests were performed to evaluate the association of various maternal risk factors with LBW.

RESULTS

Of the 300 babies born during the study period, prevalence rate of term LBW babies was found to be 36.30% with mean birth weight of 2.52 kg.

Socio demographic factors: Table No 1

Prevalence of LBW babies was noticed more in exteme age groups (<19 yrs and >35yrs), Muslim and illiterate mothers. All these parameters were statistically significant.

Table No. 1: Socio demographic factors versus LBW

		Birth weight <2.5Kg	Birth weight >2.5Kg	P value
Maternal age	<19Yrs	33(62.30%)	20(37.70%)	<0.05
	19-35Yrs	72(30.00%)	168(70.00%)	
	>35Yrs	4(57.10%)	3(42.90%)	
Religion	Hindu	43(37.7%)	71(62.3%)	<0.05
	Muslim	51(48.6%)	54(51.4%)	
	Christian	15(20.0%)	60(80.0%)	
	Others	0(0%)	6(100.0%)	
Mother's Education	Illiterate	35(43.8%)	45(56.3%)	<0.05
	Primary School	66(41.3%)	94(58.8%)	
	High school	7(17.5%)	33(82.5%)	
	Intermediate	1(5.0%)	19(95.0%)	
Occupation	Agricultural worker	44(63.8%)	25(36.2%)	<0.05
	Daily wage labour	50(51.0%)	48(49.0%)	
	Service	8(11.1%)	64(88.9%)	
	Home maker	7(11.5%)	54(88.5%)	
Family Income	<2164	106(66.3%)	54(33.8%)	<0.05
	2165-6430	3(2.8%)	109(57.1%)	
	6431-10718	0(0%)	28(100.0%)	
Socio Economic Class	Lower Middle	3(4.9%)	58(95.1%)	<0.05
	Upper Lower	24(28.6%)	60(71.4%)	
	Lower	82(52.9%)	73(47.1%)	

Maternal factors: Table No.2

Grand multiparous women, birth spacing <18 months, pre-pregnancy weight <40 kg, weight gain during pregnancy <7 kg, Short stature (<145 cm), mothers with Hb <7 mg/dl, strenuous physical activity during pregnancy, tobacco/alcohol/toddy consumption during pregnancy had increased incidence of LBW with significant association. Equal distribution of LBW was noted in mothers who received protein and calorie supplementation and who didn't.

Table No. 2: Maternal Factors versus LBW

		Birth weight <2.5Kg	Birth weight >2.5Kg	Pvalue
Parity	Primi	34(33.7%)	67(66.3%)	<0.05
	Multi para(2-3)	17(18.7%)	74(81.3%)	
	Grandmulti para (4 or above)	58(53.7%)	5(46.3%)	
Birth spacing	<18 MONTHS	63(46.7%)	72(53.3%)	<0.05
	18-24 MONTHS	30(30.6%)	68(69.4%)	
	>24 MONTHS	16(23.9%)	51(76.1%)	
Prepregnancy birth weight	<40Kgs	79(94.0%)	5(6%)	<0.05
	>40Kgs	30(13.9%)	186(86.1%)	
Weight gain	<7Kgs	97(82.2%)	21(17.8%)	<0.05
	>7Kgs	12(6.6%)	170(93.4%)	
Height of mother	<145cm	106(83.5%)	21(16.5%)	<0.05
	>145cm	3(1.7%)	170(98.3%)	
No of antenatal visits	<4	105(59.7%)	71(40.3%)	<0.05
	>4	4(3.2%)	120(96.8%)	
Haemoglobin status of mother	<7mg/dl	54(100.0%)	0(0%)	<0.05
	7-9.9mg/dl	33(22.6%)	113(77.4%)	
	>9.9mg/dl	22(22.0%)	78(78.0%)	
ICDS beneficiary	Yes	6(136.5%)	106(63.5%)	>0.05
H/O strenuous physical activity	Yes	95(48.5%)	101(51.5%)	<0.05
Smoking/tobacco chewing	Yes	64(91.4%)	6(8.6%)	<0.05
Alcohol/toddy consumption	Yes	64(66.7%)	32(33.3%)	<0.05
Iron&folicacid	Yes	62(64.6%)	34(35.4%)	<0.05
Bad obstetric history	Abortions	10(35.7%)	18(64.3%)	>0.05
	Still Births	17(51.5%)	16(48.5%)	
	Neonatal deaths	9(33.3%)	18(66.7%)	
	H/O LBW baby	7(30.4%)	16(69.6%)	

Maternal Morbidities: Table No.3

Prevalence of LBW is more in mothers who had Tubercolosis followed by other infectious disorders. Highest percentage of LBW babies were born in mothers with chronic hypertension, pre-eclampsia and eclampsia(47.6%), followed by other systemic diseases.

Table No 3: Maternal morbidities versus LBW

		Birth weight <2.5Kg	Birth weight >2.5Kg	P value
Maternal infections	Fever	7(24.1%)	22(75.9%)	>0.05
	Malaria	9(31.0%)	20(69.0%)	
	TB	3(75.0%)	1(25.0%)	
	UTI	29(34.9%)	54(65.1%)	
	Bacterial vaginosis	13(35.1%)	24(64.9%)	
Systemic diseases	Chronichypertension, Preeclampsia, Eclampsia	10(47.6%)	11(52.4%)	>0.05
	Heart disease	8(30.8%)	18(69.2%)	
	Diabetes,GDM	10(38.5%)	16(61.5%)	
	Bronchial Asthma	8(33.3%)	16(66.7%)	
	Sickle Cell Anaemia	8(32.0%)	17(68.0%)	

DISCUSSION

In the present study, the prevalence of term LBW was high i.e., 36.3% compared to Telangana state(8.6%). According to NFHS 3 data prevalence of LBW in India was 21.5%, Andhra Pradesh accounting for 19.4%.[2] This is comparable to results of Noor N et al[5] and Juneja et al[6]. This can be attributed to locality and referral hospitals receiving high risk pregnancy cases from local and area hospitals.

Association between extreme age group (<19yrs and >35 yrs) and LBW was similar with findings of Kaur S et al[7], Aggarwal A et al[8] and Dubey M et al[9] but was not consistent with the study of Prudhivi S et al[10]. Soujanya M et al[11] showed significant association. Early age at marriage and illiteracy in women will make them physically and physiologically immature for reproduction and hence resulting LBW babies. Women >35 years were mostly grand multi paras with increased incidence of complications like hypertension, diabetes etc, this may augment the risk of birth of LBW baby in them.

Muslim religion was significantly associated with LBW babies, similar to the findings of with Dubey M et al[9], Raghunath D et al.[12] Prudhivi S et al [10] , while Kaur S et al[7] found no significance. This may be due to Muslim population belonging to lower socioeconomic status.

Grand multi and primi paras association was similar with findings of Kaur S et al[7], Prudhivi S et al[10] and Dubey M et al[9] and not similar with Sumana M et al.[13]Primi paras will have utero placental insufficiency, structural factors which limit uterine capacity in the first pregnancy, so first born infants may be exposed to a different maternal immune environment, contributing to relative growth restriction, compared to subsequent pregnancies. Grand multi para had higher incidence of pregnancy related complications leading to LBW.

Less birth spacing (<18 months) association with LBW is consistent with findings of Kaur S et al[7], Sumana M et al[13] and Giri A et al[14] but not with findings of Raghunath D et al.[12] This can be explained by the deterioration of nutritional status in the present pregnancy, because of the previous delivery and breast feeding.

Pre-pregnancy weight <40kgs led to LBW and it was similar to results of Prudhivi S et al[10] and Thombre PS et al[15] but not with the findings of Raghunath D et al.[12]It can be due to malnourishment and less body stores of proteins and fats leading to LBW.

Less weight gain during pregnancy(<7 kg)and its association to LBW was similar to the findings of Rajashree K et al[16], Raghunath D et al.[12]It can be due to factors like inadequate intake of nutritious food, hard manual labour during pregnancy etc.

Short stature (145 cm) association to LBW is similar to findings of Sumana M et al[13], Prudhivi S et al[10] and Agarwal A et al[8] but not with Soujanya M et al.[11]Maternal height though influenced by heritable factors or other environmental factors, under nutrition appears to play an important role leading to short maternal height and LBW.

Literacy status of mothers was comparable with the findings of Kaur S et al[7], Raghunath D et al[12] Sumana M et al[13] and Prudhivi S et al .[10] But Reddy RS et al [18] didn't find any significance. Educated mothers may have an increased awareness about the health care services and pregnancy care.

Mother's occupation was comparable with the findings of Rajashree et al[16] and Shahnawaz k et al[17] but not with study findings of Reddy RS et al.[18] It can be attributed to an increased physical activity and less rest when compared with homemakers.

Less family income findings are similar with Reddy RS et al[18] and Sunilbala K et al[19] but not with the findings of Dandekar RH et al.[20] Low income can cause stress on pregnant women forcing them to work and also can be the reason for reduced intake of nutritious food during pregnancy.

Socioeconomic class association with LBW was comparable with findings of Sahu KK[20], Agarwal A et al[8], Raghunath D et al[12], Thomre PS et al[15] and Bendhari ML et al[21] and not consistent with Shahnawaz k et al[17] .They have not found significance between socio economic status and LBW. Low socioeconomic status indirectly linked to infections, low birth spacing etc.

Antenatal visits less than 4 led to significant association and it is similar to results of Dubey M et al[9], Thombre PS et al[15], Kaur S et al[7] but not with Dandekar RH et al.[19] Proper anti natal care can decreases modifiable risk factors like infections, anemia, hypertension etc leading to decrease in LBW.

LBW significantly associated with maternal severe anemia. This is consistent with the findings of Raghunath D et al[12], Sahu KK[20] and Kaur S et al[7].Severe maternal anaemia limits maternal oxygen uptake leading to decrease in oxygen delivery to foetus and consequently leading to foetal growth restriction.

ICDS beneficiaries association was not similar with Dubey M et al.[9] They found reduced percentage of LBW in mothers who had consumed an extra meal during pregnancy. Supplementary meal provided to the mother may not be eaten by the mother alone in the family due to poor socioeconomic conditions.

Physical activity of mothers and its association with LBW was similar with results of the Kaur S et al[7], Thomre PS et al[15] and Sahu KK et al[20]. Dandekar RH et al[19] couldn't find any significance. Strenuous physical activity can alter the balance in mothers with marginal nutritional deficiency and can lead to LBW babies.

LBW and smoking/chewing tobacco during pregnancy showed significant association. This is consistent with Giri A et al[14], Agarwal K et al[8], Dubey M et al[9], Bendhari ML et al[21], and Johnson CD et al[22] but not with the Raghunath D et al[12] and Sahu KK[20]. Nicotine on placental vasculature leads to hypoxia and foetal growth retardation.

Alcohol/toddy consumption during pregnancy significantly leads to LBW. Nykjaer C et al[23] found similar finding. Most of them consumed because alcohol can give fairer babies and also increases amniotic fluid.

LBW babies were born to those who didn't taken iron and folic acid supplementation. Raghunath D et al[12] and Giri A et al1[4] and Sahu KK[20] found similar readings. Thomre PS et al [15], Dandekar RH et al found opposite readings. This is because mothers were not aware of the benefits and also reduced compliance.

Bad obstetric history association was similar with the findings of Raghunath D et al[12]and Bendhari ML et al[21] who did not find any statistical significant association. But Sumana M et al[13] and Thomre PS et al[15] found significant association between bad obstetric history and LBW. History of still births is comparable with Negi KS et al[24] findings.

Maternal infections and LBW association is similar with the Soujanya M et al[11] findings. Tuberculosis during pregnancy lead to high incidence of LBW babies compared to other maternal infections during pregnancy. Bates M et al[25] documented similar findings.

Chronic hypertension, pre-eclampsia and eclampsia were major variables that led to LBW compared to other systemic diseases like diabetes, bronchial asthma, sickle cell anemia and heart diseases during pregnancy. It is comparable to the findings of Kumari PR[26] who did not find significant association between hypertension and LBW. Findings of Prudhivi S et al[10], Raghunath D et al[12], Bendhari ML et al[21], found significant association between hypertension and LBW.

Conclusion: Health education, socioeconomic development, maternal nutrition, and increasing use of health services during pregnancy are important in reducing LBW.

Ethical Clearance: Obtained from Institutional ethical committee

Source of Funding: self funded

Conflict of Interest: Nil

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Role of Videofluroscopy in Rehabilitation of Dysphagia– A Case Study

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ABSTRACT

Dysphagia, described as difficulty in swallowing is a commonly seen post stroke. Individuals with stroke experience difficulty in cognition, language and swallowing. Not many centres in India offer a comprehensive dysphagia management due to lack of infrastructures and professionals working in the domain of swallowing disorders. Visualisation techniques are used to detect aspiration and swallowing disorders. This helps Speech Language Pathologists (SLPs) to facilitate modification of therapeutic manoeuvres to the need of the patient. These techniques not only help in planning treatment, but also provide information on treatment efficacy and decision making on initiating oral feeds. This study focuses on demonstrating the use of Videofluroscopic swallow study (VFS) in a 57 Year old patient, medically diagnosed with left lateral medullary infarct with dysphagia. This study throws light on usage of VFS in modifying therapeutic manoeuvres to improve the patient's quality of life.

Keywords: *Dysphagia ,Videofluroscopy , Therapeutic manoeuvres, Speech Language Pathologist, Quality of life.*

INTRODUCTION

A 57 Year old male patient was medically diagnosed with left lateral medullary infarct, along with systemic hypertension and aspiration pneumonia. The patient's nutritional needs were met through nasogastric tube since February 22, 2017. The patient was consulted and clinically examined by the Speech-Language Pathologist on March 09, 2017. He was observed to have frequent throat clearing, reduced hyolaryngeal elevation during dry/saliva swallow, presence of a gurgly voice and multiple swallow attempts. His voice was breathy which suggested the presence of vocal cord palsy. Fiberoptic Endoscopic Evaluation of Swallowing (FEES) was advised before initiating therapy but was neglected due to the patient's personal reasons and he was reluctant to attend regular speech and swallow therapy to promote safe swallow. A home plan was structured and was given to the patient after a re-assurance from him for regular follow up. The patient followed up on the last week of March 2017 and showed no signs of improvement in swallowing. He consented to attend speech and swallowing therapy twice a week but refused to undergo any formal instrumental evaluation.

Therapeutics focused on strengthening the base of tongue, by pushing the tongue against the palate and Masako manoeuvre (gently biting the tongue and attempting to swallow dry air). It was initially difficult for the patient to achieve hyolaryngeal elevation using Masako manoeuvre and complained of inability to do the exercise. The base of tongue exercises along with breath holding and breath holding with gentle cough to facilitate vocal adduction were practised for ten sessions. It was observed that the patient had hyolaryngeal elevation (but clinically reduced in functioning and not adequate on three finger test).

After the above mentioned ten sessions of therapy the patient was persuaded to undergo a visualisation technique (either FEES or VFS) to understand his

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swallow physiology. The advantages of visualisation were discussed in detail with the patient. The patient then opted to undergo VFS considering that, FEES is an intrusive procedure. VFS is a radiological examination for assessing swallowing functions. The examination was done on June 02, 2017 by using soft solids and liquids (banana and water respectively mixed with Barium Sulphate). The examination was carried out in lateral and anteroposterior view.

On examination; lip closure, tongue elevation, chewing and anteroposterior movement of tongue were present (for soft solids and liquids). There was a delay in the oral transit time. Oral residue (pocketing), multiple swallow, coughing (during and after swallowing), and reduced hyolaryngeal elevation were observed.

It was also noted that the patient also had premature spillage. In the pharyngeal phase, pooling was observed in the valleculae and pyriform sinus. Relaxation of cricopharyngeus muscle was not observed. Efforts were made by the patient to regurgitate. Aspiration for liquids was also an important finding in this individual.

The results of VFS study were discussed with the patient and the treatment was planned based on the same. The therapeutic manoeuvres were modified to benefit the patient's recovery. The following exercises and manoeuvres were taught to the patient, each of them having rationale behind it.

1. Shaker's manoeuver was carried out to facilitate relaxation of the criocopharyngeus muscle. It also helps in increasing its flexibility and improving in strength.
2. Masako manoeuver was prescribed to strengthen the pharyngeal muscles.
3. Mendelsohn's manoeuvre was prescribed to facilitate hyolaryngeal elevation.
4. Pitch glide to facilitate pharyngeal movement.
5. Effortful Swallow helps in increasing the posterior movement of the tongue. This manoeuvre is to overcome the pooling in the valleculae.
6. Supraglottic swallow was done due to aspiration during swallowing. Voluntary holding of breath adducts the vocal cords, hence gaining control over aspiration before and during swallowing.
7. Breath holding exercises were also done for vocal adduction to facilitate voicing and preventing food to enter the airway.

These exercises were practiced for twelve sessions of therapy. Apart from therapy sessions, the patient was advised to maintain a record of practise sessions at home. The patient practised these exercises and manoeuvres 4 – 6 times a day. After twelve sessions, when hyolaryngeal elevation was clinically observed, oral trails of soft solids and puree (pongal and thick curd) were tried using supraglottic swallow modified to the left side was recorded on June 29,2017. It was observed that he was tolerating oral trials. It was also brought to the notice of SLPs few oral trial of liquid was attempted successfully at patient's home. The patient was assessed with VFS again on July 18, 2017 to document the prognosis attained by him over the modification of the therapeutic manoeuvres. On examination, the patient was given liquids and semi-solids (water and pongal; south Indian dish, respectively). First, the water was mixed with Barium Sulphate and was attempted. The patient did not find it difficult to swallow and no signs of aspiration or any oral/ pharyngeal residue/ pooling were observed. Secondly, pongal was given and it was observed that the patient was able to have a safe swallow without multiple swallow trials and residue/ pooling.

Based on the evaluation, the patient was asked to continue the swallowing manoeuvres and also accommodate semi-solid and puree (rice/pongal and curd) to the diet by oral intake in smaller proportions for breakfast. He was advised to slowly increase the portion of the food for intake every week. From only breakfast, the patient began oral feeds for lunch. Liquids were also advised to be included in the diet by oral intake. In the following weeks, the patient could take semi solid, puree, and liquids. Until then he was advised to use NG tube for medicines. He was then asked to start taking medication orally after discussing with the primary physician. The patient showed improvements in therapy and started to intake his food orally everyday (which include his breakfast, lunch, dinner, hydration and medication). The Nasogastric tube was removed on July 31, 2017after careful assessment of SLP and Neurologist.

DISCUSSION

Dysphagia is seen in both acute ischemic and haemorrhagic strokes. The occurrence of dysphagia

varies depending on time of evaluation, and the measures used. It is estimated that 37 to 78% of stroke patients encounter dysphagia [1,2].Aspiration pneumonia is a common threat to medical, allied health professionals and patients post stroke. This can cause greater morbidity, mortality, and increased hospital stay [3,4]. Dysphagia screening protocols are clinically used to detect dysphagia and aspiration at bedside [5,6]. Although this conveys the information of a patient at risk of aspiration, these bedside evaluations fails to provide information on silent aspiration, swallow transit time, pooling in valleculae and pyriform sinus etc. These information are important for a Speech Language Pathologist (SLP) to modify the treatment manoeuvers to facilitate safe swallow.

A good visualisation technique provides this information to SLPs who work in the field of swallowing disorders. VFS is a commonly used instrumental evaluation of swallow among oropharyngeal dysphagia patients. Thisprovide details on the nature and severity of swallowing difficulty and deliver baseline of dysphagia therapy[7] .Several manoeuvers, exercises and stimulation are provided to patients to modify physiology of swallowing in individuals with dysphagia. Manoeuvers like Mendelsohn's, Shaker's, Masako and facilitatory approaches like head tilt/ head turn during swallow, suraglottic swallow are carefully selected based on the swallowing physiology. Hence the study aims to document the role of VFS in the management of dysphagia by tailoring the manoeuvres and exercises to the need of the patient to facilitate safe swallow.

Management of Dysphagia is a 'Team Event' including many professionals contributing in the treatment of the given patient [8] .Speech Language Pathologists play a central role in assessment and management of dysphagia with the help of visualisation techniques like VFS. Modification of therapeutic manoeuvres demonstrate good prognosis and safe swallow among individuals with dysphagia. For over three decades VFS is considered gold – standard in the assessment of dysphagia. Considering the limitation like portability and vitals of patient, one may use this instrument for dysphagia assessment on individuals who are medically stable and mobile [9] .

Teaching point: Videofluroscopic swallow study has showed to be efficient and could be incorporated in rehabilitation of dysphagia. Modification of therapy is possible only after assessing swallowing physiology using visualisation technique. Speech-Language Pathologists play an important role in rehabilitation of dysphagia. Videofluroscopic swallow study also helps in decision making on nasogastric tube removal and initiating safe oral feeds after rehabilitation.

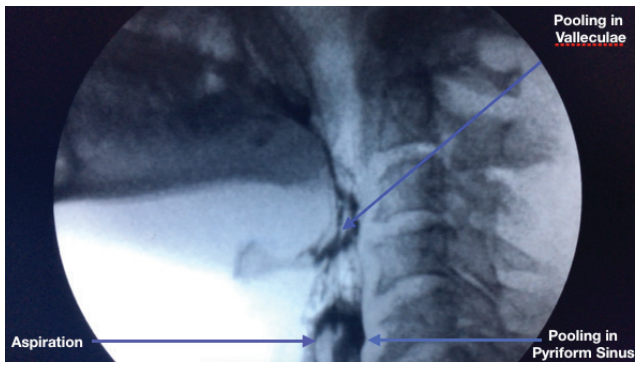
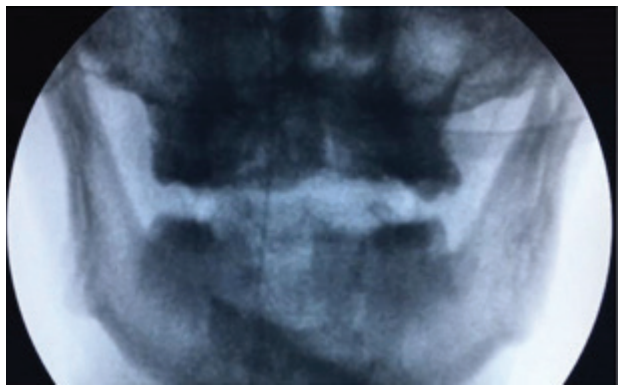
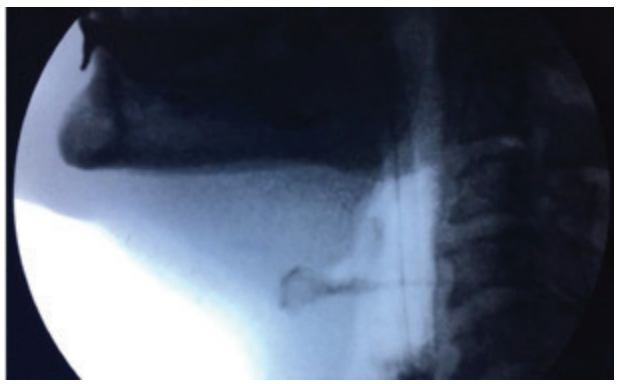


Figure 1: Lateral view demonstrating signs of dysphagia

Figure 1 demonstrates the presence of aspiration, pooling in valleculae and pyriform sinus.



(a) Anteroposterior view



(b) Lateral view

Figure 2

Figure 2 a and b confirms the findings of no aspiration, no pooling in valleculae and pyriform sinus, no oral or pharyngeal residue.

Table 1: Result of VFS evaluation of swallow (Pre-therapy)
Parameters of Swallowing

Lip Closure		Present
Oral propulsion of bolus		Present
Velum closure (Posterior Pharyngeal Walls)		Inadequate
Hyolaryngeal Elevation	Lid action of epiglottis	Absent
	Movement of hyoid (Anterior)	Inadequate
	Movement of hyoid (Posterior)	Inadequate
	Pharyngeal Transit Time	Delayed
Relaxation of Cricophrayngeus muscle		Present
Multiple Swallow		Present
Pooling in Valleculae		Present
Pooling in Pyriform Sinus		Present
Aspiration		Present

Table 2 Result of VFS evaluation of swallow(Post-therapy)
Parameters of Swallowing

Lip Closure		Present
Oral propulsion of bolus		Present
Velum closure (osterior Pharyngeal Walls)		Adequate
Hyolaryngeal Elevation	Lid action of epiglottis	Present
	Movement of hyoid (Anterior)	Adequate
	Movement of hyoid (Posterior)	Adequate
	Pharyngeal Transit Time	Immediate (Less than 1 Sec)
Relaxation of Cricophrayngeus muscle		Present
Multiple Swallow		Absent
Pooling in Valleculae		Absent
Pooling in Pyriform Sinus		Absent
Aspiration		Absent

Consent: Did the author obtain written informed consent from the patient for submission of this manuscript for publication? YES

Conflict of Interest: The authors have no conflict of interest in this publication.

Declaration: This article has not been published in any journal. This was carried out as a part of student clinical case presentation. This study did not receive funding from any agencies.

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System Modeling for Forecasting of Diabetes Prevalence

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ABSTRACT

The computer simulation models can help understanding the progression of a chronic disease like diabetes. These models allow researchers and decision makers to forecast disease progression and resource required for managing it. The simulation tools presently used for planning and evaluating the health policy are inadequate for capturing the dynamic complexity of chronic disease involving the large delays between causes and health consequences. The paper develops and uses system dynamics for diabetes system modeling. The system dynamics approach is able to address the complexity of the chronic disease like diabetes. The study further forecasts the prevalence of diabetes by the year 2030, using the case of an ancient city of Varanasi.

Keywords: *Chronic Disease Modeling, System Dynamics, Healthcare, Diabetes Prevalence*

INTRODUCTION

Diabetes is rising as an epidemic in many parts of the world. The rate of growth of diabetes has earned a tag of world's diabetes capital of India. In the year 2014, there were 387 million individuals with diabetes, and this number is estimated to become 592 million by 2035[1]. The major reasons for this increasing prevalence of diabetes are a sedentary lifestyle, increased urbanization and increased life expectancy. The South Asian population is genetically at high risk of developing diabetes[2-3]. Multiple complications like retinopathy, nephropathy, neuropathy, cardiac risk and diabetes foot occur with the progression of the disease. The cost of diabetes management increases many folds with multiple complications[4]. The close monitoring and awareness are critical in diabetes management. For planning a prevention program, we need to forecast the resource requirement. The tools like system dynamic can help in predication and capacity planning for diabetes management.

Diabetes Mellitus: Diabetes mellitus (DM), commonly known to as diabetes, is a group of metabolic disorders in which there is a persistent increased level of glucose in the blood. It is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. The prevalence of diabetes in India ranges from 5–17%, with a higher percentage, is reported in the southern part of the country and in urban areas[5-12] .As per INDIAB study done by Indian Council of Medical Research diabetes, the northern regions report a higher prevalence of diabetes than southern regions. The table below summarizes the result of INDIAB study Phase-I completed in the year 2011[13].

Table 1: Prevalence of Diabetes in Year 2011

Region	Prevalence	Confidence Interval
Tamil Nadu	10.4%	(95% CI: 9.0-11.0%)
Jharkhand	5.3%	(95% CI: 4.5-6.1%)
Chandigarh	13.6%	(95% CI: 12.8- 15.2%)
Maharashtra	8.4%	(95% CI: 7.5-9.3%)

Source: ICMR–INDIAB study (2011)

The second phase of the INDIAB study completed in July 2013 is more comprehensive and includes fifteen states of the country. The overall prevalence of diabetes in all 15 states of India was estimated as 7·3% (95% CI 7·0–7·5). The Figure 1 below suggests that state with higher GDP has a higher prevalence of diabetes. The data below made us believe that the prevalence of diabetes is dependent on the economic growth of the region[14].

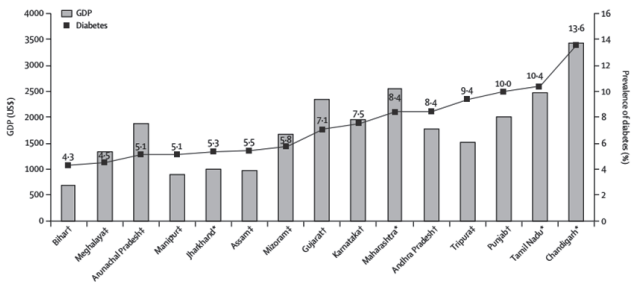

Figure 1: Prevalence of diabetes and GDP per capita by state

The National Urban Survey conducted across the metropolitan cities of India reported similar trend: 11.7 per cent in Kolkata (Eastern India), 6.1 per cent in Kashmir Valley (Northern India), 11.6 per cent in New Delhi (Northern India), and 9.3 per cent in West India (Mumbai) compared with (13.5 per cent in Chennai (South India), 16.6 per cent in Hyderabad (south India), and 12.4 per cent Bangalore (South India)[15].

There have been researchs to predict the prevalence of diabetes in a different part of the country, but there is lack of any comprehensive study to measure the prevalence of diabetes in Varanasi and surrounding areas. The government and healthcare providers still use conventional methods of evaluating and managing each aspect of the disease separately. The tools presently used are diagrammatic logic models and epidemiological forecasting models. These tools are not capable of addressing the dynamic complexity of diabetes. The silo approach to management is not appropriate for managing the disease involving a long delay between causes and the health events. It is time to adopt an integrated system-wide approach in prevention and management of diabetes. This paper attempts to address this gap.

METHOD

The method used in this research is computer simulation method known as System Dynamics. The simulation is a method that allows experiment on the system through a computer based model of the system[16]. System dynamics model has unique ability to mimic the real world scenario. It can address the complexity, nonlinearity, and feedback loop structure attached to the healthcare system[17]. The system dynamics (SD) model is used for the study because it is simple, powerful, useful and natural for addressing the dynamic complexity of health care system.

The researchers have used System Dynamics model for developing tools for chronic disease prevention and control. The research adopts the diabetes and Prediabetes stock and flow model developed by Homer et al for development of model for predicting the state of diabetes in Varanasi by year 2030. A focus group of eight experts (clinicians and researcher) was constituted for the estimation of parameters and system components. The size of eight participants is appropriate for the study as a group with higher than eight members, is hard to handle[18].

Model Structure: The suggested in studies group strived to achieve a diabetes system models having[19] :

1. Generic enough to be adaptable for another chronic disease.
2. Realistic enough to reproduce the historical data derived from other epidemiological studies.
3. Comprehensible enough to test various policy scenarios.
4. Broad enough to include various policy measures considered during the third meeting.
5. Doesn't require guess work beyond what focus group agrees upon.

The study adopts a model (Homer et al, 2004) as described in Figure 2 as preliminary stock and flow model after various iteration of the focus group we were able to finalize the customized stock and flow model for the population being studied[19]. (Undx: undiagnosed; Dx: diagnosed; PreD: prediabetes; D: diabetes)

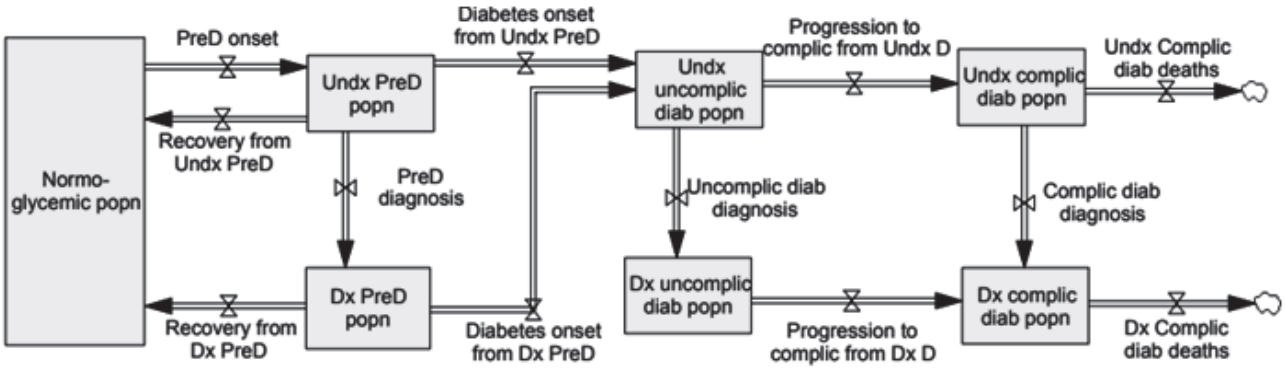

Figure 2: Preliminary Diabetes and Prediabetes Population Stock and Flow Structure

The system can be divided into two parts namely upstream (prevention related variables) and downstream (treatment related variables).Using the secondary research and input of the Focus Group the parameter values and initialization values very estimated. The proposed system dynamics model uses availability & affordability of preventive care, testing of diabetes and prediabetes, availability of qualified doctors and support staffs, availability of hospitals, health insurance and government subsidies as the policy variables. The model uses following steps in the process:

Initialization Phase:

1. Create a list of all equations in required order of evaluation.
2. Calculate initial values for all stocks, flows and auxiliaries (in order of evaluation).

Iteration Phase:

1. Estimate the change in stocks over the interval DT (Step size).
2. Calculate new values for stocks based on this estimate.
3. Use new values of stocks to calculate new values for flows and auxiliaries.
4. Add DT to simulation time.
5. Stop iterating when Time >= StopTime

The year 2017 is taken as year Zero and the step size used is a year. The numerical integration method used for the model is Euler Method. The reason for selecting the method is its simplicity and availability as inbuilt option in the Vensim tool. The Euler Method uses following steps in processes of calculating the value of stock:

$$\Delta \text{ Stock} = DT \times \text{Flow at begining at DT}$$

$$\text{Stock}_t = \text{Stock}_{(t - DT)} + \Delta\text{Stock}$$

$$\text{Stock}_t = \text{Stock}_{(t - DT)} + DT \times \text{Flow}_{(t - DT)}$$

Please refer exhibit 1 for the final system dynamics model for prediction of prevalence of diabetes.

RESULTS

The parameters for the model developed were estimated and the system was tested whether it mimics the other reliable studies. The validation was done using the information collected through secondary research. The results of the study are summarized in Table-2 below.

Table 2: Results of the Simulation Run

Year	Undx Uncomplic diab popn	Dx Uncomplic diab popn	Undx Complic diab popn	Dx Complic diab popn	Total
2017	50000	50000	25000	25000	152017
2022	85014	166727	20594.4	109643	384000.4
2027	63585.4	219735	16302	204169	505818.4
2030	**52985.7**	**215808**	**13565.6**	**235190**	**519579.3**
2032	46904.2	206247	12015	244921	512119.2
2037	34335.3	172042	8816.56	240683	457913.9
2042	24953.1	135325	6415.86	212248	380984
2047	18073.6	102965	4649.84	175220	302955.4
2050	14881.1	86515.6	3829.26	152854	260130

The prevalence of complicated and uncomplicated diabetes by year 2030 with be 0.52 million in Varanasi. At present growth rate (1.19%) the population of Varanasi will be 1.46 million by years 2030. This data gives us the prevalence of diabetes by years 2030 at 35.64 %., which is very alarming. To achieve the doctor patient ratio of 1:1000 and bed patient ratio of 1:1000, we will need 520 doctors as well as beds for diabetic population alone. Moreover, this infrastructure is needs to be specialized in diabetes care to provide health care effectively. As depicted in Figure 3, the prevalence of diabetes in Varanasi will increase and peak by year 2030 and will decrease thereafter.

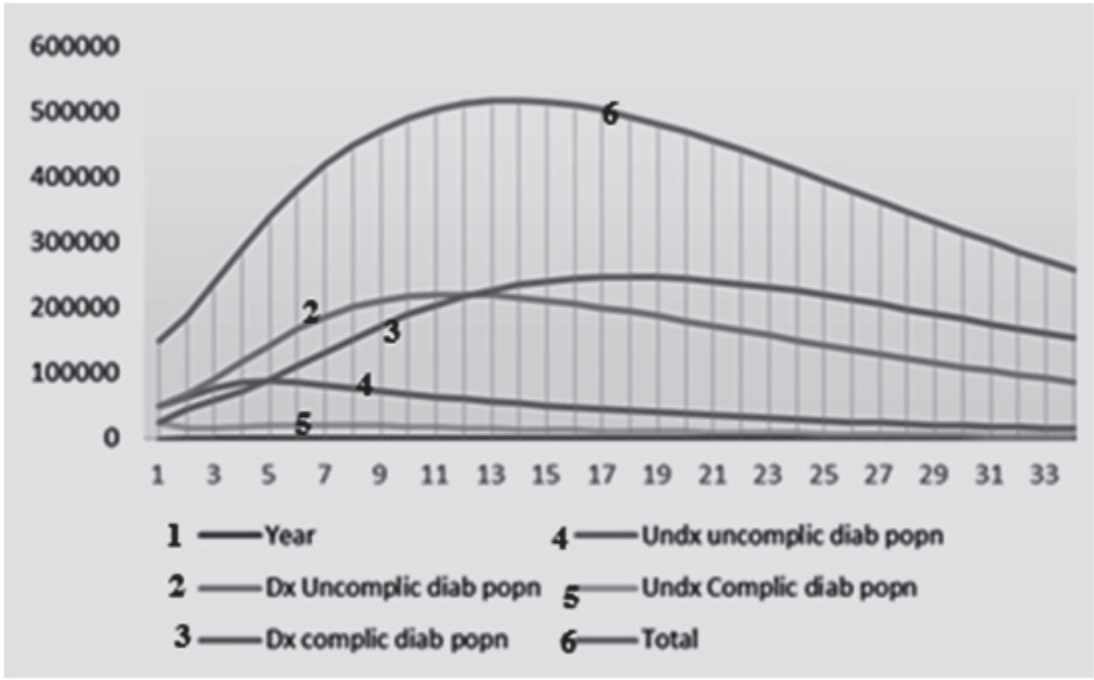

Figure 3: Prevalence of Diabetes in Varanasi

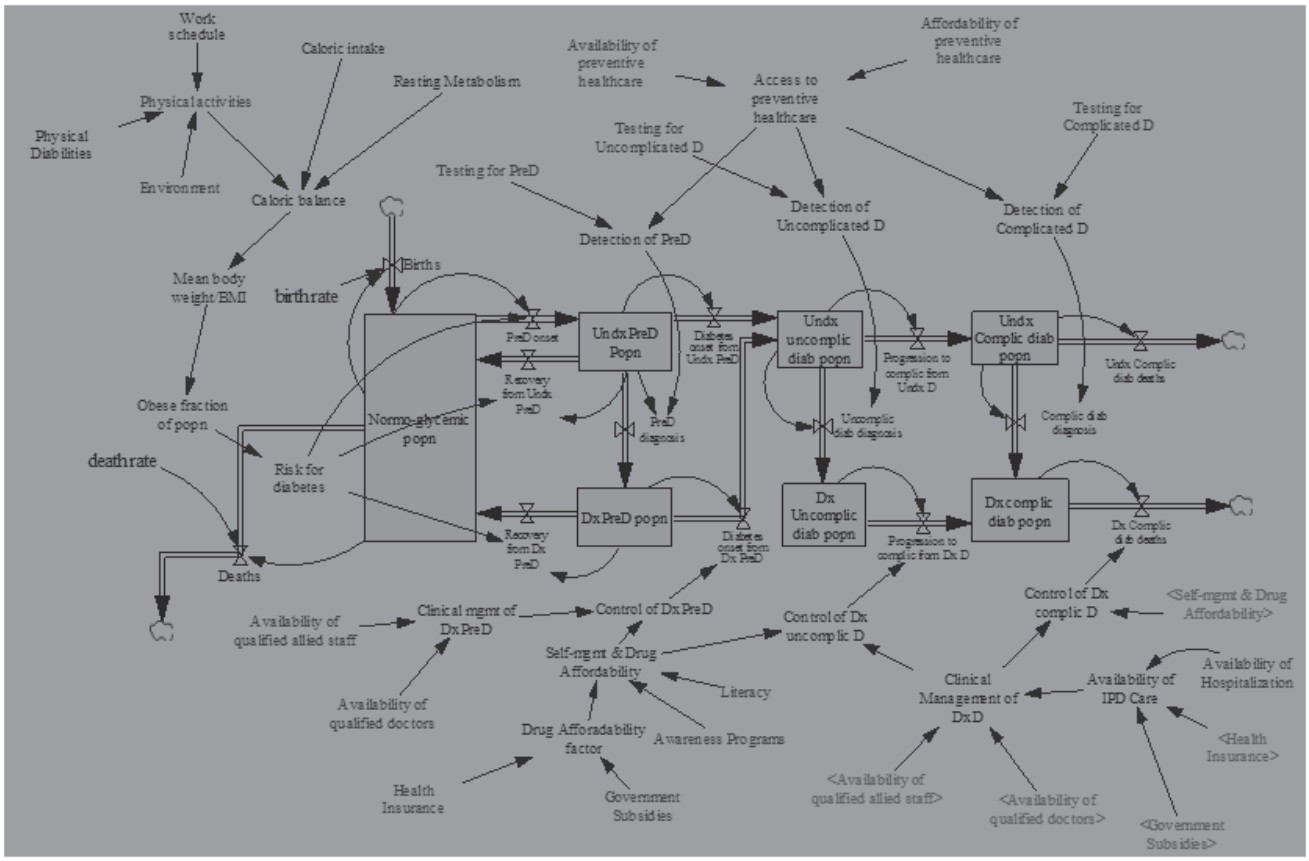

Exhibit 1: System Dynamics Model for Prediction of Diabetes Prevalence

CONCLUSION

The model described in this paper can help policy makers design strategies for addressing the burden of diabetes at national and regional level. Though the simulation is done for the city under study, the model can be easily tuned to get a picture at national level. The simulation model gives prevalence of diabetes in years

2030 as 0.52 million and 35.64 %. The study suggests involving 520 specialized doctors in management of diabetes. Assuming fifty beds per hospital, the city will need opening additional nine district level hospitals (presently two) to support this surge of diabetes cases. The same infrastructure can be utilized for proving the healthcare for other disease as well.

Ethical Clearance: The study use secondary research and focus group discussion for data collection. Since, the study uses the data freely available in public domain it don't need ethical clearance.

Source of Funding: Self, there is not any source of funding to be declared.

Conflict of Interest: Nil, there is not any conflict of interest to be declared.

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