National Journal of Research in Community Medicine

of India

ISSN: 2277-1522 (Print) ; 2277-3517 (Online)

An Official Publication of Community Medicine Faculties Association

Volume 7. Sup. Issue 2.Sep. 2018 (052-110)

Special Issue on Environmental Diseases

(SRM-5th International Management Development Programme)

Indexed in Index Copernicus& Other database

Not for Sale

www.commedjournal.in

30.09.2018

National Journal of Research in Community Medicine (NJRCM)

Volume 7.Issue 2. Sup. Issue 2. Sep.2018 (052-110)

Special Issue on Environmental Diseases
(SRM-5th International Management Development Programme)

doi: 10.26727/NJRCM.2018.7.3ii

Community Medicine Faculties Association
Chennai
India

NJRCM- Volume 7. Sup. Issue 2. Sep.2018 (052-110)

National Journal of Research in Community Medicine
ISSN - Print: 2277 – 1522, Online: 2277 – 3517

Web Site: www.commedjournal.in
Association Site: https://sites.google.com/site/comfaoffice/who-we-are
E-Mail: dopnjrcm@gmail.com

Address:
Community Medicine Faculties Association
(Registered Under The Tamil Nadu Societies Registration Act, 1975)
No: 29/2 (New no.60) Rettaikuzhi Street, Tondiarpet, Chennai – 600 081.

Manuscript Submission:
http://www.commedjournal.in/man.html

Indexed in Index Copernicus (http://journals.indexcopernicus.com/masterlist.php): ICF value:**64.29 and other data base.**

NJRCM- Volume 7. Sup. Issue 2.Sep. 2018 (052-110)

Table of Content

S.No.	Article-Author	Page No.
	Original Research Article	
1	Acute Gastroenteritis and Cholera Cases over the Last Two Decades in Epidemic Disease Hospital, Mysore. **Prathyusha Joe, Mudassir Azeez khan , Prashantha B, M.Pashupathy**	52
2	Prevalence of Hypothyroidism among Pregnant women attending Antenatal clinic at Urban Primary Health Centre, Shenoy Nagar in Chennai, Tamil Nadu. **R Senthil Kumar, C Samykkhan**	56
3	Health Care Of Brick Kiln Workers In Sholavaram Block Of Tamilnadu - Seeing Beyond the Smog. **Mary Ramola, K Sathish Kumar**	59
4	Barrier to Healthy Lifestyle among Patients of Diabetes Mellitus and Hypertension in a Rural Health Centre of Tamil Nadu. **Shankar.S, Rock britto, Raghuram.V**	64
5	Awareness On Health Effects Of RO Water Usage Amongst Medical Students. **Sriram RM. Sowmiya KR., Abhirami R. E., Balaji Arumugam.**	68
6	Awareness of Occupational cancers among industrial workers. **Subhitsha.M, Balaji Arumugam, Suganya.E**	72
7	Association between Mobile Phone Addiction and sleep pattern among engineering students. **Sujatha.K, Kalidas.P, Aji Antony**	77
8	Perceived reasons for poor sanitation and suggested solutions to overcome environmental challenges in JE-A qualitative study. **Suganya E , Roshini S, Balaji Arumugam**	81

9	Sanitation and stunting- A community based cross-sectional study among 1-5 years aged rural children, Chennai. **Suganya E,Nilani M, Balaji Arumugam**	85
10	Knowledge, Attitude and Practice regarding organ donation and transplantation among arts college students. **Sujatha. K, Sakthi Surya. P**	90
11	Coverage Of Screening And Detection Gap For Hypertension In Rural Puducherry, South India: A Cross-Sectional Study. **Sinthu Sarathamani, Chithra Boovaragasamy, Suguna A, Surekha A, Pruthu TK, Seetharaman N**	94
12	Assessment Of Stress Among Higher Secondary School Students Of South Tamil Nadu- A Cross-Sectional Study. **Suresh Balan Kumaraswamy Pillai Umayammal, Gopal Muthukrishnan, Ragavendaran, Praveen Kumar, Raghunarayanan PrithviPrashanth, Raghu P, Raghu M , Amal Johnson**	98
13	Assessment of Knowledge and Attitude on Biomedical waste management among nursing students. **Suganya E, Aishwarya, Balaji Arumugam**	103
14	Challenges in Management of Environmental Diseases: A study on assessment of sound levels in various parts of Chennai Metro. **Ashrof Raja, Prabakaran J, Kannadasan K, Aishwarya Lakshmi I,Karpaga Priya S.P., Monica Raj.S.P.,Uma.P., Shaik Sarfaraz Hussain**	107

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 52-55**

Acute Gastroenteritis and Cholera Cases over the Last Two Decades in Epidemic Disease Hospital, Mysore.

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Date of Submission : 30-04-2018 **Date of online Publication : 30-09-2018**

Date of Print Publication : 30-09-2018

Date of Acceptance : 01-09-2018

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ABSTRACT

Introduction: Gastroenteritis is defined as the inflammation of the mucus membranes of the gastrointestinal tract and is characterized by diarrhoea or vomiting. Diarrhoea is defined as passage of loose, liquid or watery stools In India acute diarrhoeal diseases account for about eight percent of deaths in under five age group. **Objectives**: To estimate the proportion of Acute gastroenteritis and cholera cases admitted in Epidemic Diseases Hospital, Mysore**. Methodology:** Descriptive study done by observation of various registers during the period 1997 to 2016 (20 years) regarding acute gastroenteritis and cholera cases. **Results:** The average number of acute gastroenteritis cases was 825 cases per year which varied from a minimum of 430 cases in the year 2003 to maximum of 1379 cases in 2010.The proportion of cases as compared with total inpatient cases varied from a minimum of 22.7% in 2016 to a maximum of 90.6 % in 2002.The cases were more during the months of March to June. The average number of deaths due to acute gastroenteritis was 1.2 per year with a maximum of 6 deaths in 1997.The total number of cholera positive cases was 654 with an average of 32.7 cases per year with a maximum of 210 cases in 1997.Cholera positive cases were more in Rural area with a maximum of 144 cases in 1997 whereas the same year showed a maximum number of 66 cholera cases in the Urban area. **Conclusion:** The number of acute gastroenteritis and cholera cases shows a declining trend due to improvement in sanitation measures and living standards but increased consumption of outside food and increased travelling are some of the factors which might lead to a rise in acute gastroenteritis in the near future.

Key-words: Acute gastroenteritis, cholera, Epidemic Disease, Rural area.

Introduction

Gastroenteritis is defined as the inflammation of the mucus membranes of the gastrointestinal tract and is characterized by diarrhoea or vomiting. Worldwide, gastroenteritis affects 3 to 5 billion children each year, and accounts for 1.5 to 2.5 million deaths per year or 12% of all deaths among children less than 5 years of age.[1]Acute gastroenteritis causes 1.5 million visits to primary care providers each year and 220,000 hospital admissions for children under the age of 5 years; that is 10% of all the hospital admissions of children in the United States.[2]

Viruses are the most important aetiology and are responsible for approximately 70% of the episodes of acute gastroenteritis in children. Worldwide, rotavirus is still the most common virus causing this disease and accounts for some 30% to 72% of all the hospitalizations and 4% to 24% of acute gastroenteritis at the community level. Other common viruses causing gastroenteritis include calicivirus, adenovirus and astrovirus. Bacterial infection accounts for 10% to 20% of all the acute gastroenteritis. The most common bacterial causes are Salmonella species, Campylobacter species, Shigella species and Yersina species. Vibrio cholerae remains a major cause of diarrhoea, especially after a disaster where sanitation is compromised. Giardia lamblia is the most common protozoal infection that causes gastroenteritis. Less developed countries have a higher rate of parasites and Escherichia coli infection which are both relatively uncommon in the industrialized countries.[1, 3]

Fifteen countries contribute three quarters of childhood deaths due to diarrhoea in children under five years of age worldwide out of which India ranks first. In India acute diarrhoeal diseases lead to 13% deaths in the under-five age group, during the year 2009.[4]Around 1.2 lakhs children die due to diarrhoea annually in India. Diarrhoeal deaths are usually clustered in summer and monsoon months and the worst affected are children from poor socio-economic situations. Diarrhoea is defined as

passage of 3 or more loose or watery stools in a 24 Hours period.[5]

Cholera is an acute diarrhoeal disease caused by V. Cholerae. It is an endemic disease with epidemics occurring at regular intervals. Cholera is transmitted through faecal contamination of water or food and causes acute, severe, watery diarrhoea that can result in hypovolemic shock and death if not treated with fluids.[6] Cholera remains a global threat to public health and a key indicator of lack of social development. The number of cholera cases reported to WHO continues to rise. The true burden of the disease is estimated to be 1.3-4.0 million cases and 21,000-1,43,000 deaths annually. Global experience has shown that the introduction of cholera into any country cannot be prevented, but cholera can create a problem only in areas where sanitation is defective. During 2014 about 969 cholera cases were reported in India with 4 deaths[7]. Based on a ten year review from 1997 to 2006, 21 states reported cholera and 12 had multiple outbreaks. During the 10-year period studied, the states having the highest number of reported outbreaks were West Bengal, Odisha, Maharashtra and Kerala. The incidence of Cholera cases and deaths has decreased in the recent years.[8] The availability of potable drinking water for a large proportion of the Indian population is a major public health concern. Ageing subterranean pipelines with multiple breakages are a common phenomenon in India.[9]

There are many national programmes like diarrhoeal disease control programme and intensified diarrhoea control fortnight with the main objective of preventing diarrhoea associated deaths in children due to dehydration. Improvements in water supply and sanitation, if implemented sustainably, will have an important impact on a wide variety of different infectious diseases, and could improve the quality of life of millions of children worldwide, and provide them a proper start in life. [10] The aim of this study was to estimate the proportion of acute gastroenteritis and cholera cases admitted in Epidemic Diseases Hospital, Mysore. This study is intended to highlight the changing trends of acute gastroenteritis and cholera cases being admitted in the hospital, which can help in planning future preventive measures.

Materials and Methods

The study was done retrospectively by observation of various registers for a period of 20 years from 1997 to 2016 in Epidemic Disease Hospital, Mysore. Epidemic Disease hospital is a government run hospital which has both outpatient and in-patient facility with a physician, paediatrician, a surgeon and resident doctors. An average of 250 patients per month is admitted of which majority are Category 3 dog bite cases, acute gastroenteritis and vaccine preventable diseases like tetanus cases. The hospital is located at a distance of five kilometres from Mysore Medical College and Research institute, a tertiary care hospital and also caters to neighbouring districts like Mandya and Chamrajnagar. It has facilities for isolation of patients admitted with rabies, tetanus and other contagious diseases. In patient registers of the study period were observed to analyse the total number of admitted cases. Other registers were observed to analyse the number of acute gastroenteritis and cholera positive cases. Observation of case records was planned to analyse the age, sex distribution and severity of the cases but major share of the case records were not available and hence could not be analysed. The available data was entered in excel and analysed using SPSS version 20. Descriptive statistics was used in the analysis.

Results

Acute gastroenteritis cases during the study period in general shows a declining trend but there were peaks in 1997, 2010 and 2012 with more than 1000 cases .The mean number of cases was 825 cases per year which varied between 430 in 2003 to a maximum of 1379 cases in 2010 as is shown in Fig 1.

Figure 1: Epidemic curve of Acute Gastroenteritis (1997-2016)

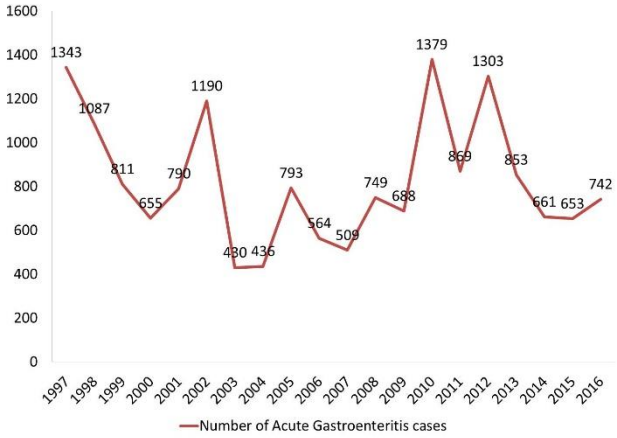
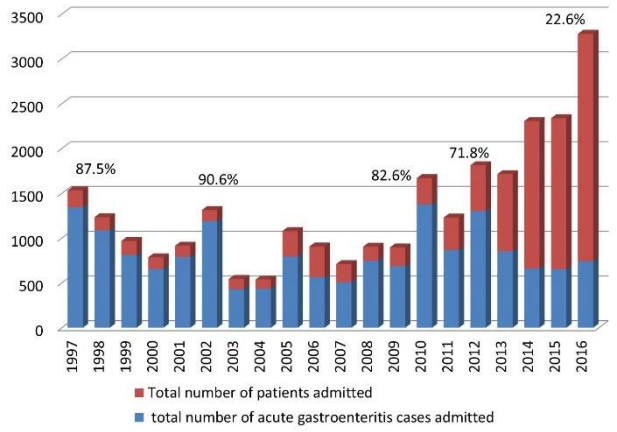


Figure 2: Comparison of acute gastroenteritis cases and total admitted cases



Analysis of acute gastroenteritis cases in comparison to inpatient cases was done by observing in patient registers which revealed that the proportion of cases was 87.5% in 1997, the maximum proportion of cases was 90.6% in the

year 2002 and minimum 22.6% in 2016 as in Figure 2. Analysis of the month wise distribution of cases throughout the study period shows that there was an increase during the months of March to June probably correlating with the summer season. The average number of deaths due to acute gastroenteritis was 1.2 with a maximum of 6 deaths in 1997 as in figure 3. The total number of cholera positive cases was 654 with an average of 32.7 cases per year with a maximum of 210 cases in 1997.Cholera positive cases were more in rural area with a maximum of 144 cases in 1997 whereas the same year showed a maximum number of 66 cholera cases in urban area. The proportion of cholera cases in comparison with acute gastroenteritis cases was highest in 2007 (16.89%) followed by 1997 (15.6%) with an average of 3.61 %. Comparison of cholera cases in rural and urban areas shows that there were more cholera cases in rural areas. The ratio of Cholera cases in rural and urban areas was maximum (4.57) in the year 2000.

Table no 1: Number of cholera cases

Year	Total number of cholera positive cases
1997	210
1998	68
1999	55
2000	39
2001	56
2002	113
2003	2
2004	1
20,052,006	0
2007	86
2008-2013	0
2014	12
2015	6
2016	6

Figure 3: Number of deaths due to acute gastroenteritis.

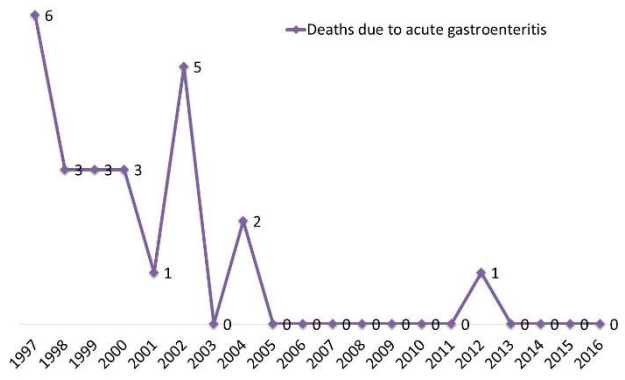
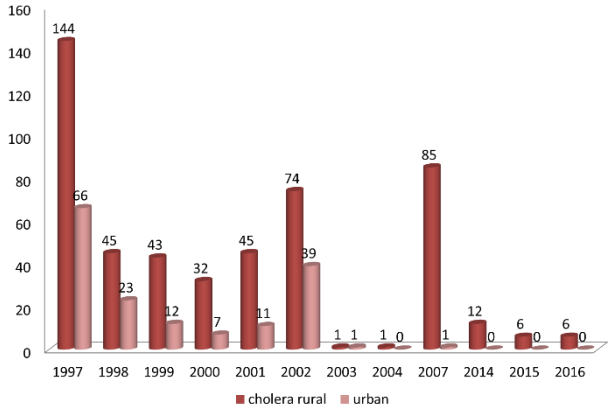


Figure 4: Comparison of cholera cases in rural and urban areas.



Discussion

The proportion of acute gastroenteritis cases shows a declining trend in our study, though the actual number shows an irregular pattern with peaks during certain years. This was similar to a study conducted in France where acute gastroenteritis cases showed a peak up to the year 2008 after which there was a declining trend[11]. This decreasing trend was observed for all age groups, and for emergency department visits, a decreasing trend was observed from 2004. Probable reasons are improvements in sanitation, use of ORS at the field level, drinking of purified water.

Analyses of our study showed that there was a peak of acute gastroenteritis cases during the months of March to June which was comparable to another study done by Stroni et al. in Albania on Gastroenteritis in Adults where Patients were admitted throughout the year with peak admissions for patients infected by bacterial pathogens in summer and those affected by viral pathogens in autumn. [12]

The average case of cholera positive cases was 3.61% which was similar to a community based study done by sur et al in Calcutta.[13] In a study in Assam by Sharma et al. cholera was found to be more prevalent in the rural areas (6.7%) followed by the tea gardens (5.06%), urban slum (1.9%) and urban areas (1.4%) which was comparable to our study where cholera cases were more prevalent in rural areas.[14] According to the Integrated disease surveillance project weekly data, there were cholera outbreaks in April and May 2012 in Nanjangundu Taluk with 181 and 80 cases respectively and 2 and 8 stool positive cases. In May 2014 there was an outbreak in T Nursipura taluk with 32 cases and 3 were stool positive. In February 2016 there were 33 cases with 4 stool positive cases in an outbreak in HD Kote.

In our study the proportion of acute gastroenteritis and cholera cases shows a declining trend because of improvement in sanitation but consumption of outside food especially from street vendors and community feeding have increased which pose a risk for gastrointestinal infections. An increase in travelling and an increase in migrant workers are also risk factors in the

future. Certain recommendations for prevention would be health education regarding hygienic practices and purification of water, improvement of sanitation and appropriate sewage treatment. Food safety measures and education to food handlers are also important in prevention. Inter sectoral coordination by involving all departments and providing safe drinking water and appropriate sanitation measures will help a long way in preventing the disease. Early diagnosis, timely assessment of dehydration and management especially with oral dehydration solutions and appropriate referrals will help in reducing complications and mortality.

The limitations of our study were that only data regarding inpatient cases were available, hence mild cases might have been missed leading to a more number of cases. Trends based on age, sex and severity of diseases could not be assessed. Data regarding other aetiologies of acute gastroenteritis was not available.

Acknowledgement: We would like to thank the physician Dr Laxman M, pharmacist Mrs Zahara Mubeen. M, and staff Mr. Vishakantha Murthy, Epidemic Diseases Hospital, Mysore for the help provided in acquiring different registers.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 56-58**

Prevalence of Hypothyroidism among Pregnant women attending Antenatal clinic at Urban Primary Health Centre, Shenoy Nagar in Chennai, Tamil Nadu.

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Introduction: The thyroid hormone is very important for wellbeing of pregnant mothers and their foetus. Uncontrolled hypothyroidism during pregnancy can lead to pre-eclampsia, anaemia, miscarriage and stillbirth. Thyroid hormone deprivation in children lead to mental retardation and short stature. **Aims and Objectives:** 1. To estimate the prevalence of hypothyroidism among pregnant women attending antenatal clinic in Chennai. 1. To determine the level of awareness about thyroid problem among pregnant women. **Material and Methods:** The cross-sectional study was conducted on 290 pregnant women attending the Antenatal clinic at Urban Primary Health Centre (UPHC), Shenoy Nagar, Chennai, Tamil Nadu, India. **Study period** was six months from 1st July to 31st December 2017. The hypothyroidism defined as subclinical hypothyroidism when TSH value between 2.5 and 10mIU/L and Overt hypothyroidism when TSH is more than 10mIU/L. The Participants were 290 pregnant women selected from antenatal clinic 10 women daily cons cutely and interviewed by using a semi- structured and pretested questionnaire and blood sample were collected after getting written informed consent for TSH estimation **Inclusion criteria**: The study subjects were pregnant women attending at antenatal clinic at UPHC, Shenoy Nagar, Chennai. **Results:** One third of pregnant women found to have hypothyroidism, out of 290 pregnant women 30.7% (89) pregnant women found to be hypothyroid and only 39.3% (115) aware that thyroid problem can occur during pregnancy **Conclusion:** The prevalence of hypothyroidism was high during pregnancy and awareness about thyroid problem during pregnancy was less. So, awareness creation and regular screening and follow up for thyroid problem during pregnancy is very essentials to control hypothyroidism among pregnant women.

Key-words: prevalence, hypothyroidism, pregnancy, awareness.

Introduction

Thyroid disorders constitute one of the most common endocrine disorders seen in pregnancy[1]. Maternal thyroid function changes during pregnancy and inadequate adaptation to these changes results in thyroid dysfunction. These changes are a result of various factors like an increase in thyroglobulin due to elevated oestrogen and human chorionic gonadotrophin, increase renal losses of iodine due to increase in glomerular filtration rate, modifications in peripheral metabolism of maternal thyroid hormone and modifications in iodine transfer to placenta[2].

The production of thyroid hormone and iodine requirement increases by 50% during pregnancy. HCG values are high in early trimester, α component of which has similarity to TSH, causing partial TSH suppression[3]. Hence the cut-off value taken for upper limit of normal is 2.5 m IU/L in 1st trimester as compared to later 2 trimesters when a higher cut off of 3.0 m IU/L is taken as normal[3]. The physiological changes of pregnancy mimic thyroid disease significantly - fatigue, sluggishness, constipation, oedema may simulate hypothyroidism; Heat intolerance, wide pulse pressure, tachycardia may mimic hyperthyroidism[4].

The foetus starts to produce thyroid hormones from 8-10 weeks of gestation but provides significant amounts after mid gestation. The maternal thyroid hormones transferred through placenta are the main source for foetal growth and development. Thyroid hormone is critical for normal foetal brain development, neuronal multiplication, migration and structural organization, thus on future intellectual development[3].

Thyroid disorder during early pregnancy has been associated with adverse obstetric and fetal outcome. The main obstetric complications are abortion, preeclampsia, abruption placenta and preterm labour and the fetal complications are prematurity, low birth weight, still birth and perinatal death. Maternal hypothyroidism in the 1st trimester may be harmful for fetal brain development and leads to mental retardation and cretinism which includes impairment of mental and physical growth and development and has a negative impact on most organ systems.

Prevalence of thyroid disorder during pregnancy has a wide geographic variation. Western literature shows a prevalence of hypothyroidism in pregnancy of 2.5% and hyperthyroidism in pregnancy has prevalence of 0.1 to 1%[3]. There is paucity of data on prevalence of thyroid disorders in Indian pregnant women, there are few reports shows that a prevalence 4.8% to 11% amongst Indian

pregnant population[5,6]. In view of adverse maternal and fetal outcome in pregnant women with thyroid disorder and obvious benefits of early diagnosis and treatment, some expert panels all around the world have suggested routine thyroid function screening of all pregnant women. Therefore, this study was carried out in pregnant women to know the prevalence of thyroid disorders in pregnant women living in Chennai. Thyroid disorders are often overlooked in pregnancy because of their non-specific symptoms and the hyper-metabolic state of pregnancy[7]. Hence, the laboratory measurements of thyroid function play an important role in the assessment of maternal thyroid health. The mainstay of thyroid function evaluation is serum Thyroxine Stimulating Hormone (TSH) assessment.

Methods and Materials

The cross-sectional study was conducted on 290 pregnant women attending the Antenatal clinic at Urban Primary Health Centre (UPHC), Shenoy Nagar, Chennai, Tamil Nadu, India. **Study period** was six months from 1st July to 31st December 2017. The hypothyroidism defined as subclinical hypothyroidism when TSH value between 2.5 and 10mIU/L and Overt hypothyroidism when TSH is more than 10mIU/L. The Participants were 290 pregnant women selected from antenatal clinic, ten women per day selected consecutively and interviewed by using a semi-structured and pretested questionnaire and blood sample were collected after getting written informed consent for TSH estimation **Inclusion criteria**: The study subjects were pregnant women attending at antenatal clinic at UPHC, Shenoy Nagar, Chennai.

Diagnostic criteria: Pregnancy-specific and trimester-specific reference levels for TSH are as follows[8]:

1st trimester- 0.1-2.5Miu/l;2nd trimester- 0.2-3Miu/l;3rd trimester- 0.3-3Miu/l

Primary maternal hypothyroidism is defined as the presence of elevated Thyroid Stimulating Hormone(TSH) levels during pregnancy. National guideline for screening of hypothyroidism during pregnancy prescribed trimester specific upper limit of TSH value.

Results

Table 1: Frequency of socio demographic variables in this study(n=290)

S. N	**Variables**	**Numbers (%)**
1	**Age group**	
	18-24 years	**142**(48.8)
	25-32 years	**140**(48.1)
	33-39 years	**8**(3.1)
2	**Educational status**	
	Up to high school	**42 (**14.4)
	Hr. secondary	**94** (32.4)
	Degree/PG/Professional	**153**(53.1)
3	**Trimester**	
	1st	**16**(5.5)
	2nd	**24**(8.3)
	3rd	**250**(86.2)

In this study, the number of participants in the age group of 18 to 24 years were 142 and in the age group of 25 to 32 years were 140 and more than 50% of them were degree holder and 86 % of the women were in third trimester of pregnancy (Table 1)

Table 2: Frequency of hypothyroidism in trimester wise.

S.N.	Period of pregnancy	**Hypothyroid**	
		Number	Percentage
1	First trimester	4	25
2	Second trimester	10	41.7
3	Third trimester	75	30
4	Over all	89	30.7

In this study, the prevalence of hypothyroidism in first trimester of pregnancy was 41.7% and over all prevalence of hypothyroidism among pregnant women was 30.7% (Table 2)

Table 3: Frequency of awareness about thyroid problem among pregnant women(n=290)

S.N.	Variable	Aware -Numbers (%)	
		Yes	No
1	Aware that thyroid problem occurs in general population	167(57.6%)	123(42.4%)
2	Aware that thyroid problem occurs during pregnancy	115(39.3%)	175(60.7%)

In this study, only 40% of pregnant women aware that thyroid problem can occurs during pregnancy.

Discussion

The American Thyroid Association and the National Association of clinical Biochemist have reduced TSH value to 2.5 m IU/L in first trimester and 3.0 m IU/L in second and third trimester. These changes may increases the frequency of hypothyroidism in pregnancy[9].

Various reasons have been proposed for increased prevalence of hypothyroidism in pregnancy. Increased iodine intake in diet[10], presence of goitrogens in Indian diet[11].

Rao *et al*. found hypothyroidism in 4.2% of recurrent pregnancy less which is statistically significant[12].

Sahu *et al*. have done thyroid function in the second trimester and reported prevalence of thyroid disorder especially OH and SCH 6.47%[6].

Dhanwal *et al*. from Delhi in 2013 reported hypothyroidism prevalence of 14.3% with cut-off value of 4.5 m IU/L as the upper limit of normal in a cohort of 100 pregnant women[13].

In the present study, in contrast, has shown the prevalence of hypothyroidism as high as 30%, thus necessitating the need for universal screening for thyroid function during pregnancy.

In this study, awareness about hypothyroidism among pregnant women and its consequences were determined and it was found that only 40% of pregnant women were aware hypothyroidism occurs during pregnancy.

Conclusion: The prevalence of hypothyroidism was high during pregnancy and awareness about thyroid problem during pregnancy was less. So, awareness creation and regular screening and follow up for thyroid problem during pregnancy is very essentials to control hypothyroidism among pregnant women.

Recommendation:

Regular awareness creation during antenatal visit of pregnant; Regular screening and follow up for thyroid problem during pregnancy is very essentials to control hypothyroidism induced bad maternal and foetal outcome among pregnant women; We must implement NRHM's National guidelines for Screening of Hypothyroidism during pregnancy.

Institutional ethical committee approval was obtained.

Acknowledgement: I am thankful to our Dean Dr. P. Vasanthamani and our Professor Dr. K. Mary Ramola for guidance and support and thankful to Dr. Mangairkarasi, Zonal Medical Officer, Shenoy Nagar Zone, Greater Chennai Corporation, Dr. Ranjini (OG) Specialist Urban Primary Health Centre, Shenoy Nagar, Dr. Shyamala Medical Officer Urban Primary Health Centre, Shenoy Nagar for valuable suggestions, guidance, support and thankful to other staff for collecting blood sample for the TSH estimation. Also, I thank to my department staff for their help m to complete the study.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 59-63**

HEALTH CARE OF BRICK KILN WORKERS IN SHOLAVARAM BLOCK OF TAMILNADU - SEEING BEYOND THE SMOG

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Context: Brick kiln workers' life style places them at high risk but not much is known about their health care needs as they work in secluded kilns away from the residential regions. Objective: To study the factors relating to health care among the Brick kiln workers. Settings and Design: Thirty brick kilns situated along the Kotralaiyar River spanning the Sholavaram block of Tamilnadu. Methods and Material: Multiple qualitative methods like Structured Observation, Key Person Interview and Focus Group Discussions were used. Statistical analysis used: Simple summarising indices like mean, median and percentages were used. Results: Structured observation showed their poor accessibility, insufficient sanitation and dusty environment. Focus group discussion among health workers of the region exposed their misinterpretation of not including the migrant workers as their beneficiaries. FGD among brick kiln workers showed their different work practices, their ignorance of available free health services and their lack of ESI services. Key person interview exposed the startling high proportion (50%) of 'unqualified non allopathic' individuals providing health care to these workers and their treatment practices which needed a radical change (only one person had given the full prescription and given clear instruction for review; one third only would ask for sputum smear for investigating cough and 42% would wait for non-response to treatment for initiating investigations for cough). Conclusions: Brick kiln workers form a high risk occupational group and require special attention in health care coverage.

Key-words: Brick kiln workers, work environment, qualitative methods, PLA Technique

Introduction

Brick kiln workers are an occupational group involved in making bricks from clay, using traditional non mechanized methods[1]. This leads to dusty work environment for this group, mainly silica dust in addition to coal dust from the Brick kiln chimneys a life with poorly understood health risks and challenges[2].Due to their migrant life style they fail to come in the accountability of any health care system. Information relating to the health status and health care needs of this group of people will ensure a people centred, need based approach for effective implementation of health programs. As per Abramson, such studies provide culture specific maps (that) can help to improve the 'fit' of programs to people[3]. Hence, this study was conducted with the objective exploring the factors relating to health care of Brick kiln workers in Sholavaram block of TN.

Material and Methods

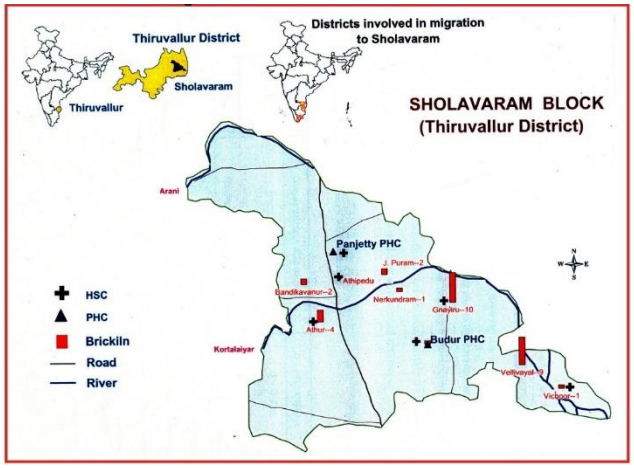
In Tamilnadu there are roughly 10,000 Brick kilns employing 3,00,000 people. Sholavarum is a block in Thiruvallore district of Tamilnadu which has 30 brick kilns situated along the Kotralaiyar river. Brick kiln workers of 1500 families, employed in 30 Brick kilns situated in Sholavaram block, formed the study population. An exploratory study design, involving multiple Qualititive Methods is used for studying the health care related factors among Brick kiln workers.

- Structured observation of the Brick kilns.
- Focus group discussion among brick workers and among public health field workers.
- Key person interview.

Since this was planned as an exploratory study, sampling was done in such a way as to get maximum information, capturing all variations. Structured observations covered all the 30 Brick kilns situated in the block. Totally four focus group discussions were held, one involving all the male health workers and the other with the female health workers, responsible for coverage of the Brick kilns. Similarly one with women Brick kiln workers (12 in number), and one with male Brick kiln workers (8 in number) were conducted in different Brick kilns. Key persons for interview were selected from the Primary Health Centers covering the Brick kilns and all the

healthcare providers visited by the Brick kiln workers during their stay in the Brick kilns.

Figure 1 – Location of Brick kilns



The major challenge was to get the Brick kiln workers participate in the study, in spite of obtaining institutional ethics clearance. They were apprehensive of losing their livelihood in the name of social welfare. Only after assuring confidentiality and anonymity, they were willing to participate in the study. The investigator along with trained volunteers (4in number) had visited all the 30 Brick kilns for structured observation of the Brick kilns using a structured checklist for observation. Data acquisition was completed over a period of one month (August 2017).

The focus group discussions were held on different days, with the investigator as the facilitator and the trained volunteers helping in recording the discussions and activities of Participatory Learning for Action (PLA).

'Time preference chart' was generated by drawing a clock showing 24 hours timing and encouraging the group to tell what they do during the various times. Their common ailments were noted on the board and subsequently they were asked to rank them based on the impact it has on their life to prepare a 'Priority Listing' from their perspective. Similarly the 'Venn diagrams' for capturing the frequency of use of the health care provider and their distance from the work place was done by providing discs of several sizes. The location of their workplace was marked on the board and the group was encouraged to choose discs of size relative to the frequency of use and pin them at a relative distance from their workplace.

The key persons were interviewed by the investigator using a semi structured questionnaire to learn about their management practices relating to the Brick kiln workers' health issues.

Results

Sholavaram block has a concentration of Brick kilns subsequent to its topography wherein the river Kotralaiyar cuts across the block. Structured observations relating to public health care services, environment relating to health and health care were systematically made.

Brick kilns are situated along the sandy stretches of the Kotralaiyar river which is usually dry in summer. A total of six subcenters were responsible for health care of the 30 Brick kilns which were under the coverage area of 2 Primary Health Centers. This showed the existence of a very good infrastructure for health care delivery. (Fig.1 Map of Brick kilns). However there were communication and logistics problem in reaching these workers at their residence as the Brick kilns were situated away from the residential area of the villages, the distance ranging from 1- 3 km.(Table1)

Table1: Accessibility of basic facilities from brick kilns

S.No	Observation	Result
1	Distance from HSC (Range)	1- 3 km.
2	Distance from nearest town (Mean)	10 km.
3	Approach Road : Kutcha	25 (83%) chambers
	Metalled surface	5 (17%) chambers
4	Public Transport: 2 service / day	28 (93%) chambers
	>3 service / day	2 (7%) chambers

The work area is spread out over several acres, each family preparing bricks separately and drying them, working in the **hot, dry, windy terrain**. Once dried, bricks are placed in the kilns for getting heated for a preset timing. Workers go into the kiln - **a very dusty hot region**, separate the bricks individually and arrange them outside the kilns or onto vehicles for transportation. Rows of 8-10 huts, situated in the neighbourhood of the kilns form their dwelling place. Though bricks were used, mud is the cementing material, as also the floor. Roof is thatched flimsily using coconut palms. A single room, with a charcoal oven in a corner, forms the entire house, supporting an average size family of 4 members. No windows are present and entry is through a small door. This reflects the overcrowded housing conditions and poor ventilation. Though all houses had electricity provision, lighting was its only application. Only one chamber had piped water supply from the panchayat. All the other chambers depended on private bore wells for drinking water. No chamber had drainage system for sewage disposal. Open air defaecation was practiced in all the chambers.

Focus Group Discussion among public health field workers was conducted during the block review day when the field health workers having chambers in their subcenters (6 male Health Workers and 6 women Health Workers) were invited for discussions relating to facets of health service coverage of the brick kilns..

As per the fixed tour programme when the HW – F visits the hamlet in which Brick kiln chambers were situated, they would send word through the "head" or

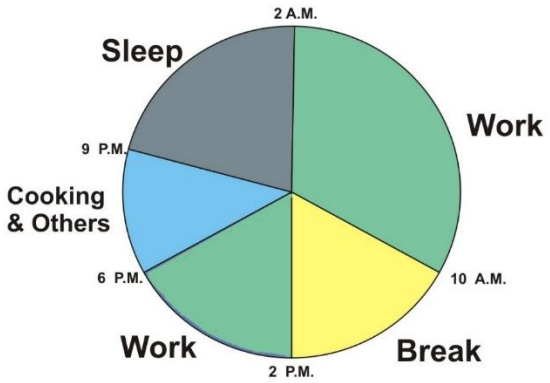
"accountant" of the chamber to send likely beneficiaries for antenatal and immunization services. Some sent the ICDS workers to pass on the message. Three of them said they would go to the Brick kiln chambers to identify the beneficiaries, accepting their failure for complete coverage as only a few will be in their houses, the rest scattered over their work spot. Frequency of visit to these chambers varied. Some visited once a month while two of the HW-F had never visited their chambers! For the HW-M, Brick kiln workers came in their purview only during camps like Pulse Polio, Leprosy Elimination Campaign etc.

All of them were uniform in identifying them as migrant workers though the duration of stay perceived by them varied. Some said they stay for 2-3 months, some considered them to stay for 6 months. One HW (F) pointed out that a few families would stay there permanently for more than 8- 10 years.

Table 2: Subjective Ranking of illness

Illness	Ranking As per Brick kiln Workers	Ranking As per Local Practitioners
Musculoskeletal Pain	1	1
Cough and breathlessness	2	5
Diarrhoea/ Pain abdomen	3	2
Trauma	4	4
Fever	5	3

Figure 2 – Time preference chart



Fear of infant death and maternal death was the main motivation that ensured coverage by HW – F while Male health workers' dreaded problem regarding Brick kiln chambers was diarrhea outbreak. None of the Health workers had registered the Brick kiln chamber workers in their Family Register. Two of the HW (F) had a list of Antenatal and child beneficiaries in a separate book to aid follow up. Two of the HW (M) had nothing to say about the chamber workers or their problems as they had never considered it their job to cover these migrant workers.

Table 3: Practices of key persons regarding management of patients

S.No	Practice	No.of Key Persons(Percentage)
1	Duration of drugs prescribed	
	Those prescribing for 1day	9 (76)
	Those prescribing for 3 days	2 (16)
	Those prescribing full course	1 (8)
2	Advice on review	
	Those who give clearly	1(8)
	Those who don't specify	11(92)
3	Average duration of cough at presentation	10 days
4	Timing of investigation (cough)	
	Those investigating at two weeks	6 (50)
	Those investigating beyond 3 weeks	1 (8)
	Those deciding based on response to treatment.	5 (42)
5	Investigation of choice (cough)	
	Sputum smear	4 (33)
	Chest X- ray	6 (50)
	Haemogram	2 (17)

When alternate strategy for improving health care of Brick kiln workers was discussed, the health workers felt that the Brick kiln workers had come all the way from their original residence only for the purpose of working and earning money and not for taking care of their health. They felt a change in the attitude of Brick kiln workers was the only solution to their problems of coverage. The male health workers felt the chamber workers to be unapproachable and hostile and considered it the responsibility of the Brick kiln worker to approach the health worker when they come to the hamlet.

The results of the discussions bring to light two factors;

(i) Instructions from the office of the Director of Public Health are clear regarding provision of health care to everyone staying in the HSC and registering them in the family register for accountability. Their duration of stay mattered only in classifying them as residents or visitors, the core message of which had not reached the health workers.

(ii). The Health workers had lost sight of the system's objective of making services acceptable to people through Behaviour Change Communication (BCC).

The focus group discussions among Brick kiln Workers were conducted incorporating simple interactive methods of 'Participatory Learning for Action'. They have a migratory pattern of life in search of employment. They are basically small farmers, who due to water

scarcity, grow one crop per year only. Farmers from the southern districts come to the Brick kilns, along with fit family members during the dry non cultivating season – usually from March to August, a period of six months. Generally they receive money in advance, usually for agricultural purposes, with the obligation of repaying by work. A few families (2-3 per chamber) reside in the chambers permanently.

Figure 3 – Health seeking behaviour; existing pattern

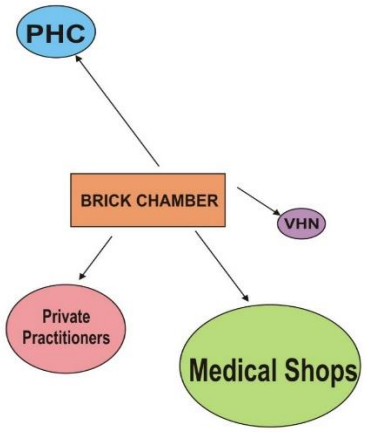
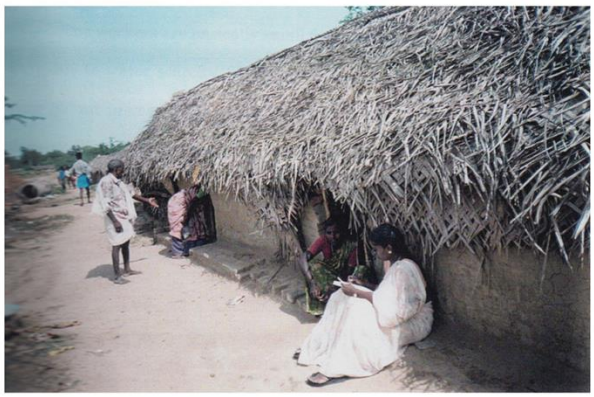


Figure 4: Work Environment

Figure 5: Housing condition



They had no fixed number of employees per Brick kiln. They sign up as a family, irrespective of the number of members contributing for work from a family. Even with the same employer, the families get registered in different units such that there are just 10 – 12 families in a unit.

Work hours are not specified. However, since payment is based on the family's output of bricks, on an average they work 12 hrs. /day, ranging from 10 -16 hrs depending on their need for money and ability to work. (Fig2. time preference chart). The common ill health that the workers feel troublesome and work limiting were listed by priority listing (Table 2). Other than the ergonomics related musculoskeletal pain respiratory illness had a high ranking. Ill health usually doesn't prevent them from work.

For health care, the workers felt they had no choice. They were not aware of free health service in the neighbourhood other than the "Stanley Govt. Hospital", 26 km. away. Though they had seen Health Workers come in for immunization, they had presumed them to have come from Stanley. Fig3 illustrates their health seeking pattern; the size of the disc is proportional to utilization of service and the distance from the chamber symbolizing the distance in reality. It reflects how ignorance prevents them from utilizing government Health Sub Centres (HSC) which were just 1 -3 km away. Many of them were not satisfied with their health providers but with no alternative, they return to them when ill health occurs. Health care was sought only when it prevents them from working. The time they sought help for ill health was determined more by 'availability of money' than by severity of illness. Though no formal arrangement was made by the employer for their health care, some of the brick chamber owners had a simple contract with a health provider (usually a non-allopath) wherein workers can get free treatment on showing a company slip issued by the manager.

As per the ESI act, any organization employing more than 20 individuals involving non – mechanized work should have the ESI system for health care. Analysis of the FGD results expose some of the factors which contribute to these employers' evading the ESI Act; (i) A single owner registering Brick kilns in different person's name decreases the employee strength. (ii) Registering employees as a family can decrease the employee strength by one third or more.

Brick kiln workers considered 'those treating illness for money' as Private practitioners. They were not aware of their qualifications. Key person interview was conducted among the private practitioners frequently visited by the brick kiln workers and the medical officers (qualified allopathic doctors) of the two Primary Health Centres covering the brick kilns. All the local practitioners responded genially to the semi structured questions. The private practitioners' type of services varied, four of them were qualified doctors from non-allopathic streams, practicing allopathic medicine and six of them were unqualified quacks! Results were obtained from recall as none of them had records to back their responses. On an average a 'doctor' treats 20 Brick kiln workers per week (range 10-40). Their ranking of the common illness reporting to them, was based on the

percentage of individual disease among the total cases. (table 2).

Analysis of the management practices of the local practitioners bring to light several factors which can affect the health care of the Brick kiln workers. The Brick kiln workers had ranked cough second only to the ergonomics related musculoskeletal pain. However, when it comes to seeking health care, those visiting the local doctors for 'cough' showed a low ranking of 5 (five). This shows their low priority in seeking health care early for chronic diseases. Consequent to the varied type of practitioner services, the proportion following recommended clinical practices was very low and dismal. Only one person gives prescription for the full course. The majority local practitioner's habit of prescribing for one day and expecting the uneducated brick kiln workers to return for the full course of treatment leaves much to be desired. Likewise forty percent of the practitioners depending on 'response to treatment' to decide on need for investigating cough may not be scientific as it is not likely that if there is no improvement, patients would return to the same doctor.

Discussion

Similar researches done in Tamilnadu[4], Maharastra[5] and Karnataka[6] which explored the health problems of brick kiln workers were all quantitative methods. Similar research done in Gujarat[7], which was a qualitative one supports the utility of using qualitative methods to serve the health care needs of socially excluded groups. "The more traditional approach, and the one with which most people are familiar, might be described as doing research 'from the outside in'. This approach is reflected in the question: "What do I see these workers doing/ how will I describe their experiences?" Such research is conducted from the perspective of professional 'outsiders', perhaps a team of researchers, or an organisation commissioning a piece of research. The framework for the research is decided in advance, and the 'research group' is usually perceived as a passive participant in the process. In contrast, taking qualitative approach means doing research 'from the inside out', and is reflected in the question: "What do these workers see themselves doing/ how do they describe their experiences?" This approach sees the research group as expert in its own right, and takes that perspective as the lens through which the data is viewed and analysed, and the research group is involved in an active and participatory way throughout the research process"

The results of the current study are helpful in two aspects. It gives an orientation to the risk laden and variant lifestyle of the Brick kiln workers which was till then shrouded in mystery inside the remote and isolated Brick kilns. Information gained from this preliminary study, makes it imperative to have sensitisation sessions to health workers covering such occupational risk groups. Further quantitative studies with external validity should be planned to quantify risk to ill health of these workers. The results of this study can help form the skeleton for the quantitative study questionnaire.

The other equally important component is the manifest utility of simple Qualitative Methods, known by varying terminologies – Rapid Epidemiological Assessments, Participatory Rural Appraisal, and Participatory Learning for Action. The simplicity of the methods, the people centred approach bringing a wealth of information as the outcome of the study in the form of time preference charts, Venn diagrams and priority listing can give a visual understanding of the Brick kiln workers' health care issues. The use of several methods served as triangulation to substantiate results from one method. The study served as a demonstration of the qualitative methods to which the field health workers have been exposed to in their training workshops, though this was not part of the objective of the study.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 64-67**

Barrier to Healthy Lifestyle among Patients of Diabetes Mellitus and Hypertension in a Rural Health Centre of Tamil Nadu.

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Introduction: Uncontrolled high blood pressure and high blood sugar leads to significant morbidity, such as heart disease, stroke, renal failure, retinopathy, neuropathy. Heart disease continues to be the leading cause of death. There are certain barriers to lifestyle among diabetics and hypertensives which leads to the above said complications. **Methodology:** A questionnaire based study was carried out among 400 diabetics and hypertensives in Sirugambur and Pullambadi primary health Centre, Trichy, Tamilnadu, during the period of August-September 2015. The patients were asked questions regarding their lifestyle (healthy diet, physical activity, alcohol consumption, tobacco use, adherence to drugs and follow ups) and the Barriers (hindrance) for controlling diabetes and hypertension. **Results:** The most common reasons for not adhering to health diet among the study population were that they wish to eat outside food (81%) followed by expense (80.5%). The most common reasons for not following physical activity is embarrassed to exercise followed by no encouragement by family members, body pain after exercise. The most common reasons for consuming tobacco were that it was a tension reliever, couldn't break the habit and kills hunger and boredom during work. The most common factors affecting follow-up were inconvenient timing of clinic followed by, unable to meet expenses and afraid of more prescription of tablets. **Conclusion:** The barriers are more in domain of physical activity, followed by follow-ups, adherence to drugs, alcohol, and tobacco use and healthy diet the least. The barriers associated with physical activity needs to be addressed before advising it.

Key-words: Diabetes, Barriers, Hypertension, Lifestyle, Prevention

Introduction:

Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar), which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves. The most common is type 2 diabetes, usually in adults, which occurs when the body becomes resistant to insulin or doesn't make enough insulin. In the past three decades the prevalence of type 2 diabetes has risen dramatically in countries of all income levels.[1] Uncontrolled high blood pressure and high blood sugar leads to significant morbidity, such as heart disease, stroke, renal failure, retinopathy, neuropathy. Heart disease continues to be the leading cause of death. Berlowitz et al, the researcher suggested diabetes and heart disease is a part of characteristics that health providers considered when attempting to manage uncontrolled hypertension. [2]

One of the key risk factors for cardiovascular disease is hypertension - or raised blood pressure. Hypertension already affects one billion people worldwide, leading to heart attacks and strokes. It is estimated that raised blood pressure currently kills nine million people every year.[3] The study of Knight et al., also discovered that hypertensive and diabetic population had a higher instance of other coexisting diseases such as cognitive, cardiac failure, stroke and myocardial infarction. [4] Both hypertension and diabetes can be termed as lifestyle diseases which are linked with the way people live their life. There are certain barriers to lifestyle among diabetics and hypertensives which leads to the above said complications. [5-6] By assessing the lifestyle of people in rural areas, the factors that inhibit the control of diabetes and hypertension may be discovered.

This discovery may assist the health care professionals to devise a health promoting lifestyle plan for control of diabetes and hypertension in future. In this context the present stud was conducted to know about the barriers in lifestyle among diabetes and hypertensive patients coming to rural primary health center and to assess the correlation between people lifestyle and the above said comorbid conditions.

Methodology:

A questionnaire based cross-sectional study was carried out among 400 diabetics and hypertensives who had a clinical diagnosis with diabetes and hypertension and who prescribed with medications in Sirugambur and Pullambadi primary health center, Trichy, Tamilnadu,

during the study period of August-September 2015. Newly diagnosed patients with diabetes and hypertension and age less than 17 years or younger, patient who are not taking any medications were excluded from the study. After explaining the purpose, procedure, benefits of the study, informed written consent was obtained. The patients were asked questions regarding their lifestyle and the hindrance for controlling diabetes and hypertension has been assessed. The questionnaire consisted of six categories such as healthy diet, physical activity, alcohol consumption, tobacco use, adherence to drugs and follow ups as they may set as hindrance for controlling diabetes and hypertension. The data was entered in Microsoft Excel and analyzed using Epi-Info Software.

Results:

Demographic details: The socio demographic details such as sex and socioeconomic status, Literacy status and comorbid conditions of the study population have been represented in Table 1. In the present study, the study population consisted almost equal percentage of males and females. Nearly half of the study population 43% belonged to Class IV according to Modified BG Prasad Classification. Among the study population about one third (31.8%) of them had Diabetes Mellitus, one third (37.5%) Hypertension and one third (30.8%) population had both diabetes and hypertension

Table 1. Socio-demographic details and co-morbid conditions of the study population (n=400)

Sl. No	Variable	Category	Frequency	Percentage
1.	Gender	Male	175	43.8
		Female	225	56.2
2.	Socio economic status (Modified BG Prasad Classification)	Class I	9	2.2
		Class II	62	15.5
		Class III	110	27.5
		Class IV	172	43
		Class V	47	11.8
3.	Literacy	Educated	63	15.8
		Uneducated	337	84.2
4.	Comorbid conditions	Diabetes mellitus	127	31.8
		Hypertension	150	37.5
		Both	123	30.8

The most common reasons for not adhering to health diet among the study population were that they wish to eat outside food (81%), more expensive (80.5%), Not much variety (68.8%) & Not attractive (67.8%). Reasons for not adhering to healthy diet is represented in the following Table.2

The most common reasons for consuming tobacco were that it was a tension reliever, couldn't break the habit and kills hunger and boredom during work. Nearly half of the study population (43.5%) felt that alcohol consumption helped to reduce body pain and only 2.2% of them felt it had no effect on health. Factors affecting tobacco usage and Pattern of alcohol consumption is represented in the following Table. 3.

Table 2. Reasons for not adhering to healthy diet among diabetes and hypertensives (n=400)

Sl. No	Factors	Yes	Percentage	No	Percentage
1.	Not tasty	125	31.2	275	68.8
2.	Not much Variety	275	68.8	125	31.2
3.	Not attractive	271	67.8	129	32.2
4.	No one to prepare	115	28.7	285	71.2
5.	Difficult to make	89	22.2	311	77.8
6.	Wish to eat outside food	324	81	76	19
7.	More expensive	322	80.5	78	19.55

Table 3. Reasons for Tobacco and Alcohol usage among diabetes and hypertensives (n=400)

Substance	Factors	Yes	%	No	%	Nil	%
Tobacco	Cannot break the habit	174	43.5	10	2.5	216	54
	Tension reliever	174	43.5	10	2.5	216	54
	Does not cause health problems	9	2.2	175	43.8	216	54
	Acceptable practice in community	9	2.2	175	43.8	216	54
	Kills hunger and boredom during work	174	43.5	10	2.5	216	54
Alcohol	No effect on Health	9	2.2	175	43.8	216	54
	Help to reduce body pain	174	43.5	10	2.5	216	54

The most common reasons for not following physical activity is embarrassed to exercise followed by no encouragement by family members, body pain after exercise. The factors affecting physical activity are represented in Table 4.

Table 4. Factors affecting Physical Activity among diabetes and hypertensives (n=400)

Sl. No	Factors	Yes	%	No	%
1	Exercise tires me	340	85	60	15
2	No place to exercise	281	70.2	119	29.8
3	Embarrassed to exercise	383	95.8	17	4.2
4	Aches and pain after exercise	352	88	48	12
5	Takes too much time	326	81.5	74	18.5
6	Family members do not encourage	374	93.5	26	6.5
7	Afraid of getting injuries	322	80.5	78	19.5
8	Watch TV rather than exercise	81	20.2	319	79.8
9	Has no effect on health	13	3.2	387	96.8

Most common causes for non-adherence of prescribed drugs were bored to take tablet daily, distance travel to consult a doctor, feeling depressed, difficult to swallow, not aware of taking drugs for life time. Barriers to adherence to drugs are represented in Table 5.

Table 5. Adherence to drugs among diabetes and hypertensives (n=400)

Sl. No	Factors	Yes	%	No	%
1	Not aware to take daily	5	1.2	395	98.8
2	Feeling depressed	352	88	48	12
3	Have to travel a lot to consult doctor	355	88.8	45	11.2
4	Not affordable	317	79.2	83	20.8
5	Too busy to buy	189	47.2	211	52.8
6	Tablets unavailable locally	6	1.5	394	98.5
7	Bored to take daily	360	90	40	10
8	Reduce the number if feeling better	340	85	60	15
9	Nobody to buy	285	71.2	115	28.7
10	Forget to take at times	299	74.8	101	25.1
11	More side effects	261	65.2	139	34.8
12	Nobody to remind	216	54	184	46
13	Difficult to swallow	352	88	48	12
14	Not aware to take lifelong	352	88	48	12
15	Used to take other system of drugs	6	1.5	394	98.5

The most common factors affecting follow-up were inconvenient timing of clinic followed by not able to meet expenses, afraid of more prescription of tablets etc.,. Barriers to follow up consultation are represented in Table 6.

Table 6. Factors affecting follow up consultation among diabetes and hypertensives (n=400)

Sl. No	Factors	Yes	%	No	%
1	Tiresome	189	47.2	211	52.8
2	Doctors makes me to do blood test	317	79.2	83	20.8
3	Clinic is too far	261	65.2	139	34.8
4	Limited means of travel	310	77.5	90	22.5
5	Not able to meet expenses	352	88	48	12
6	Nobody to take me	316	79	84	21
7	Clinic timing not convenient	360	90	40	10
8	Afraid of more tablets	352	88	48	12

Discussion:

While diabetes and hypertension has been an issue for the whole country, these conditions remained a concern for the rural areas in India. Many people in rural areas have lived with uncontrolled diabetes and hypertension and have developed organ damage. The purpose of the study is to discover the barriers to lifestyle among diabetes and hypertension. The demographic data provided great insight into the type of sample population obtained for this study. The sample population mostly consisted of uneducated females with increased population of hypertension rather than diabetes.

In the study of Berlowitz et al., (1998), the researcher suggested diabetes and heart disease is a part of characteristics that health care providers considered when attempting to manage uncontrolled hypertension. [2] The study of Knight et al., (2001) also discovered the hypertensive and diabetic population had a higher instance of other coexisting diseases such as congestive cardiac failure, stroke and myocardial infarction. A study conducted by Hamida Khan etal., in their study found that poor concordance with lifestyle (26.5%), lack of knowledge of diabetes (14.0%), infrequent attendance at clinic (16.4%) were found to be barriers for effective control of diabetes. [7] Healthy diet have positive effect on controlling diabetes and hypertension. From this study many people fail to have healthy diet due to certain factors like less taste, no variety, not attractive, difficult to make and more expensive. They attempt to skip meals to attain health (80%). People avoid to do physical activity since they consider that tires them and no place and time to exercise and are too embarrassed to perform their physical activity. They complain of increased aches and pains after exercise and afraid of injuries.

Alcohol consumption and tobacco use also plays a major role in controlling diabetes and hypertension. Adherence to drugs by the patients is very less since they consider taking more tablets make them depressed, more side effects and difficult to swallow. Most of the people travel a lot to buy medicines and bored to take more medicines. Most people are not aware that they have to take medicines lifelong. According to study conducted by Hamida Khan etal., lack of titration of tablets (7.8%) or insulin (12.5%), poor concordance with medication (14.0%), insulin refusal (11.7%), side effects (16.4%), denial that diabetes was a problem (7.0%), mental health problem (9.4%), social issues (10.9%) were identified as barriers to effective glycemic control. [7]

Most people think that monthly follow up is difficult since there is limited means of travel to health centre and they have to meet more expenses for follow ups. They are also afraid that the health care professionals might make them to do blood tests on their follow ups and add more tablets on every follow ups. A study conducted by Maysaa Khatta etal., in Pakistan, showed that negative attitude towards diabetes and increased barriers to adherence scale scores were significantly associated with increased odds of poor glycemic control. [8]A study by Omar Abdulhameed Al-Khawaldeha etal., showed that subjects with higher self-efficacy reported better self-

management behaviors in diet, exercise, blood sugar testing, and taking medication. [9]

In a study by Mahdavi R etal., it was observed that social and environmental barriers, social gathering, compliance with recommended diet and preference of other family members, palatability of the recommended diet, emotional statues and psychological factors and cost were important factors affecting the control of hypertension. [10] These finding are similar to the present study where it was observed that 68.8% said non palatability and 31% said lack of variety was perceived as barriers for adhering to the health diet. In a study conducted by George N et al, The domain of adherence to medication had the highest barrier score 119 (66.1%). The top most barriers identified were lack of variety in healthy food, lack of time to exercise and inadequate awareness about need for life-long medication. [11]

Conclusion:

The barriers are more in Physical activity, followed by follow-ups, adherence to drugs, alcohol, and tobacco use and healthy diet the least. The barriers associated with physical activity needs to be addressed before advising it.

Ethical Clearance: Obtained from Institutional Ethical Committee.

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Conflict of Interest: None
Source of funding support: Self

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 68-71**

AWARENESS ON HEALTH EFFECTS OF RO WATER USAGE AMONGST MEDICAL STUDENTS

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Introduction: Reverse Osmosis (RO) for purification of drinking water has become indispensable to us in recent times. We use it inadvertently without realizing that the water is demineralized and the effects it has on our health, and environment. Hence this study was taken up to study the awareness of the undergraduate medical students on the effects of RO water usage. **Methodology:** This is a Descriptive-Cross-sectional study, done among 200 undergraduate medical students (studying first and second year MBBS and selected through simple random sampling method.) of a private medical college. A structured close-ended questionnaire was used to collect data on their general demographic details, RO usage and Awareness on the health effects of RO. Ten questions were asked to assess the awareness on RO water health effects, effects on plumbing and soil. Data was entered in Microsoft Excel and analyzed by IBM SPSS 19.0. Results were given in percentages and categorical was analyzed by Chi Square Test. $P<0.05$ was taken as significant. **Results:** Among the 200 study participants, 65% were females and 54.5% were 1st years. 61.5% were drinking water from RO. 73 (out of 123 RO users) were using it for more than 5 years. And 95(47.5%) were using the RO water for cooking purpose. Students whose parents were post graduates were found to be using RO than others. Only 39(19.5%) students are well aware about the effects of RO. There is no significant difference in the awareness level with respect to sex of the individual, years of usage and residence. Students who drink water from RO plant had poor awareness than others. **Conclusion:** Awareness regarding the effects of artificially-produced demineralized water from RO plant is poor. Hence government should take steps to curb its usage as cheaper and safer alternatives are well available in our country.

Key-words: RO water, health effects, demineralized water.

INTRODUCTION:

"When water fails, functions of nature cease, you say;
Thus when rain fails, no men can walk in 'duty's ordered way"

- Thirukural 20

Water is essential for survival of life on this planet Earth. Around 71% of the globe is covered with water. **[1]** However, of this, around 97% is present in the oceans and only about 3% is available as fresh water. Of the available fresh water, most is locked up in glaciers and icecaps and only a small fraction of fresh water such as surface water and ground water is available for human use. **[2]**

In a country like India, the principle source of drinking water is the surface water, i.e., water present in rivers, lakes and ponds. But over the past few centuries, due to industrialization and urbanization, there has been a depletion and contamination of water sources.

Contaminated water and poor sanitation are linked to transmission of diseases such as cholera, diarrhea, dysentery, hepatitis A, typhoid, and polio. Absent, inadequate or inappropriately managed water and sanitation services expose individuals to preventable health risks. **[3]** The presence of TDS (Total Dissolved Solids) in water may also affect its taste. **[4]**

Thus, the necessity and essentiality of water purification systems arose. There are various purification systems like the RO (Reverse Osmosis), ultra-filtration, ultra-violet filtration and so on available for purifying water. The most common one that is being used by people is the RO system. Merriam Webster defines Reverse Osmosis as "the movement of fresh water through a semi-permeable membrane when pressure is applied to a solution (such as seawater) on one side of it". [5]

However, the major disadvantage of RO system that has been found is that it removes all the minerals from the water (including the essential nutrients needed by man), making it demineralized. This has been proven to be the cause of increased incidence of fatigue, weakness and muscle cramps among people using RO water compared to those who are not **[6]**. An inverse relation has been established between hardness of water (mainly due to calcium and magnesium) and

cardiovascular diseases and also fractures in children. **[7, 8]**

Using demineralized water has also been found to lead to substantial loss of nutrients in food during cooking. It can also leech pipe metals through which it passes. Drinking low-mineralized water may also increase the risk of intake of toxic metals as it is unstable and highly aggressive to materials with which it comes into contact. **[1]**

The 1980 WHO Report has recommended that the minimum TDS in drinking water should be 100mg/L. **[9]** Few options of re-mineralizing the demineralized water are now being introduced by the manufacturers to try to compensate for the loss though complete re-compensation is not possible. Also, a large amount of water is discarded by the apparatus which leads to strain on the available water resources **[10]**.

After extensive literature search, we were able to find few research articles related of effects caused due to consumption of RO water. However, the larger part of the population is unaware of the effects caused due to using RO water over longer period of time. There is also paucity of data from India regarding awareness on effects of RO water. Hence this study was planned to check the level of awareness of the various effects of using RO water among medical students, on whose hands the future health of the nation rests.

OBJECTIVE:

1. To find out the level of awareness regarding the health effects of RO water usage among undergraduate medical students.
2. To study the association of selected factors with RO water usage among undergraduate medical students.

METHODOLOGY:

A cross sectional study was carried out for a period of one month in February 2018 among undergraduate students of a private medical college in Kanchipuram district. The complete list of all students pursuing first year and second year MBBS course from the selected college was obtained from the college administrative section and from that list, 200 study participants were selected by simple random sampling through random number generator. Participants who were not present for two consecutive visits at the time of data collection were excluded from the study.

Study tool:

A self-administered validated structured close ended questionnaire was used to collect information on their socio demographic details, reverse osmosis (RO) water usage and awareness on health effects of RO water usage. Socio demographic details like name, age, gender, current locality of residence and educational qualifications of parents were elicited. Few questions related to RO water usage such as reason for choosing RO, years of usage, frequency of filter replacement and capacity of RO apparatus used by them.

Level of awareness on health effects of RO water usage were elicited using questions like nutrients and mineral content, impact on dental, cardiovascular and skeletal system. Questions such as effect on water source, amount of water discarded by RO apparatus were asked to assess the awareness level. There were ten questions to assess total level of awareness. A positive response was ascertained with a score of '1' and negative response a score of '0'. Out of a total score of 10, the participant who scored 7 and above were considered as to have good awareness on effects of RO water usage. The questionnaire was pilot tested with 30 students out of the sample and needed modifications were done before administering the questionnaire to the study participants. After getting approval from the institutional ethics committee, the data collection was started.

Data collection:

Consent for participation in the study was obtained from the participants. Questionnaire was filled by the participants after it had been completely explained by the investigator.

Statistical analysis:

Data was then entered in Microsoft Excel and analyzed using SPSS statistical package version 19.0. Descriptive statistics (mean and standard deviation) were arrived for socio demographic characteristics like age of the participants. Level of awareness on health effects of RO water usage was calculated and expressed in percentage. Chi square test was applied at 95% confidence interval to test association of selected factors with level of awareness on RO water. The p value <0.05 was considered as statistically significant.

RESULTS :

Among all,200 students had participated in the study, the mean age of the study population was found to be 18.57 ± 1 year. Among the study participants, 130 (65%) were females and 70 (35%) were males as shown in Fig.1. 109 students (54.5%) of the study participants were in their 1st year of the course and the remaining were in the second year as shown in Fig.1. Majority of the study participants were Day-scholars 119 (59.5%).

Fig.1 Gender and year of study participants

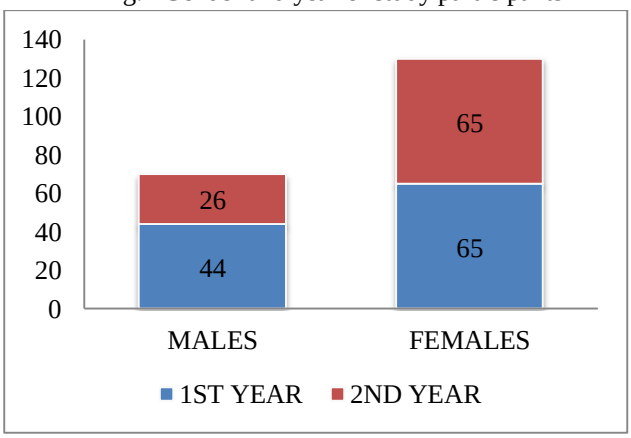
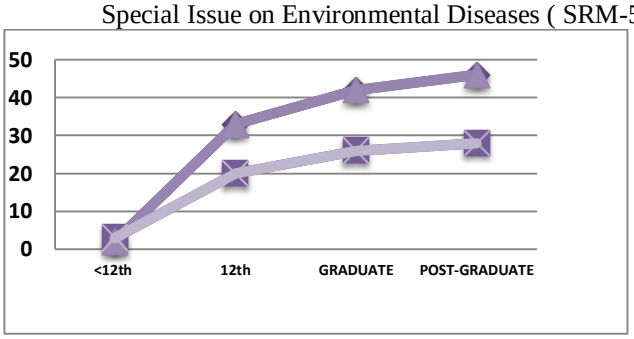


Fig. 2 Parent's educational status and RO water usage



Out of all,37% of the study participant's father had completed post graduation, 34% were graduates and only 2.5% had not completed higher secondary schooling. And 123 (61.5%) of the student population were drinking water from RO while the remaining 38.5% were using other sources of drinking water like can water, tap water and boiled tap water. Majority (32.5%) of RO users were using Aqua Guard brand.

Table 1. Association between level of awareness with certain selected factors

Variables		Level of awareness		P value
		Good	Poor	
Year of study	1st year	23	86	0.532
	2nd year	16	75	
RO Usage	Yes	23	100	0.718
	No	16	61	
Sex	Male	13	57	0.808
	Female	26	104	

Table 2: Awareness about amount of water discarded from RO plant

Level of awareness	Frequency	Percentage
Good	21	17.1
Poor	102	82.9
Total	123	100

Table 3: Awareness level about usage of discarded water from RO plant for cooking and domestic purposes

Usage of water rejected from RO apparatus	Level of awareness		Total Frequency (%)
	Good (%)	Poor (%)	
Not used for cooking	89 (72.4%)	34 (27.6%)	123 (100%)
Used for domestic purpose	76 (61.8%)	47 (38.2%)	123 (100%)

Among the 123 students who were using RO, 73 (59.5%) were using it for more than 5 years and 95 (77.2%) were using the RO water for cooking purpose.

Only 39 (19.5%) of the study participants were having good level of awareness about the effects of RO water usage. Students whose parents were post graduates were found to be using RO more than the others as shown in fig.2

AWARENESS LEVELS:

The awareness levels of the students about the health effects of drinking RO water was calculated and then categorized based on the year of study, sex and RO usage.

Above Table 1 shows association between levels of awareness on effects of RO water usage with various selected factors among study participants. Only 39 (19.5%) students are well aware about the effects of RO. And there is no statistically significant difference between the awareness level with respect to sex of the individual, years of usage and year of the course studied by students.

AWARENESS ABOUT WATER WASTAGE:

Among 200 study participants, 123 of them were using RO water. Awareness about amount of water discarded by RO apparatus for filling the maximum capacity of the tank was poor among 102 (82.9%) participants as depicted in Table 2.

AWARENESS ON USAGE OF WASTE WATER FROM RO:

Table 3 shows that, 89 (72.4%) and 76 (61.8%) of the RO users were having good awareness that the rejected water from the RO apparatus cannot be used for cooking and can be used for domestic purposes respectively.

DISCUSSION:

A study on the various effects of using RO water (demineralized water) has been published in the WHO guidelines for drinking water. **[6]** The recommended TDS of drinking water as expressed in the 1980 WHO report is 100 mg/L. **[9]**

The WHO provided recommendations in 2004 for the mineral content standards in drinking water:

1. For magnesium, a minimum of 10 mg/L and an optimum of 20-30mg/L.
2. For calcium, a minimum of 20mg/L and an optimum of about 50mg/L.
3. For total dissolved salt concentration (TDS), the sum of calcium and magnesium should be between 2 to 4 mmol /L. **[11]**

A study done by Saini RD on health risks of long term consumption of RO water explains about the various consequences occurring due to drinking demineralized water. [12]

Durlach J et al studied the importance of magnesium level in drinking water. The study showed that Calcium and magnesium are said to possess antitoxic properties and can prevent absorption of some toxic metals like Lead (Pb) and Cadmium (Cd). [13]

Bernrdi D study has established inverse relation between the hardness (mainly due to calcium and magnesium) of water and cardiovascular disease. [7] Another study by Verd VS has established inverse relation between water hardness and fractures in children. [8]

Studies done by Durlach J and Verma KC have established that low magnesium content of water has been associated with increased morbidity and mortality due to cardiovascular diseases (CVD) and also to higher risk of motor neuronal disease, pregnancy disorders (so-called preeclampsia) and some cancers. [13, 14]

Demineralized water can lead to increased intake of toxic metals as demineralized water is highly unstable and aggressively react with materials it comes in contact with and it can also lead to leeching of pipe metals.

Also, a large amount of water is discarded (approximately 3 times the capacity of the tank) by the apparatus which leads to strain on the available water resources as extrapolated from the study conducted in urban Delhi by Singh G. [10]

After an extensive review of literature, no similar awareness studies were found to have been done in India. The results show that there is significant lack of awareness amongst the medical students with only 19.5% being well aware of the effects.

Students whose parents were post-graduates were found to use RO more than others. However, there is no significant difference in the awareness level with respect to sex of the individual, years of usage and residence. Also those using RO water were found to have less awareness than others.

Many of the RO users were unaware of the amount of water discarded from the RO apparatus. However, many showed considerable awareness about not using the discarded water for cooking. They were aware that the discarded water could be used for other domestic purposes.

CONCLUSION:

A specified amount of minerals is required to be present in water to make it fit for consumption and drinking demineralized water leads to various health effects. The lack of awareness about this even amongst medical students shows the dismal state of affairs of the country in taking care of the general health of its population. Hence it is high time that we opt for better, cheaper and safer alternatives for water purification that have been tested like sand and clay filters, ceramic filters, boiling and other traditional filters. **[15, 16]**

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 72-76**

Awareness of Occupational cancers among industrial workers

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Occupational cancer is a serious health problem in Industry. Exposure to chemicals, dusts, radiation, and certain industrial processes have been too tied to occupational cancer. The proper use of safety measures by industrial worker is an important way of preventing and/or reducing occupational cancers. There is lack of awareness among industrial workers about occupational cancers and the use of Personal Protective Equipments. This study aimed at assessing the knowledge of industrial workers on occupational cancers in Chennai city. It was a cross - sectional study using a stratified sampling technique to recruit industrial workers into the study group in Chennai city. One hundred and fifty industrial workers belonging to level 5 and level 6 of the industry exposing to ionizing radiations such as X-rays and ultraviolet rays that occur in arc and other electric welding processes and infrared rays produced in welding processes were studied. A structured interview questionnaire was used to collect the data among the industrial workers. The data was entered in a MS excel sheet and was analyzed using SPSS software 21 version. The data was expressed in percentages, frequencies and continuous data was expressed in mean and SD. Appropriate test of significance was done to test the hypothesis wherever needed. Only 57.3% of the employees were aware of occupational cancers, causes, symptoms and the treatment options and 28% of the employees use all the personal protective equipments during exposure to welding. Thus, this study revealed that the level of awareness of occupational cancers among industrial workers was very low. There is need of further implementation of the safety measures as significant proportions of the workers still had low awareness. Implementation of industrial safety regulations could help to assess workers behavior and increasing the number of safety training programs would increase the awareness on occupational cancers.

Key-words: Occupational cancers, Radiation, level of awareness

INTRODUCTION:

Cancer has emerged as a major public health concern owing to its magnitude, worldwide distribution, and impact on the quality of life, financial burden on the patient, family, society, health care delivery system and associated mortality[1]. Cancer may be regarded as a group of diseases characterized by an abnormal growth of cells, ability to invade adjacent tissues and even distinct organs and the eventual death of an affected patient if the tumour has progressed beyond that stage when it can be successfully removed[1-3]. Cancer has a multifactorial aetiology that includes environmental factors such as tobacco, alcohol, dietary factors, occupational exposures, viruses, parasites, customs, habits, lifestyles and genetics factors. Cancer control consists of a series of measures based on present medical knowledge in the fields of prevention, detection, diagnosis, treatment, after care and rehabilitation, aimed at reducing significantly the number of new cases, increasing the number of cures and reducing the invalidism due to cancer[4-5]. Similarly the Occupational cancers are a serious health problem in Industry. The sites of the body most commonly affected are skin, lungs, bladder, and blood – forming organs. Occupational exposure to chemicals, dusts, radiation, and certain industrial processes have been too tied to occupational cancer. Among these most of the occupational cancers are due to exposure to radiations such as X-rays and ultraviolet rays occurs in arc and other electric welding processes and infrared rays produced in welding and in heating and drying of painted and lacquered objects[7-8]. 75 percent of occupational cancer is skin cancer caused by exposure to X-rays[9]. Occupational cancers appear after prolonged exposure which may be as long as 10 – 25 years. They may also develop after cessation of exposure. Their incidence is earlier than that of other cancers in general. The proper use of safety measures by industrial worker is an important way of preventing and/or reducing a variety of cancers that they are exposed to during radiation. There is lack of awareness among industrial workers about occupational cancers and the use of Personal Protective Equipments (PEP)[10-12]. So our study is planned to assess level of awareness among industrial workers on occupational

cancers and the use of Personal Protective Equipment (PEP) in two industries at Chennai which manufactures Hydraulic cylinders and industrial cooling fans.

OBJECTIVES:

1. To assess the level of awareness of occupational cancers among industrial workers.
2. To assess the use of Personal Protective Equipment (PEP) among the industrial workers.
3. To analyze the factors associated with level of awareness among the industrial workers.

METHODOLOGY:

STUDY DESIGN: A cross-sectional study was conducted to assess level of awareness and factors associated with the level of awareness.

STUDY AREA: The study was done among employees in two industries which manufacture hydraulic cylinders, industrial cooling fans where welding processes and painting processes are done, in an industrial estate, at Chennai city, the capital city of Tamil Nadu.

STUDY POPULATION: All the employees in an industry were included in the study until the required sample size is obtained. The males aged from 18 years and above were included in the study.

SAMPLING TECHNIQUE: Stratified sampling technique. Level 5 and Level 6 of the industries who are exposed to ionizing radiations such as X-rays and ultraviolet rays that occur in arc and other electric welding processes and infrared rays produced in welding processes. All the participants working in Level 5 and Level 6 were considered as study population, which are approximately 150. Hence, sample size (n) = 150.

SAMPLE SIZE: The employees working in both the industries belonging to level 5 and 6 were the study participants for our study which reached out to 150.

INCLUSION CRITERIA: All the employees working in both the industries were included in the study. The males aged from 18 years and above were included in the study.

EXCLUSION CRITERIA: Workers who would be repeatedly absent from work due to different reasons during the time of data collection was excluded from the study.

STUDY TOOL: A structured interview questionnaire was used to collect the data among the industrial workers in two industries. The questionnaire contains detailed information on socio-demographic, behavioral and workplace factors that would have association with awareness. A pilot tested and structured interview questionnaire was used to collect the data.

DATA COLLECTION: The data was collected among all the industrial workers by direct interview method after getting the informed consent and permission from the Institution research committee. The questionnaire was pilot tested in order to identify potential problem areas, unanticipated interpretations, and cultural objections to any of the questions.

DATA ANALYSIS: The data was entered in a MS excel sheet and was analyzed using SPSS software 21 version. The data was expressed in percentages, frequencies and continuous data was expressed in mean and SD. Appropriate test of significance was done to test the hypothesis wherever needed.

RESULTS:

Socio-demographic characteristics

A total of 150 employees completed the questionnaire making response rate 100%. All were males. 57% of the employees belong to the age group of 20 - 30 years and 43% of the employees belong to the age group of 20 - 40 years.

Workplace and behavioral characteristics

All the employees had undergone medical examination and safety training after joining the job. The employees were periodically examined at 6 months interval. Regarding hours spent on work, the employees had worked for more than 40 hours per week. Work shift and safety supervisions were maintained during work. Regarding education status, all completed their secondary education. Majority (83%) of the employees had a monthly income greater than ten thousand. Most of the employees were from rural area and did not suffer from any chronic health problems.

Participant's awareness of occupational hazards

Table 1.Participant's awareness of occupational hazards among welders around Chennai city

VARIABLES	FREQUENCY (%)	
	YES (%)	NO (%)
Aware of Occupational Cancer	117 (78%)	33 (22%)
Aware of Occupations that are risk for Cancers	115 (76.7%)	35 (23.3%)
Name some Occupational Cancers	110 (73.3%)	40 (26.7%)
Heard of Lung, Skin, Thyroid, Breast and Bladder Cancers	105 (70%)	45 (30%)
Aware of symptoms of Occupational Cancers	98 (65.3%)	52 (34.7%)
Aware of what causes Occupational Cancers	134 (89.3%)	16 (10.7%)

The majority (78%) of employees was aware of occupational cancers and 76.7% of employees were aware of occupations that are risk for cancers. Nearly three-fourth of the employees was aware of occupational cancers such as lung, skin, thyroid, breast and bladder cancers. 65.3% of the employees were aware of symptoms of occupational cancers such as altered bowel and bladder movements, change in color in wart or mole, difficulty in swallowing, lump or swelling, cough with hemoptysis and weight loss. Nearly 90% of the employees were aware of causes of occupational cancers such as radiation, smoking and chewing tobacco (Table 1).

Awareness on Treatment Options and others

Though 78% of the employees are aware of occupational cancers, only 63.3% of them were aware that occupational cancers are preventable, only 72.7% of them were aware that occupational cancers are treatable and only 65.3% of them were aware of treatment options for occupational cancers. Nearly 60% of the employees had risk of developing occupational cancers (Table 2).

Table 2 Awareness on Treatment Options and others among welders around Chennai city

VARIABLES	FREQUENCY (%)	
	YES (%)	NO (%)
Aware that Occupational Cancers are preventable	95 (63.3%)	55 (36.7%)
Aware that Occupational Cancers are treatable	109 (72.7%)	41 (27.3%)
Aware of treatment options for Occupational Cancers	98 (65.3%)	52 (34.7%)
Have risk of developing Occupational Cancers	95 (63.3%)	55 (36.7%)

Overall Awareness on Occupational cancers

On the whole, only 57.3% of the employees were aware of occupational cancers, causes, symptoms and the treatment options (Table 3).

Table 3 Overall Awareness on Occupational cancers among welders around Chennai city

VARIABLES	Frequency	Percent
Adequate	86	57.3
Inadequate	64	42.7
Total	150	100

Use of Personal Protective Equipment

Only 28% of the employees use all the personal protective equipments during exposure to welding. 50.7% of the employees use leather apron, 76.7% of the employees use helmet, 81.3% of the employees use mask, 80.7 % use goggles, 46& use earplug, 55.3% use gloves and 97.3% use safety shoes (Table 4 and Table 5).

Table 4.Overall use of Personal Protective Equipment among welders around Chennai city

VARIABLES	Frequency	Percent
Adequate	42	28
Inadequate	108	72
Total	150	100

Table 5.Use of Personal Protective Equipment among welders around Chennai city

VARIABLES	FREQUENCY (%)	
	YES (%)	NO (%)
Leather Apron	76 (50.7%)	74 (49.3%)
Helmet	115 (76.7%)	35 (23.3%)
Mask	122 (81.3%)	28 (18.7%)
Goggle	121 (80.7%)	29 (19.3%)
Earplug	69 (46%)	81 (54%)
Gloves	83 (55.3%)	67 (44.7%)
Safety shoe	146 (97.3%)	4 (2.7%)

Table 6 Comparative Analysis of Variables and knowledge on Occupational Cancers among welders around Chennai City

Variables	KNOWLEDGE		
	Adequate	Inadequate	Total
AGE GROUP			
Less than 30	52 (60.4%)	34 (53.1%)	86 (57.3%)
More than 30	34 (39.6%)	30 (46.9%)	64 (42.7%)
TOTAL	86 (100%)	64 (100%)	150 (100%)
INCOME CLASSIFICATION			
10k. To 15k.			
15k. To 20k.	48 (55.8%)	46 (71.8%)	94 (62.6%)
Less than 10k.	21 (24.4%)	10 (15.7%)	31 (20.7%)
	17 (19.8%)	8 (12.5%)	25 (16.7%)
TOTAL	86 (100%)	64 (100%)	150 (100%)
SHIFT DUTY			
1ST	44 (51.1%)	40 (62.5%)	84 (57.3%)
2ND	42 (48.9%)	24 (37.5%)	66 (42.7%)
TOTAL	86 (100%)	64 (100%)	150 (100%)
PPE USAGE			
Adequate	28 (32.5%)	14 (21.8%)	42 (28%)
Inadequate	58 (67.5%)	50 (78.2%)	108 (72%)
TOTAL	86 (100%)	64 (100%)	150 (100%)

Comparative Analysis of Variables and knowledge on Occupational Cancers

60.4% of the total employees having adequate knowledge on occupational cancers belong to the age group of less

than 30 which is higher when compared to the knowledge attained by the age group of more than 30 which is 39.6%. Nearly half (55.8%) of the employees having monthly income between 10 thousand to 15 thousand have adequate knowledge on occupational cancers which is much higher when compared to the knowledge attained by the total employees having monthly income between 15 thousand and 20 thousand; and less than 10 thousand respectively. 52.1% of the total employees working in 1st shift have adequate knowledge on occupational cancers which is higher when compared to the knowledge of the employees working in 2nd shift (48.9%). 32.5% of the total employees having knowledge on use of personal protective equipment have adequate knowledge on occupational cancers which is lower when compared to the employees not having knowledge on the use of personal protective equipment but have adequate knowledge on occupational cancers (67.5%) (Table6).

DISCUSSION

There are few studies conducted on awareness of occupational cancers and awareness on use of personal protective equipment among industrial workers worldwide. Some studies reported high and low level of awareness on occupational cancers and the use of personal protective equipment. Results from this study show that majority (57.3%) of the employees are aware of occupational cancers. Similar study was conducted in Eastern Nepal whose results reached a peak (90.7%) which is contrast to the results of our study[13]. Another study conducted in Pakistan showed similar results to our study[14]. Nearly, three-fourth of the employees had adequate awareness on occupational cancers in a study conducted at Lagos, Nigeria[15]. Thus, this study revealed that the level of awareness of occupational hazards among welders was very low when compared to the other studies conducted in other developed countries.

Results from this study show that only 28% of the total employees have adequate awareness on use of personal protective equipment and use them regularly. Similar results were obtained in a study conducted at Lagos, Nigeria among industrial workers. In India, similar study conducted in coastal south India shown 64.1% percentage results of usage of personal protective equipment[16]. Another study conducted at Eastern Nepal showed peak results of about 90.7% awareness and use personal protective equipment[17]. This was the only study that has shown the highest results. All the studies related the use of personal protective equipment with the number of safety training, lack of safety provisions and due to the lack of issue of personal protective equipment.

Our study has no significance of age group, income classification, shift duty and the use of personal protective equipment on the awareness of occupational cancers. Similar study conducted in coastal southern India related low level of education, lack of institutional training, age group structure and work experience along with non-adaptation of regulatory measures by concerned authorities on safety precautions with the awareness on occupational cancers. Many studies like Nigerian study and Arabian study related the awareness on occupational cancers with the educational qualification[18].

CONCLUSION

Hence, this study has low level of awareness on occupational cancers and the awareness on use of personal protective equipment. There is need of further implementation of the safety measures as significant proportions of the workers still had low awareness. Implementation of industrial safety regulations could help to assess workers behavior and increasing the number of safety training programs would increase the awareness on occupational cancers.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 77-80**

Association between Mobile Phone Addiction and sleep pattern among engineering students

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Background: Mobile phone addiction has been as a growing social issue nowadays. Previous studies have examined the effect of sleep alterations on one's health and performance. However, little research examined the causes leading to the altered sleep pattern in college students. **Aim:** To assess the relationship between mobile phone use and sleep pattern among college students. **Methods:** An observational cross-sectional study was conducted at an Engineering college in Coimbatore. Mobile phone addiction was measured by using the Mobile Phone Problem Use Scale – 10 (MPPUS-10). Similarly the sleep pattern, which includes duration and quality, was analysed by using Pittsburgh Sleep Quality Index (PSQI). **Results:** The sample size was 200, of which 59% were male participants. Smart phone usage time of 30% study participants was high. Of the study participants, 40% were highly addicted to their smart phones. A total of 86.5% had sleep duration less than 8 hours and 55% had poor sleep quality. Statistically significant association was found between sleep quality and Mobile Phone addiction. **Conclusion:** Just as a mother develops an "ear" for her baby, perhaps college students have developed an "ear" for their mobile phone. Hence further research is warranted in this field, as the usage of mobile phones is increasing day by day.

Key-words: Mobile Phone addiction, MPPUS-10, Sleep, PSQI

INTRODUCTION

By the end of 2016, two thirds of the world's population had a mobile subscription – a total of 4.8 billion unique subscribers**. [1]**So clearly mobile phones are now an integral part of people's everyday life, especially young people. Mobile phone overuse and addiction is a growing social issue in many societies.[2] The concerns relate to the emissions of radio frequency (RF) radiation from the mobile phones and the base stations that receive and transmit the signals. There are 2 direct ways by which health could be affected as a result of exposure to RF radiation. These are thermal (heating) effects caused mainly by holding mobile phones close to the body and also as a result of possible non-thermal effects. This has led to an increasing demand for scientific research on potential health effects related to this. Numerous studies have been conducted over the last 20 years addressing this question, with endpoints ranging from effects on brain electrical activity, cognition, and sleep, to more subjective endpoints such as personal well-being. [3-7] On the other hand, college students experience a variety of sleep difficulties ranging from lack of sleep to poor sleep quality. Research has demonstrated that many college students are sleep deprived, have poor sleep habits, and experience poor sleep quality. [8]Young adults are recommended a full eight to nine hours of high quality sleep every night. White and colleagues[9] (2009) conducted an online survey of student sleep habits and found that 25% of students reported attaining less than 6.5 hours of sleep a night and a mere 29.4% reported achieving the recommended 8 hours of sleep per night. [9] Hence, researchers have begun to direct their attention toward determining the factors contributing to sleep deprivation and decreased sleep quality in college students. However, while research has been conducted in terms of mobile phone use and other health effects, the relationship between mobile phone use and sleep remains virtually untouched. [9]Therefore the present study aimed to analyse the mobile phone addition among college students and to associate it with their sleep pattern.

AIM AND OBJECTIVES

Aim – To investigate the association between mobile phone addiction and sleep pattern among college students.

Objectives –

1) To analyse the usage of mobile phones by college students and categorise them based on their level of addiction.
2) To evaluate their sleep pattern based on the sleep duration and quality and associate it with their level of addiction.

MATERIALS AND METHODS

Study design and study setting:

This study was an observational cross-sectional study which was carried out for a period of 1 month, in July, 2018. The study was conducted among engineering students, in the Department of Chemical Engineering, in an Engineering college at Coimbatore.

Sampling method:

The sample size calculated was 180, using the formula $4pq/L^2$, where p is the prevalence (67%) [7], q = 1-p and L the permissible error, taken as 10%. For more precision, the sample size worked out to be 200 at 5% alpha error. Simple random sampling was done to select the students.

Inclusion and exclusion criteria:

Both genders, smart phone users and those willing to participate in the study were included in the study. Students with any sleep related illness, malignant and infectious diseases, anaemia, diabetes, hypertension, hearing and vision problems and those taking regular medications were excluded from the study.

Data Collection:

The study was approved and ethical clearance was obtained from Institutional Ethics Committee. The approval from the Principal of Engineering college was obtained and confidentiality was assured.

The data including student's name, age, gender, clinical history and medications history were obtained from the subjects. Mobile phone addiction was measured by using the Mobile Phone Problem Use Scale – 10 (MPPUS-10). [10]It contains 10 questions with answers ranged from 1 to 4 on a 4 – point Likert – type scale. Further, as per the need and requirement of our study, detailed assessment was done by grading the mobile phone addiction indicating the level of addiction into low (10-15), medium (16-20) and high (21-40).

Similarly the sleep pattern was assessed by using Pittsburgh Sleep Quality Index (PSQI). [11]The PSQI was used to assess quality of sleep during the past month and contained 19 self-rated questions from which seven component scores were calculated. The component scores consist of subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction. Component scores were summed into a global score with higher scores representing worse sleep quality. The component scores range from 0 to 3 and global scores range from 0 to 21. A global score of less than 5 was considered as good sleep quality and any score equal to or greater than 5 was indicative of poor sleep quality.

Statistical Analysis:

The data were collected, tabulated and statistically analysed using Statistical Package for Social Sciences (SPSS) software (version 20). Association between two attributes was found using Chi – square test. A p value < 0.05 was considered significant.

RESULTS

A total of 200 students were included in the study. Among the study group, 117(58.5%) students were male and 83(41.5%) were female.

Table – 1 demonstrates the distribution of smart phone usage time per day. Nearly 30.5% of the students used their smart phone for more than 5 hours, 34.5% of the students used their smart phone for 3-4 hours and 35% of the students used their smart phone for less than 2 hours.

Table – 1 Distribution of smart phone usage time per day (n = 200)

Category	Frequency	Percentage
High(>5 hours)	61	30.5
Medium(3-4 hours)	69	34.5
Low(<2 hours)	70	35

Figure – 1 demonstrates the distribution of Smart phone addiction level. Based on MPPUS – 10 score, the study participants were categorised based on their level of addiction as high (40%), medium (41%) and low (19%).

Fig – 1 Distribution of Smart phone addiction level (n = 200)

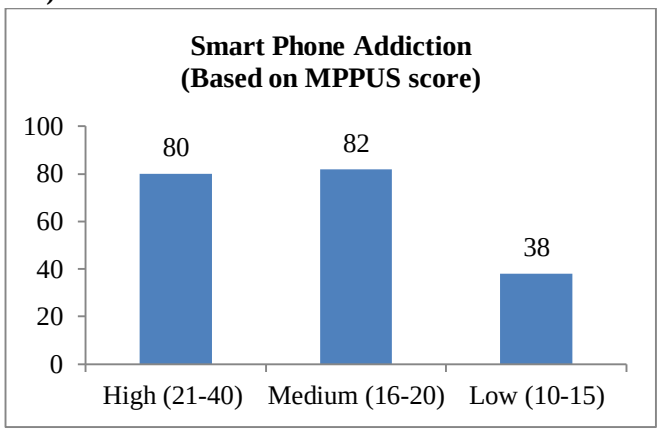

Table – 2 demonstrates the distribution of sleep duration per day. Only 13.5% had the adequate sleep of 8 hours. Almost 39%, 35% and 12.5% had 7-8 hours sleep, 6-7 hours sleep and 6 hours or les of sleep respectively.

Table – 2 Distribution of sleep duration per day (n=200)

Category	Frequency	Percentage
<6 hours	25	12.5
6-7 hours	70	35
7-8 hours	78	39
>8 hours	27	13.5

The distribution of sleep quality among study participants was assessed based on the PSQI score where students with the score of 4 or less were categorised as having good (45%)

and the score of 5 to 21 were categorised as having poor sleep quality (55%).

Table - 3 shows the association between sleep quality and mobile phone addiction. Chi square value was found to be 23.652; degree of freedom 2 and p value was found to be 0.0001, hence statistically significant.

Table – 3 Association between sleep quality and mobile phone addiction

Addiction level	Sleep quality		
	Good	Poor	Total
High	23	57	80
Low	29	9	38
Medium	38	44	82
Total	90	110	200

x^2 =23.65; df= 2; p-value = 0.0001

Table – 4 shows the association between sleep duration and mobile phone addiction. Chi square value was found to be 5.164; degree of freedom 6 and p value was found to be 0.523, hence statistically not significant.

Table – 4 Association between sleep duration and mobile phone addiction

Addiction level	Sleep duration (in hours)				
	<6	6-7	7-8	>8	Total
High	12	30	31	7	80
Medium	7	29	31	15	82
Low	6	11	16	5	38
Total	25	70	78	27	200

x^2 =5.164; df= 6; p-value = 0.523

DISCUSSION

The current study examined whether mobile phone addiction is related to the incidence of poor sleep pattern. About 86.5% had sleep duration less than 8 hours and 55% had poor sleep quality. Forty percent were highly addicted to smart phones, 41% moderately addicted and 19% less addicted. Significant association was found between sleep quality and mobile phone addiction. Hence the results of this study are in accordance with the studies conducted by Joo Eun Lee et al., [2] and Demirci et al., [12] which show a inverse relationship between mobile phone use and sleep quality in college students. However, our results were contradictory to those done by White et al., [9] which shows no significant relationship. We did not find a significant relationship between mobile phone addiction and sleep duration. Therefore, these results are consistent with those of studies done by Joo Eun Lee et al. [2] suggesting that mobile phone addiction has no direct effect on sleep duration in adolescents.

While this study acts as a catalyst for the advancement of sleep research, there are clearly some associated limitations. One limitation is that the data is based on self-reports, for this reason we cannot determine whether reported behaviours reflect actual behaviours. One possible direction for future research would be to directly measure one's mobile phone use and sleep quality. This could be achieved by having participants partake in a sleep study component in addition to monitoring mobile phone use via a tracking device. The type of smart phones if included, could have made the study more valid. Moreover, the literature in this field off research was very minimal.

The results show that college students have perhaps, developed an extra ear for their cell phone like a mother who is able to sleep through other sounds, but immediately wakes up at the sound of her baby's cry. In such a situation, quality sleep is not really possible. This phenomenon is similar to sleep apnea, where a person's oxygen levels drop during the apneic episode and the brain stimulates the person to start breathing by rousing the person to stages 1 and 2 of NREM sleep until adequate breathing has resumed. For a person with sleep apnea this pattern may happen several times a night and this constant stimulation by the brain interrupts the quality of sleep despite the individual reporting sleeping all night. This is evident the next day, where the person feels all tired and sleepy. Similar mechanisms play a role in the altered sleep pattern among those who are highly addicted to mobile phone.

CONCLUSION

The sleep pattern and smartphone usage by students was analysed. Statistically significant association was found between Sleep quality and Mobile Phone addiction. Hence further research is warranted in this field, as the usage of mobile phones is increasing day by day.

ACKNOWLEDGEMENT

We thank the Principal of Engineering College and all the study participants who gave voluntary consent and participated in the study.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 81-84**

Perceived reasons for poor sanitation and suggested solutions to overcome environmental challenges in JE-A qualitative study

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Background: Increasing trend of Japanese encephalitis in India along with the increase in vector breeding sites of culex mosquito due to unplanned town ships, makes it necessary to create awareness about Japanese encephalitis and measures to control the same. **Objectives:** To create awareness on Japanese encephalitis through small group discussion. To explore the various perceived reasons on poor environmental sanitation, through free listing and pile sorting exercise. To derive solutions to improve sanitation and to prevent JE, through Focus group discussion **Methods**: The study was carried out in Thaiyyur village, rural field practice area of a private medical college and hospital, Chennai during Feb 2018. Using Purposive sampling technique, with the help of village leader, 12 participants willing to participate in the study was identified. Awareness on Japanese encephalitis was done by small group discussion. A triangulation of free listing and pile sorting exercises was done to identify the perceived reasons for poor environmental sanitation and their perceived relationship. By semi-structured focus group discussion, solutions to prevent Japanese encephalitis through environmental manipulation was derived. Smiths'S value and cluster analysis was done for analysis. **Results:** The study participants perceived unavailability of common dustbin, improper drainage system, existing unclean environment, neighbours throwing waste in empty land to be the major reasons for poor environmental sanitations favouring Japanese encephalitis. Major solutions includes, strict laws by government, Provision of proper waste disposal area, awareness of vector borne disease, IEC, Community participation. **Conclusion:** Hence, in addition to extensive survey on vector borne diseases, survey on vector breeding sites and actions to prevent and control should be done. Behaviour change communication should be encouraged to change the attitude of the people, towards environmental sanitation

Key-words: Free listing, Smiths'Svalue, Pilesorting, Focus group discussion

Introduction:

Japanese encephalitis(JE) is predominantly a rural disease. With the challenging laboratory facilities,the burden of the disease is quite complicated to be well understood, making the Surveillance data as highly essential to overcome this complication so that local and global burden of the disease can be estimated and areas at high risk of disease can be identified.[1]Recognition of Japanese encephalitis based on serological surveys was first made in 1995 in Tamil Nadu and it is one of the state, that has reported out-breaks every year.JE has been reported as an endemic disease in 21 states of India.[3]This disease is a mosquito-borne disease, transmitted by the bite of infective Culex mosquitoes espescially, Culextritaeniorhynchus, Culexvishnui and Culexpseudovishnui. This zoonotic, arboviral infection is primarily neurotropic affecting the central nervous system.[2]

The Central Research Institute, Kasauli has developed the mouse brain-derived killed-inactivated vaccine in India, for the prevention and control of the disease. Primary immunization with this vaccine involves two doses that are given subcutaneously with 7-14 days gap between each dose followed by third dose at any time before one year and after one month of the second dose. Booster dose is administered after 3 years.[4] Other vaccines that are used are the cell culture-derived live SA-14-14-2 vaccine, cell culture-derived live-attenuated vaccine and genetically engineered live-attenuated chimeric vaccine.[5,6] However, the immunization coverage in India is considerably low[7] and the studies across the globe have shown that the major obstacle for improving vaccination coverage is missed opportunities for vaccination (MoV).[8,9,10] This emphasizes the necessity of environmental manipulation in prevention and control of the disease. Environmental sanitation is, providing an clean environment that promotes the health of the community and breaks the cycle of disease.[11] An effective way to control this disease, is by controlling the vectors transmitting it. This is done effectively by aerial or ground fogging with ultra-low-volume (ULV) insecticides (eg.malathion,fenitrothion) which covers the vegetation around houses, breeding sites and animal shelters in infected villages and in uninfected villages within 2-3km

radius of the infected village. Use of treated mosquito nets is also highly recommended.[12] Apart from all these measures, it is also mandatory to encourage the community participation in order to promote the environmental sanitation, thereby, controlling the Japanese encephalitis. In order to achieve this, the community should have a wide knowledge on preventive and control strategies. With this above background, the study was planned with the following objectives.

Objectives

1. To create awareness on Japanese encephalitis through small group discussion
2. To explore the various perceived reasons on poor environmental sanitation, through Free listing and pile sorting exercise
3. To derive solutions to overcome the environmental challenges, through Focus group discussion

Materials and methods:

The present formative qualitative study was undertaken in Thaiyyur village, rural field practice area of private tertiary care college and hospital at Chennai. By purposive sampling method, study population was selected. Twelve participants, aged above 18 years, residing in the study area, having a culex vector breeding site within 100 metres of their house premises, selected by the village leader (based on communication skills required for focus group discussion),willing to participate in the study, were included. After getting their convenient timings, SMALL GROUP DISCUSSION was conducted in the village library, to improve their awareness on JE.

This was followed by free listing on the same day, where the participants were asked to make an individual free list on perceived reasons on poor environmental sanitation (illiterate participants listed out verbally, which was noted by the investigator). Analysis of the free listing was done, using Visual Anthropac software .One week later, participants were gathered in the same village library. Based on the analysis of free listing exercise, twelve major reasons for poor environmental sanitation (determined by Smiths'S value) was listed and Pile sorting exercise was conducted. In the pile sorting exercise, the individual participants were asked to group those selected reasons which they felt together and suggest solutions to prevent them. Sample size of 12, was found to be adequate for pile sorting, as after the 5th participant, the results were likely to get repeated with> 0.75 correlation, Multi-dimensional scaling and cluster analysis was carried out to obtain the collecting picture of pile sorting exercise. This was followed by a semi-structured focus group discussion, in order to derive solutions to overcome poor environmental sanitation (environmental challenges). This FGD was conducted with the, Principal investigator being the moderator and other investigators carrying out note-taking and audio recording.

Small Group Discussion:

The 12 participants were assembled in the village library, for conducting the small group discussion. The session started with the facilitator starting, from the discussion. The participants interacted with each other on the topic to be discussed. The facilitator, facilitated the learning process and controlled the discussion. At the end of the discussion, after getting an overall view of the participants on JE, the facilitator gave a health education talk to improve their knowledge, attitude and practice towards Japanese encephalitis (JE).

Free listing:

In free listing, you ask informants to "list all the X you know about" or "what kinds of X are there? People tend to mention items in order of familiarity. Order of mention is indicator of salience. People who know a lot about a subject list more than people who know less. More "competent" informants have longer lists. People that most people list indicate locally prominent items. More prototypical items are mentioned first. Free list items were analyzed using Smith's Saliency Index.[13] Smith's S (Smith's saliency score) refers to the importance, representativeness or prominence of items to individuals or to the group, and is measured in three ways frequency across lists, word rank within lists and a combination of these two. Items that were named by multiple participants, but were worded differently (e.g. – money and finances) were grouped together prior to analysis. Community members on the research team used consensus to determine which items could be considered the same and grouped together. They also determined what word would be used for that grouping by consensus. Items chosen for the pile sort exercise included those with the highest Saliency Index.[14]

Pile sorting: In the pile sorting exercise, the individual participants were asked to group those selected reasons which they felt together and suggest solutions to prevent them.[14]

Focus group discussion: The eligible participants were gathered in the village library, and focus group discussion was conducted on perceived solutions to overcome environmental risk factor of Japanese encephalitis. The principal investigator was the moderator of the discussion, other 2 co-authors were note taker and audio-recorder respectively.

Results:

In the free list exercise, various twelve reasons identified for poor environmental sanitation , in the descending order of Smith's S value was as follows. 1)Neighbours throwing waste 2) No common dustbin in the street 3) Improper drainage system 4) Lack of municipal sanitation

5) No one is cleaning 6) Government is not taking action 7) No proper collection of waste 8) No time 9) poverty 10) All are busy 11) No Japanese encephalitis case 12) Already unclean [Table 1]

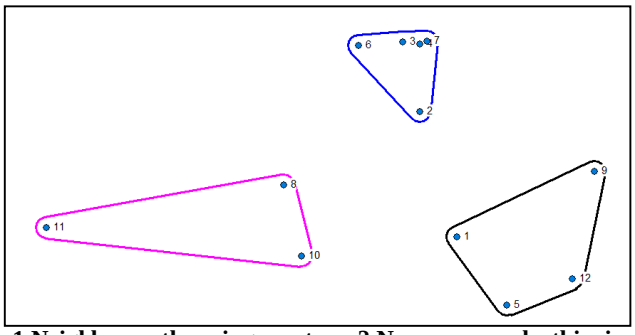
Table 1: Perceived reasons for poor environmental sanitation favoring the vector breeding sites of JE

Perceived reasons for poor environmental sanitation	Frequency (%)	Average Rank	Smith's S Value
Neighbors throwing waste	100	3	0.594
No common dustbin in the street	75	2	0.563
Improper drainage system	50	1	0.5
Lack of municipal sanitation	50	3	0.25
No one is cleaning	50	4	0.267
Government not taking action	50	5.5	0.161
No proper collection of waste	50	2	0.422
No time	25	7	0.083
Poverty	25	9	0.028
All are busy	25	8	0.056
No Japanese encephalitis case	25	5	0.139
Already unclean	25	2	0.188

Table 2 : Solutions derived to overcome environmental challenges - Focus Group Discussion

PILE GROUPS	SOLUTIONS SUGGESTED
Neighbors throwing waste Poverty No one is cleaning Already unclean	Monetary fine should be implemented Standard of living should be improved Government should take responsibility
Government not taking action Improper drainage system No proper collection of waste Lack of municipal sanitation No common dustbin in street	Regular inspection of site is necessary Proper planning of drainage system Improve manpower Politicians should be strict Common dustbin should be constructed
No time No Japanese encephalitis case All are busy	Workers should come home daily and collect waste Awareness should be improved on JE

Figure 1 :Pile sorting on perceived relationship between various reasons for poor environmental sanitation



1.Neighbours throwing waste 2.No common dustbin in street 3.Improper drainage system 4.Lack of municipal sanitation 5.No one is cleaning 6.Government not taking action 7.No proper collection of waste 8.No time 9.Poverty 10.All are busy 11.No Japanese encephalitis case 12.Already unclean.

As found in the analysis of pile sort data, twelve perceived reasons for poor environmental sanitation, favoring Japanese encephalitis, were clustered in to three groups, which they thought as mutually related to each other. [Figure 1]

For each pile group, solutions were derived in Focus group discussion. Participants felt that framing strict laws, imposing fines for having poor sanitation, proper planning and monitoring of waste disposal methods, increasing awareness on JE has to be done, in addition to various other solutions listed [Table 2]

Discussion:

The present study findings stressed the necessity to increase the awareness on Japanese encephalitis. Similarly, Akram etal[17] , in their study also reported, that, there is a lack of knowledge on Japanese encephalitis, which needed to be addressed by awareness programme .Participants of the present study, suggested a strong surveillance system is required for the prevention and control of JE, similar to the study findings of various other studies.[18,19,20]

Conclusion:

From the study results, its also clear that, people has poor community participation and poor attitude towards keeping their surrounding environment clean, hence **Behaviour change communication** is necessary. In addition to extensive survey on vector borne diseases, survey on vector breeding sites and actions to prevent and control should be done.

Acknowledgment

Authors would like to thank the village leader and the participants for co-operating in smooth conduction of the study

Ethical approval: The study was approved by Institutional ethical committee.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 85-89**

Sanitation and stunting- A community based cross-sectional study among 1-5 years aged rural children, Chennai

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Date of Submission : 30-04-2018 **Date of online Publication : 30-09-2018**
Date of Acceptance : 01-09-2018 **Date of Print Publication : 30-09-2018**

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ABSTRACT

Background: Under nutrition is the major health problem among under five children. Growth of the children is not only related to dietary deficiency, but also to surrounding environmental condition. **Objectives:**To assess the nutritional status of 1-5 years aged children; To determine the proportion of children growing under poor environmental condition;To determine the association between stunting and environmental sanitation **Methods:** A Cross sectional study was done among children aged between 1 to 5 years for a period of 2 months (Jan-Feb,2018), in three randomly selected villages of rural field practice area of a tertiary care hospital, Chennai. Weight and Height were measured and WHO growth standards were used to assess their nutritional status. The mothers were enquired about the environmental sanitation, using a content validated questionnaire. Chi-square test was used to determine the association between sanitation and stunting. Multivariate logistic regression analysis was used to determine influence of selected factors associated with under nutrition **Results:** Out of 153 children, around half (56%) of the children were under nourished. The prevalence of underweight, stunting and wasting among the study participants were 28%, 26% and 37% respectively. Nearly two-third (61%) of the children were exposed to poor sanitation practices. Children growing under poor environmental condition was found to be stunted, and the association was significant ($p<0.005$).Among the various selected influencing factors, adolescent pregnancy was found to be significantly associated with under nutrition. **Conclusions:** In spite of various measures to combat nutritional deficiencies, mortality and morbidity of under five children due to the malnutrition still exists. Proper environmental sanitation will help to avoid recurrent infection in children and hence malnutrition.

Key-words: Stunting, undernutrition, ,under five

Introduction:

Under nutrition is "the result of prolonged low level of food intake." It is generally due to protein and energy deficit and can also result from mineral and vitamin deficiency.[1] Major cause of mortality among under-5 children are due to under nutrition.World Health Organization (WHO) recommends the usage of growth chart with z – score classification to assess the nutritional status of under 5 children .[2] India contributes to nearly one-fifth of global under-5 deaths. The mortality is higher and the rate of decline is slower. [3] Hookworm is the most common intestinal parasite. The intestinal parasitic infections higher the risk deficiency. The growth stunning potential of hookworm infection is well known in many countries. It can lead to or aggravate malnutrition and anaemia through decline in food intake or an increase in nutrient wastage. [4] Open -air defecation practice leads to poor environmental conditions, resulting in high degree of soil contamination and increased pollution, which is the major risk for acquiring soil transmitted infestations, like hook worm infestations. [4] The estimation of 2.1 million annual deaths are due to diarrhoea among which Rotavirus causes 440,000 annual deaths in children <5 years of age worldwide. [5] Rotavirus is the leading cause of diarrhoea hospitalization among children.[6] Proper environmental sanitation is required not only to control infection, infestation but also to improve nutrition and prevent malnutrition.[7] With the above background the study was planned to determine the relationship between environmental sanitation and malnutrition.

Objectives:

1. To assess the nutritional status of 1-5 years aged children.
2. To determine the proportion of children growing under poor environmental condition
3. To determine the association between environmental sanitation and nutritional status.

Materials and methods:

Study design: It is an observational, Cross sectional study.

Study area: Rural field practice area, Tagore Medical College and Hospital Chennai.

Sample Size (n): 153 [obtained by using the formula $4pq/d^2$, where $p=66.5^8$, q=33.5,d=9,non-response rate=20%, the required sample size came as 120, since only 153 eligible children were present, all were included in the study.

Study Population:

Inclusion Criteria:Children aged between 1-5 years , who are resident of rural field practice area with either of the parent/Care giver consented to participate their child and also accepts to give necessary information for the study, in response to a pre-validated questionnaire

Exclusion Criteria: Those Children and/or caregiver who were not at home during the visit, were excluded

Sampling method:

After the consent from the parent/caregiver of the children,the study was conducted among the eligible participants. Rural field practice area of the private college, comprised of 7 villages. Out of 7 villages under rural field practice area, 3 villages were selected by **Simple Random** sampling method, using the lottery method. All the eligible children were included in the study. Weight and Height were measured using standard procedures and WHO growth standards was used to assess their nutritional status. Children was considered to be under nourished (based on Z-score values in growth chart) if, he/she have values plotted in the growth chart, as follows

Weight for age < -2SD = Underweight
Height for age < -2SD = Stunting
Weight for height < -2SD = Wasting.

Anthropometric assessment:

***Weight, Height and BMI assessment*:** Weight was measured with Tarring weighing scale and was recorded to nearest 0.1 kg. Height was measured with standard inch tape and was recorded to the last completed 0.1 cm.

The mothers were enquired about the environmental sanitation, using a content validated questionnaire. The questionnaire contained 10 questions, each correct answer was given a score of 1 and wrong answer was given a score of 0
Score < 5 = Poor environmental sanitation

Score ≥ 5 = Good environmental sanitation

The significance of association between nutritional status and environmental sanitation is determined by using chi square test, p value of <0.05 is considered to be statistically significant.

Multivariate logistic regression was carried out to determine the influence of various known factors on nutritional status. The factors such as exclusive breast feeding, socio-economic status, birth weight, pre-term and adolescent pregnancy were considered to be the influencing factors.

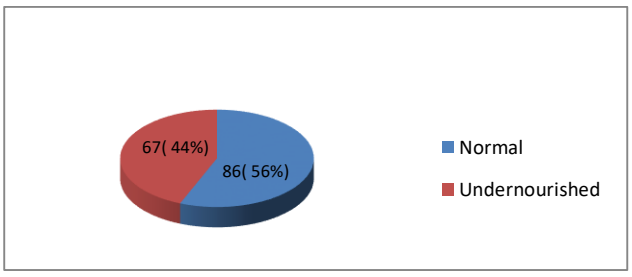
Results:

Out of 153 children, majority of them (77%) were aged between 2-5 years, while, 23% were in the age group of < 2 years. The study comprised more than half of the participants as boys (56.8%) and the remaining were girls (43.2%). Most of them belonged to class III and above socio-economic status, followed by class II (33%) and class I (17%) respectively, classified according to Modified kuppusamy scale classification(for socio-economic status). Classifying them based on the religion showed that, around 92% of them were Hindus, followed by Christians (5.8%) and muslims (2.1%) respectively. [Table 1]

Table 1: Distribution of study participants based on socio-demographic profile (n=153)

Socio demographic parameter	N(%)
Age	
<2 years	35(23)
2-5 years	118(77)
Sex	
Boys	87(56.8)
Girls	66(43.2)
Socio economic status	
Class I	17(11.1)
Class II	33(21.8)
Class III and above	103(67.1)
Religion	
Hindu	141(92.1)
Muslim	3(2.1)
Christian	9(5.8)

Figure 1: Distribution of study participants based on nutritional status (n=153)

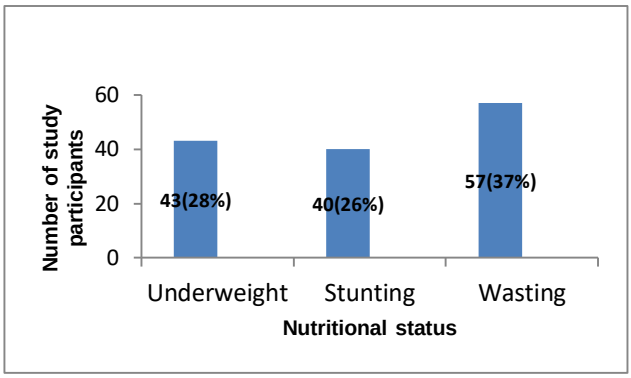


On assessment of nutritional status, based on WHO z score classification, the children were classified, either as normal or undernourished. It was found that, the

proportion of undernourished children was higher (56%) than normal children (44%) [Figure 1]

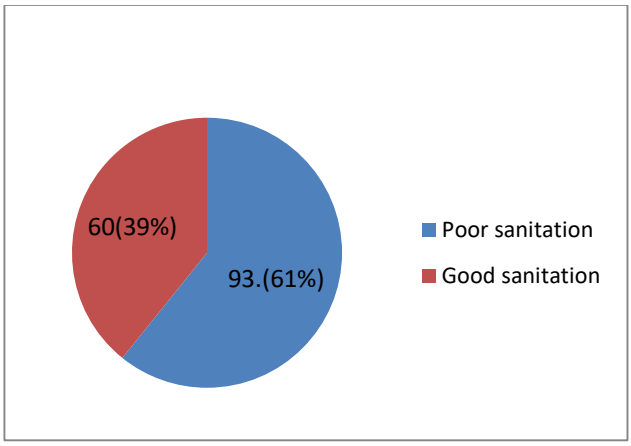
Later, based on further classification of the under nutrition, children were classified as underweight, wasted and stunted. It was found that, the proportion of children with wasting (37%) was higher than underweight (28%) and stunting (26%) respectively [Figure 2]

Figure 2: Profile of undernourished children (n=153)



Then based on the answers responded to the questionnaire on sanitary practices, the children were classified either to be grown under normal environmental sanitation or poor environmental sanitation. The proportion of children grown under poor environmental sanitation (61%) was found to be higher than those grown under normal (39%) conditions [Figure 3].

Figure 3: Distribution of study participants based on sanitation practices (n=153)



This, was followed by, the determination of association between sanitary practices and stunting, using the statistical test, chi-square test. It was found that stunting was more common among children grown under poor sanitary conditions than those grown under normal conditions. Among 40 stunted children, 31 children were grown under poor sanitary condition, while only 9 of them grown under good sanitary condition and it was found statistically significant, with a p value of 0.001 [Table 2]

The influence of various factors like, exclusive breast feeding, socio-economic status, birth weight, pre-term and adolescent pregnancy on under nutrition was determined using, multi variate logistic regression analysis. In spite of the controversial result related to exclusive breast feeding, which showed, exclusive breast feeding decreases the proportion of under nutrition, this association was not found to be statistically significant.

Table 2: Association between sanitation practice and stunting (n=153).

Sanitation Practices	Stunting	No Stunting	Total
Poor Sanitation practice	31	62	93
Good sanitation practice	9	51	60
Total	40	113	153

X^2 =6.18, p value =0.001 (significant)

Table 3: Distribution of study participants based on factors associated with under nutrition using multivariate logistic regression analysis (n=153)

Factors (n)	Frequency (%) of Under nutrition	Adjusted OR (C.I)	Significance
Exclusive Breast feeding (n=153)			
No	39(25.4%)	1	
Yes	47(30.7%)	1.532(0.753-3.115)	0.239
SES (n=153)			
Class I	6(3.9%)	0.923(0.566-1.507)	0.75
Class II	16(10.4%)	1.537(0.986-2.395)	0.061
Class III and above	64(41.8%)	1	
Birth weight(n=153)			
Normal	74(48.3%)	0.737(0.447-1.216)	0.232
Low birth weight	12(7.8%)	1	
Pre term (n=153)			
Yes	2(1.3%)	1	
No	84(54.9%)	2.377(0.261-21.613)	0.442
Adolescent pregnancy (n=153)			
Yes	21(87.5%)	**3.083(1.807-5.259)**	**0.0001***
No	65(42.4%)	1	

***statistically significant, p value < 0.05**

On interpreting the association between socio-economic status and under nutrition, it was found that, frequency of under nutrition was higher among participants belonging to Class III socio-economic status, than, those belonging to class I and class II socioeconomic status, however, this

association was also not found to be statistically significant. The proportion of undernourished children, was higher among the children born with normal birth weight compared to those children who had low birth weight, however, this was also found statistically, insignificant. The children who were born before reaching the term gestational age were only very few. The association between under nutrition and preterm was also not significant. The children whose mother was in adolescent pregnancy for the same child, was considered to be one of the influencer of nutritional status. It was found that, there was more number of undernourished children born to the mothers, who has conceived during her adolescent age-group, than those children born to the mothers after adolescence, and this was found statistically significant, having a p value of 0.001.[Table 3]

Discussion:

Malnutrition is one of the major public health problem of our country, especially contributing to the greater risk of under 5 mortality. Hence, nutritional assessment becomes a prime act in both prevention and cure of malnutrition. WHO growth chart, acting as a standard nutrtional assessment tool is validated for its global usage. This study, apart from determining the nutritional status of the under 5 children, have also, assessed the surrounding environmental sanitary conditions, under which, they were grown. The reason behind determining the environmental sanitation is that, there exists a strong interrelationship between surrounding environment and predisposition to infections, which in turn will lead to development of malnutrition. The present study was carried out using this WHO growth chart. Similarly, Yirgu F etal[10] in their study, used growth chart with z score deviations, to determine the nutrtitional status of their study participants. Among the under nutrition, the important indicator of chronic malnutrition is stunting. The chronic malnutrition will not only affect the physical health and development, but have an influence in mental development also. The present study findings, showed a higher proportion of wasting compared to underweight and stunting.

Olack B [11] et al found in his study, that, proportion of stunting was higher than underweight and wasting, this is in contrast to our present study findings. These variations could be due to the fact that the study was carried out in different geographical setting.

In an another study, conducted at different setting, the report, showed, higher proportion of stunted children, compared to other forms of under nutrition [12]

Environmental sanitation has an indirect influence on nutritional status. Poor sanitary conditions apart from predisposing to various communicable disease, also hinders the growth of the children, this was tried to get addressed through various sanitary campaigns and programmes, however lack of good sanitary conditions and practice still exists[13]

Present study findings, shows that, proportion of undernourished children was high among those grown under poor sanitary conditions and it was found statistically significant, this gives the inference that improving the environmental sanitation, improves the nutritional status. Similar to this, Routray et al [14,15] also declared in their study that, there is a improvement of nutritional status with the sanitary improvement, hence, effort should be taken in every mode to improve the environmental sanitation.

Conclusion:

In spite of the constant improvement and investments in improving the nutritional status of the children, through nutritional supplementation, nutritional surveillance and nutritional monitoring, in addition to the immunization activities, the malnutrition has not come to the end. The present study clearly, clarifies the association between nutritional status and sanitation. Thus simultaneous improvement of sanitation, will not only prevent the communicable diseases, but also helps in long term towards the healthy life of the individual. Enhanced IEC activities to all the age group to all the individuals should be carried out pertaining to the adverse effects of environmental sanitation.

Acknowledgment

Authors would like to thank the village leader and the study participants for co-operating in smooth conduction of the study

Ethical approval: The study was approved by Institutional ethical committee

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Conflict of Interest: None
Source of funding support: Nil

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 90-93**

Knowledge, Attitude and Practice regarding organ donation and transplantation among arts college students

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Background: In the modern world, organ transplantation is considered as a major treatment option for patients with end stage organ failure. The Indian government is being supported by several Non-Governmental Organisations (NGOs) to promote good systems to encourage organ donation to meet the ever rising demands. Still there is shortage of organs. This is mainly attributed to the lack of awareness and knowledge among people, superstitions and misunderstandings regarding the process of organ donation. Since college students make up majority of the future population, it is important to assess their knowledge and attitude towards organ donation for further improvements. **Aim:** To assess the knowledge, attitude and practice of arts college students regarding organ donation, and determine the obstacles preventing students to become organ donors. **Methods:** A descriptive cross-sectional questionnaire based study was conducted at Government Arts College, Coimbatore. Questionnaire had about 15 questions based on the knowledge of Organ Donation, 10 questions towards attitude and 5 questions for practice. A total of 209 undergraduate students were recruited during the study period of 1 month. **Results:** Among 209 respondents, 59.3% had average knowledge about organ donation. Knowledge of girls about organ donation was found to be better than the boys (p value< 0.0001) and the attitude of students aged more than 20 was found to be better than the students aged less than 20 (p value< 0.049). Surprisingly, 30.1% of the students believe that their body should remain intact after death highlighting the influence of superstitions in students becoming voluntary organ donors. **Conclusion:** One person can save almost 8 individual lives if they donate their organs after death. Hence, it becomes all the more essential to improve the knowledge and attitude by implementing targeted awareness programs to encourage organ donation.

Key-words: Organ Donation, Arts college students, Knowledge, Attitude.

INTRODUCTION

Organ donation is when a person allows his organ to be transplanted or be used for research purposes with his consent while he is alive, or after death with due permission from his next of kin.[1] In the modern world, organ transplantation is considered as a major treatment option for patients with end stage organ failure. There are three different ways of donating an organ, namely, donation after brain stem death, donation after cardiac death and live organ donation. [2] A very small number of organs and tissues can be donated during life and after a natural death, whereas about 37 different organs can be donated after brain death. [3] The demand for organs in India is increasing every minute. The government is being supported by several Non-Governmental Organisations (NGOs) to promote good systems to encourage organ donation to meet these ever rising demands. Still there is shortage of organs. This is mainly attributed to the lack of awareness and knowledge among people, superstitions and misunderstandings regarding the processes involved in organ retrieval and transport, religious and cultural beliefs.[4] All these leads to hesitancy in signing an organ donation form. It is vital to know that, in India, organ failure claims about 6 lakh lives per annum and about 1.4 lakh accident victims are pronounced brain dead per annum, yet, organs from mere 120 people are consented to be retrieved which makes the number of donors per million population to be 0.08. [5] This number is very less considering the fact that India is the world's second most populous country. According to an analysis done by the U.S. Agency for Healthcare Research and Quality (AHRQ), people often lack the knowledge they require to make an informed decision about donating a family member's organs nor do they have a clear understanding of the donation process. [6] Since fewer studies have been conducted among college students, this study aims to do that.

OBJECTIVES

1. To analyze the knowledge, attitude and practice about organ donation among arts college students and its association with the demographic profile of the students.
2. To determine the source of information about organ donation and transplantation among study sample.
3. To determine the main obstacle preventing the study population from being potential donors.

MATERIALS AND METHODS

Study design and setting:

A descriptive cross-sectional questionnaire based study was conducted at the Government Arts and Science College, Coimbatore within a period of one month.

Sample size:

The sample size calculated was 197, using the formula $4pq/d^2$, where p is the prevalence (67%) [9], the sample size of 210 was taken. Simple random sampling was done to select the students.

Selection Criteria:

Students who consented to fill the questionnaire were included in the study and one incomplete questionnaire was excluded.

Data Collection:

The Institutional Ethical Committee approval was obtained. The permission from the Principal of Government Arts College, Coimbatore was also obtained. The data were collected from the subjects using a self-administered, semi structured questionnaire which contained a total of 30 questions with the following sections –

1) Socio-demographic details: Age, sex, year of study.
2) Knowledge: 15 questions
3) Attitude: 10 questions.
4) Practice: 5 questions.

Each right answer was given one point. The knowledge score of 0-5, 6-10 and >10 was considered poor, average and good respectively. Similarly, an attitude score of 0-5 and 6-10 was considered poor and good respectively.

Statistical Analysis:

The data were collected, tabulated and statistically analysed using SPSS software (version 20). The association between knowledge and attitude with that of age and gender was assessed using Chi-Square test. A p value < 0.05 was considered statistically significant.

RESULTS

Among 209 respondents, 41.1% of them were males, 58.9% of them were females. The mean age of the study participants were 21.4 ± 1.2 years. About 82.8% of students said that they are aware about the term organ donation. (Table 1)

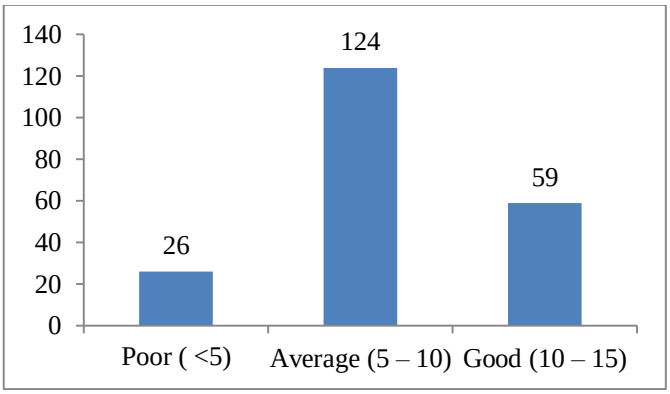
Knowledge:

Table 1 – Awareness about the term organ donation (n = 209)

Aware of the term Organ Donation	Frequency	Percentage
Yes	173	82.8
No	36	17.2

The knowledge of students regarding organ donation and transplantation is depicted in Figure 1. More than half of the study population (59.3%) had average knowledge about organ donation. Only 28.2% of students had good knowledge.

Figure 1 – Knowledge assessment (n=209)



Nearly 56.9% of the students did not know about the existence of an organ donor card and 46.9% of the students thought that eyes are the most transplanted organ as against kidney, which is the most transplanted organ. About 52.2% of the students felt that there are enough organs for those who are in need of an organ transplant. A significant association was found between knowledge score and gender. Females had good knowledge compared to males. (Table 2)

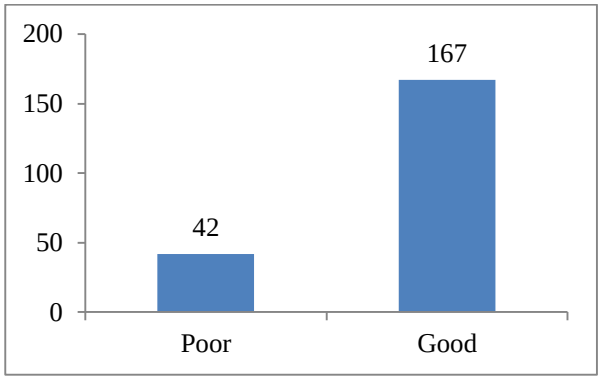
Table 2 – Knowledge score and gender. (n=209)

Gender	Knowledge Scores			Chi-square value = 18.046; df = 1; P value < 0.0001;
	Good	Average	Poor	
Males	12	57	17	
Females	47	67	9	
Total	59	124	26	209

Attitude:

After filling the questionnaire, 46.4% of them were interested in learning more about organ donation. Figure 2 depicts the attitude of students towards the concept of organ donation. About 80% of the study population showed good attitude.

Figure 2 – Attitude assessment. (n=209)



There was a significant association between attitude score and age. People above the age of 20 showed good attitudes compared to people below the age of 20. (Table 3)

Table 3 – Attitude score and age. (n= 209)

Age	Good Attitude	Poor Attitude	Chi-square value = 3.884; df = 1; P value = 0.049
<20 years	75	26	
>=20years	92	16	
Total	167	42	209

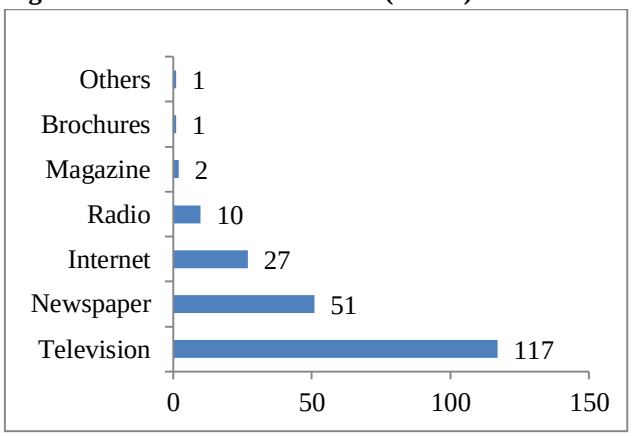
Practice:

Despite the good attitude, only 59.8% of the students were ready to pledge their organs after death. And none of the students have donated an organ before.

Source of information:

Mass media plays an important role in educating people about organ donation. About 56% of the students knew about organ donation by means of television. Nearly 24.4% and 12.9% of the students knew about organ donation by means of newspaper and internet respectively. (Figure 3)

Figure 3 – Source of information (n=209)



Hindrances to students becoming donors:

Thirty percent of the students believe that their body should remain intact after death. Nearly 16% students stated that their parents will not allow for organ donation. Lack of knowledge was stated as one of the major reasons for reluctance in becoming voluntary organ donors by 46.4% of students, followed by socio-cultural factors and fear of disfigurement of body by 19.6% each. This is depicted in Table 4.

Table 4 – Reasons for organ donation not being popular in India. (n=209)

Reasons	Frequency	Percentage
Inconvenience to relatives	30	14.4
Socio-cultural factors	41	19.6
Lack of knowledge	97	46.4
Fear of disfigurement of dead body	41	19.6

DISCUSSION

Today, in India the demand for organs for transplantation far exceed the supply. The modern technologies and surgical methods continue to improve chances of survival and improved quality of life for the recipient. However this rapid improvement pertaining to transplantation of organs has not been accompanied by a parallel increase in the availability of donor organs. The success of organ donation in any region is dependent on the knowledge and attitude of the people residing in that region towards organ donation. Hence, in the present study, we have assessed the knowledge of college students regarding organ donation.

This cross-sectional study was conducted among 209 participants of Government Arts and Science College, Coimbatore. In this study it was interesting to see that majority of the participants (82.8 %) were aware of the term organ donation. The response to the questionnaire provided us with valuable insight into the understanding of the participants about organ donation. In the present study most of the participants were between the age of 18 to 27. Of the 209 participants, 59.3 % had average knowledge, 28.2 % had good knowledge about organ donation. This was in accordance to the study conducted by Vijayakumar M B [7] et al in which 57 % had average knowledge and 43 % had good knowledge. Nearly 80 % of the study population had good attitude and 20 % had poor attitude regarding organ donation. When questioned about the source of knowledge 56 % of the study population stated that they heard about organ donation through television, followed by 24.4 % from newspaper and 12.8 % from the internet. This is similar to the study conducted by Adeena Shahib [10] et al where 46.5 % acquired knowledge from television. Regarding their religion's view about organ donation, 76.6 % were that their religion permitted organ donation and 24.4 % were unaware if their religion permitted organ donation. This was in contrast with the study conducted by Sahan B.N [4] et al in which 62.4 % were aware and 50.3 % were not aware of their religion's view on organ donation. This statistics is important because, though no religion considers organ donation as unethical there is a widespread misconception that organ donation is an anti-religious thing to do. If this misconception is avoided, the number of people willing to donate their organs will surely rise. About 46.6 % of the participants were aware of the process of live donation. This is in contrast to the study conducted by Vaishaly K.Bharambe [9] et al in which 24.4 % of the respondents were aware of live organ donation. In our study, 43.5 % of the participants had knowledge regarding organ donor card which is in contrast with the study conducted by Janapriya Sugumar [3] et al where only 11.42 % of the study population were aware of the donor card. About 46.9 % of the participants thought that eye was the most transplanted organ whereas only 42.1 % answered correctly that kidney is the most transplanted organ. This is in accordance with the study conducted by Vaishaly K.Bharambe [9] et al, in which 78 % stated eye, and 53.7% stated kidney as the most transplanted organ. Regarding the need for effective laws to govern the process of organ donation, 59.3 % of the participants stated that there is a need for an effective law and 18.2 % felt there is no need. This is in contrast to the study conducted by Sucharitha [8] et al in which 76 % agreed and 7 % disagreed. The study found that the undergraduate students are having average to good knowledge regarding organ donation. The implications of this study are to emphasise the need to educate students about organ donation. This can be accomplished by the various campaigns like short films, advertisements, celebrity endorsement and panel discussion utilising experts in that field and inculcating in their curriculum regarding its importance.

CONCLUSION

The study found that though there is above average knowledge and good attitude towards organ donation and transplantation among most of the study population, when it comes to practice it is still limited by various reasons such as parents' acceptance, religious beliefs, superstitions and myths. Many of these can be reduced by using proper awareness creating strategies targeted at specific groups of people. Since lack of knowledge was stated as one of the main reasons for organ donation not being popular among college students, it is essential to incorporate this concept in the curriculum of all fields of education to ensure adequate awareness among every spectrum of students. This becomes very essential because there is an ever growing demand for organs in India, which is not being met by the available donors.

ACKNOWLEDGEMENT

We thank the Principal, Government Arts College, Coimbatore, who gave us permission to conduct the study in their college. We also thank all the study participants who willingly participated in the study.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 94-97**

COVERAGE OF SCREENING AND DETECTION GAP FOR HYPERTENSION IN RURAL PUDUCHERRY, SOUTH INDIA: A CROSS-SECTIONAL STUDY

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Introduction: Early diagnosis & screening of blood pressure can reduce the risk of further complications associated with hypertension. Hence, the current study was conducted to assess the detection gap in hypertension compared to regional estimates. **Objectives:** Among the adults in the selected rural areas of Puducherry district 1.To estimate the detection gap in hypertension compared to regional estimates 2.To determine the proportion not been screened for hypertension in past one year3.To assess the socio-demographic factors associated with not being screened for hypertension.**Methodology:** An explanatory mixed methods study was conducted in the selected rural areas of Puducherry. House to house enumeration survey was conducted in the purposively selected rural areas among 1028 individuals during September-2016 to February-2017. Information on hypertension status, status of screening in last one year was collected from individuals aged more than eighteen years. Data was entered in Epidata 3.1 and analyzed using Stata 12 software. Percentages with 95% CI were used to estimate the detection gap in hypertension. Generalized Linear Models were used to assess the individual level characteristics associated with not screening for hypertension. FGD was used as a method for extracting descriptive qualitative information. .**Results:** Of the total 1844 enumerated individuals, 1423 (78.6%) were above 18 years of age. The detection gap for hypertension was 65.8% (95%CI=60.3%-71.2%). Of the eligible individuals for screening, 81.1% (95%CI-79.0%-83.2%) were not screened for hypertension in last one year. Age less than thirty [PR- 1.19 (1.06 - 1.35)] was independently associated with not getting screened for hypertension. **Conclusion:** With high detection gap and low utilization of screening, there is need for developing innovative strategies like task shifting, ICT utilization for screening and targeted screening.

Key-words: Coverage; screening; detection gap; hypertension, South India

BACKGROUND:

WHO describes hypertension as a "Silent, invisible killer" affecting one billion population worldwide, leading to heart attacks and strokes and there by killing 9.4 million people around the world. When high income counties have started reducing the burden of hypertension in their population, many developing countries have been witnessing increased burden of cardiovascular diseases due to undiagnosed and uncontrolled hypertension.[1]In India 33% of the urban population and 25% of the rural population are hypertensives, out of 42% of urban and 25% rural population are aware of their hypertensive status.[2]With hypertensive causing 15.6% of deaths and 7.8% of DALY(Disability adjusted Life years) in India.[3]

Hypertension rarely causes symptoms in its early stages so many people go undiagnosed and they later develop complications of cardiovascular diseases and sometimes eventually death. Recent studies have shown that over half of the hypertensive population in India are unaware about their hypertensive status and out of those who are aware of their blood pressure status only 60-80% get treated of those a huge number of population do not have controlled Blood pressure.[4]Thus the point of origin for uncontrolled blood pressure and its complications start with the undiagnosed blood pressure.

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7) recommends a annual screening for normotensive adults.[5]Though hypertension is causing higher mortality through its complications the risk can be effectively prevented through appropriate screening strategies and filling up the detection gaps.

With the World Hypertension League(WHL) celebrating the 2018 world hypertension day with the theme "know your numbers" with a goal of increasing the awareness of blood pressure among the population, there are very few studies in the country that access the screening coverage among the population. Thus by accessing the screening

coverage among the population we could able to know the awareness of hypertension among the population and apply appropriate strategies to reduce the burden.

OBJECTIVES: Among the adults (>18 years) in the selected rural areas of Puducherry district during September 2016- February 2017

1. To estimate the detection gap in hypertension compared to regional estimates
2. To determine the proportion not been screened for hypertension in past one year
3. To assess the socio-demographic factors associated with not being screened for hypertension.

METHODOLOGY:

The study was a cross-sectional analytical study conducted among the adult population in rural Puducherry. Four villages (Bahour, Kuruvinatham, Pillaiyarkuppam and Irulansandai) located closer to the Mahatma Gandhi medical college and research institute were selected conveniently, all the houses in selected villages were enumerated and all the individuals of more than age eighteen years were included. The sample size was calculated using n-master software 2.0 version as 1028 assuming 70% not screened, 5% relative precision, 95% CI and design effect of 1.5.

A semi-structured interview using electronic form epicollect v5.0 was used and variables such us socio-demographic factors(age, gender, education, occupation, socio-economic status, martial status, caste), presence of hypertension and screened for hypertension in the last one year were captured.

*Procedure:*Each house in the selected village were enumerated and Interviews were conducted by trained MBBS students under the supervision of faculties and post graduates, among those individuals who are available and information of those are not available was extracted from the available individuals. If the house is locked during the first visit one more attempt was made to cover the whole population.

Data entry and Analysis: Data was entered using epidata v3.0 and was analysed using STATA 12 software. Percentage was used to summarize the categorical variables. Detection gap was calculated using the following formula

$$Detectiongap = (Expected - selfreported)X100/\text{Expected}$$

95% confidence interval was calculated for all outcomes of interest and generalized Linear Models adjusting for clustering at village was used to assess the independent association. Prevalence Ratio (PR) with 95% confidence interval was used to express the association in both bivariate and multivariate model.

RESULTS:

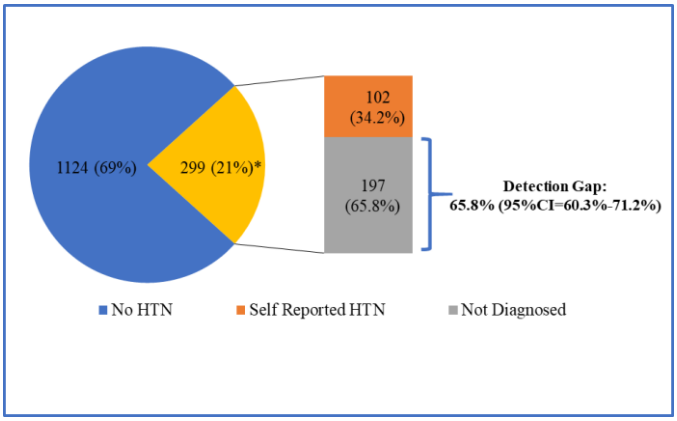
TABLE 1.Socio-demographic factors of adults in the selected rural areas of Puducherry, September-2016 to February-2017, N=1423

Socio-demographic Characteristics	Frequency (%)
Age (in years)	
18-29	399 (28.0)
30-44	437 (30.7)
45-59	343 (24.1)
≥60	244 (17.2)
GENDER	
Male	658 (46.2)
Female	765 (53.8)
EDUCATION	
No formal Education	402 (28.3)
Primary	190 (13.4)
Secondary	302 (21.0)
Higher Secondary	157 (11.1)
Intermediate/Diploma	114 (8.0)
Graduate and above	258 (18.2)
OCCUPATION	
Unemployed/Housewife	749 (52.7)
Unskilled	279 (19.6)
Semiskilled	138 (9.7)
Skilled	130 (9.1)
Semi-professional and Professional	127 (8.9)
MARITAL STATUS	
Never Married	267 (18.8)
Married	1093 (76.8)
Widow/Separated	63 (4.4)
SOCIO-ECONOMIC STATUS	
Upper	147 (12.6)
Upper Middle	178 (15.3)
Middle	315 (27.0)
Lower Middle	325 (27.9)
Lower	300 (17.2)
CASTE	
Forward Caste	3 (0.3)
Backward Caste	196 (16.8)
Most Backward Caste	107 (9.2)
Scheduled Caste	861 (73.8)
VILLAGE	
Pillayarkuppam	397 (27.9)
Bahourpet	517 (36.3)
Kuruvinatham	299 (18.0)
Irulansandhai	253 (17.8)

Table-2: Socio-demographic factors associated with not getting screened for Hypertension among adults in rural areas of Puducherry, N=1423

Characteristic	Total	Not Screened, n (%)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
Overall	**1321**	**1082 (81.9, 95%CI-79.7-83.9)**		
Age (in years)				
18-29	395	359 (90.9)	1.22 (1.13 - 1.34)	**1.19 (1.06 - 1.35)**
30-44	418	340 (81.3)	1.10 (1.01 - 1.21)	1.11 (0.98 - 1.25)
45-59	301	230 (76.4)	1.03 (0.93 - 1.15)	1.03 (0.92 - 1.15)
≥60	207	153 (73.9)	1	1
Gender				
Male	609	497 (81.6)	1	
Female	712	585 (82.2)	1.01 (0.96 – 1.06)	
Marital Status				
Never Married	263	245 (93.6)	1.39 (1.14 – 1.71)	1.39 (0.87 - 2.21)
Married	1010	805 (79.7)	1.19 (0.97 – 1.46)	1.30 (0.81 - 2.08)
Widow	48	32 (66.7)	1	1
Education				
NFE	367	308 (83.9)	1.16 (1.05 - 1.29)	1.14 (0.95 - 1.38)
Primary	165	119 (72.1)	1	1
Secondary	276	216 (78.3)	1.08 (0.96 - 1.21)	1.01 (0.91 - 1.12)
Higher Secondary	150	124 (82.7)	1.14 (1.02 - 1.29)	0.98 (0.84 - 1.17)
Intermediate	112	89 (79.5)	1.01 (0.96 - 1.29)	0.97 (0.80 - 1.16)
> Graduate	251	226 (90.0)	1.25 (1.13 - 1.38)	1.02 (0.89 - 1.16)
Occupation				
Unemployed	696	573 (82.3)	1.07 (0.99 - 1.16)	0.98 (0.92 - 1.06)
Unskilled	260	199 (76.5)	1	1
Semiskilled	124	108 (87.1)	1.13 (1.03 - 1.25)	1.02 (0.98 - 1.08)
Skilled	120	96 (80.0)	1.04 (0.93 - 1.17)	0.98 (0.95 - 1.01)
Semi-professional	121	106 (87.6)	1.14 (1.04 – 1.25)	1.02 (0.97 - 1.08)
SES				
Upper	134	121 (90.3)	1.06 (0.98 - 1.16)	
Upper Middle	175	150 (85.7)	1.01 (0.93 - 1.10)	
Middle	288	241 (83.7)	0.99 (0.91 – 1.07)	
Lower Middle	299	253 (84.6)	1.00 (0.92 – 1.08)	
Lower	187	158 (84.5)	1	
Caste				
FC and BC	186	146 (78.5)	1.07 (0.93 - 1.23)	1.06 (0.95 - 1.17)
MBC	101	74 (73.3)	1	1
Scheduled Caste	798	705 (88.4)	1.20 (1.06 - 1.36)	1.17 (0.99 - 1.38)

Figure-1: Pie-chart depicting detection gap in hypertension among adults of selected rural areas of Puducherry, September-2016 to February-2017, N=1423



In total, 581 houses were included with 1844 individualsof which 1423 individuals were more than 18 years, among which 658(46.2%) are males and 765(53.8%) were females and the mean age of the population was 41.8years.The demographic details are represented in Table 1.Majority 402(28.3%) of the population had no formal education and Nearly half 749(52.7%) of the population was unemployed or being a housewife.Most of people the 861(73.8%) belonged to scheduled caste. The Prevalence of self-reported hypertension was only 102, 7.2%(95%CI-5.8-8.6).

The detection gap of hypertension among the adults was found to be 65.8%(95%CI-60.3%-71.2%) as depicted in Figure 1.

In the association between sociodemographic factors and not getting screened for hypertension, Higher number of people from Age group 18-29, graduates, semi-professional and upper socio-economic class were not getting screened but none of them were significant in univariate analysis. (Table 2) After adjustment for the confounding factors such as gender and socio-economic class age group alone came out to be significant.

DISCUSSION:

The self-reported hypertension in our study was 7.2%. This was higher when compared to a study conducted by ICMR-INDIAB among three regions Tamil Nadu, Maharashtra ,Jharkhand and Chandigarh found self-reported hypertension was 5.5%.,with highest prevalence was found in Tamil Nadu (27.6%)and lowest self-

reported was Jharkhand(3.5%)[6]The screening coverage in the present study was 18.1% which was lower than compared to the previous study done in the rural region of Himachal Pradesh where they found the screening coverage as 24.9%.[7]

One of our findings in the study was the significant low level of screening rates among the people of age group 18-25. This shows that there is a low level of awareness among the youth population regarding the hypertension screening. This can be compared with the study done in Pakistan to see the blood pressure screening and its determinants and found a marked difference in the level of screening among males and females and low level of screening was found among the age group of 18-25years, illiterates and low and middle socio-economic status versus High socio economic status.[8]Another study in Nigeria compared the various socio-demographic factors with the various screening for CVD risk factors. They found that age group from 18-24years had lowest prevalence of screening for hypertension and also found that Male had higher prevalence of screening for hypertension than females this can be compared with our study were both men and women have nearly equal level of screening awareness, Another finding from the Nigeria study is that the hypertension screening was low among the people with no formal education and primary education.[9]Thus this shows that irrespective of the geographical regions hypertension screening is low among the youth population in the developing and underdeveloped countries and there is a need to increase the screening strategies among the youth population.

CONCLUSION:

Researchers have been keep on warning that with the second most populated country in the world India can soon become the hypertensive capital of the world.[10]Among the rural population nearly seven out of ten hypertensives are not been detected and very low uptake of screening for hypertension was found across all groups especially among the youth population.Thus there is a need to generate demand for screening by social mobilization. Opportunistic screening strategy can be supplemented with targeted screening of high yielding groups and task shifting for screening using peripheral health workers and community volunteers needs to be explored, such that effective screening can be maximized.

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Conflict of Interest: None

Source of funding support: Nil

NJRCM: www.commedjournal.in

Special Issue on Environmental Diseases (SRM-5th International Management Development Programme)
ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 98-102**

ASSESSMENT OF STRESS AMONG HIGHER SECONDARY SCHOOL STUDENTS OF SOUTH TAMIL NADU- A CROSS-SECTIONAL STUDY

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Introduction: Stress is a negative emotional, cognitive, behavioral and physiological process that occurs as a person tries to adjust to or deal with stressors. The school children especially the adolescent age are under great stress due to their transient age, educational achievements, expectation over them of the family and society. This study was an attempt to assess the prevalence of stress and also its associated risk factors among higher secondary school children in South Tamil Nadu. **Materials and methods**: A total of 2321 students from class XI and XII of 27 schools under the Government, Government aided and private establishment in the 9 blocks of kanyakumari district of Tamil Nadu were selected using Multistage stratified sampling. The information on socio demographic data were obtained with a pretested questionnaire and the response for the level of stress questions were obtained with the help of validated General Health Questionnaire (GHQ 12). The scoring was done using the Likert scale. The data was analysed using SPSS 16 trial version. The statistical test of Chi square and t test was applied. **Results:** The mean (SD) age of study participants was 16.47 (0.61) yrs. Males were 51.2% and females were 48.8%. About 60% of participants had no to mild stress, 30.8% had mild to moderate stress and 9.6% had moderate to severe stress. The mean total stress score obtained by the study participants was 12.19 (7.8). The mean stress score of subjects in English medium (12.60) was higher than Tamil medium (11.78) which was statistically significant ($p<0.05$). **Conclusion**: The present study showed that prevalence of stress was high among the higher secondary school students, although the average total mean score was in the mild to moderate stress range. The stress level in the study participants had a significant association with age, type of school, medium of instruction, type of family, fathers' occupation and number of siblings

Key-words: Stress, higher secondary school students, GHQ

Background-

Stress is our bodys' way of responding to any kind of demand. It can be caused by both good and bad experience. Stress affects most people in some way. Acute stress leads to rapid changes throughout the body. The relationship between psychosocial stressors and disease is affected by the nature, number and persistence of the stressors as well as Biological vulnerability, psychosocial resources and learned pattern of coping.[1] The amount of stress and their coping strategy are very essential in the school age group especially the adolescent child. The expectations of the parents, society, peer group along with availability of good social support to the student in times of need are essential contributor for stress. The national crime records bureau of India has positioned Tamil Nadu with highest suicide rate, emphasizing the need to understand the pattern of stress and various factors contributing to it among the higher secondary school students.[2]

Aims and Objectives- To estimate the prevalence of stress among higher secondary school students. To estimate the prevalence of associated risk factors of stress among higher secondary school students.

Materials and Methods-

The present study was a descriptive cross-sectional study. The sample was selected by multistage stratified sampling method. A total of 27 schools were selected from the nine blocks of kanyakumari district (one each of Govt., Govt aided and private school per block). The sample size was calculated based on the study done by Kumar K S and Akoijam B S on the stress among higher secondary school students in Imphal, Manipur that reported a prevalence of 21.1%. The minimal sample required was 1450 participants. With 95% confidence interval, 8%

relative precision and non response rate of 10%, sample size of 2321 participants was arrived, using the formula $n= \frac{4pq}{d^2}$. A total of 2321 students belonging to the class XI and class XII were selected. The school students were briefly explained about the study. Each question had 4 responses to assess the level of stress among the students. The scoring was done based on the Likert scale. The data on socio demographic profile and response of general health questions were obtained from the students by using validated GHQ- 12 questionnaire. The prior permission to conduct the study was obtained from district educational officer, the principal of each school and approval of the Institutional Ethics Committee was obtained. The informed consent was obtained from each student before self administration of questionnaire.

Operational Definitions-

Stress: Stress is a negative emotional, cognitive, behavioural and physiological process that occurs as a person tries to adjust to or deal with stressors[3]

Stressors: Physical, psychological or social force that puts real or perceived demands on the body, emotions, mind or spirit of an individual.

The data collected was entered in MS Excel and analysed using SPSS 16 trial version. The statistical test of Chi square and t test was applied.

Results-

The sample comprised of 2321 subjects belonging to XIth and XIIth class with a mean age of 16.47(0.61). The proportion of males (51.2%) was slightly more than the females. Half of the study population (50%) belonged to Christianity. The sample population was nearly equally distributed among Govt school (31.2%), Govt aided school (33.5 %) and private school (35.3%) The study sample were nearly equally distributed between Tamil (49.8%) and English(50.2%) medium of instruction. Around fifty percent (50.2%) belonged to joint family and the rest belonged to nuclear family. Close to fifty percent of students' father did skilled job and around 7% of student's father were unemployed.

Table 2 showed the frequency distribution of study population based on level of stress. Based on Likert scoring for the response to the GHQ 12 questionnaire, 59.6% of sample had no to mild stress, 30.8% had mild to moderate stress and 9.6% had moderate to severe stress. The mean (SD) score obtained by the study population was 12.19 (7.86).

Table 3 showed the association of socioeconomic and educational factors with the level of stress. The prevalence of mild to moderate stress was seen to be higher (36.8%) in the age of 17 yrs and moderate to severe stress was 25.6% in the age of 15 yrs, which was found to be statistically significant ($p<0.05$). Significantly more number of students in Govt. aided school (38.5%) showed mild to moderate stress. Grade 2 stress was significantly higher in English medium school students at 38.7% prevalence. Around thirty five percent (35.7%) and 17.4% prevalence of mild to moderate and moderate to severe stress respectively was seen among students belonging to nuclear family. The higher secondary students of unemployed father had 37.9% prevalence of mild to moderate stress whereas severe stress was more in students of parents involved in skilled job who had a prevalence of 16.6%. The students having two or more sibling (37.4% and 12%) significantly showed greater among grade 2 and grade 3 stress levels respectively. Gender differences and Religion had no significant association with the level of stress.

Table 1.Distribution of study population based on socio demographic profile (N=2321)

S.No	Variable	Category	Frequency (%)
1	Sex	Male	1189(51.2)
		Female	1132(48.8)
2	Religion	Hindu	1104(47.6)
		Christian	1161(50.0)
		Muslim	56(2.4)
3	Type of school	Govt	724(31.2)
		Govt aided	777(33.5)
		Private	820(35.3)
4	Class	XI	1067(46)
		XII	1254(54)
4	Medium of instruction	Tamil	1157(49.8)
		English	1164(50.2)
5	Type of family	Nuclear	1143(49.2)
		Joint	1178(50.2)
6	Father occupation	Unemployed	161(6.9)
		Unskilled	1013(43.7)
		Skilled	1147(49.4)

Table 2.Frequency distribution of study population based on level of stress

S.No	Level Of Stress(total score)	Frequency (%)
1	No to mild (0-11)	1272(54.8)
2	Mild to moderate(12-23)	791(34.1)
3	Moderate to severe (24-36)	258(11.1)

Table 4 showed that the difference in mean score of 15yrs old participants (15.73) was significantly

Table 3 .Association between level of stress and sociodemographic factors (N= 2321)

Sl. No	Variable	Category	Level of stress			Total	Chi square value	P Value
			Grade 1 (N=1272)	Grade 2 (N=791)	Grade 3 (N=258)			
1	Age (Yrs)	15	53(42.4)	40(32)	32(25.6)	125	49.7	0
		16	701(54.8)	414(32.4)	164(12.8)	1279		
		17	518(56.5)	337(36.8)	62(6.8)	917		
2	Sex	Male	656(55.2)	397(33.4)	136(11.4)	1189	0.63	0.73
		Female	616(54.4)	394(34.8)	122(10.8)	1132		
3	Religion	Hindu	630(57.1)	364(33)	110(10)	1104	5.9	0.21
		Christian	612(52.7)	406(35)	143(12.3)	1161		
		Muslim	30(53.6)	21(37.5)	5*(8.9)	56		
4	Type of School	Govt	422(58.3)	208(28.7)	94(13)	724	19.92	0
		Govt. Aided	411(52.9)	299(38.5)	67(8.6)	777		
		Private	439(53.5)	284(34.6)	97(11.8)	820		
5	Medium of study	Tamil	682(58.9)	341(29.5)	134(11.6)	1157	22.04	0
		English	590(50.7)	450(38.7)	124(10.7)	1164		
6	Class	XI	580(54.4)	354(33.2)	133(12.5)	1067	3.77	0.15
		XII	692(55.2)	437(34.8)	125(10)	1254		
7	Type of Family	Joint	736(62.5)	383(32.5)	59(5)	1178	107.7	0
		Nuclear	536(46.9)	408(35.7)	199(17.4)	1143		
8	Fathers occupation	Unemployed	81(50.3)	61(37.9)	19(11.8)	161	95	0
		Unskilled	644(63.6)	320(31.6)	49(4.8)	1013		
		Skilled	547(47.7)	410(35.7)	190(16.6)	1147		
9	Siblings	No siblings	84(51.9)	62(38.3)	16(9.9)	162	12.79	0.01
		One Siblings	757(57.9)	410(31.4)	140(10.7)	1307		
		Two and more	431(50.6)	319(37.4)	102(12)	852		

*fisher exact test applied **values in the parenthesis to the right indicates row percentage

Table 4 Cross tabulation of association of variables with participant's mean scores (N = 2321)

Sl. No	Variable	Category	N	Mean (SD)	t Value	p Value
1	Age (yrs)	15	125	15.73(8.99)	4.5	0
		16	1279	12.23(8.14)		
2	Age (yrs)	15	125	15.73(8.99)	5.78	0
		17	917	11.65(7.14)		
3	Religion	Hindu	1104	11.62(7.65)	3.57	0
		Christian	1161	12.79(7.99)		
4	Family type	Nuclear	1143	13.88(8.63)	10.43	0
		Joint	1178	10.55(6.60)		
5	Father occupation	Unskilled	1013	10.21(6.65)	11.12	0
		Skilled	1147	13.87(8.39)		
6	Medium of instruction	Tamil	1157	11.78(7.92)	2.52	0.01
		English	1164	12.60(7.78)		

higher than the 16 yrs old participants (12.23). Similarly significant higher difference in mean score of 15yrs from 17yrs old was seen. With regard to religion, participants belonging to Christianity had a mean score of 12.79 in comparison to Hindu religion students (11.62), which was statistically significant ($p<0.05$). The students in nuclear family had 13.88 mean stress score and joint family had 10.55.Thedifferenceinmeanwasstatisticallysignificant. Comparing the mean stress scores of study participants based on their fathers' occupation, students of skilled job parents had 13.87 score to 10.21 score of unskilled parents. The difference was statistically significant. Significantly higher stress score was seen in English medium students (12.60) in comparison to Tamil medium students (11.78). By applying logistic regression, the study finding revealed that every one unit increase in age score, we expect a 0.16 decrease in the log- odds of stress. For every unit increase in occupation score, there will be 0.05increase in the log- odds of stress. For every one unit increase in sibling score, there will be 0.10increase in the log- odds of stress.

The average score of the GHQ-12 was 12.2 (SD=0.95) which was close to the cut off point of 12. The highest average score were for items 1, 6 and 8 which were more than 1.1. Of these items, the average score of item 1 was 1.16 (SD=0.92) as the highest indicating that majority of the respondents were unable to concentrate.

Discussion-

The study revealed an estimate of 45.2% prevalence of mild to severe stress among study population which was comparable to that reported (47 %) by Sandal R K et al., in a similar study setting in Chandigarh.[3] The study done by Jayanthi et al. in 2432 high school students in Tamil Nadu found 25.2 % prevalence of depression due to academic stress.[4] The study revealed that the majority of the students ((54.8%) had no to mild stress, which was in contrast to the study done by Manikandan K et al. on 350 adolescents of Madurai city that showed 82.58% had moderate stress.[5] Both male and female participants showed similar response to GHQ 12 questionnaire assessing level of stress, the finding of which was identical to the study done by Akande J A et al. in secondary school students.[6] But the study done by Rebellow et al. in adolescent children of Tiruchirapally found a significant difference in stress levels more among boys.[7] The religious background of the study participant had no significant relation on the level of stress in the present study. The finding was similar to that reported by Ading C E et al. in their study in University students of Malaysia which showed a p value>0.05.[8] A similar finding was also seen in the study done by Baqutayan in 218 bachelor's degree students. However the intrinsically religious students had lower stress levels than the extrinsically religious participants.[9] More than one third (38.5%) of the participants who studied in Govt Aided schools suffered mild to moderate stress. This finding was in contrast to the study done by Deb S et al. in private schools of Delhi, who showed a prevalence of 72%.[10] Similar finding was seen in the study done by Razia, which concluded that children of private schools had more stress than Govt school students.[11] In the present study, the level of stress in study participants was influenced by the medium of instruction in school which was shown to be statistically significant. This finding was comparable with the study by Hussain A et al. in 100 high school students of Delhi (mean score 22.44and16.90 respectively).[12] A study done by Rathore et al. concluded that English medium students suffered more stress than local medium students.[13] The study disclosed no significant association of higher and lower secondary students with grading of stress. However the study done by Sripongwiwat S et al. in northeast Thailand showed a lower stress level among older secondary students (mean= 111.92) in comparison to younger students (mean=103.37), which was statistically significant.[14] The present study inferred that the level of stress had significant association with type of family, which was contrary to the study done by Rebellow et al.[7] that showed no association. The present study showed a significant association between father's occupation and stress in children, which was similar to the study done by Saila T S et al. that showed a positive relationship between father's occupation and stress in students.[15] There was a significant association between the birth order of the student and the grading of stress, which was in contrast to the study done by Manikandan et al.[5] that had no relation between the two.

Conclusion-The present study showed that the prevalence of stress was high among the higher secondary school students. Although the total mean score of study participants falls in the mild to moderate stress range, yet the condition need to be addressed. The stress level in the study participants had a significant association with age, religion, type of school, medium of instruction, type of family, fathers' occupation and number of siblings.

Limitation-The response outcome of the GHQ 12 questionnaire need to be compared with quantitative assessment of stress level in the study population. The individual stressors were not identified using this tool

Recommendation-The mental health of school children must be addressed immediately with proper assessment and counseling. The stress in school adolescents must be alleviated by behavior change communication and coping strategies.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 103-106**

Assessment of Knowledge and Attitude on Biomedical waste management among nursing students

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Background: Health care waste being a potential source of various life threatening infections requires proper management of biomedical waste. Hence inadequate knowledge in handling of biomedical waste have significant impact not only for those involved in generation of such waste but also among the innocent general population**. Objective: 1.** To assess the knowledge and attitude on biomedical waste management among the nursing students **2.** To determine the effectiveness of educational intervention among the study participants**. Materials and methods:** The study was conducted among 100 nursing students during Jan-Feb 2018, in a private nursing college, Chennai. A training programme was conducted on Bio-medical waste management and the effectiveness was assessed before and after (1 week) the training programme. Using a pre-validated questionnaire, Knowledge and Attitude of the participants on Biomedical waste management was determined. The Discrete and continuous variables were expressed in terms of Proportion and Mean ± SD respectively. The significance of effectiveness of educational intervention was assessed using Wilcoxan sign rank test.**Results:** Out of 100 study participants, proportion of participants having poor, fair and good degree of knowledge on bio-medical waste management before and after educational intervention are 68%,27%,5% and 1%,8%,91% respectively. Proportion of participants having favourable and unfavourable attitude before and after educational intervention are 64%,36% and 87%,13% respectively. Wilcoxon sign rank test showed that, the training programme on biomedical waste management improved the Knowledge (Z=-8.660, p=0.0001) and Attitude (Z=-1.978, p=0.048) of the study participants, which was statistically significant**. Conclusion:** Educational intervention have significantly improved the knowledge and attitude of the participants, hence regular training improves biomedical waste management.

Key-words: Biomedical waste management, educational intervention, Knowledge, Attitude

INTRODUCTION :

Biomedical waste management is defined as any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals[1].Iimproper hospital waste disposal can even result in life threatening infections like AIDS , HEPATITIS etc[2]. Various surveys have been conducted across the world and in India to assess the hospital waste disposal method. Majority of the survey reported, that segregation and disposal of wastes was not done properly and has imposed a great threat in development of fatal communicable diseases.[3] The rules framed for biomedical waste handling and management is applicable to all those who generate, collect, receive, store, transport, treat, dispose or handle BMW in any manner. Thus the proper management of biomedical waste starts right form site of source, hence proper guidelines has to be followed from the source segregation to the disposal site, which is a concern for both the medical personnel and the community.[4]

In spite of framing various rules pertaining to biomedical waste management, using the colour coding system, many health institutions still do not follow the proper disposal of wastes .[5] Since the implementation of the Biomedical Waste Management and Handling Rules (1998) until the recent amendment every concerned health personnel is expected to have proper knowledge, practice, and capacity to guide others for waste collection and management, and proper handling techniques [6] Various studies conducted in different health care settings among nurses and midwifes concluded that, there is a lack of knowledge, attitude and practice pertaining to the bio-medical waste disposal and they have also insisted the need for training programme to keep them updated. [7,8] The recent amendment on 2016 , with some modifications has made it essential for a regular training programme on Bio medical waste management.[9]

With the above background the study was planned to improve Knowledge and Attitude towards Biomedical waste management by means of educational intervention

OBJECTIVES:

To assess the knowledge and attitude on biomedical waste management among the nursing students before and after the educational intervention

MATERIALS AND METHODS:

The study was conducted in a private nursing college which comprised a total of 100 students(college was recently established and contained only 100 first year students). All of them were included by Convenient sampling method. Knowledge and Attitude on biomedical waste management was assessed using a structured pre–validated questionnaire. The questionnaire contained, 14 knowledge questions and 10 attitude questions The scoring was given in following manner.

KNOWLEDGE : 14 questions (correct answer: 1 mark; wrong answer: 0 mark)

Maximum score: 14; Minimum score: 0

Poor knowledge: ≤ 6; Fair knowledge:7-10; Good knowledge:≥11

ATTITUDE: 10 questions (Likert scale(5 item) based, score range from 1 to 5, hence maximum score:50,minimum score:10)

Favourable attitude: ≥25

Unfavourable attitude:≤24

Using the above mentioned questionnaire, Knowledge and attitude on BMWM was assessed, before the educational intervention. This was followed by an interactive lecture with audio-visual aids, which also contained the recent amendments in Biomedical waste management, 2016 guidelines.[Table 1]

Later, by using the same questionnaire, the effectiveness of the educational intervention was assessed, after 1 week of the lecture.The significance of variation in knowledge and attitude before and after educational intervention, was determined using Wilcoxan sign rank test.

RESULTS:

The total number of study participants was 100. All of them were studying first year nursing in an private nursing college, Chennai. Nearly three-fourth (74%) of them were girls. The mean age of the participants was 19 ± 2.1 years. The proportion of participants having poor, fair and good knowledge before educational intervention was 68%, 27% and 5% respectively. While, the proportion of participants having poor, fair and good knowledge after the educational intervention was 1%, 8% and 91% respectively. It has been noted that the proportion of participants with good knowledge has been improved from 5% to 91% following educational intervention, and the proportion of participants with poor knowledge has also decreased from 68% to 1% respectively [Figure 1]

Table 1: Knowledge and Attitude before and after the educational intervention (n=100)

Variables	Before educational Intervention (n=100) Mean ± SD	After educational Intervention (n=100) Mean ± SD	Wilcoxan Sign rank test (p value)
KNOWLEDGE	6.53 ± 2.08	12.32 ± 1.85	0.0001*
ATTITUDE	30.20 ± 11.66	34.06 ± 10.46	0.048*

p value < 0.005, statistically significant

Figure 1:Distribution of study participants based on level of knowledge on Biomedical waste management (n=100)

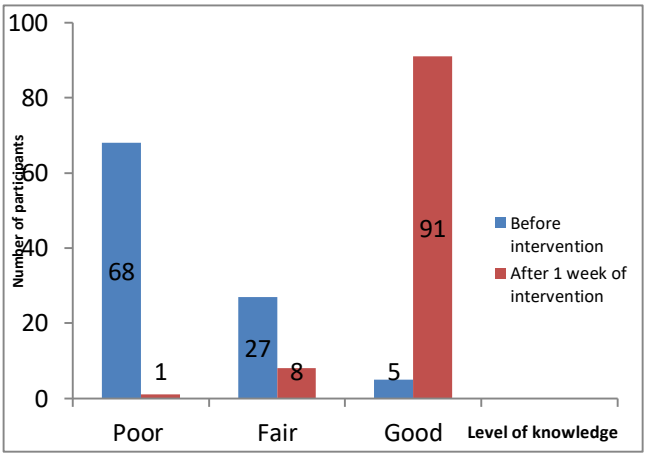
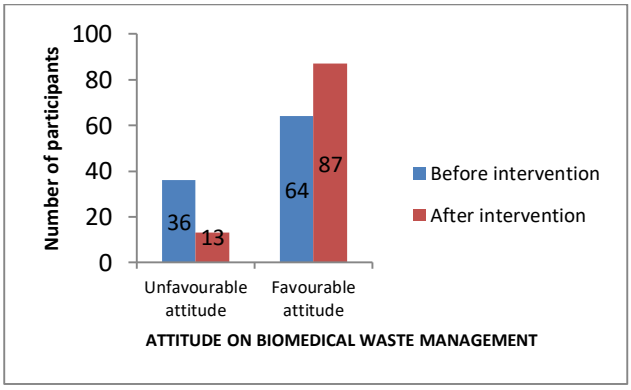


Figure 2: Distribution of study participants based on their attitude towards Biomedical waste management(n=100)



The proportion of participants, having unfavourable attitude and favourable attitude towards biomedical waste management was 36% and 64% respectively before the educational intervention. The proportion of participants having favorable attitude has increased from 64% to 87% , after the educational intervention [Figure 2]

The significance of the effectiveness of educational intervention was assessed using Wilcoxan sign rank test, which proved, that proportion of participants with good knowledge and favourable attitude among the study participants was higher after the educational intervention, compared to prior intervention starus and this was found statistically significant. (p value <0.005) [Table 2]

DISCUSSION:

The awareness on Bio medical waste management is highly essential, in order to protect oneself and the community from various life threatening diseases. The present study was done to identify the knowledge and attitude on biomedical waste management among first year nursing students before and after an educational intervention.

The study findings of Suganya P etal revealed that, three-fourth of their study participants had adequate knowledge on biomedical waste management.[10] The present study showed that, having good knowledge on Biomedical waste management has been increased for 5% to 91% after the educational intervention. This indicates the necessity of regular training programme on BMWM. Haider S etal in their study suggested that, continuous training programme is necessary for all health personnel is needed to improve the biomedical waste managment[11]

Anand P etal also suggested in their study that, Guidelines should be laid down for continuous training programme for all health personnel with special focus on sanitary staff. BMW management rules should be strictly implemented at all levels. A formal injury reporting system due to sharps should be started in all health care facilities so that no injury is missed[12]

Sengodan P etal in their study, revealed that young doctors and nursing students who have biomedical waste management in their curriculum have more knowledge than others.[13]

Rishay B etal , also in his study concluded that, training on Biomedical waste management improves the knowledge and practice on BMWM..[14] and also felt regular compulsory training programme is necessary to improve their awareness status[15,16]

Most of the studies comes in concordance with our study results, that, to have a good knowledge and attitude towards biomedical waste management, regular training is essential.

CONCLUSION:

The present study has been conducted among the first year nursing students, as its better to imprint the knowledge and attitude towards biomedical waste management and its importance, instead of changing the attitude and practice in later life. The findings of the present study clearly emphasize on the training programmes on BMWM. Training programme should not be a one-time process, instead should be a regular basis, as on to keep them updated, to have safe and proper biomedical waste handling and management.

Acknowledgment

Authors would like to thank the Nursing college principal, Vice principal and the students for their kind co-operation

Ethical approval: The study was approved by Institutional ethical committee

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Conflict of Interest: None

Source of funding support: Nil

NJRCM: www.commedjournal.in

ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

doi: 10.26727/NJRCM.2018.7.3ii **Year: 2018 Vol: 7 Sup. Issue: 2. Sep. Page: 107-110**

Challenges in Management of Environmental Diseases: A study on assessment of sound levels in various parts of Chennai Metro.

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Date of Submission	**: 30-04-2018**	**Date of online Publication**	**: 30-09-2018**
Date of Acceptance	**: 01-09-2018**	**Date of Print Publication**	**: 30-09-2018**

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ABSTRACT

Background: Exposure to high levels of noise can cause permanent hearing loss. Short term exposure to loud noise can also cause a temporary change in hearing or a ringing in ears. Noise pollution can be described as harsh, disturbing noise with the potential to have a harmful impact on human and animal life. **Objectives:** To analyse the noise level in residential, silence zone and commercial areas of Chennai and propose preventive measure from noise pollution. **Methods: Study Design:** Cross Sectional Study. **Study Period:** February 2018. **Study Setting:** Select residential and commercial areas of Chennai Metro. **Type of Sampling:** Simple Random Sampling. Sound level was recorded from digital sound level meter as decibel (dB) values. It was compared with acceptable values. **Results:** Sound levels were measured in 53 places (Commercial-40, Residential7, and Silence Zone-6) in Chennai. The average sound level recorded in commercial was 90.55 dB, residential 81.36 dB and Silence zone 74.7 dB. The highest dB was recorded in commercial segment was 110.5 at Heavy Lorry Horn at Outer Ring Road followed by 103.2 dB at Tenampet, 100-102.5 at Anna Nagar, Tambaram, T.Nagar, Chrompet and OMR. The average dB in residential area without external sound was 65.3 dB. The silence zone-Hospital recorded dB ranges from 65 to 73without external sound. **Conclusion:** The noise levels were higher in all areas than mentioned in the norms. Efficient engineering measures, work place policies and personal measures will help in control the noise pollution.

Key-words: Nosie pollution, decibel, hearing loss, Sound level, CPCB

Introduction:

Noise can be defined as "unwanted sound", and an audible acoustic energy that adversely affects the physiological and/or psychological well-being of people, or which disturbs or impairs the convenience or peace of any person. Sound level is expressed in decibels (dB). To hear sounds, air pressure changes must be very rapid. Changes must complete a cycle at least 20 times per second and not more than 20 000 times a second. The rate at which these cycles repeat is called the frequency of the sound and is measured in Hertz (Hz). One Hertz is equal to one cycle per second.[1] The main contributors to noise are factories and industries, transportation (air, rail and road) community and religious activities and sirens, lawn movers, musical instruments, TV, radio, transistor, telephone, dogs, and loudspeakers etc.[2] Exposure to high levels of noise can cause permanent hearing loss. Short term exposure to loud noise can also cause a temporary change in hearing or a ringing in ears.[3]

Noise pollution can be described as harsh, disturbing noise with the potential to have a harmful impact on human and animal life. As a result, noise pollution can have a detrimental effect on our ears, causing noise-induced hearing loss.[4] In addition to irritability, digestive problems, and biochemical changes, exposure to excessive noise can cause acoustic trauma. This can be in the form of noise-induced hearing loss or tinnitus. Noise-induced hearing loss is one of the most common forms of sensorineural hearing loss, is a major health problem.[5]

Sounds entering the ear are carried through the eardrum to the middle ear. Small hairs located in the cochlea transform the sound waves into electrical impulses. The hearing nerves transmit these impulses to the brain. Afterwards, the brain interprets them as sounds. This is how one sound is recognized from another. Continuous exposure to loud noise can damage the hair cells and once damaged, they cannot be repaired. This is known as sensorineural hearing loss, which may require hearing aids to effectively manage the condition. [6]

Occupational hearing loss is one of the most common work-related illnesses in the United States. Each year, about 22 million U.S. workers are exposed to hazardous noise levels at work.[7] It has been suggested that 12% or more of the global population is at risk for hearing loss

from noise, which equates to well over 600 million people.[8]

Figure 1. Automatic Sound monitoring by CPCB[10]

As per section 5.2.8 (IV) of National Environment Policy (NEP)-2006, Ambient Noise included as environmental quality parameter and to be monitored in specified urban areas regularly. Therefore, Central Pollution Control Board developed National Ambient Noise Monitoring Network Programme which includes installation of Noise Monitoring Stations all over India. CPCB has installed 35 noise monitoring at 35 locations in 09 metropolitan cities. [9] In Chennai , Velacherry, Pallikaranai, Washermanpet, T.Nagar, Triplican, Showcarpet,Guindy, Egmore, Perambur and Anna Nagar have automatic sound monitoring stations.

Objectives: To analyse the noise level in residential, silence zone and commercial areas of Chennai and propose preventive measure from noise pollution.

Material & Methods:

Study Design: Cross Sectional Study

Study Period: February 2018.

Study Setting: Select residential and commercial areas of Chennai Metro

Type of Sampling: Simple Random Sampling

Information Collected: Sound level was recorded from digital sound level meter. The maximum, minimum and average decibel (dB) values were recorded in each place.

Operational Definition:

Noise level: Noise level means the reading taken at a measuring point in the presence of any alleged disturbing noise at the end of a total period of at least ten minutes after such meter was put into operation, and if the alleged disturbing noise has a discernable pitch.[1]

Method of data collection: The information on sound level collected by medical students using Google sheets. The time of measurement, place of measurement with decibel values recorded. Central Pollution Control Board values were taken as reference.

Figure 2. Sound level meter used to measure the sound level in our study

Table 1. Acceptable Noise Level (dBA) (CBCB-Ambient Air Quality Standards in respect of Noise)[11]

(Day time shall mean from 6.00 a.m. to 10.00 p.m. Night time shall mean from 10.00 p.m. to 6.00 a.m, Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places etc)

Area Code	Category of Area	Noise Level Limit (dB)	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Data management: The saved information at Google Server downloaded in the form of Microsoft Excel and analysed.

Results:

Sound levels were measured in 53 places (Commercial-40, Residential 7, Silence Zone-6) in Chennai. The average sound level recorded in commercial was 90.55 dB, residential 81.36 dB and Silence zone 74.7 dB.(Figure 3) The highest dB was recorded in commercial segment was 110.5 at Heavy Lorry Horn at Outer Ring Road, 103.2 db at Tenampet, 100-102.5 at Anna Nagar, Tambaram, T.Nagar, Chrompet and OMR.(Figure 4) The

auto-rickshaw has highest noise in single vehicle segment (average 90dB), fast local train 85 dB and bus 80db. A single horn rises up to 15 dB from the existing noise. The medium traffic had average 82.73 db, normal traffic 76.6 dB. The average dB in residential area without external sound was 65.3 and with TV, Speaker it raised upto 100 dB. A single fan raises 10 dB, loud speaker 15-20 dB in average. The silence zone-Hospital recorded dB ranges from 65 to 73without external sound.

Figure 3. Noise level compared with standard noise limits

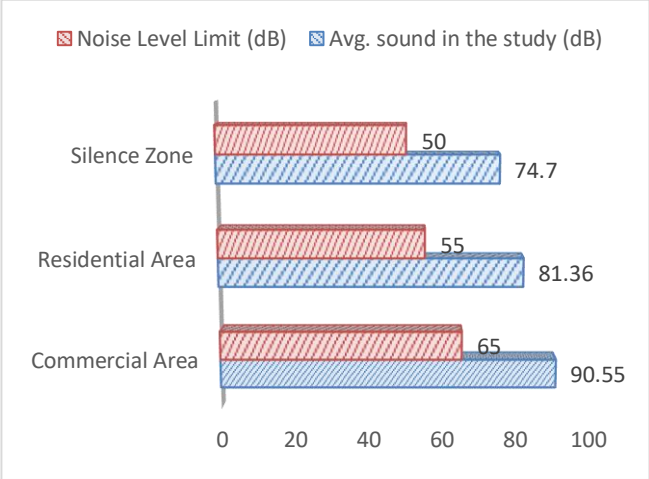
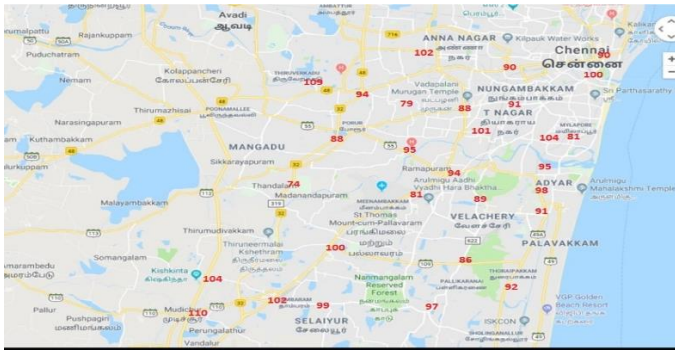


Figure 4. Noise level in major roads in Chennai



Discussion:

The World of balmy sound is a chimeric dream .When sound veers into an offensive noise,there is an inception of distressing concern . Hence, we undertook a study of sound level in Chennai. The findings of study reveal that we live in an environment where we are masked by noise such that there is no one who could possibly escape from this disaster.

According to a 2007 WHO estimate, almost six per cent people in India suffer from hearing loss. In 2011, the Centre for Science and Environment (CSE) conducted a decibel survey which showed that Delhi had some of the noisiest roads in India.[12]

The types of sound includes, Continuous sounds, Varying sounds, Intermittent sounds, Impulsive sounds. Mainly the duration and level of the noise determine the effects of noise.[1] Under section 29(a) of Prevention and control of Pollution Act , 1981, Noise is defined as air pollutant. Ambient noise level data for 2011-2014 showed maximum noise violations observed in Mumbai followed by Lucknow, Hyderabad, Delhi and Chennai. Chennai recorded the sound level in range of 55 to 65 dB (A) and 65 to 75 dB (A). 03 stations installed at T Nagar, Triplicane and Perambur recorded exceedence of prescribed limits for all observations.[9]

Living in Chennai is tantamount to a living in a factory as in metaphoric terms of sound level. Data from Central Pollution Control Board (CPCB) shows that the noise levels everywhere in Chennai are over 100 dB - Triplicane and T Nagar in Chennai city - commercial-residential neighbourhoods - registered noise levels above 130. The Tamil Nadu Pollution Control Board/CPCB checks periodic and special noise monitoring during festival mainly Diwali.[13] The automatic sound monitoring meters placed in seven places in India in India(New Delhi, Chennai, Mumbai, Hyderabad, Kolkota, Bengaluru and Lucknow.). The 10 monitoring stations maintained by the CPCB at Chennai ,reported >20% higher noise level than permissible.

Table 2. Noise level compared with other studies

Area Code	Category of Area	Noise Level Limit (dB)	Our Study (dB)	Other Studies(dB)
B	Commercial Area	65	90.55	87
C	Residential Area	55	81.36	80
D	Silence Zone	50	74.7	79

Avenue tree-cover can reduce the noise level. Earplugs properly used (conical plugs of synthetic material) can reduce noise levels by up to 30 dB. Protective Ear Caps (ear muffs) can reduce noise levels by 40-50dB. It is suggestive that ear plugs ought to be used for noise levels of 85-100 dB(A) and ear muffs be used for noise levels above 100 dB(A).[14]

Central Government notified the Noise Pollution (Regulation and Control) Rules, 2000 as it is published in the Gazette of India, Extraordinary, Part-II –section 3(ii), vide S.O 123 (E) dated 14.2.2000. Any other officer not below the rank of Deputy Superintendent of Police to monitor enforcement of Noise Pollution control measures and the due compliance of ambient air quality standards in respect of noise, restriction on the use of Loud Speakers/Public Address system. State Government may permit loud speakers or public address system in night hours (between 10.00 p.m. to 12.00 midnight not exceeding 15 days in year.[11]

The order of the Hon'ble Supreme Court of India, dated September 27, 2001, prohibiting the use of fireworks between 10.00 p.m. and 06.00 a.m. should be strictly enforced. The manufacture, sale or use of fire-crackers generating noise level exceeding 125 dB(AI) or 145 dB(C)pk at 4 meters distance from the point of bursting should be prohibited. Unorganised, highly congested commercial activity should not be encouraged in proximity to the residential colonies. Efforts should be made to control noise pollution progressively in the following order: at source, transmitting medium, at receiver.[9]

Efficient control strategies usually rely on a combination of engineering (technical) control measures (e.g., quieter equipment and enclosures) and health/personal measures (e.g., work practices).[4] Those who work in high sound environment like factory worker, traffic police, drives are likely to be screened for noise induced hearing loss periodically. Pre-placement and periodic examination of health workers and periodic monitoring is recommended. Public education, engineering methods, environmental modification, legislation are employed in noise control.[15]

Conclusion and Recommendation: The noise levels were higher than prescribed limits in most of the areas. Efficient engineering measures, work place policies and personal measures will help in control the noise pollution. We can use ear muffs or ear plugs while travelling. Circumvent the usage of auto-rickshaw for minimize the cost of adversity. We have to check the dB values before buying home appliances like fan, AC, motors chimney etc.

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Conflict of Interest: None
Source of funding support: Nil

NJRCM: www.commedjournal.in


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