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SHORT ARTICLE

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A study of Socio-demographic factors and fertility in a village of Western Maharashtra

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ABSTRACT

Background: In India rural population was reported to be 66%.there is gap in fertility of rural and urban population. Worldwide, fertility rates have fallen from an average of about six children per woman in the 1950s to fewer than three today. Total fertility rate (TFR) gives approximate magnitude of the completed family size. **Objectives:** To describe socio-demographic factors and ascertaining relationship of fertility with socio-demographic factors in a rural area of Maharashtra. **Results:** A total 292 families were interviewed from Dahitane village; Majority Head of family were Hindu males (90%). About 93% population resided in their own houses in that 63% houses were semi-pucca. Houses having electricity supply, in house water connection and in-house latrines were 91%, 39% and 61% respectively. Total fertility rate (TFR) was found to be 1.71 and not significantly associated with socioeconomic class and female literacy. **Conclusions:** The present study showed betterment in water supply and sanitation facility in rural dwellings in spite of the predominance of semi-pucca house.

Key Words: rural, fertility, Total fertility rate, socio demography.

INTRODUCTION

Human fertility is one of the most complex. By fertility is meant the actual bearing of children.¹ It is a measure of rate at which population adds to itself by birth and normally assessed by relating number of births to size of some section of population such as number of married couples or number of women of child bearing age. When fertility remains high population tends to grow at a higher rate than before as mortality is controlled. Fertility is directly influenced by a set of social and biological factors. These factors are often called intermediate fertility variables because they are influenced in turn by several socio-economic, cultural and biological variables. Declines in fertility rates typically follow a reduction in desired family size; parents increasingly want to invest more in the health and education of their children, which raises the “costs” of each child. As these costs increase, couples become more interested in regulating their fertility. Worldwide, fertility rates have fallen from an average of about six children per woman in the 1950s to fewer than three today. Total fertility rate (TFR) gives approximate magnitude of the completed family size. This study was carried out in a rural area of Maharashtra with the objective of describing socio-demographic factors and ascertaining relationship of fertility with socio-demographic factors.

MATERIAL AND METHODS

A cross-sectional community based study was conducted in a Dahitane village of Barshi block in western Maharashtra which is rural field practice area of department of community medicine Dr. Vaishampayan

Memorial Government Medical College, Solapur. The “questionnaire survey” by house interview was employed as method of data collection. The entire village community having 300 households with population 1500 but eight houses were repeatedly closed after three visits so they were excluded and remaining 292 households with population 1480 was divided into the zones as per the number of interviewers and then all 292 households were interviewed during the month of July 2017. Institutional Ethical committee approval was obtained prior to study.

After obtaining verbal informed consent, the questionnaire was organized so as to get information on four broad perspectives; socio-economic, infrastructure, environmental health, and fertility. However, this paper will be mainly focused on linking the socioeconomic factors to the fertility. Data was analyzed by using statistical software SPSS 16.0 version. The statistical analysis included mean, standard deviation, percentages and ANOVA test. The results obtained were considered statistically significant whenever $P < 0.05$.

RESULTS

There were 292 families in the study area. Of the 1480 individuals 692 were females. The sex ratio was 878: 1000 (female: male). Among the population, 45% was below 15 years of age and 8.5% over 60 years of age. Ninety percent household heads were males. Hindus comprised 90 % of the population and the remaining includes Muslims (6%) and Buddhist (4%).

About 93% of the population lived in their own houses; 60% of all houses were semi-pucca houses² (Table-1). While 91% of the houses had electricity connection, only 1-in-3 had in-house water connection; and 61% of houses had in-house latrines. In our study Total fertility rate (TFR) was found to be 1.71 and Socioeconomic class of family according to Modified BG Prasad classification³ had insignificantly related to Variation in TFR. Variation in TFR in the families was insignificant due to Education of child bearing woman in that families using ANOVA test of statistical significance (Table-2).

Table1. Percentage of Households in Dahitane village with Specific Facilities Compared with Indian National Rural Average (NFHS-4) Maharashtra.

Sr. no	Characteristics	Dahitane village	Maharashtra rural (NHFS-4)
1	Household headship	Male	89.7
		Female	10.3
2	Household structure	Nuclear	66
		Non-nuclear	34
3	Religion of household head	Hindu	89.7
		Muslim	5.9
		Buddhist	4.4
		Other	0
4	Electricity	Yes	91.4
		No	8.6
		Improved source	97.9
5	Source of drinking water	Piped water	39.3
		Tube well	58.6
		Unimproved source	2.1
6	Sanitation facility	Improved, private latrine	61.4
		No facility/open space/field	38.6
		Pucca	24.8
7	Type of house	Semi-pucca	60
		Kachha	15.2
			2.6

DISCUSSION

This study was done to ascertain socio-demographic determinants and fertility pattern in rural Maharashtra. In this study nuclear household (66%) was more compared to Maharashtra state average (51%)² and 43% nuclear family in a study conducted at rural area of Dakshina Kannada by Padma Mohanan et al.⁴ Similar finding of demographic characteristic religion Hindu (86%), Muslim (5%) was found in NFHS-4 but according to Ram Chandra Acharya et al.⁵ from Western Terai of Nepal Hindu (63%), Muslim (24%) and Buddhist (10%) and according to Padma Mohanan et al.⁴ Hindu (50%), Muslim (45%) and Christians (5%) in rural Dakshina Kannada. Out of 292 Households, 267 (91%) Household had electricity supply comparable to Maharashtra rural

electricity supply (90%)² but a study conducted in slums of vellore town, Southern India by P.K. Mony et al.⁶ narrated that electricity supply to house was 96.8%. Sanitation coverage of 61% in our study area was more than the national average of 44%², this could be due to providing affordable sanitation technology and awareness or motivation through 'Swachh Bharat Mission- Gramin' Of Government of India⁷ but 28% sanitation coverage was found in vellore slums by P.K.Mony et al. Moving towards Sustainable Development Goal 6⁸ Improved source of drinking water 97% was found in our study near to target of universal and equitable access to safe drinking water.

Table2. Effect of socioeconomic status and female education on fertility

Sr.	Socioeconomic class	No. of family	TFR	P value#
1	Upper	06 (02%)	1	
2	Upper middle	18 (06%)	1	
3	Middle	126 (43%)	1.2	0.069
4	Lower middle	108(37%)	2	
5	Lower	34(12%)	0.6	(F ratio 2.19)
	Female Education*	Frequency	TFR	
1	Illiterate	92(31%)	1.2	
2	Primary	88(30%)	1.2	
3	Secondary	58(20%)	2.3	0.702
4	Higher Secondary	42(14%)	2.2	
5	Graduate	12(04%)	1.5	(F ratio 0.54)

*- woman of 15-49 years age, # ANOVA test, In bracket percentages

In present study pucca houses (24.8%) much lower than state rural area average (53.5%) and urban slums of Vellore town (56.9%), Southern India by P.K. Mony et al. In this study TFR (1.71) was less compared to state rural TFR (2.06) and Rural community, U.T, Chandigarh TFR (2.40) was found by Kaushalya et al.⁹ whereas Higher TFR (4.71) was mentioned in study conducted in rural area of Dehradun district by Amrita Kansal et al.¹⁰ In our study socioeconomic class of family and female education was insignificantly related to Variation in TFR but Family monthly income and female education was significantly associated with family planning practices in study conducted in rural Dakshina Kannada by Padma Mohanan et al.⁴

Conclusions: There was betterment in water supply and sanitation facility in spite of the predominance of semi-pucca house. The results can't be generalized.

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Prevalence of Modifiable Risk Factors of Low Bone Density among Adults in an Urban Area of Tamil Nadu

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ABSTRACT

Introduction: Low bone density (LBD) is a major public health problem that has enormous health-related, social and economic consequences. With increasing life expectancy, LBD is also expected to increase. LBD has both modifiable and non-modifiable risk factors and prevention of the modifiable risk factors will help in attaining optimal peak bone mass by younger populations and improving bone health in older populations. **Objective:** The study was done to assess the prevalence of modifiable risk factors of low bone density adults in an urban area of Tamil Nadu and its association with low bone density among the study population. **Methodology:** It was a community based cross-sectional study among 405 adults in Nanganallur, Chennai. The modifiable risk factors were assessed using a pre-tested semi structured questionnaire and LBD was measured by T-score using Quantitative Ultrasound (QUS). **Results:** Dietary risk factors like inadequate milk (<300ml), ragi (<once/week) and fish (<once/week) intake were seen in 54%, 55.3% and 56.7% of the population. Caffeine intake was seen among 46.6%. Physical activity was inadequate (aerobic exercises of 30 minutes < 5 times/week) in 93.3% of the population and 21.2% were not getting adequate sun exposure (<15 minutes/ day). Smoking and alcohol intake was seen among 21.2% and 32.8% of the males. Body mass index had significant positive correlation with T-score ($r=0.152$, $p=0.002$). **Conclusion:** There is a high prevalence of modifiable risk factors for low bone density among the population which is easily amenable to correction. Awareness must be promoted among the community on habits which will prevent bone loss and build bone density.

Key Words: Modifiable risk factors; Risk factors; Low bone density; Low bone mass; Osteoporosis

INTRODUCTION

Low bone density (LBD) which comprises of osteopenia and osteoporosis is the commonest bone disease. LBD is of major public health importance as osteoporosis alone affects an estimated 200 million people world over. (1) In India, it is estimated that 50 million people are affected by both osteoporosis and osteopenia up from earlier estimates of 36 million.(2,3) Low bone density is seen as a disease that mainly affects women and the elderly. However, recent studies show that among Indian populations in contrast to Caucasians, low bone density affects even younger populations and a large proportion of men as well.(4–8) The presence of low bone density can lead to increased fractures especially among the ageing population. The effects of fractures can be devastating to individuals, their care-givers and families physically, psychologically and socially. It also leads to high health system and economic burden.(9)

Peak bone mass in adults is attained at around 30 years after which there is a natural decline in bone mass. Presence of several risk factors can contribute to increased osteoclastic activity and thereby cause increased bone resorption. This can lead to non-

attainment of peak bone mass and also more rapid decline in the bone density. Some of these risk factors for low bone density are modifiable and others are non-modifiable. The modifiable risk factors include alcohol intake, smoking, low body mass index, poor nutrition, low dietary calcium intake, caffeine intake, Vitamin D deficiency, non-exposure to sunlight and low physical activity. Apart from the above risk factors which can be modified to prevent low bone density, there are other non-modifiable risk factors which include increasing age, sex, genetic factors, late menarche, early menopause or hysterectomy with oophorectomy, family history of osteoporosis and previous fractures. Low bone density may also occur consequent to secondary causes like endocrinological, rheumatological, malignant disorders or as a side effect of drugs like glucocorticoids and anticonvulsants.(10) Preventing the setting in of modifiable risk factors among the younger populations and risk modification among those in whom such factors are identified, can prevent development of low bone density and its consequent fractures. It is important to devise strategies to combat these risk factors in the

community and therefore this study was done to assess the prevalence of modifiable risk factors for low bone density and its association with low bone density among adults in an urban area of Tamil Nadu.

METHODOLOGY

The study was a community based cross-sectional study conducted at Nanganallur, an urban area in Chennai, Tamil Nadu with a population of around 86,000. This study was conducted among 405 adults of age 18 years and above. The study was part of a larger study assessing prevalence of low bone density among the adult population of Nanganallur and employed cluster sampling. The detailed description of calculation of sample size, sampling, selection criteria of study subjects, method of data collection and use of Quantitative Ultrasound for measuring low bone density had been published elsewhere previously. (5)

Following approval of the Institutional Ethics Committee, a questionnaire in the local language was administered to the study subjects to collect details regarding socio-demographics and the risk factors for low bone density. The questionnaire to elicit risk factors has been adapted from the Osteoporosis risk test developed by the International Osteoporosis Foundation. Bone density was measured using a portable quantitative ultrasound machine. The T-scores from QUS were classified as normal, osteopenia, osteoporosis or severe osteoporosis according to the WHO criteria.(11) Any T score below -1 was considered as low bone density combining the categories of osteopenia, osteoporosis and severe osteoporosis. The modifiable factors studied were caffeine, fish, milk and ragi intake, sun exposure, physical activity, body mass index (BMI), alcohol intake, smoking status, etc. The operational definitions used to study each of the risk factors is given below:

Milk intake: The intake of 2 or more glasses of milk (300 ml) per day was classified as adequate milk intake. **Fish intake:** The intake of fish on at least one day in a week was classified as adequate fish intake. **Ragi intake:** Ragi consumption on at least one day in a week was classified as adequate ragi intake. **Caffeine units:** The total number of caffeine units consumed by an individual was calculated as one cup of tea (150 ml) equaling 0.5 caffeine units and one cup of coffee (150 ml) equaling 1 caffeine unit.(12) **Sun exposure:** Exposure to direct sunlight for at least 15 minutes every day was classified as adequate sun exposure. **Physical activity:** Taking up any sort of aerobic exercise like running, jogging, swimming, bicycling, etc. for at least 5 days a week for a minimum of 30 minutes on all those days was taken as adequate physical activity.(13) **Body Mass index:** BMI was calculated as weight in kilograms divided by height in m².(14) **Calcium supplementation:** Consumption of supplementary calcium at least once daily for at least the last 1 month was taken as regular calcium supplementation.

Statistical analysis:

The collected data were entered into a MS Office excel sheet and analysis was done with SPSS v18. The prevalence of risk factors for low bone density has been given as proportions. The association between the risk factors and low bone density were tested for statistical significance using chi-square test and the strength of association was expressed using Odd's ratio with 95% CI. Correlation coefficient was used to study the relationship between the T score and BMI. P-value of 0.05 was considered for statistical significance.

RESULTS

The study was conducted among 405 individuals among whom 137 (33.8%) were males and 268 (66.2%) were females. The prevalence of low bone density was 53.3% (95% CI: 48.45 - 58.21%) of which osteopenia contributed 40% (35.21-44.79%) and osteoporosis contributed 13.3% (10.01 - 16.66%). The prevalence of LBD was 51.8% among males and 54.1% among females.

Table 1: Prevalence of modifiable risk factors

Variables		Prevalence n (%) (N = 405)
Milk intake	≤ 1 cup	350 (86.4)
	None	222 (54.8)
Calcium supplementation	No	368 (90.8)
	Irregularly	12 (2.9)
Total caffeine units	≥ 2units	189 (46.6)
Ragi intake	< once/ week	349 (86.2)
	Never	274 (67.7)
Fish intake	< once/ week	215 (53)
	Never	93 (23)
Sun exposure	Inadequate	86 (21.2)
Physical activity	Inadequate	378 (93.3)
BMI	< 18.5	28 (6.9)

Prevalence of modifiable risk factors (Table 1)

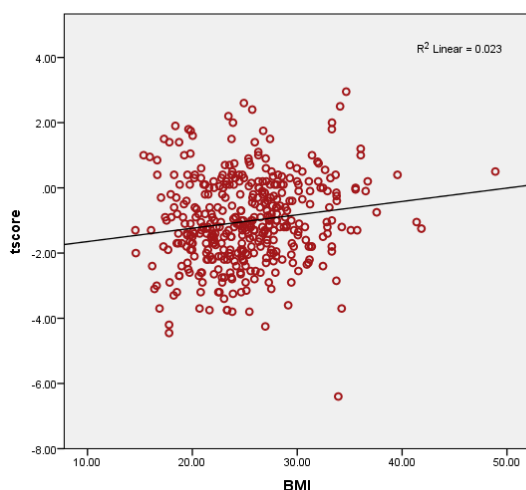
High prevalence of many of the risk factors for low bone density was seen in the study population. The dietary risk factors that were studied included milk, caffeine, ragi and fish intake. It was seen that 54.8% of the participants did not consume any milk and 31.6% consumed only a single glass of milk constituting 86.4% of total participants who consumed one glass of milk or none. Caffeine intake exceeded 2 units in 46.6% of the population. Rich sources of calcium like ragi and fish were not consumed at all by 67.7% and 23% of the population, respectively. At least once weekly consumption of ragi and fish was seen only among 13.8% and 53% of the participants and rest had less than once weekly consumption of these foods. It was seen that a very small proportion of the study population (6.6%) engaged in adequate physical activity that promotes bone health. Sun exposure was limited to less than 15 minutes a day in almost one-fifth (21.2%) of the

participants. Seven percent of the participants were underweight.

Table 2: Prevalence of tobacco and alcohol use among males

Factor	Prevalence (N=137)
	n (%)
Current Smoker	29 (21.2)
Ever Smoked	43 (31.4)
Other forms of tobacco	12 (8.8)
Alcohol intake	45 (32.8)

Figure 1: Scatter Plot – BMI versus T score



The prevalence of current smoking among the males was 21.2%; and 31.4% of the male subjects had ever smoked. Alternate forms of tobacco were used by 8.8% of the male subjects and alcohol was consumed by 32.8% of the males. Only 1 female participant answered as a current smoker and 3 of them had ever smoked. 4 of the females consumed other forms of tobacco and 3 of them consumed alcohol. Among the total population, 7.4%, 11.3% and 11.8% were currently smokers, had ever smoked and consumed alcohol, respectively.

Association of modifiable risk factors with low bone density

Greater prevalence of low bone density was noted among those with dietary risk factors such as lower intake of milk, ragi and fish, higher intake of caffeine and non-supplementation of calcium compared to those without these risk factors (54% vs 49.1%, 55.3% vs 41.1%, 56.7% vs 49.5%, 56.1% vs 50.9%, and 54.1% vs 45.9%). People with dietary risk factors had greater odds of developing low bone density than among those who did not have these risk factors but they were not statistically significant except for ragi consumption. Those not consuming ragi on at least one day of a week had 1.77 significantly greater odds of low bone density than those who consumed ragi on at least a single day of the week. (Table 3).

Higher prevalence of low bone density was seen among those who had inadequate sun exposure (58.1%) and inadequate physical activity (54.4%). No statistically significant difference was seen for low bone density in

Table 4: Association of Low Bone Density and certain modifiable risk factors among males

Variables		Low bone density		Odds Ratio (95% CI)	Chi-square value (df=1)	P value
		No N (%)	Yes N (%)			
Current smoker	No	53 (49.1)	55 (50.9)	1.18	0.165	0.684
	Yes	13 (44.8)	16 (55.2)	(0.52 - 2.70)		
Ever smoked	No	49 (52.1)	45 (47.9)	1.66	1.87	0.171
	Yes	17 (39.5)	26 (60.5)	(0.80 - 3.46)		
Alcohol intake	No	45 (48.9)	47 (51.1)	1.09	0.06	0.805
	Yes	21 (46.7)	24 (53.3)	(0.53 - 2.23)		
Total (N = 137)		66 (48.2)	71 (51.8)			

terms of sun exposure, physical activity and BMI. The association between low bone density and smoking and alcohol intake was studied only among the male population as very few women participants reported smoking and alcohol intake status. There was again higher prevalence of low bone density among males who consumed alcohol, were currently smoking or had ever smoked but there were no significant associations. (Table 4. Correlation between T-scores which indicate bone density and BMI showed that as BMI increases an increase in the T score is seen. The positive correlation seen between the two variables was statistically significant ($r = 0.152$, $n = 405$, $p = 0.002$). (Figure 1)

DISCUSSION

From this study, it can be seen that there is a high prevalence of modifiable risk factors for low bone density among adults. Recommended dietary allowance (RDA) of calcium in western countries & by WHO is 1000 mg but in India the RDA is only 600 mg but that is also not achieved, especially in lower socio-economic group men and women.(9,15) In this study, it is seen that poor dietary habits like avoidance of foods rich in calcium (milk, ragi and fish) are common among the participants. Consumption of caffeine in excessive amounts which promotes apoptosis of osteoblasts(16) is also common among the participants. Calcium supplementation which can compensate poor dietary intake is also absent among 90.8% of the participants and even among the small proportion on supplements, only few of them have regular intake. Ragi intake less than once a week had 1.77 odds of being significantly associated with low bone density than intake once or more in a week but no other dietary factors showed significant association. A study conducted in Chandigarh showed that among women with low calcium diet assessed by 24-hr recall method there was 2.3 significant odds of osteoporosis.(17) Another study conducted at rural and urban areas of Andhra Pradesh also showed a 62.3% prevalence of calcium poor diet and was significantly associated with LBD.(18)

The absorption of Calcium is augmented by Vitamin D which is naturally obtainable by exposure to sunlight.

Table 3: Association between Low Bone Density and modifiable risk factors

Variables		Low bone density		Odds Ratio (95% CI)	Chi-square value (df=1)	P value
		No N (%)	Yes N (%)			
Milk intake	≥ 2 cups	28 (50.9)	27 (49.1)	1.21	0.46	0.498
	≤ 1 cup	161 (46)	189 (54)	(0.68 – 2.15)		
Total caffeine units	< 2 units	106 (49.1)	110 (50.9)	1.23	1.07	0.299
	≥ 2units	83 (43.9)	106 (56.1)	(0.83 – 1.82)		
Ragi intake	≥ once/ week	33 (58.9)	23 (41.1)	1.77	3.92	0.048
	< once/ week	156 (44.7)	193 (55.3)	(1.001-3.14)		
Fish intake	≥ once/ week	96 (50.5)	94 (49.5)	1.34	2.14	0.143
	< once/ week	93 (43.3)	122 (56.7)	(0.90 -1.98)		
Calcium supplementation	Yes	20 (54.1)	17 (45.9)	1.38	0.89	0.345
	No	169 (45.9)	199 (54.1)	(0.70 – 2.73)		
Sun exposure	Adequate	153 (48)	166 (52)	1.28	1.01	0.314
	Inadequate	36 (41.9)	50 (58.1)	(0.79 – 2.07)		
Physical activity	Adequate	17 (63)	10 (37)	2.03	3.08	0.079
	Inadequate	172 (45.5)	206 (54.4)	(0.90 – 4.56)		
BMI	≥ 18.5	174 (46.2)	203 (53.8)	0.74	0.57	0.448
	< 18.5	15 (53.6)	13 (46.4)	(0.34 – 1.60)		
Total (N = 405)		189 (46.7)	216 (53.3)			

Even in a tropical area like the study area, 21.2% of the population did not have enough sun exposure further impeding absorption of calcium however, there was no significant difference in those with or without adequate sun exposure. Other studies have also shown higher levels of inadequate sun exposure and significant difference in sun exposure among those with and without low bone density.(19,20)

Physical activity helps in building bone mass. It can help reduce fragility fractures even in those with LBD by helping develop posture and balance.(21) Similar to the current study which showed high proportion of physically inactive participants, other studies conducted at Andhra Pradesh and Loni also showed high prevalence of physical inactivity - 44.23% & 42%, respectively.(18,22) A meta-analysis of studies done in Asian countries has shown that women benefit from exercise in preventing low bone density.(10) Even if the current study has not shown any significant association of physical activity with low bone density, being physically active can still help those with who have already developed LBD from developing fractures by helping in muscle strengthening and preventing falls.(23)

Alcohol and smoking habits are also present in a relatively larger proportion of adult males. The current study shows 21.2% and 32.8% of the male study participants as smokers and alcohol consumers. A study conducted at Delhi which assessed risk factors for LBD showed that a smaller proportion of participants were smokers(9.66%) or alcohol consumers (6.06%).(24) However, this study has not mentioned the number of male and female smokers and alcohol consumers; and it is likely that in our society there are fewer women with these habits and expressing smoking and alcohol consumption among all participants may show a falsely low prevalence. The study done at Loni, shows that habits of alcohol intake and smoking is seen among 50% of healthcare personnel and 69.9% of them have low bone density.(22) Alcohol use can disrupt osteoblastic activity and decrease the bone mass.(25) Smoking and alcohol intake ≥ 2 glasses/ day also increase risk of osteoporotic fracture.(9,26) The males in our country are more predisposed to LBD than western counterparts(27), therefore, it is more important to address this risk factor among our population.

It has been documented that low BMI is a predictor of fracture risk.(28–30) As seen in other studies, T-scores

indicating LBD showed a positive correlation with BMI.(31–33) BMI is also an indicator of the overall health status and those with increasing BMI were also showing better bone mass.

Conclusion:

The prevalence of low bone density and associated fractures is expected to increase with increase in life expectancy and presence of poor nutritional status. The over-burdened health system of our country will be further burdened by the increase in hospitalization due to osteoporotic fractures. Risk factors for LBD are also abundantly present in the population. Therefore, it is essential to focus on prevention of LBD and its risk factors. As indicated by many of the studies, increasing body weight and overall nutritional status, especially calcium intake along with adequate physical activity, improved Vitamin D status through adequate sun exposure and healthy lifestyle habits will help promote bone health. Strategies to prevent development of modifiable risk factors among the younger age groups must be developed to ensure optimal peak bone mass development and among older age groups to slow down age related bone density loss.(31) Even in the presence of low bone density, strategies to promote physical activity will ensure reduction of osteoporotic fractures.(34) Community based osteoporosis prevention programmes at the individual, interpersonal, institutional, community and policy level will help to reduce the burden of osteoporosis and its risk factors (35)

The limitations of the study is that it is a cross-sectional study and temporality of risk factors cannot be established. However, if the modifiable risk factors are removed even after onset of LBD, it still reduces age related bone loss. Though there are many more foods rich in calcium, only few items such as ragi, milk and fish were assessed considering they are the commonest foods available and consumed in the region. The strength of the study is that it was a community based study and reflects the truly rampant problem of risk factors in the population. Using operational definitions to assess the risk factors also ensured that any measurement bias was avoided.

It is recommended that awareness must be spread among the communities on how certain health habits predispose to bone loss and prevention of these modifiable risk factors can improve bone health and avoid osteoporotic fractures. Younger populations must be motivated to take up healthier diet, physical activity and other healthy lifestyle habits. Evidence of rampant risk factors must translate into policies that curb these risk factors and more research is needed into implementation of actionable policies.

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Injury Patterns & Determinants of Road Accidents in Rural Wardha.

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ABSTRACT

Introduction: WHO's report on road traffic accidents (2009) revealed 50% of deaths occur in vulnerable road users with higher rates in poorer economies of the world. Administrative records of Wardha district show the total number of road traffic accidents reported in the year 2011 were 601 including 165 fatalities and by 2012 midyear 441 cases including 116 fatalities. There is possibility of gross underreporting of road traffic accidents. Complexity of epidemiology of accidents as well as patterns of injuries suffered makes it an essential study determinant. **Objective:** To find out the severity & pattern of injuries sustained in RTA's. **Material and Methods:** Community based Cross sectional study was done in the villages of Wardha district (India). Sample size of 385 was estimated by Probability Proportional to Size sampling {PPS}. Variables like Pattern of injuries as fatal, non-fatal outcomes, type of injury sustained and sites of injury were enquired. **Result:** Abrasions were more at almost all times in the entire day with maximum during afternoon 50(45.0%), 20.7 % showed alcohol influence, 36.8 % suffered injuries to upper limb. **Conclusion:** Alcohol, over speeding is more dangerous on city roads, abrasions and lacerations were common injuries, fractures and crush injuries were less common. 20.7 % chances of Accidents under influence of Alcohol, most of them had motor driving license. Majority of accidents were non-fatal. Fractures were more common in motorized 4 wheeler occupants. Stones, animals on roads and defect on roads also played major role in accidents. Lack of visibility on the road had significantly increased the risk of fatal injuries.

Key Words: Road traffic accidents; Pattern of injury; Road safety

INTRODUCTION

By various accounts, the first injury crash was supposedly suffered by a cyclist in New York city in 1896 and the first fatality of a pedestrian in London, hit by a four wheeler.¹ Due to the fast pace of modernization, the requirement of a vehicle for transportation epidemic situation of injury everywhere including developing countries.² It is killing nearly 1.3 million people annually that too in low and middle income countries, it is 20 per hundred thousand population in middle income countries and 10 per hundred thousand population in high income countries. It is ninth leading cause of death, which may be the fifth leading cause of death by 2030.³ In 2016 India recorded 150785 deaths in road accidents, while in 2017 the fatal accidents were 147913⁴

The geographical and climatic conditions are different across our country and we have variety of roads, the travel pattern of people is different. The absence of scientific transport environment and human safety policies is increasing the burden on society.⁵ In 2009 WHO published a report on road traffic accidents 50% of death occurs in vulnerable road users i.e. in motorcyclists, cyclists and pedestrians, it is higher in the poorer

economies of the world.^{6, 7} Beyond the enormous suffering, family faces poverty as crash survivors and their families struggle to cope with the cost of medical care and rehabilitation and loss of the family breadwinner.⁷ Road safety has begun to receive some importance, as news of road crashes are beginning to become day to day concern.⁸

Administrative records in Wardha district where the present Community based Cross-sectional study is undertaken, shows the total number of road traffic accidents reported in Wardha in the year 2010 were 657 with 185 fatalities, in 2011 were 601 including 165 fatalities and by 2012 midyear 441 cases including 116 fatalities. This data signifies that there could be gross underreporting of the road traffic accidents. Patterns of accidents are needed to be studied for prevention and policy making. Pedestrians or victims with minor injuries do not report their accidents; a lot of it goes unreported and unseen. An accident can result in losing daily wages, spending out of pocket for treatment and hospitalization and if fatal, scattering an entire family as their bread winner and most productive family member is lost. So

Table 1: Type of injury wise distribution with time of accident

Type of injury	Time of accident				TOTAL
	06.00 Am-12.00Noon	12.01Noon – 05.59Pm	06.00 Pm-11.59 Pm	12.00midnight – 05.59 Am	
Abrasions Number (%)	32(28.8)	50(45.0)	27(24.3)	2(1.8)	111(50.4)
Lacerations Number (%)	3(15.0)	5(25.0)	10(50.0)	2(10.0)	20(9)
Fractures Number (%)	7(15.9)	19(43.2)	17(38.6)	1(2.3)	44(20)
Crush injuries Number (%)	5(19.2)	6(23.1)	15(57.7)	0	26(11.8)
Contusions Number (%)	0	0	0	4(100.0)	4(1.8)
Others Number (%)	0	9(60.0)	6(40.0)	0	15(6.8)
Total Number (n=220)	47(100)	89(100)	75(100)	9(100)	220(100)

this study was conducted with the objective to find out the severity & pattern of injuries sustained in RTA's

degree of significance was established as p-value < 0.05 was considered as significant.

MATERIAL AND METHODS

This was a Community based Cross sectional study done in the villages of Wardha district situated in Central India between 2010 and 2012. The sample size of 385 was estimated by Probability Proportional to Size sampling {PPS}this, is a method of sampling from a finite population in which a size measure is available for each population unit before sampling and where the probability of selecting a unit is proportional to its size.⁵ Ethical approval for the study was granted by the Institutional Ethics Committee of Datta Meghe Institute of Medical sciences, India. A Verbal informed consent was obtained from the individual adults. For minors, verbal informed consent was obtained from the parents/guardians.

The data was collected by the use of a structured interview. Information concerning the type of accident met by the victim may be fatal-leading to death within 30 days of the accident or non-fatal sustaining minor, moderate, severe injury but not causing fatality/hospitalization for more than 30 days. Pattern of injuries as fatal, non-fatal outcomes, type of injury sustained and the sites of injury, potentially unsafe conditions due to faulty roads, environmental factors, speeding, Potentially unsafe acts, potential error in judgement, human information about road safety and attitudes regarding traffic rules

Operational definition used: A road traffic accident (RTA) is any injury due to crashes originating from, terminating with or involving a vehicle partially or fully on a public road.^[6]

Inclusion criteria: Individuals who have met with a road traffic accident in the past 1 year and willing to give verbal consent for the interview.

Data collected was entered in Microsoft Excel 97-2003 worksheet and was analyzed using EPI-Info version 3.5.4. Descriptive statistics like mode, frequency and percentage were used. Chi-square, p-value were calculated and

RESULTS

Table 2: Alcohol influence and type of accident

Type Of Accident: Fatal/Non-Fatal	Alcohol Influence		
	Yes	No	Total
Fatal No. (%)	3 (15.0)	17 (85.0)	20 (5.8)
Non-Fatal No. (%)	52 (16.1)	270(83.9)	322 (94.1)
Total (n=342)	55(100)	287(100)	342 (100.0)

*57 consist of fatal cases, housewives and pediatric age group.

Table 3 : Relation between type of vehicle and type accident

Details of vehicle	Fatal Number (%)	Non fatal Number (%)	Total
Bicycle	7(20)	56(16.8)	63 (17.1)
Cycle rickshaw	4(11.4)	2(0.6)	6 (1.6)
Bullock cart	1(2.8)	2(0.6)	3 (0.8)
Motorized 2 wheeler	15(42.8)	204 (61.2)	219 (59.5)
Motorized 3 wheeler	2(5.7)	12(3.6)	14 (3.8)
Motorized 4 wheeler	3(8.5)	34(10.2)	37 (10)
Others	3(8.5)	23(6.9)	26 (7)
Total	35(100)	333(100)	368*(100)

*Rest were pedestrians or victims whose vehicle details were unknown.

Table 4 : Site of injury

Site of injury	Number	%
Head, neck, face	133	20.8
Thorax	15	2.35
Abdomen	9	1.41
Upper Limb	235	36.8
Lower Limb	225	35.3
Others	20	3.13
Total	637*	100%

*in the total 385 victims, most of the victims had injuries at multiple sites hence the total of 637

Time and type of injury

The relationship between type of injury sustained and the time of injury. Abrasions were more at all most all times in the entire day i.e. 06.00 Am-12.00Noon i.e.morning hours 32(28.8%), in the afternoon 50 (45.0%), and

Table 5: Relation between Pattern of Injury and type of vehicle

Type of vehicle	Abrasions Number (%)	Lacerations Number (%)	Fractures Number (%)	Crush injuries Number (%)	Contusions Number (%)	Others Number (%)
Bicycle, Cycle rickshaw, Bullock cart	35(31.53)	1(5)	5(11.3)	6(23)	0	1(6.6)
Motorized 2 wheeler	1(0.9)	1(5)	3(6.8)	1(3.8)	0	3(20)
Motorized 3 wheeler	9(8.1)	0	2(4.5)	5(19.2)	4(100)	3(20)
Motorized 4 wheeler	66 (59.4)	18(90)	34(77.2)	14 (53.8)	0	8(53.3)
Total (n=220)	111 (100)	20 (100)	44 (100)	26 (100)	4 (100)	15(100)

evening times 27(24.3). Lacerations were 3 (15%) in morning hours from 6-12 noon, 5 (25 %) in the afternoon, highest in the evening from 6 pm to 11.59 pm and 2 (10 %) at late night. Fractures were mostly seen in the afternoon 12-5.59 pm, 19(43.2), then at evening time 6-11.59 pm, 17(38.6 %), and 7(15.9 %) in the morning hours. Crush injuries were maximum 15(57.7%) found in between 6-11.59 pm followed by afternoon 12.01Noon – 05.59pm, 6(23.1 %) and morning hours 5(19.2%). Contusions were seen only in 4 cases during midnight till dawn. (Table 1)

Accidents under influence of Alcohol

Fatal accidents were 20 in number and those with alcohol influence were 3(15%) out of 342 cases and 52 cases were either homemakers and patients who are considered as non-consumers of alcohol and are always at back seat(Table 2) The effect of alcohol influence at the time of accident on the severity of injury in the accident. The total number of victims who consumed alcohol were 41 out of 198 those who were drivers and percentage wise it is 20.7%, 21.3 % i.e 23 victims had suffered abrasions, 9(21.9%) had lacerations, 4 (9.7%) had Fractures, 5(12.19 %) had crush injuries. Victims who were not under alcohol influence showed the following results 85(54.1 %) victims had suffered abrasions, 9(5.73%) had lacerations, 31(19.7%) had Fractures, 14(8.9%) had crush injuries while 4 (2.5%) had contusions. (Table 3)

Status of Vehicle driving license

13 victims out of the 204 license holders met with a fatal accident and 191 (77.3%) had a non-fatal accident. While all i.e. 56 of the non-license holders met with a non-fatal accident. (Table 4)

Visual defects in victims

The victims with visual defect who met with a fatal accident were 10 (38.5 %) and non fatal accident were 84 (26.2). while those who did not have any visual defect and met with a fatal accident were 16 (61.5 %) and non fatal accident were 237 (73.8 %). (Table 5)

Use of Mobile during Accident

Out of 290 victim 31(10.69%) were using their mobile phone at the time of accident and 259(89.31%) were not using mobile phone during their accident.

Mode of transport of victims

In this study out of 385 victims, 17 were pedestrians, whose vehicle details were unknown. 7(20%) were bicycles, 4(11.4%) were cycle rickshaws, 1(2.8%) bullock carts, 15(42.8 %) were motorized 2 wheelers, 2(5.7%) were motorized 3 wheelers, 3(8.5%) were motorized 4 wheeler, and 3(8.5%) were other vehicles involved. 347 were non-fatal cases out of which details of 14 were pedestrians or victims whose vehicle details were unknown. 56(16.8%) were bicycles, 2(0.6%) were cycle rickshaws, 2(0.6%) bullock carts, 204(61.2%) were motorized 2 wheelers, 12(3.6 %) were motorized 3 wheeler, 34 (10.2 %) were motorized 4 wheeler, and 23(6.9 %) others vehicles involved. (Table 3)

Type and pattern of injuries

In fatal cases maximum were lacerations 10(2.63%) and fractures in 9(2.39%) patients, in non-fatal cases abrasions and lacerations were common 64.2% and 32.8%. The maximum victims had injuries over upper limb 235 (36.8 %), 225 (35.3%) had injuries over lower limbs. About 133 (20.8 %) victims had injuries over head, neck and face while 15 (2.3%) were injured over thorax, 9 (1.4 %) over abdomen. Most of the victims had multiple injuries involving at least 2 or 3 of the body sites. (Table 4)

Fractures constituted maximum amongst the accident patterns accounting for 77.2 % observed among the motorized4 wheelers. While abrasions were maximum in Motorized 4 wheeler drivers (59.4 %) followed by Bicycle, Cycle rickshaw & Bullock cart drivers (31.5 %). Crush injuries were observed more in motorized 4 wheelers too followed by Bicycle, Cycle rickshaw, Bullock cart. Motorized 4 wheelers accounted for varied pattern of injuries like Abrasions, Lacerations, Fractures, Crush injuries, Contusions and others. (Table 5)

Environmental factors and surroundings of site

Among the 38 fatal accidents, 14 of the victims were travelling in dark, while in non-fatal cases 107 were travelling in dark. Depending on number of occupants on two wheelers, fatality was 55.6% and in non-fatal group it was 52.2 %, 18 victims had fatal injuries out of 271 victims travelling on two wheelers.

Out of 8 fatal cases, informants have stated that there were rocks and stones on the road; while in non-fatal cases 168 (49.1 %) said the same.

The data regarding animals and plants on the road in 342 non-fatal cases 62 (18.1%) victims said that there were animals /plants on the road and a cause of accidents.

Out of the total 374 cases 30 were fatal accidents while 344 were non-fatal. Among the fatal accidents 19 (63.3) took place on cemented roads while 11 (36.6) were met with on non-cemented roads.

Among the non-fatal accidents 179 (52) were on cemented roads and 165 (47.9) were on Uncemented/ tar roads. In 199 cases 197 non-fatal accident victims admitted to defect in road design and layout were a cause of the accident. (Table 6) In 108 (30.7 %) cases visibility on the road was poor leading to accidents. While 244 (29.3) felt the visibility was good. There was presence of plants and animals on the road were responsible for 62 (17.7 %) of the road accidents.

Among the factors analyzed for association with severity of injury, the type of vehicle (2/3/4 wheeler) and visibility on road were observed to be independently associated with fatal injury. Also it can be concluded that good visibility on the road has significantly less risk (0.05) of fatal injuries. (Table 8)

DISCUSSION

In the present study it is seen that from the total 385 accident victims, 9 victims had sustained zero injuries from a non-fatal accident. From the rest 376 cases, 10.1 % victims met with fatal end, i.e. leading to death within 30 days of the accident while 89.9 % had a non-fatal accident. The information was elicited from the victim's kin as well as witnesses. Quite close were the findings of Olukoga A (2008) ¹¹ stating the fatalities as 17% and the majority were among pedestrians who were 24% of the casualties. Eric OM (2011) ¹² found the Fatality rate as 0.8% and Chaudhary B L Et al (2005) ¹¹ found 25.6 % fatality in their study.

Our study found in 36.8 % accidents upper limb was the site of injury, followed by lower limb (35.3 %). Head, neck and face injuries were seen in 20.8 % victims, while thorax abdomen and other injuries accounted for 6.9 %, Jha N et al (2003) ¹⁴ reported that among the various injuries, the limbs and the face were the commonly affected areas to suffer external injuries. Head injuries were the commonest form of internal injuries seen in the victims (34.1%). These injuries were common among bicycle riders, pedestrians and riders of motorized two wheelers. The commonest site for fracture was the lower limbs (43.4%) and Esiyok B et al (2005) ¹⁵ observed that the most frequently affected body part was lower extremities and 73.6% of lesions taken into account in estimation of the rate of disability were located in the pelvis and lower extremities. While Bener A et al (2009)

¹⁶ observed that Head injury (33.3%) was more common with light vehicle crashes. Neck injuries were more common with Pickup and SUVs (44.7%). Most of the injured drivers were hospitalized (97%) for their injuries. Eric OM et al (2011) ¹² approximately 19% of the road crash victims sustained severe injury. Most (69%) of the injuries sustained among study victims were to the head and neck region followed by the lower (64%) and upper extremities (23%). Among those who sustained head injury (n=15), 73% were vulnerable road users. The commonest site of fracture was lower limb 88 (46.3%) followed by upper limb 47 (24.7%) and skull 25 (13.2%). Other sites were spine 12 (6.3%), ribs 11 (5.8%) and pelvis 7 (3.7%). The severity of injury according to category of road users showed that two (1.6%) drivers, five (2.9%) vehicle occupants and one (2.1%) pedestrian have severe injuries. There is no significant association between severity of injuries and category of road users.

Conclusion: The study concludes that alcohol, over speeding, time of the day, type of vehicle are just a few of the multiple determinants of accidents leading to different types of injuries fatal and non-fatal. There were one fourth chances of Accidents under influence of Alcohol and most of them suffered from abrasions, majority of the victims were license holders, there was a lesser role of visual defects in these accidents. Mobiles were not culprit in most of the cases, most often the victims were using motorized two wheelers, lacerations and abrasions were most common in fatal and non-fatal cases, and fractures were more common in motorized four wheeler occupants. Rocks, stones, animals on roads, defect in road designs also played major role in accidents. It can be concluded that good visibility on the road has significantly less risk of fatal injuries.

Recommendations: A multipronged approach is necessary to control the road accidents.

Safer roads and mobility- it is important to raise the safety and protective quality of road networks for the benefit of all road users especially the most vulnerable i.e. pedestrians, bicyclists and motor cyclists. Improvement in the existing road infrastructure to meet the mobility and access need of all users

Road safety management- rural roads are generally not tarred and non-cemented. These mud roads do not give a good tyre grip, causing a lot of accidents.

Improve the post-crash response so that the victim can be easily and well in time be transported to a health facility and given quality of care.

Conclusion

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Seroprevalence of Typhoid in Indian Regions: Tertiary Care Hospitals & Diagnostic Laboratories-Based Study

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ABSTRACT

Background: Typhoid fever is a systemic infection caused by *Salmonella enterica typhi* (*S. Typhi*). It is an important public health concern in developing countries like India. It is estimated that 17.8 million (95% CI: 6.9-48.4 million) cases of typhoid fever occur every year in low-middle income countries with highest incidence in Central Africa, followed by Central, South and Southeast Asia. The objective of this study is to understand the trend of typhoid by using diagnostic laboratories data across Delhi, Uttar Pradesh, Uttarakhand, Punjab, West Bengal, Maharashtra, and Kerala. **Methods:** It is an observational retrospective study. The study involves laboratories data of 1,01,977 subjects (males - 56,140, females – 45,837) who got tested for typhoid by Widal between January 2016-December 2017 across different regions of India. Positivity criteria for Widal test is taken as TO and TH titre > 80 and TO > 80 and TH > 160. **Results:** Out of the total subjects, 11.3% showed level of O and H agglutinins ≥ 80 , while only 3% showed O and H agglutinin titre ≥ 160 . North Indian states (Delhi, Punjab, and Uttar Pradesh) have the higher proportion of cases – estimated at 12-27% (at agglutinin level of >80 for H and O). Other states in South (Kerala), East (West Bengal) and West (Maharashtra) show lower proportion of subjects with significant titres. The highest typhoid burden is among young adults (18-30 years) contributing 32% of overall cases, followed by paediatric age group (0-18 years) contributing 27% of total burden. **Conclusion:** Lab based data analysis can play an imperative role in assessing the epidemiological characteristics of typhoid. In accord with the objective of the study, a large nation-wide surveillance program engaging various health institutions can help in understanding the epidemiology of infectious diseases and taking timely preventive steps.

Key Words: Typhoid, Widal test, Infectious disease, Seroprevalence

INTRODUCTION

Typhoid is a systemic infection caused by *Salmonella enterica* serotype Typhi (*Salmonella typhi*). It is an important cause of morbidity and mortality worldwide, but more specifically in tropical areas. Developing countries bear a high burden of typhoid because of poor sanitation and lack of clean drinking water.

An accurate estimation of typhoid burden in communities is a challenging task especially in developing countries such as India because of multiple factors. Broadly these factors are of two types, firstly because of inherent shortcomings of diagnostic tests and secondly due to external factors associated with diagnosis such as lack of culture facilities, rampant use of over-the-counter antibiotics before patient reach medical care facility which hampers culture yield.

There are multiple diagnostic tests for typhoid including culture (blood, bone marrow, urine, and stool) and serological tests (Tubex, Typhidot, Widal). Every diagnostic test has its own strengths and limitations. Multiple studies compared culture tests with serological

tests to estimate sensitivity and specificity. Anduallem *et al.*,¹ in a comparative study of Widal test with blood culture reported that Widal has 71.4% sensitivity, 68.4% specificity, 5.7% positive predictive value and 98.9% negative predictive value. High negative predictive value indicates that negative Widal test is good in ruling out disease. A prospective study² which compared bone marrow culture with serial blood cultures and agglutination test, found that *salmonella typhi* was recovered from marrow cultures in 95% of patients while blood culture was positive in 43.3 % patients only. Another study by Akoh³, reported that among 64 proved typhoid patients 44% and 59% yielded *salmonella typhi* on blood and bone marrow culture respectively. Study by Gilman *et al.*⁴ suggested blood culture as less sensitive when compared to bone marrow culture in isolation of *salmonella typhi* from typhoid fever patients. Another study⁵ among children also reported blood culture as less sensitive (44%) in comparison to bone marrow culture (84%) and stool culture (65%).

The culture tests have a definite advantage in being more precise than Widal in individual diagnosis, still they have operational limitations in resource-poor settings. Bone marrow culture is an invasive procedure and cumbersome to use in primary care settings. Blood culture has limitations in the form of time, cost, and availability.

Serological tests such as Widal need to be explored in depth as a surveillance tool in communities, where conditions do not permit other methods. Despite its limitations, it is among the most commonly used test for diagnosis of typhoid in low-middle income countries. The seroprevalence studies are an underrated tool in exploring the epidemiological behaviour of typhoid. A cross-sectional study⁶ in Uganda analysed association between health education and other factors with seroprevalence of typhoid among febrile patients in the semi-urban area. This study estimated a seroprevalence at 26.5% (95 CI: 21.7-32.0) and revealed lower chances of typhoid among those who have received health education in the past two months in comparison to those reported no health education recently.

In our study, we assessed the trend of typhoid by using Widal data from diagnostic laboratories across India. We analysed distribution of agglutinin O and H across various regions.

Objective: To assess the variation in seroprevalence of typhoid with the help of diagnostic laboratories data of Widal test across different regions in India.

METHODOLOGY

A retrospective, observational study is conducted to assess patterns of seroprevalence of typhoid across multiple Indian regions by using diagnostic laboratories data of Widal test.

Sampling and sample size: The analysis has been conducted on retrospective data from diagnostic laboratories and hospitals located in states of Maharashtra, Uttar Pradesh, Delhi, Punjab, Kerala, and West Bengal. For the present study, data was retrieved from diagnostic laboratories located in major metropolitan and tier-II cities in these states. In the study 20 diagnostic laboratories participated - 9 from Maharashtra, 1 each from, Kerala and West Bengal, 3 from Delhi, 2 from Punjab and 4 from Uttar Pradesh and Uttarakhand.

There were 1,01,977 subjects who got tested for typhoid by Widal, between January 2016 and December 2017 in the participating diagnostic laboratories. The Widal diagnostic cut off values vary across regions and different populations. Sensitivity and specificity depend on cut-off values. According to a community-based study in Kolkata, an agglutinin O titre of 1:80 was optimal with 58% sensitivity, 85% specificity, 69% positive predictive value, and 77% negative predictive value.⁷ According to other Indian studies,⁸ a cut off value for O and H

agglutinin titres ≥ 80 has been considered as significant. Other two studies from Uttarakhand⁹ and Maharashtra¹⁰ have considered a level of 80 for O and 160 for the H as significant.

We divided levels of agglutinin titres in five categories to analyse agglutinin distribution:

1. < 40 : Titre levels of O and H less than 40
2. ≥ 40 : Titre levels of O and H equal to and more than 40 but less than 80
3. ≥ 80 : Titre levels of O and H equal to and more than 80 but less than 160
4. ≥ 160 : Titre levels of O and H equal to and more than 160 but less than 320
5. ≥ 320 : Titre levels of O and H equal to or more than 320

Following are the two different diagnostic criteria used in the study:

Criteria 1: TO and TH titre ≥ 80 considered as significant

Criteria 2: TO ≥ 80 and TH ≥ 160 considered as significant

Statistical analysis: Descriptive statistics are summarized as mean $\pm$ standard deviation for continuous variables. Frequency distribution is presented in form of proportions for categorical variables. Data analysis was done by using MS Excel and R.

Ethical approval: Confidentiality of subjects has been maintained by de-identifying personal information and only anonymised data was used. Ethical approval for the study has been taken from the Max Healthcare Ethics Committee (MHEC), New Delhi.¹¹

RESULTS

Total sample size was 1,01,977 with males accounting for 55.1%. Mean age of the sample population was 28 years (Table 1). The largest sample share was from Maharashtra (65%) followed by Uttar Pradesh / Uttarakhand (13%) and Delhi (11%).

Table 1: Descriptive statistics of sample population

Variable	Values
Total sample	1,01,977
Mean age	28 years (SD: 19.8)
Range (age)	2 months – 100 years
Duration	Jan 2016 – Dec 2017
Male proportion	56,140 (55.1%)
	Maharashtra: 66,216 (65%)
	Uttar Pradesh/Uttarakhand: 13,514 (13%)
State-wise sample distribution	Delhi: 10,887 (11%)
	Punjab: 7,257 (7%)
	Kerala: 2,612 (3%)
	West Bengal: 1,491 (1%)

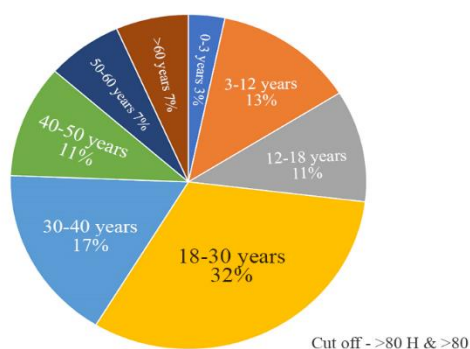
Table 2: Agglutinin 'O' and 'H' distribution in sample population

Agglutinin ‘H’ Level							
Agglutinin ‘O’ Level		<40	>=40-80	>=80 – 160	>=160 – 320	>=320	Total
		(%)	(%)	(%)	(%)	(%)	(%)
	<40 (%)	66.2	1	1.1	0.9	0	69.2
	>=40 – 80 (%)	0.7	12.2	3.2	0.3	0	16.4
	>=80 – 160 (%)	0.6	1.3	4.5	2.1	0.1	8.6
	>=160-320 (%)	0.5	0.5	1.3	1.6	0.3	4.1
	>=320 (%)	0.1	0.2	0.3	0.6	0.5	1.6
	Total (%)	68	15.2	10.5	5.4	0.9	100

Table 3: Significant level of titres across different states

Region	State	Positivity rate (≥80 H & O)	Positivity rate (≥160 H & ≥80 O)
North	Delhi	12.30%	4.60%
North	Punjab	26.60%	12.10%
North	Uttar Pradesh/Uttarakhand	18.00%	4.70%
South	Kerala	4.20%	2.10%
East	West Bengal	2.10%	1.40%
West	Maharashtra	3.10%	1.60%

Figure 1: Proportional burden of typhoid across age categories



The Table 2 presents the distribution of H and O agglutinin titres in sample population. Out of the total subjects, 11.3% showed level of O and H agglutinins ≥ 80 , while only 3% showed O and H agglutinin titre ≥ 160 .

The Table 3 shows estimated typhoid positivity across states. North Indian states (Delhi, Punjab, Uttar Pradesh) have the higher proportion of cases – estimated at 12-27% (at agglutinin level of ≥ 80 for H and O). Other states in South (Kerala), East (West Bengal) and West (Maharashtra) show lower proportion of subjects with significant titres, estimated at 2-4%.

The Figure 1 suggests that highest typhoid burden is among young adults (18-30 years) contributing 32% of overall cases, followed by paediatric age group (0-18 years) contributing 27% of total burden.

The Table 4 presents age and state-wise distribution of typhoid. The table shows that states in north India (Delhi, Punjab, and Uttar Pradesh/Uttarakhand) have higher proportion of cases (at agglutinin level of ≥ 80 for H and O) among the age group $>3-30$ years.

The analysis (Table 5) revealed a higher proportion with significant level of agglutinins in paediatric age groups (3-12 and 12-18 years) among males, and in early adult age groups (18-30 and 30-40 years) among females at a cut-off of ≥ 80 for H and O and >160 H, >80 O.

DISCUSSION

Our study estimated seroprevalence at level of ≥ 80 and ≥ 160 for agglutinin 'O' as 14.3% and 5.7% respectively, while for agglutinin 'H' it was 16.8% and 6.3% respectively. The seroprevalence estimates were 11.3% and 3% considering levels of both 'H' and 'O' agglutinin titres together at levels of ≥ 80 and ≥ 160 respectively. There were 68% and 69.2% subjects with agglutinin titres <40 for 'H' and 'O' respectively.

According to a study conducted in Ethiopia,¹² at agglutinin titres of O ≥ 80 and H ≥ 160 , sensitivity and specificity of Widal were found to be 75% and 95.7% respectively among febrile patients, while considering only O ≥ 80 , sensitivity and specificity was 87.5% and 96.5% respectively.

A study by Kulkarni,¹³ reported sensitivity and specificity of Widal at 76.7% and 90% respectively, at agglutinin O levels of 1:80, and 70% and 97% respectively, at a level of 1:160. At O titre level of 1:320, sensitivity and specificity were 60% and 100% respectively. These studies showed good sensitivity and specificity of Widal test and also revealed that increase in cut-off titre leads to decreased sensitivity and increased specificity.

A systematic review by Jacob *et al*¹⁴ estimated the prevalence of laboratory-confirmed typhoid among individuals with fever across hospital studies as 9.7% (95% CI: 5.7-16%). A seroprevalence study conducted in Fiji reported seropositivity against Vi antigen of Salmonella typhi as 32.3% (95% CI: 28.2-36.3%) in a sample population comprising vaccinated and unvaccinated individuals.¹⁵ This study also highlighted the role of improved hygiene such as the presence of

Table 4: Distribution of significant titres of H and O across age and state categories

Age category (years)	Delhi (%)	Kerala (%)	Maharashtra (%)	Punjab (%)	Uttar Pradesh/Uttarakhand (%)	West Bengal (%)	Overall (%)
0 – 3	9.1	4.3	3.7	9	10.5	4.9	7
>3 – 12	16.7	2.4	5.3	16.4	19.2	5.7	10.9
>12 – 18	15.2	7.1	4.4	28.8	18.5	2.3	12.7
>18 – 30	14	6.3	2.8	29.9	18.8	1.8	12.8
>30 – 40	10	2.9	2.5	31.6	21.3	1.3	11.8
>40 – 50	9.1	3.9	2.2	31.7	17.6	1.1	10.4
>50 – 60	6.9	1.7	1.7	26	14.9	0	9.1
>60	7.7	2.8	1.3	25.2	13.8	1.1	9.9

Cut off: >80 H and >80 O titration

Table 5: Age and gender-wise positivity (or significant titres)

Age category (years)	Positivity rate ->80 H & O (%)	Positivity rate ->160 H & >80 O (%)	Positivity rate (>80 H & O)	Positivity rate (>160 H & >80 O)
	Males		Females	
0 - 3	4.60%	1.40%	10.00%	5.00%
>3 - 12	11.80%	4.80%	9.60%	4.60%
>12 - 18	12.60%	5.20%	12.90%	5.50%
>18 - 30	9.50%	3.90%	16.80%	6.00%
>30 - 40	8.30%	3.60%	16.10%	6.10%
>40 - 50	7.00%	3.40%	14.20%	6.00%
>50 - 60	8.10%	2.80%	10.30%	3.70%
>60	9.30%	2.80%	10.70%	6.80%
Overall	9.30%	3.70%	13.80%	5.60%

septic tank or piped sewer than pit latrines, residential housing than settlements as important factors in reducing exposure to *Salmonella typhi*. Several other studies^{16,17} have highlighted the association between poor sanitation and unclean water with a high incidence of typhoid. Our analysis showed higher seroprevalence in states like Uttar Pradesh where only 35% of households use improved sanitation facility as per the National Family Health Survey-4 (NFHS-4).¹⁸ The seroprevalence was very low in states like Kerala which have 98.1% households with improved sanitation facility. Though this association was not observed in case of Punjab which has high seroprevalence but also a higher proportion of households with improved sanitation facilities (81.5%).

Our findings showed higher seroprevalence in children and young adults and estimated that these age groups (0-30 years) bear 59% of total burden at titre level of ≥ 80 for 'H' and 'O'. Studies^{9,19} have shown that typhoid is a disease of children and young adults, with the highest rate of significant titres in early age groups (0-30 years). Sinha *et al.*,²⁰ showed a higher positivity rate in paediatric subjects. It is believed that higher exposure in early ages can be the reason for higher positivity. According to Ochiai *et al.*,²¹ there is an inverse relation between typhoid incidence and mean age of cases.

There is a wide variation in reported prevalence in hospital-based studies. On comparison of studies conducted in Delhi²⁰ and Kolkata,¹⁹ a higher rate of incidence rate is reported in Delhi than Kolkata. Our estimate also shows a higher proportion of subjects with significant titres in Delhi (7.7%) in comparison to West Bengal (1.1%).

This study helped in highlighting the differences in seroprevalence of typhoid across age, sex, and different geographical areas in India, which reflects the effect of environmental factors on the incidence of typhoid. A registry-based study²² in Kelantan, found sex is associated with typhoid, and females are at higher risk. Our analysis reveals a higher proportion of females (13.8%) with significant titres in comparison to males (9.0%).

A recent data¹⁰ from the Indian Council of Medical Research (ICMR) has given estimates of deaths due to typhoid. Uttar Pradesh shows high mortality (8.6/100000), while Kerala (0.17), West Bengal (1.68), and Maharashtra (3.0) show lesser mortality because of typhoid. These estimates are consistent with our findings of high agglutinin titres in Uttar Pradesh (and other North Indian states) in comparison to Kerala, West Bengal, and Maharashtra.

Limitation: This is a big data-based retrospective analysis and it is not possible to assure the quality of methods employed in Widal testing in different laboratories. There is a wide variation in living conditions and socioeconomic status even in a single state. As this data is from metropolitan and big tier-II cities, it might not be a representation of the overall community in a state. As data from only private laboratories were included, the analysis might be an underrepresentation of population with poor socioeconomic status living in rural and semi-urban areas. It is difficult to ascertain the clinical profiles of the patients and their association with agglutinin titre.

Conclusion: A country-wide analysis is useful to understand the detailed patterns of typhoid as well as regional variations in typhoid epidemiology. This analysis has consolidated several findings such as higher positivity rate in paediatric and young adults.

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Prevalence of internet usage among selected professional college students in Puducherry

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ABSTRACT

Background: Internet usage has been rapidly increasing among the general population in the modern era. India has been ranked fourth among highest number of internet users next to China, U.S and Japan. Even though the internet provides better opportunities for communication, information and social interaction, its excessive use leads to addictive behavior with mental health implications. Taking this into consideration we conducted a study to assess the prevalence and levels of internet addiction and to determine the behavior aspects among professional college students. **Methods:** A cross sectional study was conducted among 600 undergraduate students of medical, dental and nursing colleges from December 2017 to March 2018 by using population proportion to sample size and by stratified sampling technique. Internet addiction was analyzed using internet addiction test questionnaire. **Result:** Among 600 students, 94.8% males were more addicted to internet than females (83.4%). Internet addiction was present in 87.5% of students. BDS students (90%) were more addicted to internet than nursing and medical college students. Internet addiction between males and females were found to be statistically significant. About 70.8% of students used internet for social networking. 58.8% of students had mild level of internet addiction and only 1.5% students had severe level of internet addiction. Among those who were addicted to internet, females had decreased outdoor activity due to internet usage, had felt sleeplessness due to late night log in and were depressed when offline. **Conclusion:** Internet usage has been increased among the professional college students which will also affect the physical and mental health. An awareness regarding the internet use and opportunities for recreational activities should also be created.

Key Words: Internet usage, Internet addiction test, Professional college students

INTRODUCTION

Internet is increasingly becoming more and more useful and a necessity among people. It has become an integral part of the day-to-day life of people worldwide. [1] As reported, globally the number of internet users have been increased from 360 million in December 2000 to 4.1 billion in December 2017 and hence the worldwide internet penetration is almost 54.4% of the population. Apparently in Asia, the number has been increased from 114 million internet users in December 2000 to 2.02 billion in December 2017 and the internet penetration is 48.1% of the population. [2] According to a report from the Internet and Mobile Association of India and Market Research Bureau International, internet usage in India were about 462 million in December 2017 as compared to 137 million in 2012, and the internet penetration in India is 34.1% of the population. [3] Internet addiction is defined as any online related, compulsive behavior which interferes with normal life, causing severe stress on relationship and work environment. It is a compulsive impulse control disorder

consisting of three sub-types such as excessive gaming, sexual preoccupation and e-mail/text messaging. The four components of internet addictions are [4]

- 1) Increased use associated with loss of time,
- 2) Withdrawal, which includes feelings of anger, tension, depression when the computer is inaccessible,
- 3) Tolerance, which includes the need for better computer equipment, more software, or more hours of use, and
- 4) Negative repercussions, which includes arguments, lying, poor achievement, social isolation, and fatigue.

The invasion of worldwide web applications in daily life makes the adolescent community increasingly susceptible to the internet addiction. Many research studies have been focused on internet addiction across the world especially among adolescent community. It would be interesting to know the internet addiction levels among various professional college students. The finding of the study will also help for future researches on internet addiction.

AIMS AND OBJECTIVES:

1. To assess the prevalence of internet addiction among professional college students in Puducherry
2. To determine the levels of internet addiction and behavioral aspects among the study population

MATERIAL AND METHODS

A cross sectional study was carried out among undergraduate students of medical, dental and nursing colleges within Sri Venkateshwara Medical College Hospital & Research Centre Campus, Puducherry. The study was conducted for over a period of four months from Dec 2017 to March 2018. The inclusion criteria were students of medical, dental and nursing colleges who had history of using the internet for the past 1 year. The exclusion criteria were those students who were not using internet for more than 3 months and those students who remained absent for a long period. The sample size was calculated using the formula $n = Z^2 pq/d^2$ (where $Z=1.96$ at 95% confidence; a similar study done by Sharma A et al, [6] reported prevalence of internet addiction of 42.7%, with an allowable error of 10% of p. The sample size thus yielded was 550 which was rounded to 600. The final sample in each college was selected using population proportion to sample size. In each college, equal number of students per year were decided. In each year, stratified sampling technique was used in selecting the study subjects.

The primary study tool was a semi structured questionnaire. The questionnaire included sections on demographic characteristics such as age, sex, education, etc. and also details about usage of the internet and behavior aspects. Questions pertaining to levels of internet addiction was done using the standardized "Internet Addiction Test" (IAT) questionnaire which was developed by Dr. Kimberly S. Young in 1998. IAT is a 20-item questionnaire in 6-point Likert scale with scores ranging from 0 to 5 for each item, which measures the severity of self-reported compulsive use of the internet. After all the questions had been answered, numbers for each response were added to obtain a final score. Total internet addiction scores were calculated, with possible scores for the sum of 20 items ranging from 0 to 100. Higher the score, greater were the level of internet addiction and the problems internet usage causes. A score of 0-19 were considered as no addiction/normal internet usage, 20-49 points as mild addiction, 50-79 as moderate addiction and 80-100 as severe addiction. [5]

The study was conducted after obtaining the necessary clearance from Scientific Research Committee and Institutional Human Ethics committee. Permission was obtained from the Dean/ Principals of the medical, nursing and dental colleges. The purpose of collection of data was explained to the respondents after brief introduction. The eligible respondent was interviewed after obtaining the written informed consent. Confidentiality were maintained. Data were entered in Microsoft Excel sheet. Analysis was carried out by using SPSS version 23. Baseline data were expressed as Mean and Standard Deviation for continuous variable and proportion for categorical variable.

Association were assessed using Chi square test and odds ratio.

RESULTS

Out of the total 600 students, 213 (35.5%) were males and 387 (64.5%) were females. The mean age of the students was 18.99 (± 1.305) years. The internet addiction was present in 525 (87.5%) students. Males (94.8%) were reported to have more internet addiction than Females (83.4%). Among the various professional colleges, BDS students (90%) were more addicted to internet followed by nursing (87.7%) and MBBS students (85.6%). The internet addiction between males and females were found to be statistically significant (p value < 0.05) [Table 1].

Table No:1 Association of internet addiction with demographic characteristics: (N=600)

Characteristics		Internet addiction		Total (%)	Chi-square (P value)	Odds ratio (95% C I)
		Present	Absent			
Gender	Male	202	11	213 (35.5)	16.247 (0.000)	3.6386 (1.8741-7.0643)
	Female	323	64	387 (64.5)		
Age (years)	≤ 20	461	66	527 (87.8)	0.002 (0.962)	0.9822 (0.4668-2.0668)
	> 20	64	9	73 (12.2)		
Course	MBBS	214	36	250 (41.7)	1.809 (0.405)	1.219 (0.6605-0.3578)
	BDS	153	17	170 (28.3)		
	Nursing	158	22	180 (30)		
Current residential status	Hosteller	157	22	179 (29.8)	0.010 (0.919)	1.0278 (0.6043-1.7480)
	Day scholar	368	53	421 (70.2)		

Table No:2 Information Regarding Usage of Internet among Study Population (N=600)

Variables		No	%
Internet addiction			
i.	Present	525	87.5
ii.	Absent	75	12.5
Time spent on internet per day			
i.	< 2 hours	474	79
ii.	2-3 hours	87	14.5
iii.	≥ 2 hours	39	6.5
Years exposed to internet			
i.	1-5 years	442	73.7
ii.	6-10 years	112	18.7
iii.	11-15 years	46	7.7
Source of internet access (*)			
i.	Personal Desktop	61	10.1
ii.	Laptop	86	14.3
iii.	Mobile Phone	543	90.5
iv.	Cyber Café	8	1.3
v.	Library	4	1.4
Monthly expenditure for internet (Rupees)			
i.	< 100	120	20
ii.	100-199	153	25.5

iii.	200-299	79	13.2
iv.	300-399	151	25.2
v.	400-499	45	7.5
vi.	500 or more.	52	8.7

Commonly used Website (*)

i.	Google	255	42.6
ii.	All Social networking	427	70.8
iii.	Wikipedia	61	10.1
iv.	You tube	174	29
v.	Others	4	0.8

Using internet better than textbooks

i.	Yes	345	57.5
ii.	No	255	42.5

If yes, reason (multiple answer)

i.	Time saving	64	10.7
ii.	Easy accessibility	115	19.2
iii.	Updated knowledge	173	28.7
iv.	Input from multiple sources	79	13.2
v.	Others (specify)	2	0.4

Purpose of internet activities (*)

i.	Entertainment	344	57.4
ii.	Social networking (only Facebook/ WhatsApp)	330	40.9
iii.	Internet conferences	14	2.7
iv.	Email communication	42	7.2
v.	Research	101	8.6
vi.	Educational	203	33.9
vii.	Others	2	0.4

* As multiple responses

Table:3 Levels of Internet Addiction among the study population (N=600)

Levels of Internet Addiction (score)	No.	%
No addiction/ normal internet usage (0-19)	75	12.5
Mild addiction (20-49)	353	58.8
Moderate addiction (50-79)	163	27.2
Severe addiction (80-100)	9	1.5

About 73.7% of students had started using internet since last 5 years. Most of the students (90.5%) accessed internet through mobile phones. 70.8% of students had used social networking such as WhatsApp, Facebook, twitter, Instagram as the commonly used website. About 57.5% of students reported that using internet was better than textbooks and the reason most of the students answered was that they will get updated knowledge from internet. Majority of the study participants (57.4%) had used internet for entertainment purpose such as watching movies and playing video games [Table 2]. Among the 600 students, the internet addiction test scoring had showed that 12.5% had no addiction, 58.8% had mild internet addiction, 27.2% had moderate internet addiction and 1.5% of students had severe internet addiction [Table 3]. Among the study participants who were addicted to internet, females (188) had outdoor activity time decreased due to internet when compared to males and was found to be

statistically significant. About 153 female internet addicts felt making friends online was beneficial and statistical significance was found. More females (290) than males had sleeplessness due to late night log ins and was statistically significant. 268 females when compared with 181 males who were addicted to internet have told that spending more time online is better than going out with friends and the differences were also statistically significant. Most of the female students (260) had felt depressed when offline and there was statistical significance ($p=0.005$) [Table 4].

DISCUSSION

In this study, the internet addiction was present in about 87.5% of students of various professional colleges, out of which 58.8% students had mild internet addiction where as in a similar study done by Sharma A et al the internet addiction was present in 42.7% of students.[6] In another study by Shety SKC et al it has been reported that internet addiction was present in 90% of medical students.[7] Salehi M et al had reported that only 7.3% medical students from Iran were addicted to internet.[8] Similar study done in Vietnam by Tran et al, only 21.2% of students were addicted to internet.[9] The reason for the increased prevalence could be due to the reduced rates and offers provided for internet recharge and also it has been found as the simple and easy method for communicating and entertaining. The mean age of the students in this study was 18.99 (± 1.305) years and no statistical significance was found with age and internet addiction. Sharma A et al had reported the mean age for their study as 17 years which was also not statistically significant between age and internet addiction. [6] Similar study by Sulania et al, the mean age was 20.3(± 1.4) years and was also not statistically significant between age and internet addiction. [10] Kuss D J et al had done internet addiction among adolescents and found that 14 years of age was more addicted to internet than any other age group. [11] This shows that there is no association between the age and internet usage.

Females were found to be more addicted to internet than males in this study and was found to be statistically significant. In the study done in Netherland by Kuss D J et al, [11] females were more addicted to internet and was not statistically significant. But in a study done by Sharma A et al and Sulania et al the males were found to be more addicted to internet. [6,10] Also, in a study done by Salehi M et al male Iranian students were more addicted to internet and was statistically significant. [8] Tran et al [9] had done a study among Vietnam students resulted that males were more addicted to internet. Most of the studies have shown that males were more addicted to internet because they had interest in online games, pornography and gambling activities but in this study, females were found to have addicted to internet mostly to social networking, entertainment and educational purpose. Among the 3 professional college students, BDS students were found to be more addicted to internet than nursing and MBBS students. It could be due to majority of BDS

students were staying outside while more of nursing and MBBS students were hostellers. In a study done by Sharma

Table:4 Comparison between behavior aspects of internet users by sex

Characteristics	Internet addiction	Sex		Chi-square (p value)	Odds ratio (95% CI)
		Male (n=213)	Female (n=387)		
Outdoor activity time decreased due to internet	Yes	122	188	4.165 (0.041)	1.4191 (1.0133-1.9874)
	No	91	199		
Feeling lonely when using internet	Yes	45	62	2.444 (0.118)	1.4041 (0.9165-2.1512)
	No	168	325		
Making friends online is beneficial	Yes	103	153	4.371 (0.037)	1.4321 (1.0221-2.0065)
	No	110	234		
Fear of being bored, empty or joyless	Yes	182	314	1.780 (0.182)	1.3649 (0.8633-2.1581)
	No	31	73		
Feel sleeplessness due to late night log-ins	Yes	191	290	18.763 (0.000)	2.9039 (1.7656-4.7762)
	No	22	97		
Spending more time on-line is better than going out with friends	Yes	181	268	18.040 (0.000)	2.5115 (1.6281-3.8743)
	No	32	119		
Feels depressed when offline	Yes	166	260	7.712 (0.005)	1.7252 (1.1714-2.5409)
	No	47	127		

A et al [6] BPT students were addicted to internet followed by BE, MBBS and Nursing students. Hashemian A reported in his study the prevalence of internet addiction was more in medical students when compared to non-medical students ($P < 0.001$). [12] Day scholars or those living outside hostel were found to be more addicted to internet than hostellers in this study. Whereas in a study by Sulania et al showed that those who were hosteller were more addicted to internet than days scholar. [10] Tran et al also reported that among vietnam students, those staying in hostel were more addicted to internet. [9] Most of the students have told that they had used internet only for < 2 hrs. per day. Sharma A et al also had reported the same, the mean time spent on internet per day was 1.29 (± 1.251) hours. [6] [13] Krishnamurthy S et al had reported that majority of the participants had used internet for less than 5 hours per day. [8] Salehi et al reported that the mean length of internet usage was 1.87 (± 1.72) hours per day. Srijampana et al also reported daily average internet usage of medical students were < 3 hrs. [14] This might be due to the speed of internet connection which may affect the time spent on internet. Majority of the students had used mobile phones for surfing internet and social networking such as WhatsApp, Facebook, Instagram. Few students told that they had used internet for other purpose such as online shopping, gaming, etc. 100 students had used internet for research purpose. Kapadia R et al reported that most of the students had used mobile phone to access the internet and the main purpose used was for entertainment, chatting and

also for study purpose. [1] Sulania et al also reported the same purpose of internet use among the students. [10] In most of the studies, mobile phone was used as easy access to internet [13,14] and social networking was the main purpose for using internet. [15,16,17] Some students in our study had told that they had used internet for leisure activity. Majority of the students in this study reported that using internet was better than reading textbooks because of updated knowledge from internet and was also easy to assess. In a study by Kapadia R et al had also reported the same reasons for preferring internet over books. [1] In this study significantly, more females than males had decreased time for outdoor activity due to internet, felt sleeplessness due to late night log-in, felt depressed and moody when they were offline from internet and also felt that spending time online was better than going out with friends. Similar study done by Sharma A et al reported that more males than females felt bored without internet, felt sleepless due to online till late night, found internet was better than going out with friends, decreased outdoor activity due to internet. This shows that those who were addicted to internet have decreased time for outdoor activity such as sports activity, going out with friends or family, they also had delayed their work activity because of their usage with internet, they felt lonely and also had decreased sleep. [6] In our study, boys had more outdoor activity such as sports, going out with friends and enjoying than the girls. This shows that the person with less addiction has more of social healthy well-being than others.

CONCLUSION: Internet addiction has been considered as a serious problem among professional college students which will also affect their mental and physical health. So, it is necessary to take interventional measures for preventing internet addiction and initiatives would also be created by giving more opportunities for recreational and extracurricular activities. Awareness regarding the usage of internet will also be given to promote better healthy life.

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Self directed learning readiness among undergraduate medical students in a tertiary care health institution in Pondicherry

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ABSTRACT

Background: To achieve “Health for All”, the medical curriculum in India needs remodeling with learners being proactive and centre of all teaching learning activities. The self-directed learning enables learners’ acquisition of knowledge and skills for better performance and achievements. **Objective:** To assess the level of readiness for self-directed learning (SDLR) and its correlates among medical undergraduate students of a tertiary health care institution in Pondicherry. **Methods:** This cross-sectional study was conducted among 243 Bachelor of Medicine and Bachelor of Surgery (MBBS) students of a private medical college in Pondicherry after obtaining written informed consent. A self administered study tool was used for collection of relevant information. SDLR was assessed using Fisher’s 40 items SDLR scale. A score of > 150 and ≤ 150 were considered as high and low SDLR respectively. Motivation and time management were assessed using Pintrich’s Motivated Strategy for Learning Questionnaire, and Britton and Tessor’s Time Management Questionnaire. **Results:** Response rate was $> 90\%$. The mean (SD) SDLR score was 147.8 (13.2). The mean (SD) score in the domains of the SDLR were 44.1 ± 4.8 (self-management), 46.6 ± 4.6 (desire for learning) and 57.1 ± 6.9 (self-control). Around 44% of the students had high readiness for self-directed learning. Among the student’s characteristics, only stay arrangement had shown significant association with self-directed learning. Motivation level and time management skills were significant associated with readiness for self learning. **Conclusion:** Majority of the students had low readiness for self-directed learning. Considering the significant association of SDLR with motivation and time management skills, the curriculum planners should develop strategies and guidance for students to improve their motivation level and time management skills.

Key Words: Self-directed learning readiness, Medical students, Medical education, Pondicherry

INTRODUCTION

The medical curriculum in India emphasizes on scientific habits of thought, clarity of expression and independence of judgment, and instills eagerness to learn new things. Indian medical graduates are expected to be lifelong independent learner. The educational process is expected to be ever evolving and should encompasses other modalities of teaching and learning along with lecture discussion for making the medical graduates to have right knowledge, acquire sound skills and develop right attitude. In this regard, self directed learning should be encouraged and mentored by teaching faculty members.^[1] Self directed learning (SDL) has been encouraged as a methods for lifelong learning among health professionals.^[2]

Critical thinking and self directed learning (SDL) are the two crucial attributes of adult learning. According to M Knowles, SDL is defined as “a process in which an individual takes the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate

learning strategies and evaluating learning outcomes”. Readiness to SDL involves the individual’s attitude and capability of learning. Mismatch between individual’s readiness and learning direction can lead to anxiety, distress and poor knowledge and skill development which are hindering factors for lifelong learning.^[3] Motivation is an important component of learning and academic success.^[4,5] Literature on motivation among medical student is very limited especially in India.

Various studies from India in different discipline of medicine have demonstrated improvement in knowledge and skills following self directed case based learning or problem solving exercises but without assessing their readiness to learn.^[6,7] Few studies from India and Nepal have reported readiness for self directed learning among the medical students which varied widely.^[8-13] Moreover, the motivation level has not been reported in any of them. The current study was planned with the aim to assess the level of readiness for self-directed learning (SDLR) and its correlates among medical undergraduate students of a tertiary health care institution in Pondicherry.

METHODOLOGY

Study setting: Pondicherry has around nine medical colleges which includes one state government college and one autonomous institution of national importance. This study was conducted in one of the private medical colleges among MBBS students in Pondicherry. The medical college has 150 intakes into MBBS course every year. Community medicine is taught from third to seventh semester and training on primary health care is imparted during rotatory internship.

Ethical approval and study participants: This study has been approved by Institute Ethics Committee of the Medical College and conducted during the months of April-May 2018 among IV and VI semester MBBS students. Though we intended to include all the students under Community medicine during the study period, only 243 (90.7%) gave written informed consent to participate. Chronic absentees and student self reporting under psychiatric care were excluded from the study.

Study tool: The study tool, to be self-administered, had four sections. First section had a semi-structured proforma to collect general information about the participants. The various information like age, gender, medium class 12th board, language of instruction in class 12th board, residence (urban/rural) and current stay (hostel/day scholar) were collected. Second, third and fourth section had pre-tested SDLR, Motivation and Time Management questionnaires. SDRL was measured using Fisher's SDLR scale (40 items in 5 point Likert scale) which has been used in earlier studies from India. Each item is in a 5-point Likert scale and indicates; 1 – never true of me, 2 – not often true of me, 3 - sometimes true of me, 4 – usually true of me and 5 – always true of me. The motivation strategies for learning questionnaire (31 items in 7-point Likert scale) was used to measure the motivation. The response varies from 1 to 7 in a continuous scale; 1 – not at all true of me and 7 – very true of me. This motivation questionnaire showed good internal consistency among the study population. (cronbach alfa =0.883) A validated Time Management Questionnaire (TMQ) developed by Britton and Tesser was used to assess the time management skills of participants. This questionnaire has been used in Indian context by earlier research.^[14] The time management questionnaire has 18 items. Each item of total 18 items in TMQ is in a 5-point Likert scale and indicates; 1 – never, 2 – rarely, 3 – sometimes, 4 – often and 5 – always. The higher score corresponds to better outcome of interest in all the three scales.

Study procedure: The students were asked to assemble in a lecture hall. The researchers explained the study procedures and tools, and students giving written informed consent were distributed the self-administered study tool. No discussion and talking among students were ensured.

Statistical analysis: The missing data which was $\leq 1\%$ in $\leq 5\%$ of items were imputed using median score for that particular item. The scores in negative items were reversed in MSLQ as per the instruction provided with the MSLQ manual. The SDLR was categorized as high readiness (SDLR score of > 150) and low readiness (≤ 150). A score of more than 162 (corresponding to upper quadrant of score in motivation scale) was considered as good motivation level for this study.^[15] The score of more than 58 was considered as good time management skills.^[16] Association of SDLR with socio-demographic variables, motivation level and time management skill was assessed using unpaired “t” test, and p value of < 0.05 was considered statistically significant.

RESULTS

The median (range) age of the study population was 20 (18 – 23) years. Other demographic and general information of the study population is presented in Table 1. Nearly 90% of the participants studied in state boards. About 25% of the study participants had doctors in the family. English was the medium of instruction in class 12th for almost all the participants. **Table 1: Socio-demographic details of the study participants (N=243)**

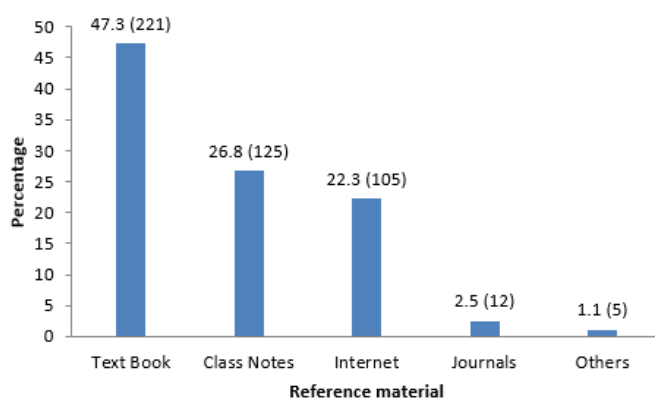
Variable	Number of students (%)
Gender	
Male	101 (41.6)
Female	142 (58.4)
Semester	
4 th	122 (50.2)
6 th	121 (49.8)
Residence	
Rural	57 (23.5)
Urban	187 (76.5)
Stay	
Day scholar	127 (52.3)
Hosteller	116 (47.7)
Class 12 th Board	
State	214 (88.1)
Others (CBSE/ICSE)	29 (9.9)
Doctors in the Family	
No	180 (74.1)
Yes	63 (25.9)
Study reference	
Don't refer	18 (7.4)
Single source	86 (35.4)
Multiple sources	139 (57.4)

Majority (57.2) of the study participants reported multiple sources of references for study. Most common sources (multiple response) for study reference were text book (47.3%) followed by class notes (26.8%) and internet (22.3%). (Figure 1)

Table 2: SDLR score among study participants (N=243)

	Total Score Mean (SD)	P value	Self management	Desire for learning	Self control
	147.8 (13.2)		44.1 (4.8)	46.6 (4.6)	57.1 (6.9)
Gender				*	
Male	149.3 (12.9)	0.141	44.6 (4.8)	47.3 (4.6)	56.9 (6.9)
Female	146.8 (13.4)		43.7 (4.9)	46.1 (4.7)	57.4 (6.8)
Stay			*	*	
Day scholar	149.9 (12.9)	0.011	44.8 (4.9)	47.2 (4.7)	57.9 (6.6)
Hosteller	145.6 (13.4)		43.3 (4.6)	45.9 (4.5)	56.3 (7.1)
Class 12 th Board					
State	147.9 (13.3)	0.595	44.1 (4.8)	46.7 (4.6)	57.2 (6.9)
Others (CBSE/ICSE)	146.6 (12.6)		44.1 (4.3)	46.2 (4.6)	56.3 (7.2)
Presence physician					
Yes	148.2 (13.1)	0.451	44.3 (4.9)	46.8 (4.7)	57.2 (6.8)
no	146.7(12.9)		43.6 (4.4)	46.1 (4.6)	57.1 (7.1)
Motivation level			*	*	*
Good	152.5 (13.5)	0	45.4 (4.7)	47.6 (4.8)	59.6 (6.8)
Moderate	144.5 (11.9)		43.1 (4.6)	45.9 (4.4)	55.4 (6.5)
Time management			*	*	*
Good	153.9 (13.1)	0	46.4 (4.8)	48.1 (4.4)	59.5 (7.1)
Poor to moderate	145.3 (12.5)		43.1 (4.6)	46.1 (4.6)	56.2 (6.6)

*significant differences, p value <0.05

Figure 1: Study reference materials among participants (multiple responses, N=467)

The mean [standard deviation (SD)] SDRL score was 147.8 (13.2) among the study participants. The mean (SD) scores in three domains of SDLR were 44.1 (4.8) [self management], 46.6 (4.6) [desire for learning] and 57.1 (6.9) [self control]. Day scholar, students with good motivation level and good time management skills had statistically significant higher SDLR scores than their counterparts. Males had higher SDLR score overall as well as in all three domains than females but the difference were statistically significant in desire for learning domain. Students with good motivation level and time management skills scored significantly higher SDLR scores in all three domains than their counterparts.

Student studied in state board for class 12th and student with doctor in the family have higher SDLR score than their counterparts, though statistically not significant. The SDLR score was similar among 4th and 6th semester students as well as students from urban and rural areas. (Table 2)

About 44.4% of the students had high readiness for SDL. Nearly half of the male students against 41% of female students had high readiness for SDL. Age did not show correlation with SDRL overall or its domains.

DISCUSSION

Available doctors in India, especially in rural areas, lack the adequate competencies to meet the health requirement of the communities to achieve “Health for All”.^[17] One of the criticisms for the current medical curriculum which emphasizes more on traditionally way of teaching is failure to inculcate acquisition of competencies and need based skills.^[18] Considering the poor competency of medical graduates, the MCI has proposed to implement competency based medical curriculum from the academic year 2019-20.^[19] Problem based learning, case discussion, community based learning, in-ward learning, case based questionnaire solving, better communication skills, interpretation and application of health related information can improve competencies of learners but requires great motivation, initiative from learner, desire,

confidence, autonomy and deep understanding.^[13,20,21] These can be instilled in an learner through SDL which is gaining momentum in various developed countries. However, an unplanned SDL can potentially harm the learning. Hence, curriculum developers need to plan the teaching learning strategies accordingly after assessing the SDL readiness.

The mean (SD) SDLR score was found to be 147.8 (13.2). This was higher than the SDLR score reported by Madhvi et al (145.2±18.2), Balamurugan et al (144.6±34.8) and Kar et al (140.4±24.4) from India.^[8,13,22] Studies by Abraham et al^[23] from Manipal Medical College, Manipal [mean score: 151.5], Gyawali et al^[9] from Nepal [mean score: 157.8], Said et al^[24] from Pakistan [mean score: 153] and Shankar et al^[11] from Nepal [mean score: 152.3] reported higher mean SDLR score compared to our study. This higher SDLR scores could be as a result of the teaching learning environment provided to the students in the respective colleges. Medical colleges from Manipal and Nepal adopt problem based learning along with didactic lecture discussions.

Except staying arrangement, none of the socio-demographic variables age, gender, medium of class 12th board, presence of doctors in the family, showed significant association with readiness for self learning. However, females, day scholar, students who had studied their class 12th in state board and having doctor in the family had higher SDLR score than their counterpart. Similar findings have been reported by Kar et al and Madhvi et al.^[8,13] In contrast to our study, Gyawali et al from Nepal and Fisher et al have reported higher SDLR scores among females than males.^[9,25] In contrast to Kar et al^[8], day scholars had significantly higher scores compared to hostelites in our study. We could not find any correlation between age and SDLR score. However, Fisher et al has reported weak but significant positive correlation between age and SDLR scores.

Students with good/high motivation level and good/excellent time management skills had significantly higher SDLR score compared to their counterparts in our study. Earlier studies from Korea and Turkey have also reported positive correlation between time management skills and readiness for self learning.^[26,27] Published scientific literature has demonstrated positive correlation and influence of motivation on self directed learning.^[28–31]

Text book was most preferred reference material for reading among our students. This probably indicates that learning is only short term to just pass the university examination. The teacher/facilitators should encourage students to go beyond text book for acquisition of knowledge and skills to be a lifelong learner and make oneself updated with current knowledge.

Among the various domains of SDLR, lowest score was recorded in self-management domain in our study. Similar findings have been reported by other studies from

India.^[8,13,22] Though students need guidance and encouragement for self learning, priority should be given to self management skills.

This is one of the very few studies in India, which has reported readiness among medical students for self learning. Almost all studies from India including ours recorded majority of the medical students have not yet developed high readiness for self learning.^[8,13,22] Focused motivation and guidance is required for the medical students to improve their readiness for self learning. Curriculum planners also need to consider the students SDL readiness before devising various teaching learning strategies.

Strength and limitations: This is one of the very few studies exploring the readiness for self directed learning in India in view of the MCI recommendation of lifelong learning for medical graduates. Data was collected anonymous self administered. Adequate care was taken for clear explanation of each item by the investigators and sufficient time was provided to respond to all the items.

The study findings are from a single medical college. Because of self administered nature of questionnaire, guessing and approximation could not be completely ruled out. Despite explaining the study tool to the participants and giving adequate time to mark responses, misunderstanding the item cannot be ruled out completely.

Conclusion: Majority of the students had low readiness for self learning in the study population. There was positive association between level of motivation and time management skills with readiness for self directed leaning among medical students.

Curriculum assessor should consider various strategies to improve the motivation and time management skills of medical students.

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Why are temporary methods of contraception not popular even among urban women? - A Qualitative study

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ABSTRACT

Introduction: Tamil Nadu, has drastically brought down its birth rate (15) and Total fertility rate (1.7). This success could be attributed to increased female sterilization, while use of temporary contraceptives which is essential to avoid unwanted pregnancies and space births continuous to be very low. The main objective of this qualitative study is to understand why temporary methods of contraception are not popular even among urban women and reasons for poor acceptance and high discontinuation rates. **Material and Methods:** In-depth interviews and Focus group discussions were conducted with women adopting one or other methods of contraceptives and those not adopting any. Focus group discussion was also conducted with service providers of urban health Centre. **Results:** Inadequate knowledge, fear of side effects and lack of spousal support were reasons for poor adoption and high discontinuation rates of temporary contraceptives. Misconceptions about fertility and opting for abortion to space births are other reasons for not using contraceptives. Service providers recommend women with two or more children to adopt tubectomy and Copper-T for those who should space births, information of other temporary methods is not provided routinely. Service providers hesitate to promote Emergency oral contraceptive pills for fear of routine use by women. Women suggested that couple counselling and information sharing through social media will promote increased use of temporary methods of contraception. **Conclusion:** Couples should be educated about the various contraceptives available, its side effects, advantages, importance of birth spacing and risks of repeated abortions and given the option to choose. Proper screenings of cases, adoption of correct techniques, efficient couple counselling and a good follow up care will promote increased use of temporary methods of contraception.

Key Words: Copper-T, Contraceptive Oral pills, Contraception

INTRODUCTION

Tamil Nadu (TN) is the 7th largest state in India with a population of 72 million and has 48% of its population living in urban areas with the literacy rate of women at 73.8%¹. TN is one of the socially and economically progressive states in India with impressive indicators related to maternal and child health. The state has brought its birth rate to 1.5² with a Total fertility rate of 1.7³ and this has been achieved mainly by female sterilization which accounts for 90% of the contraceptive use. However, focus on temporary methods of contraception cannot be neglected as it helps to avoid unwanted pregnancies, increase birth spacing and to reduce repeated termination of pregnancies as all these have a direct impact on the maternal and infant mortality and morbidity. NFHS-3 data shows that 26% of the births occur within 24 months and 59% within 3 years⁴. Few study reports that pregnancies are terminated to space births irrespective of the sex of the children^{5,6}.

It's generally expected that adoption of good health practices and utilization of health services is usually much better in urban areas, however reports from NFHS-4

reveal that adoption of temporary methods is very low even in the urban areas of the state with only 0.4% using Oral pills, 2.3% Intrauterine devices and 2.1% Condoms and the unmet need for spacing is 5.1³. According to DLHS 3, all the spacing methods together account for just around 25.5% of the current contraceptive use compared to 74.5% by female & male sterilizations.⁷ High discontinuation rates of contraceptive use are also observed in TN.⁵

The main objective of this study is to understand why temporary methods of contraception are not popular even among urban women and reasons for poor acceptance and high discontinuation rates. The study would bring out the views of the service providers (SPs) as well as the perception of women on contraceptive practice to give a holistic picture. The study findings will help to develop strategies to popularize and enhance adoption of temporary methods of contraception.

METHODOLOGY

Place of study: This would be an operation research, conducted in the catchment area of the Urban Primary

Health Centre (UPHC) Pudhupettai, located within limits of Chennai Corporation and is attached to the Department of Community Medicine, Govt Medical College, OGE, Chennai.

Study Design: A qualitative study design was chosen to obtain information from the users and SPs. In-depth Interviews (IDIs) were conducted with women and the SPs as it was considered as the ideal technique which would provide a deeper understanding on factors contributing to underutilization of temporary methods of contraceptives, Focus Group Discussions (FGDs) were conducted with women to understand group and community norms and also for triangulating information with more than one type of data collection technique.

Study Participants:

Users

IDIs & FGDs

A purposive sample of 15 women using the different methods of temporary contraceptives and those not using where also interviewed to give a holistic picture. Of the 15 women, 3 were using copper-T, three were using Oral contraceptive pills (OCPs) and another 3 who have undergone tubectomy. IDIs included three women whose spouses used condoms and another 3 who did not adopt any method of contraception. Four FGDs were conducted, two with women adopting one or the other method of contraception and another two with women not using any method of contraception

Service Providers

IDIs

IDIs were conducted with the staff of the Urban Primary Health Centre (UPHC) providing contraceptive services to obtain their views and practice – Doctor [1], staff nurse [1], urban health nurses (UHNs) [5] and Sector health nurses (SHN) [1]

The data was collected by the first and second author with the assistance of two persons and analyzed manually.

Study Period: July to Sept 2017

Ethics: Informed consent was obtained from all the study participants. Ethical clearance was obtained from the Institutional Ethical Committee of the Government Medical College, Omandurar Government Estate, Chennai.

Limitations of the Study: This study has been carried out in one UPHC area. The results of the study cannot be generalized to the entire state of TN but will definitely reflect the common views of the service providers and the user on use of temporary methods in urban areas

RESULTS

I. Users

A. Women's perception, acceptance/ reluctance and use of temporary methods of Contraception

Women said that if they have two children then the Doctor/UHNs talks to them only about tubectomy and facilitates for undergoing it in the nearest public health institution. The next option given is Copper T. For spacing they are briefed only about Copper- T.

Information on Oral contraceptive pills (OCPs) and Condoms are provided only to those not willing to use Copper-T.

a. Copper- T: The main reasons for poor acceptance and removal of Copper-T was excess and intermittent bleeding, abdominal pain, white discharge and low back ache. Fear of expulsion and need for frequent checkups were mentioned by some. Women felt that use of Copper-T can lead to ulcers in the uterus and also cause uterine perforation. With a lot of hesitation two of them said pricking pain during intercourse was the reason for removal

Failure of Copper-T in few cases has also made many lose faith in it. They have heard of instances where women have delivered baby with the Copper-T. In almost every group there was someone quoting instances of uterine infection and excessive bleeding. Such instances have created fear in the minds of many. Some felt that the Copper- T available in the private hospitals were of better quality. One of the women a teacher by profession said *"the couple should be very careful during intercourse otherwise the copper- T would be displaced, she felt that this was difficult for many women"*. Another said *"My husband will not permit me use a Copper- T as it pricks during intercourse"*. There were some positive experiences also. Two woman who have been using Copper T for more than three years said they were comfortable with it. Some said that Copper-T is inserted routinely after the birth of the first baby in most of the public institutions especially after a caesarean section and women were not informed about it.

b. Oral Contraceptive Pills (OCPs): Women at large felt that taking any tablet continuously is not good for health as it would have side effects, they felt there is always a possibility that they would forget to take it. Two women who had earlier used discontinued because of weight gain and nausea. OCPs were not considered as a reliable method and many felt that the failure rate was very high. Women did not know about the advantages of the OCPs and what they should do if they forget to take.

C. Condoms: Most of the women did not prefer condom because their husbands were not willing to use it. They said that they cannot insist their husbands to use as child bearing is the responsibility of the women. Some women did not consider it reliable as there is a possibility that it can tear. Two women whose husbands were using the condoms said that this was the best with no side effects and proper counselling of men would help to promote condom use.

d. Other methods: Women did not know about natural methods, even those who said they knew 'safe period' did not know about it correctly. Emergency contraceptive pills (EOCPs) were available in the UPHC yet no one knew about it. Tubectomy was the most popular and all women preferred it after the birth of their second child as it is a one-time solution to prevent future births.

e. Non-users: Some women who are currently not adopting any contraceptive method have had Copper-T

inserted immediately after delivery and had removed it because of bleeding or abdominal pain. Few wanted to have children and the other just had a belief that they will not conceive. Non-contraceptive users who conceive, opt for an abortion or continue their pregnancy and then go for tubectomy. The health hazards in reduced birth interval and repeated abortions is not known to them.

B. Suggestions to improve Utilization of temporary methods of contraception

Women preferred to be counselled by the Doctor rather than the nurse. Many women suggested that couple counselling on contraception should be given in all health centers as the husband has to permit to use contraception and promotion of condom use is only possible if the men are involved.

One of them said that details about the use of contraceptive methods can be shared through "WhatsApp" as every other person has access to it. Many felt that the present mode of educating women on contraception at home by the UHNs should continue as it is the best method.

II. Service Providers

A. Views of SPs – on use of Copper- T & preference for tubectomy

The doctor said that many patients are scared about using Copper- T, even if we convince them and insert it; they would remove it after some time, become pregnant and continue it or abort it in a private hospital. Hence the UHNs usually suggest only tubectomy if the women had two or more children. Copper-T was only for those who wants to space births. Information on OCPs was given to women who refused to use Copper-T. Lactating mothers and those refusing to use both Copper-T and OCPs were only suggested to use Condoms.

OCPs were not the choice of the SPs because they felt that women will definitely forget to take it regularly and it also has side effects. Again, as condom use depends on the husband, they felt it was not reliable. Since the UHNS and SHN talk only with the women they feel they cannot promote condom use. One of them said "*condom is the only temporary method which is popularized, and that too for protection against AIDS and not much as a contraceptive.*" The UPHC has EOCPS, but this is never informed to women for fear that they would start using it frequently.

At large the contraceptive used is decided by the SPs based on the needs of the women. The SPs suggest the type of contraceptive which they feel would suit the women and open choice was not given. Though the Government promotes all methods of contraception, emphasis is given only for the permanent method. UPHCs have information on the number of women using temporary methods but all the SPs felt that this is not reliable as many may discontinue and not inform them.

The SPs agreed that Copper-T is inserted in all institutions after the first baby is born. The Doctor added that Dr Muthu Lakshmi Reddy Maternity Benefit scheme

(MRMBS), the state sponsored maternity benefit fund now insists on adopting a spacing method for payment under this scheme, this she felt would encourage more women to use Copper- T.

Women generally complain of white discharge, excess bleeding and pain in the abdomen and difficulty in doing house hold work. The doctor's felt that it was the general tendency of the patients to blame the Copper-T for any sickness they have. The doctor said that the women have poor genital hygiene and go for infection frequently.

Excessive bleeding and infection in the uterus, Fear of displacement, Pain abdomen and low back ache. Inconvenience during coitus were reasons for not using Copper-T. The doctor said that "*I draw a picture of the uterus and tell them that the Copper-T will be inside the uterus like the baby and will not easily come out*", Yet some are not convinced.

Some women use Copper-T, but with fear and prefer to opt for tubectomy once they have their second child. Awareness about tubectomy is fairly high. In spite of certain problems following tubectomy it is still the most preferred by both women and SPs as it is a onetime solution and has no side effects. Puerperal sterilization is commonly done, as the rest following childbirth and for the surgery goes together..

B. Suggestions to improve Utilization of temporary methods of contraception

Counselling should be done by the doctors, as women have more faith in the doctors than the nurses. Women who have positive experience using temporary methods should share their experience in mothers meeting, which will give confidence to the others as mostly decision are made on what they hear from their friends and neighbors.

Few UHNs felt that Celebrities adopting temporary methods should come forward and talk about the advantages and the need for spacing births, as this will motivate many people similar to pulse polio immunization campaign. One UHN said that incentives can be given for Copper-T users as given a decade before to promote it.

DISCUSSION

1. Reasons for Poor acceptance of temporary methods

a. Copper- T: The SPs felt that Copper-T was ideal only for spacing and was considered to be better than other spacing methods. Side effects like Bleeding, abdominal pain, displacement of Copper- T and infection was the cause of concern both by the users and SPs as seen in other studies.^{10,11,12} Studies suggest that intra uterine contraceptive device (IUCDs) users are about 2 to 8% more at risk of developing pelvic infection⁹. Proper screening of cases, sterile insertion techniques and health education before insertion, infection could be minimized. Studies done by savitha chandra and Sarbajna also reveals the same^{13,14}. Excess and intermittent bleeding accounts for 10 to 20% of the removals. This usually settles within

one or two months. Such women should be given iron tablets and in case of slight pain managed with analgesics⁹. Adequate counselling, proper follow up care and assurance to remove in case of a problem will make the user confident to use it. IUCD continuation rates can be improved markedly by providing specific health education, which effectively addresses women's perceived fears and apprehensions.¹⁵

Women seem to discontinue use of Copper- T even at the slightest fear, pain or discomfort¹⁶, and an attitude to switch to another method was low¹⁷. Emphasize on reversibility would enhance the methods popularity and improve the level of a contraceptive use among women. Most of the other reasons expressed by women were not what they have experienced but have heard from others. Lack of adequate information from the health facilities has led to such misconceptions.

The grievance of some women was that Copper-T was inserted after the first delivery without counselling and sometimes even without their knowledge. The same scenario is seen in other studies also.^{18,19} Introducing women to the use of these contraceptives without providing counselling is probably the reason for the poor utilization of these methods. SPs should never resort to such measures, as it would make women lose confidence in the existing health care delivery system. It has to be agreed that it's unethical to do so.

b. OCPs : SPs were concerned about the side effects and tendency of women to forget to take the pills daily. Side effects like intermittent bleeding, weight gain, nausea and headache mentioned has been stated in other studies also.^{8,10,12} A medical examination before starting OCPS and reassurance from the doctors will make women confidently accept it. Proper selection of women coupled with good counselling will promote utilization.

The main reason for refusal of OCPs was the difficulty to take the pills daily without missing a single day. Such women should be informed that it could be taken as soon as they remember it along with the usual dose for that day. Not one of them knew the advantages of using OCPs. They were curious to know what would happen if they forget to take the tablet for a day or if she conceived while she was on pills ...and many more questions. There is no access to clarify their doubts. When women have so many misconceptions and doubts, it is natural to find the utilization to be very poor.

Women seem to get most the information from the friends and relatives and not from the health facilities; this is the reason for their misconceptions and fear. There were women who were comfortably using them; they could be quoted as models to build confidence among the others. A satisfied user is the best person to motivate the others.

c. Other Methods – Condoms & EOCPS : Though EOCPS were available in the UPHCs, Women were not aware of it as the SPs never provided any information for fear that women would misuse EOCPS by not adopting

any other method. A study done by Anjali Nayyar also shows that such similar fear is observed among many SPs, and women also do not consider it as a reliable method.²⁰ Counselling on condoms use was also lacking as the UHNs felt it was not of much use as they were talking only to the women

II. Tubectomy the contraceptive of choice

Tubectomy was preferred as it is impossible for a woman to adopt a temporary method till she was 45 and this gives a once in for all solution. The same views have been reflected in a qualitative study done among the SPs in Uttar Pradesh in north India.²¹ Female sterilization, is considered as the most reliable method as it does not have side effects like Copper-Tor OCPs.

III. Abortion as a method of Contraception

Women knew that reduced birth interval affects the health of the mother and new born and the difficulties in bring up the children and therefore opted to terminate their pregnancy, women are not aware of the consequences of repeated abortions. A study done in India by Agarwal N et al in India has shown that 67.18% of women who were 35 and above had a history of termination of pregnancy atleast once.²² In India only 10% of the induced abortions are legal³. The risk of death is 100 to 500 times greater for these women than women who has access for safe abortions. Emergency contraceptives should be promoted and it has lesser side effects and helps to avoid abortions²⁰

IV. Suggestions of the SPs & Users

a. Strengthening Counselling Services : Except few most of the women choose the contraceptive in consultation with their husbands. The lacuna in the existing system is that the female health functionaries always spoke about the contraceptives only to the women. Couple counselling is the need of the day. Family welfare clinics should organize Couple counselling in UPHCs on selected days by the Doctors/ Counsellors where the couples have an opportunity to discuss and chose a suitable contraceptive. Intensive counselling with multiple contact and reminders will help to improve acceptability and adherence to contraceptive use^{23,24}.

Counselling on contraceptives can be done soon after delivery in the postnatal ward and also in the immunization clinics. Doctors could examine the women and counsel the women atleast on their first visit and later could be followed by the UHN as people they had more faith in the doctors. Inter personal communication stills continues to be the most preferred method..

Awareness and access to EOCPS would help to avoid abortions. Emergency contraceptives can be used post coitally and provide back up to individuals after unprotected intercourse, missed oral pills and failure of barrier methods. EOCPS are found to be safe and effective with low failure rates²⁰. The SPs should provide information to women and on EOCPS and should make it available to women .

b. Upgrading Skills : The skills of the UHNs for screening women, Copper-T insertion and counselling

need to be upgraded. Periodical refresher training needs to be given and this has found to increase the quality of care.⁹ Comfortable use of women will reduce the number of drop outs. Use of body mapping technique as suggested by the Doctor would be a good idea and could be followed by the others also. The procedure of Copper-T insertion should be explained with good audio- visual aids in simple language to remove the fear and misconceptions.

c. Others : A smart phone App can be developed to provide information related to contraceptive use and this has shown an improvement in contraception uptake in Bihar.²⁵ Celebrities adopting these methods should come forward and talk about the advantages, as this will motivate people.

Conclusion and Recommendations

Public sector institutions should provide more information about the available facilities and popularize all methods of contraception. A separate counselling clinic exclusively for family welfare should be organized in all the UPHCs. A doctor should be made available at least on specific days in a week and the UHNS on all days. Couple counselling services should be provided with a Cafeteria approach where they are provided information about all the contraceptives including the advantages and side effects and also briefed on the risks of repeated abortions and the importance of birth spacing and also make EOCs accessible to women. This would help to promote use OCPs and condoms and will reduce abortions. Proper screenings of cases, adopting correct insertion technique, efficient counselling and a good follow up care are the tools for successfully promoting Copper-T.

Quality indicators like expulsion rates, failure rates, perforate rates, rate of removal of Copper-T and its reasons should be monitored as a routine. This should be inbuilt as a part of the routine health management information system. The problems faced by the SPs and users and the lacuna in the existing system, should be periodically studied to make necessary changes and to plan for strategies to improve the quality of Family welfare services to meet the unmet needs of women.

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Health seeking behaviours of individuals exposed to animals

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ABSTRACT

Background: India is a rabies endemic country, where animal bites to humans are a major public health problem and an estimated 17.4 million animal bites occur annually. It is more common in urban poor locality, since there is a combination of large human and dog populations in congested habitable areas. Seeking timely and correct post exposure prophylaxis by the exposed victims is important to prevent rabies. **Objectives:** 1. To know the characteristics of animal exposures. 2. To determine the post exposure prophylaxis seeking behaviour of individuals exposed to animals. **Methodology:** A community based cross-sectional study was conducted in urban poor locality of Tumkur District, Karnataka. The study subjects were interviewed using a pretested, semi-structured proforma to collect information regarding any history of animal exposures in last one year; if there were any animal exposures, a detailed history regarding the post exposure prophylaxis seeking behaviour was obtained. **Results:** A total of 11,289 individuals were surveyed, among whom 128 animal bite cases were reported giving the prevalence of 1.13%. In all the 128 cases, the biting animal was dog and 86.2% of them were unprovoked bites. The common bite injuries were abrasions (59.4%) and were mainly on the limbs (97.6%); 52.4% of them were category III exposures. Among the exposed, 96.1% sought help from the medical doctor, among whom 61.7% from government health care facility. **Conclusion:** The post exposure prophylaxis seeking behaviour has to be further improved; since early and correct post exposure prophylaxis is necessary to prevent rabies.

Key Words: health seeking behaviour, urban poor locality, rabies, animal bite, post exposure prophylaxis.

INTRODUCTION

Rabies is one of the oldest zoonotic disease which continues to pose a significant threat to humans in most parts of the world; particularly in Asia and Africa.¹ Nearly 95% of all human infections are due to exposure to rabid dogs.² As per a World Health Organization (WHO) estimate, annually about 59,000 human rabies deaths occur globally and of these 31,000 are from Asia and 24,000 from Africa.³

Rabies is primarily a disease of terrestrial and airborne mammals, including dogs, wolves, foxes, coyotes, jackals, cats, bobcats, lions, mongooses, skunks, monkeys, bats and humans.⁴ It is transmitted to humans and other animals through close contact with saliva from infected animals i.e. bite, scratches, licks on broken skin and mucous membranes.

India is highly endemic for rabies and has the largest number of animal bites in the World. About 15 million people are bitten by animals, mostly dogs, every year and require post-exposure prophylaxis.⁵ In urban areas, because of increased urbanization and ineffective dog population control measures; the incidence of dog bites are more. It is more so in urban poor localities, because of combination of large human & dog populations in congested habitable area. India has approximately 25 million dogs, with an estimated dog : man ratio of 1: 36.2. ⁶ The reported incidence of animal

bites is 17.4 per 1000 population. The annual number of person-days lost because of animal bites is 38 million, and the cost of post-bite treatment is about \$25 million. ⁷

Rabies deaths can be prevented by effective post exposure prophylaxis (PEP) with potent rabies vaccines and immunoglobulins administered soon after the exposure.⁸ Successful human rabies control programme comprise of three pillars: Community participation, public awareness and access to post-exposure prophylaxis. Therefore, seeking timely and correct PEP by the exposed victims is important to prevent rabies. The exposed person should seek immediate post exposure prophylaxis from the health care facility. Timely and correct PEP, which includes thorough wound wash, full course of anti-rabies vaccine (ARV) and local infiltration of rabies immunoglobulin (RIGs), is almost invariably effective in preventing rabies, even after high-risk exposure.⁹

The present study was taken up to assess the health seeking behaviour of animal exposure victims in the urban field practice area of a medical college.

Objectives

1. To know the characteristics of animal exposures in the study population.
2. To determine the post exposure prophylaxis seeking behaviour of individuals exposed to animals.

MATERIAL AND METHOD

Study place: Urban field practice area of medical college in Tumkur.

Study subjects: All household members of the study area after getting their informed consent.

Study design: Cross-sectional study.

Sample Size: 11,289 Subjects.

Statistical Analysis: Percentages.

Study period: January to June, 2018.

Methodology: A cross-sectional study was conducted in the urban poor locality of Tumkur district, Karnataka. A total of 2786 households were visited and 11,289 people were surveyed using a pretested, semi-structured proforma to collect information regarding any history of animal exposures in last one year. If there were any, than a detailed history regarding socio-demographic profile, details of exposure, PEP seeking behaviour after the exposure and details of PEP received by them were recorded. The data was analyzed using Microsoft Excel.

RESULTS

Among the study population of 11,289; 128 had animal exposure during the past one year, giving the prevalence rate of 1.13%. Among the exposed persons, majority of them were adults (63.3%) followed by children (33.6%); most of them were males (78.9%) and educated above primary school. (Table 1)

Table 1: Profile of animal bite victims (n = 128)

Characteristics		N=128
Age	Children (<14years)	43 (33.6)
	Adults (15-60 years)	81 (63.3)
	Elderly (> 60years)	4 (3.1)
Sex	Male	101 (78.9)
	Female	27 (21.1)
Education	Illiterate	37 (28.9)
	Primary school	51 (39.8)
	High school	28 (21.9)
	Diploma	11 (8.6)
Occupation	Graduate/Postgraduate	1 (0.8)
	Unemployed	24 (18.7)
	Student	55 (42.9)
	Unskilled	7 (5.5)
	semiskilled	7 (5.5)
	Skilled	26 (20.3)
	Semi profession clerk/shopkeeper	3 (2.3) 6 (4.6)

Figures in the parenthesis indicate percentage

Characteristics of exposure: Biting animal was dog in all subjects and majority of them were stray dogs (78.9%) whose fate was not known. Among the exposed individuals; 55.1% had category III exposures and 44.9% had category II exposures. Majority of the exposed

individuals had on the limbs (97.7%); abrasion and lacerations were the most common type of exposures. (Table 2)

Table 2: Characteristics of exposure (N = 128)

Characteristics		N=128
Biting animal	Dog	128 (100.0)
	Stray	101 (78.9)
Type	Pet	27 (21.1)
	Healthy	28 (21.9)
Fate of the animal	Killed	2 (1.5)
	Not known	98 (76.6)
Category of exposure	II	59 (44.9)
	III	69 (55.1)
Site of bite	Upper limb	36 (28.1)
	Lower limb	89 (69.6)
Type of wounds	Trunk	3 (2.3)
	Abrasion	76 (59.4)
	Laceration	36 (28.1)
	Punctures	4 (3.1)
	Multiple	12 (9.4)

Figures in the parenthesis indicate percentage

Table 3: Details of health seeking behaviour (N = 128)

Characteristics		N=128
Wound wash done at home	Soap & water	77 (60.1)
	Only water	17 (13.3)
	Nothing	34 (26.6)
Seeking medical care	Medical doctor	123 (96.1)
	None	5 (3.9)
Type of health care visited (n =123)	Govt. hospital	79 (61.7)
	Private tertiary hospital	29 (22.7)
	Private clinic/nursing home	15 (11.7)
	None	5 (3.9)
Distance to the health care facility (n =123)	<1km	35 (28.5)
	1-4km	25 (20.3)
	5-10km	63 (51.2)
Time of reporting to medical care (n =123)	<4hrs	110 (89.4)
	4-12hrs	9 (7.3)
	1-2days	4 (3.3)

Figures in the parenthesis indicate percentage

PEP seeking behavior: Only 73.4% of the study subjects washed their wound/s with either water or soap & water. 96.1% of them sought medical care from a medical doctor, mostly (61.7%) from a Government hospital and most of them (51.2%) travelled to the health care facility which was located at 5-10km distance from their

residence and majority of them (89.4%) reported to health care facility within 4 hours after exposure. (Table 3)

Details of PEP received: Majority of study subjects received wound management (96.1%) and anti-rabies vaccination (96.1%) in the health care facility. 99.1% of the vaccinees received by intramuscular route and only 0.9% received by intradermal route. Rabies immunoglobulin was infiltrated only in 14.5% of category III exposure victims. Only 85.9% of study subjects completed full course of anti-rabies vaccination. The reasons for not completing the full course of vaccination were negligence (38.4%), lack of transportation (15.4%), cost involved (15.4%), loss of wages (15.4%) and interferes with school timings (15.4%) (Table 4).

Table 4: Details of PEP received and compliance (N = 128)

Characteristics		N=128
Wound wash	Yes	123 (96.1)
	No	5 (3.1)
Anti-rabies vaccination	Yes	123 (96.1)
	No	5 (3.1)
Type of regimen (n =123)	Intradermal	1 (0.9)
	Intramuscular	122 (99.1)
RIG administration (n=69)	Yes	10 (14.5)
	No	59 (85.5)
Complications	None	123 (100.0)
Completion of course (n =123)	Completed	110 (85.9)
	Not completed	13 (14.1)
Reasons for non-compliance (n = 13)	Negligence	5 (38.4)
	Lack of transportation	2 (15.4)
	Cost involved	2 (15.4)
	Loss of wages	2 (15.4)
	School	2 (15.4)

Figures in the parenthesis indicate percentage

DISCUSSION

Rabies is a neglected zoonotic disease caused by the rabies virus; occurs in over 100 countries and poses a potential threat to >3.3 billion people worldwide.¹⁰ The neglected disease indicates that, it is insufficiently addressed by Governments and the International community, as they are best defined by the people and communities they affect the most i.e., poor people living in the remote rural areas and urban slums of the developing World.¹¹ It is however, the disease most amenable to control, as the tools for prevention i.e., post exposure prophylaxis (PEP) are available worldwide. Therefore, early and correct post exposure prophylaxis is necessary to prevent rabies.¹²

India is highly endemic for rabies and has the largest number of animal bites in the World. Therefore, in rabies endemic country like India, where every animal

bite is potentially suspected as a rabid animal bite, the treatment should be started immediately. It is important that the exposed individuals should seek proper medical care immediately for complete post exposure prophylaxis to prevent rabies.

The present study in the urban poor locality showed that, the prevalence rate of dog bite was 1.13 %. Likewise, the WHO sponsored multi-centric study conducted in 2003 (i.e. 15 years back) also showed that, the incidence of animal bites was 1.7%.¹³ Another study by S Sharma et al, showed that the total dog bite rate for the previous year was 2.5%.¹⁴ All these studies showed that, the animal bites are still a substantial burden for both the community as well as the health care delivery system.

The present study showed that, the biting animal was dog in all the subjects and majority of them were stray dogs (78.9%) whose fate was not known. Among the exposed individuals; 55.1% had category III exposures; majority of the exposed had on the limbs (97.7%) and abrasion/ lacerations were the most common type of exposures.

Likewise, a study conducted by Ganasva et al, showed that 95.8% of the exposures were from stray dogs.¹⁵ Similarly, a study conducted by S Sharma et al. showed that, 84.2% of the exposures were on lower limbs.¹⁴ A study by Trivedi et al, showed that 82.85% of bites were by dogs, 52.06% were by stray animals, 78.41% was unprovoked bites, 62.59% of bites were over lower limbs, 70.74% suffered from multiple bites/scratches and 73.01% were category III bites.¹⁶ A study by Venkatesan et al, showed that 78% bites were unprovoked, 53.3% were over lower limbs, 66.6% had bleeding at the site of bite.¹⁷ A study by Umarigar et al, showed that 94.1% bites were by dogs, 64.7% were unprovoked bites, lower limb was the most common site (84.3%), majority were category II exposures.¹⁸ All the studies showed that, most of them were category III exposures, which were severe exposures and need immediate and complete post exposure prophylaxis in the health care facility.

The present study showed that, only 73.4% of the study subjects washed their wound/s with either water or soap & water. 96.1% of them sought medical care from a medical doctor, mostly (61.7%) from a Government hospital and most of them (51.2%) travelled to the health care facility which was located at 5-10km distance from their residence and majority of them (89.4%) reported to health care facility within 4 hours after exposure. Likewise a study by S Sharma et al. showed that 57.9% of the animal bite victims washed wound with soap and water.¹⁴ Similarly, a study by Ganasva et al. showed that 93.8% approached Government health care facilities for post exposure prophylaxis and 64.1% travelled <10kms to approach the health care facility.¹⁵ A study by Anshuli Trivedi et al, showed that, 53.01% washed their wound with soap and water.¹⁶ A study by Venkatesan et al, showed that only 36% washed their wounds with soap and water, 65% received treatment from primary health centre.¹⁷ In a study by Dhiman et al, 43.07% washed their

wounds with soap and water, 42.38% animal bite victims opted for rational treatment.¹⁹ The above studies showed that, wound wash, which is the first and most important step to remove all the virus deposited on the surface of the wound is not followed by every exposed individual; similarly, few of the animal bite victims are still not reporting to health care facility for post exposure prophylaxis which is of important concern.

The present study showed that 96.1% got wound wash and anti-rabies vaccination as a part of post-exposure prophylaxis at the health care facility. Likewise, a study from S Sharma reported that, only 79.2% of the animal bite victims received anti rabies vaccine at the health care facility.¹⁴ The above studies showed that, many of them had not received anti rabies vaccine, which is the primary step for prevention. Similarly, the present showed that, only 14.5% of category III exposures received rabies immunoglobulins at the site of bite; likewise a study by S Sharma et al. also showed that only 29% received rabies immunoglobulin.¹⁴ A study by Venkatesan et al, showed that 70.4% bite victims received anti-rabies vaccine and only 3.8% received rabies immunoglobulin.¹⁷ A study by Umarigar et al, showed that 97% category III exposures did not receive rabies immunoglobulin.¹⁸ Rabies immunoglobulin is a life-saving immune-biological in all category III exposures, since any modern cell culture vaccine will take about 7-14 days to produce the protective immune response and these rabies immunoglobulins are readymade antibodies which will neutralize the virus at the site of deposition and thereby important for prevention of rabies.

The present study showed that, the compliance rate for complete course of anti-rabies vaccine was only 85.9%. Similarly, a study by Ravish et al. showed that, the compliance was only 60% for intramuscular rabies vaccination and 77% for intradermal rabies vaccination.²⁰ All these studies showed that the compliance for anti-rabies vaccination was poor. It is essential for all the bite victims to complete the full course of vaccination as recommended by the physician for full protection, as those who do not complete the full course of vaccines

The present study also showed that reasons for not completing the full course of vaccination were negligence (38.4%), lack of transportation (15.4%), cost involved (15.4%), loss of wages (15.4%) and interferes with school timings (15.4%). Similarly, a study by Ravish et al. showed that, the constraints for non-compliance to ARV were loss of wages, forgotten dates, cost incurred, distance to the hospital and interfering with school timing.¹⁰

To facilitate the completion of PEP and to improve compliance to ARV, anti-rabies vaccines should be made continuously available at all government hospitals and have to be provided free of charge to all animal bite victims, so that they can continue their course in any hospital, near their house/school/work place without interfering with their working hours/school timings and they need not lose their wages. Similarly, telephonic reminders can be given to all animal bite victims

regarding their next dose of vaccination. A coordinated effort should be made by all concerned, in order to complete the PEP to prevent rabies and to eliminate the disease as a public health problem.

Conclusion: In conclusion, the post exposure prophylaxis seeking behaviour of the population was inadequate and it has to be further improved by IEC activities; since early and correct post exposure prophylaxis is necessary to prevent rabies. This will help in preventing rabies among the vulnerable group and to minimize the disease burden, which in turn helps in eliminating the disease by 2030 as declared by WHO.

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Psychological aspects of quality of life of breast cancer survivors

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ABSTRACT

Background: Cancer is one of the most important health concerns and evaluating quality of life in cancer patients is an increasingly important issue. **Objectives:** To assess psychological facets of quality of life of patient suffering from breast cancer and to establish the relationship with socio- demographic determinants. **Material and methods:** A hospital based cross sectional study was conducted at rural tertiary health care centre among a total of 78 breast cancer patients in the year 2017. Data were collected by utilizing questionnaire focused on the psychological aspects of quality of life of breast cancer patients. Descriptive and inferential statistics were applied to find out significant association between demographic variables and quality of life. **Results:** Among the total of 78 breast cancer patients max, 65.3 % were in age group 45-60 years, 83.3% and 41.6% participants were unemployed and followed economic class II however; illiteracy was reported in 34.6% cases. The low age at diagnosis of disease was 30 years with max, 43.5% and 61.5% patients experienced very difficult to cope up with disease and treatment. Anxiety and depression each was experienced by maximum, 71.6% participants respectively however; almost similar psychological attitude was experienced by breast cancer patients. Determinants like occupation, economic status and marital behavior ($p < 0.05$) were significantly associated with psychological aspects of quality of life of breast cancer patients. **Conclusion:** Family support, counseling, quality health care services and breast cancer supporting group could induces confidence and positive attitude towards breast cancer as well as further quality of life.

Key Words: Breast cancer, quality of life, psychological aspects, correlation

INTRODUCTION

Globally, breast cancer is the most common malignancy affecting women, with more than 1 million cases occurring on annual basis with 5 lakh deaths. In India, there were 1.5 lakh of new cases of breast cancer during 2016 [1]. As per the Indian Council of Medical Research (ICMR) report May 2016, breast cancer stood rank 1st (14.3%) followed by cancer cervix (12.1%) amongst all cancerous conditions in women residing in India [2]. World Health Organization (WHO) defines Quality Of Life (QOL) as individual perception of life, values, objectives, standards and interests in the frame work of culture. Today, cancer is one of the most important health concerns and evaluating QOL in cancer patients is an increasingly important issue [3]. QOL is increasingly being used as a primary outcome measure in evaluating the effectiveness of cancer treatment [4, 5].

Despite of medical revolution in diagnosis and treatment of breast cancer, fear and anxiety is still rooted among patients suffering from cancer which adversely affects the mental as well as social wellbeing of their lives. Psychological distress among patient suffering from breast cancer could be exacerbated by inadequate information, cultural background, complex treatments, decision options and scheduling with various specialists

[6]. Studies have been demonstrated positive psychological effect of counseling in cancer patient, including in mood, adherence, pain and longer survival [7]. In developing countries like India, social stigma is deeply enrooted in context to cancer and its existence. According to recent statistics, prevalence of breast cancer has increased due to change in norms of society and influence of western lifestyle. Due to lack of knowledge, poverty, illiteracy and health care facilities regarding breast cancer, there is late stage detection and poor outcome reported among Indian women.

The present aimed to investigate the psychological consequences of quality of life of patients suffering from breast cancer residing in rural Indian women. There has been a social stigma regarding the incurability of breast cancer which ultimately causes mental depression, fear, anxiety, suicidal tendency and lack of social support amongst the patients, leading to premature morbidity and mortality. The psychological and functional sequelae of breast cancer management have recently received a great deal of attention for quality of life. The applications of advancement in management of quality of life of patient suffering from breast cancer could be incorporated for healthy outcome of breast cancer among rural population.

MATERIAL AND METHODS

This is a hospital based cross sectional study conducted at Krishna Institute of Medical Sciences Karad. The institute is located in rural area of western Maharashtra, India and provides specialty and super-specialty health care services. The study subjects were breast cancer patients who were diagnosed and completed treated from the parent institute and were in post treatment phase of six months to one years of duration. Study was conducted over a period of first quarter of year 2017 and a total of 78 patients were enrolled by utilizing time bound, non probability sampling technique (Purposive sampling technique) and inclusion criteria of study. Data were collected by face to face, single interactive interview, starting with an open-ended technique and culminating with a pool of scale items. The interview comprised a set of standard questionnaire which focused on the psychological facets of their disease based on scores. The score scale ranges from 1 to 5 of which score 1 denote worst possible response and 5 being the best. The interview technique began with obtaining breast cancer patients' assessments of their experiences as survivors with a focus on problems they experienced since their diagnosis and treatment along with socio-demographic factors elaborated through colloquial language (Marathi). Descriptive and inferential statistics were applied to find out significant association between demographic data and QOL. All the subjects were accounted for input were fed in an Excel spreadsheet using Microsoft® Excel 2016 and decrypted using IBM SPSS 2016 to a statistical form of data which helped to draw a conclusion.

Inclusion criteria: Breast cancer survivor willing to participate in study, able to talk and cooperate, resident of rural western Maharashtra without any other cancerous condition.

Case definition: Breast cancer survivor is one who has finished the cancer treatment and living with, through and beyond cancer^[8].

Ethical Consideration: Institutional ethical committee approval and written consent of each patient was obtained before to conduct the research.

RESULTS

A total of 78 breast cancer patients, interviewed with standard questionnaire were in age group ranges from 30 to 76 years with mean age 50.1yrs and standard deviation(SD) 12.37 years respectively. Maximum, 65.3 % were in age group 45-60 years followed by 28.2% in 30-45. High proportions, 83.3% participants were unemployed/housewife category however; illiteracy was reported among 34.6% cases. According to modified B.G. Prasad classification 2017 max, 41% cases were belonged to economic class II. The married behavior was observed among max, 96.1% cases (Table 1).

Table 1: Socio-demographic distribution of breast cancer survivors

Socio-demographic determinants	Frequency (%)	Socio-demographic determinants	Frequency (%)
Age (yrs):		Occupation:	
30-45	22(28.2%)	Unemployed	65(83.3%)
45-60	51(65.3%)	Employed	13(16.6%)
60-75	04(5.1%)	Income :	
75-90	01(1.2%)	Class-I	11(14.1%)
Education:		Class-II	32(41.0%)
Illiterate	27(34.6%)	Class-III	18(23.0%)
Primary	24(30.7%)	Class-IV	10(12.8%)
Secondary	18(23.0%)	Class-V	07(8.9%)
Graduate	09(11.5%)	Marital Status:	
		Married	75(96.1%)
		Unmarried	3(3.8%)

Table 2 indicates that 19.2% and 43.5% individuals experienced extremely and very difficult for them to cope up with their underlying disease. Similarly, 15.3% and 61.5% patients were found extremely and very difficult time in coping with the undergoing treatment for breast cancer. Max, 62.8% patients had a bearable experience in perspective of their general quality of life compared to 21.7% had an excellent response. Happiness and cheerfulness was reported among 38.4% patients as compared to 6.4% who were not at all happy in their lives. The 33.3% of the patients were quite positive about their future certainty whereas 26.9% not sure about their future life. Max, 32% participants were completely able to manage their life situation on an adequate basis compared to 12.8% who had a very lesser control. The modest review about their life satisfaction was noticed among 34.6% patients. Max, 62.8% of participants had no problems to concentrate while 17.9% said that their memory and ability had deteriorated to some extent. The 57.6% of women said that there is no change at all in their appearance whereas 8.9% felt unattractiveness. Max, 57.6% patients were confident enough about their concept and thinking. The anxiety and depression each was experienced by max, 71.6% participants respectively.

Based on the responses given by the participants, the score was distinguished into 2 categories. Response was declared either 'Poor' on the grounds of the ones marked from 1-3 whereas it was declared 'Good' when they were marked from 4-5. According to table 3, 50% patients were pointing towards the good (positive attitude) psychological responses while equal percentages were perceived poor (negative attitude) responses. The psychological aspects had a mean of 3.42 with SD of 0.55. The bi-variate analysis showed significant association between socio-economic and demographic factors like occupation ($p<0.05$), economic status ($p<0.05$) and marital behavior ($p<0.05$) with psychological aspects of quality of life of patient suffering from breast cancer (Table 4).

Table 2: Psychological behavior of breast cancer survivor

Psychological facets	Score	Frequency (%)	Psychological facets	Score	Frequency (%)
Difficulty to cope today as a result of disease	Slightly difficult	19(24.3)	Control of situations in life	Not at all	5(6.4)
	Very difficult	34(43.5)		Slightly	10(12.8)
	Extremely difficult	15(19.2)		Just	17(21.7)
	Bed ridden	10(12.8)		Manageable	21(26.9)
Difficulty to cope today as a result of treatment	Slightly difficult	8(10.2)	Satisfaction in life	Complete control	25(32.0)
	Very difficult	48(61.5)		Slightly	12(15.3)
	Extremely difficult	12(15.3)		Just	23(29.4)
	Bed ridden	10(12.8)		Manageable	27(34.6)
Quality of life	Very poor	3(3.8)	Present ability to concentrate	Totally	16(20.5)
	Poor	9(11.5)		Extremely poor	5(6.4)
	Bearable	49(62.8)		Very poor	9(11.5)
	Excellent	17(21.7)		Poor	15(19.2)
Happiness	Not at all	5(6.4)	Changes appearance in	Good	27(34.6)
	Just okay	15(19.2)		Excellent	22(28.2)
	Happy	30(38.4)		Unattractive	7(8.9)
	Quiet happy	20(25.6)		Limited to clothes	26(33.3)
Uncertainty about future	Very happy	8(10.2)	Changes concept in self-	No change	45(57.6)
	Extreme	7(8.9)		Self doubt	14(17.9)
	Variable	13(16.6)		Slightly confident	19(24.3)
	Not sure	21(26.9)		Enough confident	29(37.1)
Anxiety	Quiet positive	26(33.3)	Depression	Quite confident	16(20.5)
	Very positive	11(14.1)		Severe	11(14.1)
	Very anxious	9(11.5)		Moderate	26(33.3)
	Moderate	15(19.2)		Mild	19(24.3)
	Unforgettable	7(8.9)		Not at all	22(28.2)
	Uneasy	25(32.0)			
	No problem	22(28.2)			

Table 3: Score category distribution of Psychological aspects

Study variables	Poor response	Good response	Study variables	Poor response	Good response
	Frequency (%)	Frequency (%)		Frequency (%)	Frequency (%)
Coping with disease	59(75.64)	19(24.35)	Ability to concentrate	29(37.17)	49(62.82)
Coping with treatment	70(89.74)	08(10.25)	Future uncertainty	41(52.56)	37(47.43)
Quality of life	61(78.20)	17(21.79)	Appearance change	7(8.97)	71(91.02)
Happiness	50(64.10)	28(35.89)	Self-concept	62(79.48)	16(20.51)
Control situations over	32(41.02)	46(58.97)	Anxiety	31(39.74)	47(60.25)
Life satisfaction	35(44.87)	43(55.12)	Depression	56(71.79)	22(28.20)

DISCUSSION

The present study revealed maximum breast cancer cases (65.3%) were in age group 45-60 years with low age at

diagnosis of disease was 30 years. Similar observations were also reported by Suresh P ^[9] from North India, Kokiwar P ^[10] from South India and Acharya SC ^[11] from

Table 4: Association between demographic and Score of psychosocial variables

Socio-demographic Variable	Psychological aspects of Quality of life	
	Mean and SD: 3.42 and 0.55	
	Chi square	p-value
Age	22.133	0.731
Occupation	35.267	0.001*
Education	5.067	0.167
Economic status	29.467	0.001*
Marital Status	38.4	0.001*

(* indicate $p < 0.05$ at 95% confidence level)

Nepal. It indicates that high incidence of breast cancer among Asian women confined to age group of 45-60 years. Majority of breast cancer cases [83.3%] in our study are housewives as they are coming from rural area and farming is still not considered as occupation in India. The studies conducted by Pakseresht S et al [12] and Pandey M [13] have been also reported similar findings. In our study, proportion of occurrence of breast cancer cases is high, 70.1% among the women from upper economic class and reason behind is even though study conducted in rural area but modern agriculture initiatives, sugar belt of Maharashtra state, cash generating farming, increased literacy, good connectivity and strong political support leads to sound economic status occupied by farmers could be responsible change in lifestyle and exposure to environmental factors lead to high incidence of breast cancer among rural population. Study carried out by Kelsey JL [14] also mentioned that breast cancer is mainly confined to women coming from high economic status.

On an average each, 50% patients have had good as well as poor score of psychological aspects. However, a study conducted by Khandelwal et al [15] in India stated that maximum participants mentioned poor score and this difference could be due to proper counseling, assurances, modern and high quality of cancer services rendered by study institute. Similarly, education, sound economic status and family support during disease going to play important role in strong psychological behavior of breast cancer patients even though they are from rural area. In context to psychological aspects like depression, happiness, confidence, uncertainty of life, quality of life and combat to underline disease and treatment was reported moderate to severe by 50% individuals. The nuclear family structure, poor emotional and physical support by family, poor nutritional status, poverty/cost of treatment induced economic crisis and misbelief could be the determinants for poor psychological behavior. Similar findings have also been reported in a study on "depression and family support in the breast cancer patient's" conducted in Japan as well as by Suleiman AH et al [16].

The psychological aspects viz; memory and ability to concentrate (control of situations and concentration), sexuality and sex life (change in appearance), home activities (satisfaction of life), anxiety were adequately adopted by patients. Similar cognitive behavior findings were also observed by Ahles TA [17]. However, study carried out by Sharma A [18] proved that there was extreme dissatisfaction in the quality of the married relationship and this could be due to age differences among study population and geographical distribution. In young patient the dissatisfaction in with sex life was related to their frequent interruptions, performance, and psychological difficulties. Similarly, more than 50% of the patients reported were disinterested during routine and employment activities noticed by Tevaarwerk A [19]. These differences could be due to family support which was provided in present study by family members, relatives as well as health personals. Breast cancer supporting group which was established by institution induces confidence and positive attitude towards disease as well as life observed among our study participants.

Study revealed a significant positive association between psychosocial aspects of QOL and determinants viz. education, occupation and marital status ($p < 0.05$). This means high socio-economic status breeds psychological distress. Similarly, being married adds up to the problem. Contrary to what other studies state, we've found that majority of the women were housewives (unemployed) had a linear relation with the current issue. In Indian rural scenario, majority of women population are engaged with household as well as farm activities with little variation. Some epidemiological studies conducted in India have indicated a positive association between occupational status quality of life breast cancer [20].

CONCLUSION:

The psychological facets of quality of life of breast cancer were perceived poor by the patients resided in rural area of India. Socio- demographic factors like occupation, economic status and marital behavior were significantly associated with psychological aspects of quality of life. There is a need to create more awareness and counseling regarding quality of life at the times of diagnosis among breast cancer patient. Knowledge regarding self examination of breast and early detection of breast cancer along with creating more breast cancer support group from diagnosed and treated cases are required.

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Risk of Type 2 Diabetes Mellitus among Health Care Providers at Tertiary Care Hospital

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ABSTRACT

Background: Diabetes is a leading public health problem throughout the world, and despite years of research and development, it is one of the fastest growing conditions worldwide. Diabetes along with other non-communicable diseases acts as an obstacle for attaining sustainable developmental goals. It is also responsible for premature death and disability¹. Hence, the early screening which prevents the complications and premature death is very much needed in the society. **Objectives:** 1. To evaluate the risk of type 2 diabetes among health care providers using Indian diabetes risk score. 2. To explore the relationship between Indian diabetes risk score and random capillary blood glucose level. **Methodology:** A cross sectional study was conducted among 250 health care providers of Velammal medical college and Research Institute, Madurai. A pretested semi-structured questionnaire was applied. Indian diabetic risk score (IDRS) was used to assess the risk of getting diabetes. **Results:** Among study subjects 18.4 % had high risk for getting diabetes based on IDRS. Housekeeping staffs had higher risk for diabetes compare to other occupational groups. IDRS was positively correlated with random capillary blood glucose level. High BMI, frequent meat consumption, frequent sweet consumption and low water consumption were significantly associated with high risk for diabetes. **Conclusion:** Even though health care providers are at continuous contact with health care system still the early screening for diabetes risk was not happening. Hence this present study create a milestone to generate awareness among them regarding the importance of early screening to detect the hidden disease. Hence it is recommended that, the screening for diabetes has to be a part of their pre-placement examination and periodical examination.

Key Words: IDRS, Diabetes, Health care providers, Capillary blood glucose.

INTRODUCTION

Diabetes is a metabolic disorder occurs as a result of defective insulin production from pancreas or when the body cannot use the insulin effectively. Insulin regulates the blood sugar level by carrying glucose to the cell. If the glucose cannot get in to the cells then the sugar builds up to harmful levels in the blood.

The major risk factors of diabetes are strong family history of diabetes mellitus, age, obesity and physical inactivity. Insulin resistance is yet another factor which increases the risk of getting type 2 diabetes mellitus. Out of these, the modifiable risk factors like obesity and physical inactivity are increasing day by day in current generation. These two factors along with strong family history of diabetes mellitus becomes a major predictor of type 2 diabetes mellitus. Both obesity and physical inactivity decreases insulin sensitivity which in turn leads to alteration in glucose homeostasis.

Diabetes previously a disease of middle age and elderly, now it is seen in all age groups due to change in lifestyle, dietary habits and stressful working environment².

Diabetes epidemic is increasing rapidly in low and middle income countries in the recent years. As per the 2015 data, India had 69.2 million people living with

diabetes. Out of that more than half (36 million) of the people remain undiagnosed of the condition¹. Based on studies conducted in different part of India, the prevalence of risk of diabetes varies from 33% to 86%³⁻⁸. Lack of physical activity along with obesity plays a major role in poor insulin sensitivity which leads to type 2 diabetes mellitus⁹. The health care providers are at risk of getting diabetes because of their stressful working environment along with lack of physical activity¹⁰. Since diabetes is an iceberg disease the hidden portion of disease is yet to be explored¹¹. For that, in the present study, a simple and validated questionnaire developed by Mohan et.al, called Indian Diabetic Risk Score (IDRS) was used¹². IDRS contains four parameters i.e. age, obesity status, exercise status and family history of type 2 diabetes mellitus.

Objectives: 1. To evaluate the risk of type 2 diabetes among health care providers using Indian diabetes risk score. 2. To explore the relationship between Indian diabetes risk score and random capillary blood glucose level.

MATERIAL AND METHODS

Study design:

Cross sectional study was conducted among health care providers like Doctors, Nurses, lab technicians,

administrative workers and House-keeping workers of Velammal medical college and research institute, Madurai over a period of two months (June and July 2017).

Sample size and selection criteria:

Based on a study conducted by Anand Vardhan et al, the prevalence of risk of diabetes was 33%³.

Sample size $N = Z_{\alpha}^2 pq/d^2$

Z_{α} at 95% confidence interval = 1.96

$p = 33\%$, $q = 100 - p = 67\%$

$d =$ absolute precision = 6%

$N = 236$ rounded off to 250

Total samples needed for the study was 250 and 50 samples was selected from each stratum of health care providers.

Inclusion criteria:

Age above 20 years and willing to participate in the study

Exclusion criteria:

People already having diabetes mellitus

Procedure:

After getting clearance from ethical committee and informed consent from the study participants a pretested semi-structured questionnaire was applied. Data regarding the basic socio-demographic details, family history of diabetes and physical activity level were collected. Waist circumference was measured by using a measuring tape at the mid-point below the lower rib cage and the highest point of the iliac crest. Measurements were taken with the subjects in minimum clothes and when they were breathing quietly at the end of their expirations. Based on the above data Indian diabetes risk score (IDRS) was calculated. Weight was measured using a digital weighing machine and height was measured using inch tape pasted on a wall. Random capillary blood glucose was measured using a valid glucometer with least error margin.

Operational definition:

Box 1. Indian Diabetic Risk Score (IDRS)

Particulars	Score
Age in years	
< 35 (Reference)	0
35 – 49	20
>= 50	30
Abdominal obesity	
Waist <80 cm [female] , <90 [male] [reference]	0
Waist ≥ 80 – 89 cm [female], ≥ 90 – 99 cm [male]	10
Waist ≥90 cm [female], ≥ 100 cm [male]	20
Physical activity	
Exercise [regular] + strenuous work [reference]	0
Exercise [regular] or strenuous work	20
No exercise and sedentary work	30
Family history	
No family history [reference]	0
Either parent	10
Both parents	20

Maximum score = 100; Minimum score = 0

Based on Indian diabetes risk score (IDRS)¹², the risk of getting type 2 diabetes classified as:

Low risk: IDRS score < 30; Medium risk: 30 – 50; High risk: ≥ 60

Box 2. Body mass index (BMI):

Calculated using formula Weight in kg/ height in meter square Asian Classification¹³:

Category	BMI (kg/m ²)
Underweight	<18.5
Normal	18.5-22.9
Overweight	>23
Pre-Obese	23-24.9
Obese class I	25-29.9
Obese class II	>30

Study tools:

Semi-structured questionnaire

Weighing machine

Inch tape

Glucometer

Quality control and confidentiality:

Data were collected and confidentiality was maintained with utmost care by the investigator.

Statistical analysis:

Data were entered in Microsoft Excel and analysis was done using SPSS 16.0. Descriptive analysis like mean and standard deviation was calculated for quantitative variables and proportion for qualitative variables. Association between qualitative variables were assessed using Chi-square test and for continuous variables t-test or ANOVA was used. Correlation coefficient was measured to find out correlation between IDRS score and random capillary glucose level.

Ethical considerations:

Ethical committee clearance was obtained before starting the study

RESULTS

A cross sectional study was conducted among 250 health care providers of velammal medical college hospital and research institute, Madurai. Doctors, nurses, lab technician, house-keeping and administrative staffs were included in the study. In each strata 50 samples were recruited based on convenient sampling.

The mean age among the study participants were 28.87 years with standard deviation of 8.73 years. In the present study female participants were more (83.6%) when compared to male (16.4%). Majority of study subjects were in the upper middle class (46.8%) followed by upper class (22.4%), lower middle (16.8%) and upper lower (14%). Non vegetarian (67.6%) was the predominant dietary habits among the study subjects. Mean BMI among study population was 22.51 kg/m² with standard deviation of 4.602 kg/m². In the present study the proportion of overweight and obesity together contribute a significant bulk with 38.8 %.(**Table: 1**)

In the present study majority belongs to age less than 35 years (76.8%), two non-diabetic parents (75.2%), sedentary at work or home (48.8%) and waist

circumference with female <80 or male <90 (58.8%). Then overall IDRS score showed majority belongs to medium risk (59.6%). (**Table: 2**)

Table 1: Socio-demographic and nutritional profile of study subjects

Variables		Number of subjects	Percentage
Gender	Male	41	16.4
	Female	209	83.6
Socioeconomic status	Upper class	56	22.4
	Upper middle class	117	46.8
	Lower middle class	42	16.8
	Upper lower class	35	14
	Vegetarian	81	32.4
Diet	Non vegetarian	169	67.6
	Underweight	50	20
BMI	Normal	103	41.2
	Overweight	36	14.4
	Obese	61	24.4

Table 2: Distribution of study subjects based on IDRS scoring system

IDRS Domain	Classification	Number (n=250)	Percentage
Age	< 35 years	192	76.80%
	35-49 years	48	19.20%
	>= 50 years	10	4.00%
Family history of diabetes mellitus	Two non-diabetic parents	188	75.20%
	Either parent diabetes	46	18.40%
	Both parents diabetic	16	6.40%
	Vigorous exercise or strenuous work	14	5.60%
Physical activity level	Moderate exercise at work/home	114	45.60%
	No exercise and sedentary at work/home	122	48.80%
	Female <80, male <90	147	58.80%
Waist circumference	Female 80-89, male 90-99	58	23.20%
	Female >= 90, male >= 100	45	18.00%
	Low risk	55	22.00%
IDRS overall scoring	Medium risk	149	59.60%
	High risk	46	18.40%

There was a positive correlation exists between IDRS score and random capillary blood glucose value, it was found to be statistically significant with spearman correlation value of 0.231 and p value of 0.001. (**Fig: 1**)

Factors associated with diabetes

Factors which found to be significantly associated with diabetic risk were housekeeping by occupation (p=0.001); Upper lower class (p=0.003); Non-vegetarian by diet (p=0.009); Frequent consumption of

meat (p<0.001); Frequent consumption of sweet or pastries (p=0.002); High BMI (p<0.001) and those who consume less amount of water (p=0.019). (**Table: 3**) Other factors analyzed but not significant were gender, awareness about balanced diet, practicing balanced diet and consumption of fruits, vegetables and fish.

Table 3: Association of socio-demographic and nutritional factors with diabetes risk

Variables		High risk for diabetes	P value
Gender	Male (N=41)	9 (22%)	0.69
	Female (N=209)	37 (17.7%)	
Socioeconomic status	Upper class (N=56)	14 (25%)	0.003
	Upper middle class (N=117)	11 (9.4%)	
	Lower middle class (N=42)	7 (16.7%)	
	Upper lower class (N=35)	14 (40%)	
	Doctors (N=50)	14 (28%)	
Occupation	Nurses (N=50)	1 (2%)	< 0.001
	Lab technicians (N=50)	6 (12%)	
	Housekeeping staffs (N=50)	19 (38%)	
	Administrative staffs (N=50)	6 (12%)	
	Vegetarian (N=81)	8 (9.9%)	
Diet	Non vegetarian (N=169)	38 (22.5%)	0.009
	Underweight (N=50)	0	
BMI	Normal (N=103)	14 (13.6%)	<0.001
	Overweight (N=36)	6 (16.7%)	
	Obese (N=61)	26 (42.6%)	
Water consumption per day	>= 7 glasses (N=86)	8 (9.3%)	0.019
	3 - 6 glasses (N=42)	6 (14.3%)	
	1 - 2 glasses (N=122)	32 (26.2%)	
	<= 2 times a week (N=214)	26 (12.2%)	
Meat consumption	>2 times a week (N=36)	20 (55.6%)	<0.001
	<= 2 times a week (N=225)	35 (15.6%)	
Sweet/pastries consumption	>2 times a week (N=25)	11 (44%)	0.002
	<= 2 times a week (N=225)	35 (15.6%)	

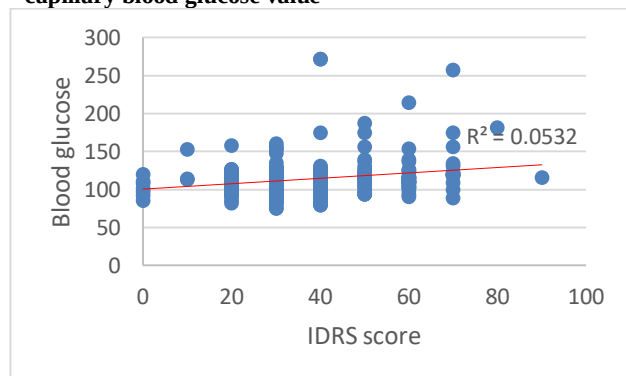
Discussion:

In this study Indian diabetic risk score was used to find out the people who were at the risk of getting diabetes. Out of 250 subjects, 18.4% had high risk, 59.6% medium risk and 22% had low risk. Similar results were obtained in a study conducted by Pothukuchi Madhavi et al. with 21.5% had high risk, 52.8% moderate risk, 19.9% had low risk¹¹.

Table 4: Association of random capillary blood glucose with diabetes risk based on IDRS

Variable	N	Random capillary blood sugar (mg/dl)		F value
		Mean	Std. Deviation	
Risk of getting diabetes (IDRS)	Low risk	55	108.87	14.263
	Medium risk	149	112.57	27.024
	High risk	46	123.54	30.931

Spearman correlation between IDRS and Random capillary blood sugar = 0.231, $p=0.001$

Fig. 1: Correlation between IDRS score and Random capillary blood glucose value

The percentage of people with high risk was more among house keeping staffs with 38%, followed by doctors 28%. This was explained by stressful working environment and change in lifestyle habits. This was concordant with the results of the study conducted by Kjeld Poulsen et al.¹⁰

While comparing socioeconomic status the upper lower class had significantly higher percentage of high risk with 40%. Similarly a study conducted by Uppara V et al. demonstrate that participants with low income have a higher prevalence of diabetes than wealthy participants¹⁴.

Regarding diet, the percentage of high risk was significantly higher among those who were non vegetarian by diet (22.5%), consuming meat more than two times a week (55.6%) and sweet or pastries consumption more than two times a week. This was similar to the results obtained in the study conducted by A Steinbrecher et al. that, meat consumption and processed meat have associated with risk of getting diabetes¹⁵.

The percentage of high risk was more among obese (42.6%) and overweight (16.7%) compared to normal subjects (13.6%). It was concordant with the study conducted by Sanjeev Kumar Gupta et al. that the chances of high diabetic score increases with increase in BMI⁷.

Another interesting factor which found to have high risk for diabetes was decreased intake of water. Those who consume one to two glasses of water per day had higher risk (26.2%) when compared to three to six glasses (14.3%) and seven or more glasses of water (9.3%). This was concordant with the study conducted by Ronan Roussel et al. lower the intake of water higher the risk of hyperglycemia¹⁶.

The mean capillary blood glucose value was significantly increasing with increase in diabetes risk ($p=0.012$) and also there was a positive correlation exists between them (Spearman Correlation $R = 0.231$, $p=0.001$). The result was concordant with the study conducted by Anad Vardhan et al.³ in which the fasting glucose value was significantly increasing with increasing risk and also positively correlated. Similarly the study conducted by V.Mohan et al.¹³ showed that an increase in IDRS was associated with worsening of glucose tolerance.

Conclusion:

In the present study the percentage of high risk for diabetes based on IDRS was 18.4%. Among them housekeeping staffs had higher proportion of high risk score and also had high mean random capillary blood glucose value. Lower socioeconomic status, high meat consumption, high sweet consumption and poor water consumption were some of the factors found to be significantly associated with high risk for getting diabetes. Even though health care providers are at continuous contact with health care system still the early screening for diabetes risk was not happening. Hence this present study create a milestone to generate awareness among them regarding the importance of early screening to detect the hidden disease. Hence it is recommended that, the screening for diabetes has to be a part of their pre-placement examination and periodical examination.

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Profile of Pediatric Animal Bite Cases in Victoria Hospital, Bengaluru: A Cross Sectional Study.

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ABSTRACT

BACKGROUND: Animal bite, usually dog bite is a significant public health problem in India. In India, every 30 minutes, a life is lost due to rabies. There is an overall rate of 2 dog bites per second in India. The annual incidence of animal bite is more in children. India's share is more than 36% of total rabies deaths. The incidence of animal bite/yr is 17.4 millions due to poor surveillance & inadequate legislation for compulsory notification of cases. **OBJECTIVE:** To determine the proportion and profile of pediatric animal bite cases attending Anti Rabies Clinic (ARC), Victoria hospital, Bengaluru. **METHODS:** Retrospective record based study from 22nd January to 31st December 2015 was conducted among children aged 0-18yrs in Victoria Hospital during January-February 2016. Study was analyzed using descriptive statistics and results represented in the form of figures, tables and proportion. **RESULTS:** Among 2856 animal bites, 962 cases (33%) belonged to study group & 95.84% of them were dog bites. 70.47% of animal bites belonged to category III and around 56% of animal bites were on upper limb of the study group. Only 253 cases (26.29%) visited Anti-Rabies Clinic on the day of bite. **CONCLUSION:** The proportion of pediatric animal bite cases is 33% which is significantly high and alarming too. Knowledge among public about the rabies and its outcomes is very less and most of them are unaware of its timely treatment with the availability of immunoglobulins and vaccines.

Key Words: animal bite, anti-rabies clinic, rabies, Victoria Hospital, Bengaluru

INTRODUCTION

Rabies, a practically 100% fatal disease is endemic in India and continues to be a public health problem except in the Islands of Andaman & Nicobar and Lakshadweep which are rabies free.¹ The incidence of rabies has reportedly declined from 30,000 annually to 20,000 following a recent assessment by a WHO sponsored national multi-centric survey in 2003-04.² In India, every 30 minutes, a life is lost due to rabies. There is an overall rate of 2 dog bites per second in India. The annual incidence of animal bite is more in children. India's share is more than 36% of total rabies deaths.³

The rabies virus, bullet shaped is very minute (120 x 80 nanometer; 1 nanometer = One millionth of a millimeter) and seen only through an electron microscope. The virus is present in the saliva of rabid animals; in the saliva of hydrophobia patients and also in the urine (low titres).⁴ Following bite, scratch, lick on broken skin (cuts/abrasions) and on intact mucus membrane the virus enters the body, multiplies locally in the tissues, muscles and enters a nerve (neurotropic) and travels to brain (@ 3 mm per hour) and

affects the brainstem function; causes hydrophobia (fear of water), aerophobia (fear of breeze) and photophobia (fear of light) and finally leads to death. The time interval between bite/exposure and onset of hydrophobia (incubation period) is usually between 3 weeks to 3 months; rarely 4 days to 2 years.⁵

Rabies, a disease of 100% fatal even today with no cure anywhere in the world. However, it is preventable with currently available modern rabies vaccines and immunoglobulins.⁶ Consequently, more responsibility rests with the physician to advise and provide the patient the correct post-exposure prophylaxis. With the advent of consumer protection act in the country and the mass media providing rabies information to lay people, the role of physician in rabies prevention assumes significance. So the physician must provide correct rabies prophylaxis following exposure failing which he/she may be sued for compensation under Consumer Protection Act.⁷

An expert group meeting for reviewing and finalizing the guidelines for management of animal bite cases was held at National Institute of Communicable Diseases, Delhi. Following this, the national guidelines for management of

animal bites were formulated in 2002 to bring out uniformity in post-exposure prophylaxis practices. Until recently the Nervous Tissue Vaccine (NTV) was the mainstay for post-exposure prophylaxis.⁶ As per WHO recommendations, the production and use of this reactogenic vaccine has been stopped since December 2004 in our country. Modern Cell Culture Vaccines (CCV) are now being used for post-exposure prophylaxis. Higher cost of intra-muscular administration of CCV is a limiting factor for its wider use. To overcome this problem, WHO has recommended use of efficacious, safe and feasible intra-dermal (ID) route of inoculation of CCVs. Sri Lanka, Thailand and Philippines have successfully adopted ID route of administration of CCV against rabies as part of their policy.⁷

National authorities after expert consultation have approved the use of ID route for administration of CCVs in the country in phased manner. Hence, the guidelines of animal bite management have been reviewed and revised with inclusion of correct technique of ID inoculation of anti-rabies CCVs.

Many studies had been taken up on the profile of rabies and its consequences but very few are done on pediatric age group who are highly susceptible for animal bites. The present study is about the profile of pediatric animal bites in Victoria Hospital in order to know the profile of pediatric animal bite.

METHODOLOGY

A hospital based cross sectional study was conducted in Victoria Hospital under Bangalore Medical College and Research Institute (BMCRI) after obtaining institutional ethical clearance. It was a record based Cross-sectional study from 22nd January 2015 to 31st December 2015. The study duration was from January 2016 to April 2016.

The study participants belonged to the age group of 0-18yrs. Data was collected retrospectively using Anti-rabies clinic ARC Registers from 22nd January 2015 to 31st December 2015. Anti-Rabies Clinic was started in Victoria Hospital during the same time from department of Community Medicine under the guidance of Dr. Anil Kumar.S, Medical Officer. A semi-structured questionnaire was prepared and the respective retrospective data was collected accordingly.

Data was entered in Microsoft Excel and analyzed in Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics used to describe the distribution of all variables. Results are represented in proportions/frequency, tables, figures and graphs.

RESULTS

Age and Gender distribution of study participants: A total of 2856 animal bite cases, 962 (33%) cases belong to pediatric age group. As per IAP, pediatric age group is in between 0-16 years. 318 cases (33.06%) were in the age group of 6-10yrs. Among 962 cases, 734(76.29%) animal

bites were seen in boys and 228 cases(23.70%) in girls. Mean age of the study participants was 8.5yrs±0.8SD as shown in table 1.

Table 1: Age Group Distribution of Study participants

Age group in years	Total number of cases(N) in %	Male(n) in %	Female(n) in %
0-5	216(32.45%)	157(72.68%)	59(27.31%)
06-10	318(33.06%)	233(73.27%)	85(26.27%)
11-15	282(29.3%)	229(81.20%)	53(18.79%)
>15	146(15.18%)	115(78.76%)	31(21.23%)
Total	962	734(76.29%)	228(23.70%)

*Mean age of study subjects: 8.5±0.8SD

Table 2: Distribution of type of animal bite cases

Type of Animal bite	Number of bites in %
Dog bite	922(95.84%)
Cat bite	23(2.39%)
Monkey bite	16(1.66%)
Bear bite	01(0.1%)

Table 3: Time of ARC visit after animal bite

TIME OF ARC VISIT	Number of animal bites in %
Day of bite	253(26.29%)
First day	333(34.61%)
Second day	107(11.12%)
Third day	83(8.63%)
Fourth day	80(8.32%)
Fifth day	27(2.81%)
Sixth day	18(1.87%)
Seventh day	24(2.5%)
More than a week	37(3.85%)

Distribution of type of animal bites: Out of 962 pediatric animal bites, 922(95.84%) were dog bite and the remaining animal bite cases were by cat, monkey and bear bite to a lesser extent as depicted in table 2.

Time of ARC visit after animal bite: Victims of animal bites visited ARC on the day of bite were dramatically less(253 cases-26.29%) followed by 34.61%, 11.12%, 8.63%, 8.32%, 2.81%, 1.87%, 2.5% and 3.85% on 1st day, 2nd day, 3rd day, 4th day, 5th day, 6th day, 7th day and more than a week respectively as mentioned in table 3.

Distribution of type of dogs: Stray dogs are the most common culprit for dog bite cases. Of 922 dog bite cases, 582 (63.12%) were stray dogs followed by 340(36.87%)

were pet dogs and 272(29.50%) were dogs under observation. Dogs under observation was for 10 days though this concept of observation is not applicable in present days but still considered based on history which is mentioned in figure 1.

Figure 1: Distribution of type of dogs

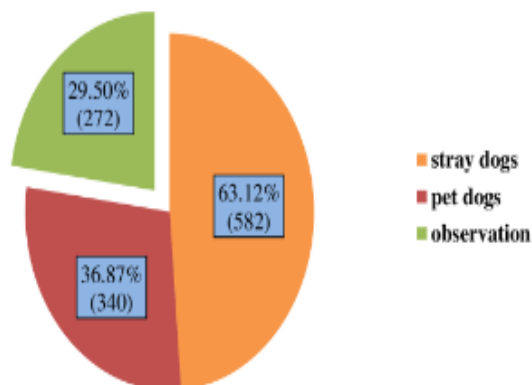


Figure 2: Categories of Animal bites

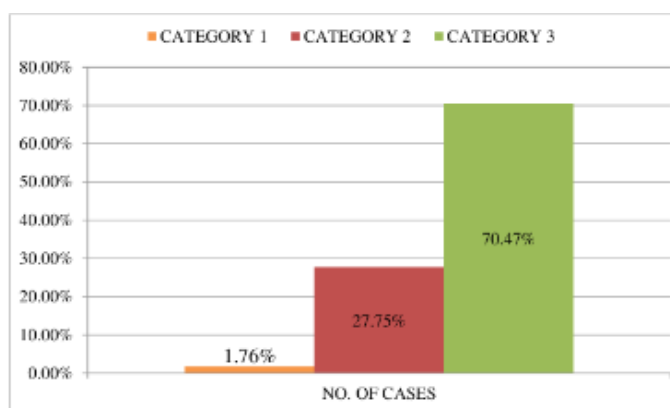
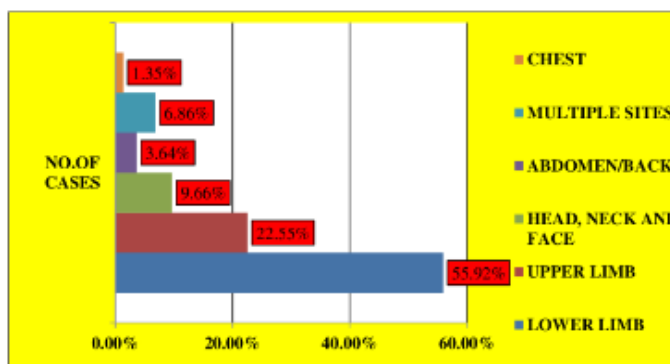


Figure 3: Sites of Animal bites



Categories of Animal bite: Category III animal bites are the most dangerous. 70.47% of the cases belonged to Category III followed by 27.75% of cases in category II and only 1.76% of them were category I as shown in figure 2.

Sites of Animal bite: The site of animal bite also possess a major threat to the victims of animal bite. 55.92% of animal bites were on lower limb, 22.5% on upper limb and 9.66% were on head, neck and face region. The bites were also seen on chest, abdomen and back and also multiple sites which is mentioned in figure 3.

DISCUSSION

Dog bite injuries in children remain an under recognized and underreported public health problem. Children continue to be at much greater risk of sustaining a serious dog bite injury than adults. Dog bites account for about 80% of animal bites.⁸

In the current study, the prevalence of pediatric animal bite cases is 33% and most of the animal bite victims were in the age group of 6-10yrs; 33.06%. The similar type of study was conducted by Vyas Sheetal et al⁹ in municipal corporation hospitals of Ahmedabad showed that 25.7% of cases were in 0-9yrs age group. Dinesh et al¹⁰ concluded that the proportion of pediatric dog bite cases was 31.68% and 39.8% of cases was seen in 6-10yrs age group. MuruganVenkatesh et al¹¹ showed that period prevalence of dog bites was 17.9 per 1000 children and 56% of cases were among children less than 10yrs of age. ApoorvaBhaskar et al¹² depicted that more number of animal bite cases (37.5%) were in pre-school age group.

Males (76.29%) are commonly affected than females (23.70%) in the present study. Vyas Sheetal et al⁹ also concluded that 75% of animal bite cases were among males and 25% in females. Dinesh et al¹⁰ concluded that 70.94% of animal bite victims were males and 29.06% were females.

In the current study, 95.84% were dog bite cases followed by cat, monkey and others. A study conducted by Vyas Sheetal et al⁹ determined that 97.3% were dog bite cases, 3% were monkey bites. R.C Panda and K.N.Tiwari¹³ also showed that 90.7% of cases were dog bite.

Category III bites are the most dangerous and life-threatening for any victim of animal bite cases. In such instance, 70.47% of cases belonged to category III animal bite followed by 27.75% category II and 1.76% were category I in our study. Vyas Sheetal et al⁹ concluded that 59% of cases were category III and 41% were category II. MuruganVenkatesh et al¹¹ determined that 67% of animal bite cases were category III. Apoorva Bhaskar et al¹² also concluded that 70% of cases were category III. R.C Panda and K.N.Tiwari et al¹³ showed that 94.7% belonged to category III.

Lower limb (55.92%) was the most commonly involved site of animal bite among animal bite victims in the current study. Vyas Sheetal et al⁹ concluded that 83% of animal bite victims had the bite on their lower limb. Dinesh et al¹⁰ also showed that 53.7% of animal bites were on lower limb of the victims. Murugan Venkatesh et al¹¹ depicted that 53.6% of bites were on lower limb of the cases. R.C Panda and K.N.Tiwari et al¹³ also showed that 44.7% of animal bites were on lower limb.

Only 26.29% of cases reported to ARC on the day of bite in our study. Vyas Sheetal et al⁹ concluded that only 22.5% of cases visited ARC on the same day of animal bite. R.C Panda and K.N.Tiwari et al¹³ showed that 33.2% of cases reported to ARC on the same day of animal bite.

CONCLUSION:

The proportion of pediatric animal bite cases is 33% which is significantly high and alarming too. Children are the most susceptible for these animal bites as they will be outdoors most of the time and the chances of getting bites are more for head and neck among younger children which is severe category III bite and if left neglected and untreated it has 100% chances of fatality. 66% of the dogs were stray dogs which are more potent for biting humans as they tend to remain unvaccinated and improper licensing. Knowledge among public about the rabies and its outcomes is very less and most of them are unaware of its timely treatment with the availability of immunoglobulins and vaccines which is depicted in the present study stating that only 26% of the victims of animal bite reported to ARC on the day of bite. Hence parents and children should be given health education and awareness regarding handling of pets and pre-exposure prophylaxis and all cases of animal bite should be given ARV and advised for RIG if required.

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Transport sector and cardiovascular disease risk estimation: cross-sectional analysis based on WHO/ISH chart.

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ABSTRACT

Introduction: Cardiovascular Diseases (CVDs) has emerged as one of the leading causes of morbidity and mortality among Non-Communicable Diseases (NCDs). Compared to occupational social class, very few studies have focused on work economic sectors. Bus drivers work conditions favour the development of a set of cardiovascular risk factors. **Objectives:** 1. To assess the cardiovascular disease risk among Cuddalore road transport corporation workers. 2. To find the factors associated with higher cardiovascular disease risk among the same population. **Methods:** An analytical cross-sectional study was done among all the workers of Cuddalore Road Transport Corporation (CRTC) from the month of March to May 2017. About 164 workers were interviewed using a pre-designed questionnaire. The total CVD risk of the workers was calculated using WHO/ISH (World Health Organization/International Society of hypertension) risk prediction charts. Ordinal regression analysis was done using STATA to study the factors associated with higher cardiovascular risk among the workers. **Results:** Among the workers, 29.9% were smokers, 42.7% were alcoholics, 23.2% and 28.9% were known diabetics and hypertensives respectively and 34.8% had family history of cardiovascular disease. As per WHO/ISH risk prediction chart, 21% of the workers had higher cardiovascular risk. On adjusted regression analysis, smoking and alcohol consumption, presence of diabetes and hypertension, family history of CVDs, reduced fruit and vegetable consumption, inadequate physical activity and higher body mass index were significantly associated to higher risk of CVD's among the workers. Work related factors like driving occupation and more than 10 years work experience contributed to higher cardiovascular risk. **Conclusion:** More than one-fifth of CRTC workers had high cardiovascular risk. Driving work conditions significantly contributed to higher CVD risk. Work place preventive and educational actions directed at changes in lifestyle regarding diet and physical activity could be beneficial to this occupation.

Key Words: Cardiovascular risk, transport workers, WHO/ISH charts

INTRODUCTION

With the turn of the century, cardiovascular diseases (CVDs) have become the leading cause of morbidity and mortality among non-communicable diseases (NCDs) in India.¹ In comparison with the western population, CVD affects Indians at least a decade earlier and in their most productive midlife years.^{2,3} Work economic sectors, even considered on a broad scale, may be of importance, because numerous exposures may vary in prevalence from one sector to the other. Recent studies in India have demonstrated an increased trend of cardiovascular disease risk factors, such as obesity, smoking and hypertension is seen among professional drivers.^{4,5,6} Considering the inherent risks associated with the profession of driving, the importance of transport workers to the country's economy and the job responsibility they carry, this study aimed to assess the cardiovascular disease risk and the factors associated among transport workers of Cuddalore Road Transport Corporation. We have adopted WHO/ISH cardiovascular risk prediction charts in the current study.

MATERIALS AND METHODS

To attain the objectives of the study an analytical cross-sectional study was carried out among the transport workers of Cuddalore Road Transport Corporation. The study was conducted during the period of March and May 2017. The transport workers comprised of bus drivers and conductors. Transport workers aged above 18 years and below 60 years who have completed at least twelve months of service in CRTC were included and workers with known history of cardiovascular disease or stroke were excluded for the analysis. After obtaining the informed consent, the study participants were subjected to a structured interview schedule capturing the following parts: Socio demographic profile, Work-related information, Cardiovascular disease risk factor profile, Lifestyle profile

The interview schedule was followed by general health examination of the workers which included measurements of weight, height, waist circumference and blood

pressure. The measurements were taken by trained field staffs using standardised methods. Since the studied involves general examination and risk factor profile, all CRTC workers were evaluated and only those fitting the inclusion criteria were included for the analysis. **WHO/ISH cardiovascular risk prediction charts:** The total CVD risk of the sampled individuals was calculated by using WHO/ISH risk prediction charts. In this study, the chart for SEAR-D region which includes India has been used as reference.^{7,8} Operational definitions are given in box1.

Box 1. Operational definitions and Data Collection:

Smoking was defined as the use of any smoke form of tobacco product in the last six months. Alcohol use was defined as consumption of any type of alcohol in the last one year. Study participants were classified as diabetics if they were under treatment with oral hypoglycaemic agents/insulin. Subjects were labelled hypertensive if systolic blood pressure ≥ 140 mm Hg and/or diastolic blood pressure ≥ 90 mm Hg or taking antihypertensive medication. Height was measured using adult portable stadiometer.

One serving of vegetable was one cup of raw green leafy vegetables or 1/2 cup of other vegetables (cooked or chopped raw). One serving of fruit was one medium size piece of apple, banana or orange, 1/2 cup of chopped, canned fruit or 1/2 cup of fruit juice. At least 2 servings of fruits or vegetable per day was considered adequate consumption in this study. Participants were also classified as sufficiently active if they exceed the minimum duration of physical activity per week recommended by WHO i.e. 150 min of moderate intensity physical activity or 75 min of vigorous intensity physical activity.⁹ Body Mass Index (BMI) was calculated by obtaining the ratio of weight (kg)/height² (m) and study subjects were classified as underweight (<18.5 kg/m²), normal (18.5 – 22.99 kg/m²), overweight (23 – 24.99 kg/m²) and obese (≥ 25 kg/m²).¹⁰ Cardiovascular disease in this study context refers to the coronary artery disease, stroke, arrhythmias and valvular heart diseases.

Procedure: This study was approved by the Institutional Ethical Committee. After establishing rapport with the workers, the purpose and procedure of the study was explained. Informed written consent was obtained from the participants and the interview schedule was administered to the participants. The identity of the participant was kept anonymous from the stage of data collection. The data was entered twice in Epidata Entryclient (v 4.2) to check for data entry errors and analysed using STATA (v 14). The significant exposure variables at $p=0.2$ were then used for model fitting. Effect of each exposure variables on high cardiovascular risk was studied after adjusting for other variables in ordinal logistic model and was expressed as adjusted odds ratio. A p -value of 0.05 was considered significant for adjusted analysis.

RESULTS

All 171 transport workers of CRTC participated in the study. Among them, 7 were known cases of coronary artery disease and were excluded for analysis. All 164

eligible workers were males and their mean age was 45.6 ± 7.5 years. About three-fourth (73.7%) of the workers had education up to higher secondary, majority (62.8%) employed as drivers and nearly half of them had more than 10-year work experience as transport workers (Table 1).

Table 1: Baseline socio-demographic characteristics of CRTC workers (N=164)

Variables	Summary statistics
Age in years, mean($\pm$ SD)	45.6 (± 7.5) years
Gender, n(%)	
male	164 (100%)
Education, n(%)	
up to higher secondary	121 (73.7%)
bachelor's degree or more	43 (26.3%)
Occupation, n(%)	
driver	103 (62.8%)
conductor/others	61 (37.2%)
Work experience, n(%)	
1-10 years	93 (56.7%)
>10 years	71 (43.3%)

Based on the workers age, gender, smoking status, presence of diabetes and systolic blood pressure, each individual's CVD risk was assessed using WHO/ISH charts. The charts shows the percentage risk of a major cardiovascular outcome in the next ten years. The percentages obtained were finally interpreted into three risk categories, low ($<10\%$), moderate (10 – $\leq 20\%$) and high ($>20\%$). Among the workers, majority (63%) had low CVD risk and about one-fifth (21%) had high cardiovascular risk

Among the CRTC workers, 29.9% were smokers, 42.7% were alcoholics, 23.2% and 28.9% were known diabetics and hypertensives respectively and 34.8% had family history of cardiovascular disease. Table 2 and 3 shows the various factors (socio-demographic, known cardiovascular disease risk factors, work-related and lifestyle) associated with high cardiovascular disease risk as assessed by WHO/ISH charts. On unadjusted analysis, all known risk factors of CVD viz., smoking and alcohol consumption, presence of diabetes and hypertension, family history of CVD and higher body mass index were significantly associated with high CVD risk among the workers (Table 2). Moreover, work related factors (occupational position, work experience), reduced physical activity and junk food consumption were also significantly associated with high CVD (Table 3). All factors significantly associated with high CVD risk in unadjusted analysis except junk food consumption were also significant associated in adjusted analysis. Additionally, inadequate fruit and vegetable consumption per day were also significantly associated to high CVD risk in adjusted analysis.

Table 2: Association of socio-demographic and known CVD risk factors with high CVD risk assessed by WHO/ISH charts among CRTC workers(N=164)

Factors	n (%)	Unadjusted Odds ratio (95% CI)*	p-value*	Adjusted Odds Ratio (95% CI)**	p-value*
Education					
higher secondary	121 (73.7%)	1	0.177	1	0.322
bachelor's degree or more	43 (26.3%)	1.3 (0.7-2.6)		0.7 (0.3-2)	
Family income					
<20,000	86 (52.4%)	1	0.015	1	0.196
>20,000 and above	78 (47.6%)	3.7 (1.3-9.7)		1.1 (0.6-2.5)	
Smoking					
yes	49 (29.9%)	6.4 (3.2-10.5)	<0.001	3.4 (1.9 -5.8)	<0.001
no	115 (70.1%)	1		1	
Alcohol consumption					
yes	70 (42.7%)	3.7 (1.8- 6.7)	0.003	2.2 (1.1-4.6)	0.036
no	94 (57.3%)	1		1	
Diabetes					
yes	38 (23.2%)	4.6 (2.3-8.1)	<0.001	3.1 (1.7-5.4)	<0.001
No	126 (76.8%)	1		1	
Hypertension					
yes	47 (28.9%)	4.9 (2.7- 8.8)	<0.001	3.9 (1.7- 6.5)	<0.001
no	117 (71.1%)	1		1	
Family history of CVD					
yes	57 (34.8%)	2.9 (1.3- 5.9)	0.024	1.8 (1.1- 4.9)	0.044
No	107 (65.2%)	1		1	
Body mass index					
normal	73 (44.5%)	1	<0.001	1	0.021
overweight	68 (41.5%)	3.2 (1.7- 5.4)		1.9 (1.2 -3.9)	
obese	23 (14%)	4.7 (2.2- 7.3)		2.6 (1.5- 5.3)	

*- Unadjusted and adjusted odds ratio calculated using ordinal logistic regression

#- Adjusted to age and all factors with p value <0.2 in unadjusted analysis (factors from table 2 & 3)

Table 3: Association of work-related and lifestyle factors with high CVD risk assessed by WHO/ISH charts among CRTC workers(N=164)

Factors	n (%)	Unadjusted Odds ratio (95% CI)*	p-value*	Adjusted Odds Ratio (95% CI)**	p-value*
Occupational position					
Conductor	61 (37.2%)	1	<0.001	1	<0.001
Driver	103 (62.8%)	10.2 (5.6 -16.1)		3.3 (1.3- 5.7)	
Work experience					
1-10 years	93 (56.7%)	1	<0.001	1	<0.001
>10 years	71 (43.3%)	16.1 (7.2-17.8)		4.1 (1.5- 5.7)	
Adequate fruit consumption					
yes	57 (34.5%)	1	0.196	1	0.025
no	107 (65.5%)	1.45 (0.7 -2.8)		2.9 (1.1-7.3)	
Adequate vegetable consumption					
yes	113 (68.9%)	1	0.192	1	0.041
no	51 (31.1%)	1.4 (0.7 -2.6)		1.8 (1.1-5.4)	
Adequate physical activity					
yes	59 (36%)	1	0.007	1	0.039
No	105 (64%)	3.6 (1.6-6.2)		1.9 (1.2-4.6)	
Junk food consumption					
yes	117 (71.3%)	2.6 (1.2-5.7)	0.038	1.1 (0.8-1.4)	0.148
no	47 (28.7%)	1		1	

*- Unadjusted and adjusted odds ratio calculated using ordinal logistic regression

#- Adjusted to age and all factors with p value <0.2 in unadjusted analysis (factors from table 2 & 3)

DISCUSSION

The main finding of our study is that more than one-third (37%) of the CRTC had moderate to high cardiovascular disease risk i.e. >10% chance of a major cardiovascular disease outcome in the next ten years. This level of CVD risk is alarmingly high when compared to a similar study done among Karnataka state transport corporation workers in 2015 where only 10% of the drivers had moderate to high CVD risk as assessed by the same WHO/ISH charts.¹¹ Similarly, a study done by *Thiyagarajan P et al* among workers of Chidambaram road transport corporation (which is in close proximity to CRTC) in 2015 revealed that only 15.5% of the workers had moderate to high CVD risk which was well below the current study's estimate.^{12,13,14} In the current study, different socio-demographic, work-related, and lifestyle factors have been assessed to identify their association with cardiovascular disease risk. It has been found that smoking and alcohol consumption, presence of diabetes and hypertension, family history of CVD, higher body mass index, driving occupation, higher work experience in transport industry, reduced fruit and vegetable intake and inadequate physical activity were independently associated with high cardiovascular disease among the CRTC workers. Since all workers were males, the association between gender and CVD risk could not be established.

The alarmingly high cardiovascular disease risk in this study population is mostly attributed to the presence of excessive unhealthy behavioural and lifestyle factors, high prevalence of central obesity, diabetes and hypertension. Nearly one-third (29.9%) were smokers, 42.7% were alcoholics, 23.2% and 28.9% were known diabetics and hypertensives respectively and 34.8% had family history of cardiovascular disease. All the above prevalence estimates of known cardiovascular disease risk factors are significantly higher than the national and state prevalence estimates.^{15,16,17} On comparison with studies done among similar population, the prevalence of alcohol consumption, diabetes and hypertension were two times higher in the current study.^{11,12,18,19} However, the prevalence of overweight (41.5%) and obesity (14%) were in par with studies done by *Kartikeyan S et al* and *Zulkifle MD* among transport workers in Andhra Pradesh and Bangalore respectively.^{20,21}

Driving occupation was a strong independent predictor of CVD risk among the workers. Additionally increased work experience as driver was also significantly correlated to high CVD risk. *Chen et al* (2005) reported that haematological markers of increased cardiovascular risks are associated with long driving time independent of conventional risk factors in drivers. Further exploration of inflammatory markers associated with hours of driving and/or exposure to environmental pollutants and its association with CVD is needed.^{22,23}

Finally, it should be highlighted that no transport worker at CRTC refused to participate in this study. The study is reported according to the STROBE checklist for cross-sectional studies. The major strength of this study is the incorporation of WHO/ISH charts which is available for the specific region and encompasses a wide range of factors for CVD risk prediction. Other strengths include the use of ordinal regression modelling to identify the independent effect of each factor on the total cardiovascular disease risk, especially the effect of work related factors.

However, our study does not allow the determination of causal associations, since we used a cross-sectional study design, and there was no control group and no followup. Since the current study aimed at identifying a cluster of cardiovascular risk factors and CVD risk in this population, one other limitation of this study would be the lack of measurements on lipid profiles or inflammatory biomarkers. System-level or worksite interventions include offering healthy food at bus depots, creating a work culture of frequent walking breaks, and interventions focusing on smoking and alcohol cessation, improving physical activity, and weight management could be beneficial to this occupational category, which will require future prospective studies to verify these outcomes.

CONCLUSION

The study found that one in five transport workers had high cardiovascular disease risk. The prevalence of known Cardiovascular Disease risk factors were higher among CRTC workers. Work conditions and few lifestyle factors were also major independent contributors to high CVD risk among the workers.

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DECLARATIONS

Ethical approval: The study was approved by the Institutional Human Ethics Committee of Mahatma Gandhi Medical College & Research Institute

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A study to Assess the Proportion of Age-related problems and Psychosocial distress among Elderly in Urban field practice area of BMCRI, Bengaluru

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ABSTRACT

BACKGROUND: Human resource is considered as an asset for a country. It plays an important role in economic development and growth. Population ageing has profound social, economic and political implications for a country. The increasing number of older persons put a strain on health care and social care systems in the country. Ageing is mainly associated with social isolation, poverty, apparent reduction in family support, inadequate housing, impairment of cognitive functioning, mental illness, widowhood, limited options for living arrangement and dependency towards end of life. **OBJECTIVE:** 1. To assess the proportion of problems in elderly. 2. To determine the psychosocial distress among elderly using GHQ-30 Score. **METHODS:** A Community based cross sectional study conducted in Urban Health Training Centre (UHTC) under Bangalore Medical College and Research Institute (BMCRI) between August 2016 to October 2016. The study was conducted among 200 elderly people aged >60yrs as per inclusion criteria by convenient sampling. A semi structured questionnaire was used to calculate socio demographic details and psychosocial distress was assessed by using General Health Questionnaire-30 (GHQ-30). Descriptive statistics and chi square tests were used to analyze the data. **RESULTS:** Mean age group of the study subjects was 67±1.24 years (N=200) and 61% of them were Hindu by religion. Most common age related disease was Cataract (46%) and 28% of them had Diabetes Mellitus as their long term illness. Depression (28%) was the most common psychological problems. There was a statistically significant association ($p < 0.005$) between female gender and psychosocial problems, Loss of spouse and psychosocial problems, Age and aging problems.

Key Words: aging, GHQ-30, psychosocial distress, Depression.

INTRODUCTION

Human resource is considered as an asset for a country. It plays an important role in economic development and growth. Greater the proportion of young persons in the population of a country, larger is the workforce, and thus more is the economic potential. India has got an advantage at present and is considered as a leading nation in the world in terms of human power. The huge young population is considered as its strength and it enhances its potential for faster growth.¹

Ageing is an inevitable developmental phenomenon bringing along a number of changes in the physical, psychological, hormonal and the social conditions.² Ageing is defined as the regular changes that occur in mature genetically representative organism living under comprehensive environmental conditions as they advance in chronological age.³ Old age has been viewed, as problematic period of one's life and this is correct to some extent.

The proportion of older persons in the population of a country has increased. Due to economic well-being, better health care system, good medicines etc. there is substantial reduction in mortality in the society. Reduced mortality has led to reduction in fertility too. These

factors together have resulted in increasing number of elderly persons in the population. This phenomenon, called population ageing, is a dynamic demographic trend all over the world.⁴

Depression is one of the most common psychological conditions during the normal course of life with so much of losses and disappointments. Depression itself refers to a heterogeneous set of phenomenon ranging from simple mood swings to severe affective state.⁵ Depression in old age creates many problems in carrying out activities of daily living. In other words, there is an increased dependency on others and health care systems. Psychological well-being studied extensively as there is a need to improve the state of mental conditions of people.⁴ Researchers find a large number of people are getting affected by mental health problems. Wellness is generally used to mean a healthy balance of mind, body and spirit and it results in an overall feeling of well-being.⁵ In other words; wellness is a view of health that emphasizes the state of the entire being and its ongoing development.

Very old people, due to their reduced mobility and debilitating disabilities, need other people to do things for them. With the increasing trend of nuclear families in the

society and with fewer children in the family, the care of older persons in the families gets increasingly difficult. To fulfill caring needs of aged persons more and more nursing people with appropriate skills are required.

Social security spending of Government also increases with the increase of old age population. On the other hand, lesser people of working age means lower number of working people leading to lower tax base and lower tax collection.⁶ Economy grows slowly as less money is available for spending on things that help economy grow. A sizeable portion of money is spent on meeting requirement of old age population. Government, thus, has to face the double whammy. On one side the resources are shrunk, on the other, expenditure is increased.⁷

To face the challenges of ageing population, the country needs to be well prepared. Appropriate social and economic policies need to be made to mitigate its ill effects. Social policy development for the elderly needs to be critically examined for society to adapt to ageing as well as for older population to adapt to a changing society.⁸ New priorities must be added to the scarce resources for social programs for elderly, while still having to deal with the problems of the younger populations. Women issues also are of paramount importance in considering social policies for elderly population. Due to better life expectancy women live longer than men. Exacerbated risks for women across the life course make them more vulnerable in old age.⁹ Appropriate care and support for them is a priority.

Hence this study is taken up to determine the psychosocial problems and psychosocial distress among the elderly in a urban slum.

METHODOLOGY

This community-based cross-sectional study was carried out at the field practice area of Urban Health Center, located at H.Siddaih road of Bengaluru city which comes under the Department of community medicine of Bangalore Medical College and Research Institute during August 2016-October 2016. The Urban field practice area was covering a population of 38,000. Among them 3600 belonged to geriatric age group. It comprised of 9.4% of population of UHTC. The study population comprises of all geriatric population aged 60 years and above in the study area, who were residing in the study area for atleast one year. The survey was done by house to house visit. After excluding the non-respondents and locked houses after atleast 3 visits and also those who were bed ridden and chronically ill, 200 respondents were recruited for the study by Convenient Sampling technique. Informed consent was taken from the study subjects.

Approval from the Human Ethical Committee, BMCRI was obtained to conduct the study. The study subjects were subjected for personal interview using a pre-tested and semi-structured proforma and clinical examinations and checking of individual records were also used as study tools in order to collect data on demographic, socio-economic, environmental and morbidity conditions.

Psychosocial distress was assessed using GHQ-30 Score which is validated and pre-tested and the scoring was done using modified likert scale.(0-0-1-1) Those who have got ≥ 8 Points, they had psychosocial distress.¹⁰

Data was entered in MS-Excel and later transferred to SPSS V.23. Analyzed using descriptive statistics. Results are expressed in terms of proportions, represented using tables, charts and graphs. Inferential statistics is used wherever required.

RESULTS

Age-group distribution of study subjects: There were 200 study subjects in the current study. Mean age of the study subjects was 67 ± 1.24 years and 76(38%) of them were in the age-group of 65-69 years as depicted in table 1.

Table 1: Age group distribution of study subjects

Age group	Frequency(N=200)	PERCENTAGE (%)
60-64 Years	39	19.50%
65-69 Years	76	38%
70-74 Years	45	22.50%
75-79 Years	19	9.50%
80-84 Years	19	9.50%
85-89 Years	2	1%

Mean age-group: 67 ± 1.24 Years

Table 2: Distribution of other socio-demographic factors

	SOCIO-DEMOGRAPHIC FACTORS	FREQUENCY(N=200)	PERCENTAGE (%)
Sex	Male	78	39%
	Female	122	61%
	Hindu	120	60%
Religion	Muslim	47	23.50%
	Christian	30	16.50%
	Others	3	1.50%
Education	Literate	139	69.50%
	Illiterate	61	30.50%
Loss of spouse	Alive	112	56%
	Dead	88	44%

Other socio-demographic factors: Among 200 of geriatric people in our study, 122(61%) of them were females and 78(39%) were males and 120(60%) of them were hindu. Among 200, 139(69.5%) were literates. Loosing spouse has a significant impact on the later part of life. 88(44%) of them lost their spouse in the present study as depicted in table 2.

Table 03: Psychological problems among elderly

PROBLEMS	FREQUENCY(N=200)	PERCENTAGE (%)
Dementia	29	14.50%
Sexual adjustment disorders	27	13.50%
Depression	56	28%
Bipolar disorders	13	6.50%
None	75	37.50%

Table 04: Psychosocial distress using ghq-30 questionnaire

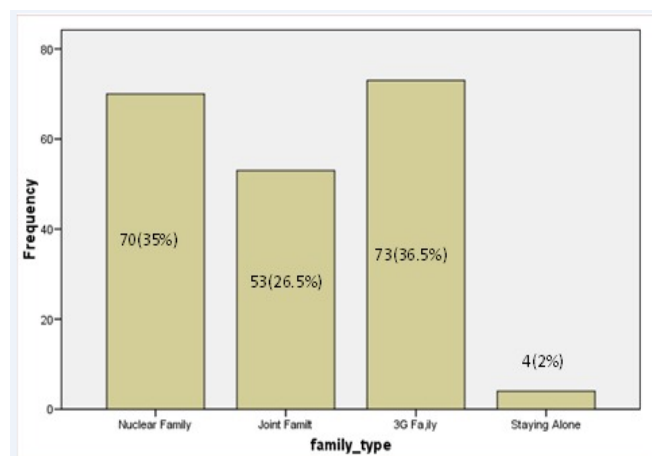
GHQ SCORING	FREQUENCY(N=200)	PERCENTAGE (%)
>8 POINTS	58	29%
< 8 P OINTS	142	71%
Total	200	100%

Table 5: Association Between Variables

Sl. no	Association	p-value
1	Female gender and psychological problems	S <0.05
2	Loss of spouse and psychological problems	S <0.05
3	Age and aging problems	S <0.05

S-Significant

Figure 1: Type of Family among Study Subjects



Psychological problems among elderly: Depression (28%) was the most common problem. Study participants had depression symptoms but not evaluated further and confirmed by any scale as shown in table 3.

Psychosocial distress assessment using GHQ-30: Among 200 study subjects, 58 (29%) of them had psychosocial distress as they scored ≥ 8 points in General Health Questionnaire-30 (GHQ-30) which is shown in table 4.

Association of Variables: There was a statistically significant association ($p < 0.005$) between female gender and psychosocial problems, Loss of spouse and psychosocial problems, Age and aging problems which means females have more psychosocial problems than males, Geriatric people who has lost their spouse and leaving alone had more psychosocial problems than the one who is leaving with their spouse, Aging problems were more as the age advances respectively as mentioned in table 5.

Figure 2: Aging problems among study subjects

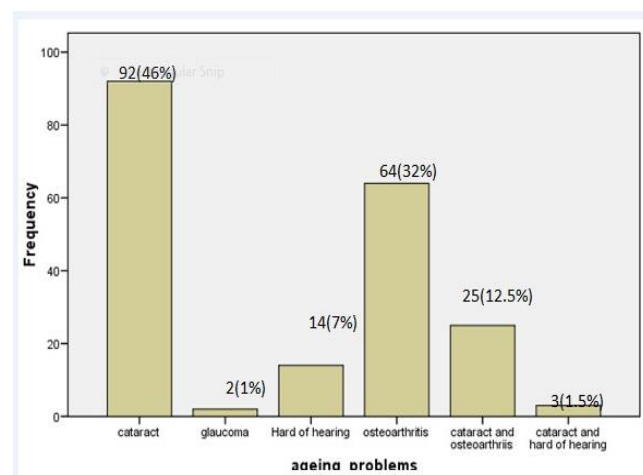
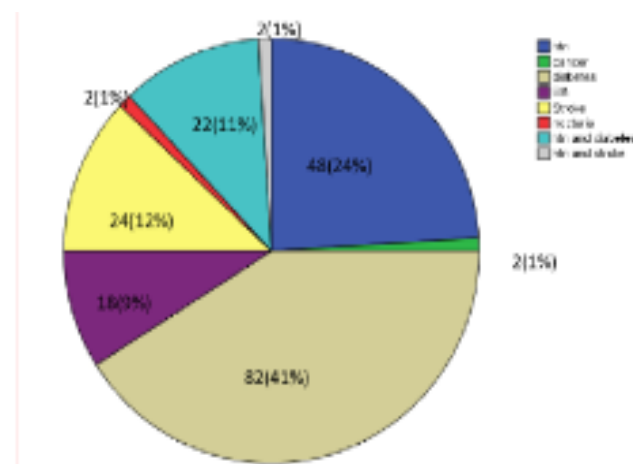


Figure 3: Long-term illness among Study subjects



Type of family among study subjects: Among 200 study subjects, 73(36.5%) of them had a three-generation family followed by 70(35%) had a nuclear family. The mode of joint family is decreasing in these days which is represented in figure 1.

Age-related illness: Aging has a impact on all the organs of human body. Cataract (41%) was the most common age related illness followed by osteoarthritis, hard of hearing and glaucoma as stated in figure 2.

Long term illness: Out of 200, 82(41%) were diagnosed with Diabetes Mellitus followed by other illness like Cancer, stroke, hypertension, Benign Prostatic Hypertrophy which is represented numerically in figure 3.

DISCUSSION

Population ageing is a global phenomenon. The elder persons in the society face a number of problems due to

absence of assured and sufficient income to support themselves for their health care and other social securities. Loss of social role and recognition and non-availability of opportunities for creative and effective use of free time are also becoming a matter of great concern for elderly persons. The trend will clearly reveal that ageing will emerge as a major social challenge in the future.⁶

In our study, mean age of the study participants was 67.2±1.2years and 38% of them belonged to 65-69yrs age group. B.Santosh et al¹¹ in a study on health profile of geriatric population in urban slum of Bijapur showed that mean age was 68±1.8years.K.Shraddha et al¹² concluded that 34.6% of the study subjects belonged to 60-64yrs.In a study done by Banerjee et al¹³ resulted that mean age of study subjects was 68.68years and most of them were in 60-69yrs age group.

Sex-ratio of elderly in India is more for females than males. In our study 61% of study subjects were females. K.Shraddha et al¹² concluded that 59% of the study sample were females in their study area.Banerjee et al¹³ also determined that 62% of the study subjects were females.

India is a hindu nation by origin so hindus are residing here more compared to other religions.In the current study,60% of the study subjects were hindus. K.Shraddha et al¹² and Banerjee et al¹³ also concluded that 94.6% and 79.6% were hindus in their study respectively.

Family is the fundamental unit of a person in community. The trend of type of family is changing in the present days which is having its own implications socially. We noticed 36% of our study subjects were belonging to three generation family where as K.Shraddha et al¹² concluded that 48.9% of them belonged to nuclear family.

Loss of spouse has a significant impact on psychosocial well-being of elderly.In our study,44% of study subjects lost their spouse and 56% of them were living with their spouse.K.Shraddha et al¹² resulted that 45% of them had lost their spouse in their old age. Banerjee et al¹³ determined that 92% of the study subjects lived with their spouse/children.

Cataract (46%) was commonly found ageing problem followed by osteoarthritis (32%) and hard of hearing in the present study. Banerjee et al¹³ concluded that 29.2% of them had cataract followed by 44.7% of them having arthritis. Long term illness like Diabetes (41%),Hypertension (24%),stroke(12%) and cancer(2%) were prevalent in the current study. Banerjee et al¹³ concluded that 12% of the study subjects had Diabetes and 30.7% of them had Hypertension.

Psychological problems are becoming more among elderly due to various reasons. Depression (28%) was the most common among our study subjects followed by dementia (14.5%) and 37.5% of them led a normal life.

Banerjee et al¹³ found that 52.3% of their study subjects reported with depression which is relatively higher than the national prevalence that needs to be addressed.

Psychosocial distress was assessed using GHQ-30 Questionnaire on study subjects. Among 200 geriatric people, 29% of them had psychosocial distress by scoring >8 points on a modified likert scale that needs to be addressed effectively.

CONCLUSION:

Awareness among the elderly population should be created for regular medical check-ups to ensure prevention and early detection of the chronic diseases. Awareness about nutrition and health-related issues of the elderly are of great importance. Health problems of elderly should be tackled with psycho-social intervention.

LIMITATIONS:

Major psychosocial distress can be seen in bedridden elderly people which I have excluded from the study and the age-related problems and chronic illness were elicited only by asking symptoms but confirmatory tests were not done. Hence this study is open for further research.

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Adherence to Treatment in Patients with Type 2 Diabetes Mellitus

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ABSTRACT

BACKGROUND: Adherence to medications is an important factor in effective prevention of diabetes complications. Assessment of treatment adherence is necessary for the effective treatment planning. This study was undertaken with the objective of assessing adherence to diabetes medications, association between adherence & glycemic control and factors affecting the poor adherence among the Type 2 DM patients. **METHODOLOGY:** A total of 236 diabetic patients were included in this cross sectional study. The required sample was obtained by simple random sampling from line listing of diabetic cases in the study area. Patients above the age of 18 years diagnosed with type 2 DM & on regular treatment for at least one year were included in the study. Glycemic control was assessed by the measuring glycated hemoglobin (A1C) value. **RESULTS:** The overall prevalence of poor adherence to diabetic medications i.e. brief medication adherence score ≥ 1 among the participants was 58.89%. There was a significant association between poor diabetic medication adherence level and their glycemic status. The majority of nonadherent patients (62.58%) had poor glycemic control state as compared to adherent patients (37.42%). Although female, frequent change in drug regimen, higher annual direct cost expenditure had higher percentages of poor medication adherence, none of these variables significantly related to poor medication adherence. However, it was found that education ≤ 10 years of schooling, duration of disease ≥ 5 years, frequency of dosing thrice daily and presence of other co-morbidities were significantly related to a low adherence level. **CONCLUSION:** A high percentage of the study population was poorly adherent to the diabetic medication. A more concerning fact was the significant association of the non-compliance with poor glycemic control, which emphasized the role of a repeated patient education regarding drug adherence.

Key Words: Adherence, diabetes, glycemic control, Salem

INTRODUCTION

Diabetes prevalence is rapidly increasing and it requires lifelong treatment with medications, regular health care follow-up for surveillance and prevention of complications, and ongoing lifestyle counseling. The majority of patients with type 2 diabetes fail to control glycaemia with diet and exercise and require pharmacotherapy—in general, initially monotherapy with an oral hypoglycemic agents (OHA); however, owing to the progressive nature of the disease, most of the patients will eventually require combination therapy and ultimately injectable treatments as monotherapy or part of polytherapy.

Despite the extensive therapy options available for various stages of type 2 diabetes, studies have indicated that less than 50% of patients achieve the glycemic goals recommended and approximately two-thirds die prematurely of cardiovascular disease. ⁽¹⁾ Drugs and lifestyle changes to control type 2 diabetes and associated conditions can only be effective through adherence to the overall prescribed regimen. The World Health Organization (WHO) has shown that adherence to long-

term therapy for chronic illnesses in developed countries averages only around 50%. Such reduced adherence not only results in poor health outcomes but it also has a significant impact on healthcare costs. ⁽²⁾ The control of diabetes requires more than just taking medicine. Other aspects of self-management such as self-monitoring of blood glucose, dietary restrictions, regular foot care and ophthalmic examinations have all been shown to markedly reduce the incidence and progression of complications of diabetes.

Patients with diabetes usually have co-morbidities that make their treatment regimens even more complex. In particular, other commonly associated diseases such as hypertension, obesity and hypercholesterolemia are themselves known to be characterized by poor rates of adherence, and serve to further increase the likelihood of poor treatment outcomes. ⁽²⁾

Treatment adherence can be defined as the extent to which the patients take medications as prescribed by health care providers and as agreed upon in the patient's

treatment plan. ⁽³⁾ Adherence to medications is an important factor in effective prevention of diabetes complications. Poor medication adherence in patients with diabetes has been associated with increased health care resource utilization, increased all-cause mortality, and increased all-cause hospitalization rates. ⁽²⁾ Assessment of treatment adherence is necessary for the effective treatment planning. Methods of measuring adherence can be either direct (biological marker), which is more sensitive but can be invasive and is not usually practical, or indirect (self-reporting, questionnaires, pill counts). Number of studies has been published in India about non-adherence to medication in Type 2 DM, however it is essential to evaluate adherence on a regular basis due to changes in culture and life style.

This study was undertaken with the objective of assessing adherence to diabetes medications, association between adherence & glycemic control and factors affecting the poor adherence among the Type 2 DM patients.

METHODOLOGY

The cross sectional study was conducted to estimate poor medication adherence rate in type 2 diabetes mellitus patients in the urban field practicing area of our medical college hospital for a period of three months from August 2017 to October 2017. . Using a prevalence of 30 percent anticipated drug adherence and absolute precision of 6 percent with 95 percent confidence; the required sample size was estimated to be 232. The required sample was obtained by simple random sampling from line listing of diabetic cases in the study area. A separate information sheet was prepared for the data collection procedures. Informed consent was obtained from the participants. Confidentiality was maintained in the process of data collection. A total of 236 diabetic patients attending urban health centre and various private clinics & hospitals were enrolled for the study. Patients above the age of 18 years diagnosed with type 2 DM & on regular treatment for at least one year were included in the study. Exclusion criteria were being pregnant, older than age 75 years, or having other diseases that could significantly affect the analysis of resource use.

Data collection was done by house visit, using the structured questionnaire. The questionnaire was pilot tested for data quality and the questions were modified and finalized based on the results of the pilot study. The three sections of the questionnaire were (1) questionnaire based survey for socio demographic characteristics (2) the brief medication adherence questionnaire, (3) costs associated with diabetic care.

Glycemic control was assessed by the measuring glycated hemoglobin (A1C) value. The cut-off for optimal glycemic control in the present study was accepted at $HbA1C \leq 7\%$.

The Brief Medication Questionnaire explores both patient's medication-taking behavior and barriers to adherence. The tool includes

(1) A 5-item Regimen Screen that asks the patients about their medications that they were currently taking. Questions are asked to list the name of each medication, frequency of medication per day, number of days and times they have received each medication along with the number of times the patient missed taking medications in the past week,

(2) A 2-item Belief Screen consists of two questions that ask the patients whether they had any difficulty with any of the medications, and does the medication bother them in any way,

(3) A 2-item Recall Screen assesses the patient's difficulty in recalling and remembering the dosage regimen of their medications.

Direct costs were estimated using a bottom-up approach for primary data collection and divided into medical and nonmedical costs. The direct medical costs assessed included medications, procedures, medical supplies (such as blood glucose test strips), visits with physicians, and hospital costs for emergency room visits (including provider fees only). The direct nonmedical costs assessed included expenses with artificial sweeteners and diet products, and laboratory testing. Annual direct cost associated with diabetic care was divided into 2 based on the median value.

Insufficient physical activity: Insufficient physical activity can be defined as less than 5 times 30 minutes of moderate activity per week, or less than 3 times 20 minutes of vigorous activity per week. Examples of moderate intensity physical activity includes walking briskly, gardening, dancing, swimming, bicycling, volleyball, scrubbing floors, carrying water from river or well, manual grinding or pounding of cereals, manual washing of clothes. Vigorous intensity activity includes jogging, running, high impact aerobic exercise, rowing, carrying or lifting heavy loads, digging or construction work, football and cycling uphill.

Statistical Analysis: Descriptive statistics were used to describe demographic and clinical characteristics of the patients and their medication adherence levels. Poor adherence to medication was considered as brief medication adherence score ≥ 1 . Due to the skewed distribution of the cost associated with diabetic care, the median values and ranges are reported. χ^2 test was used to analyze the association between the predictor variables and poor adherence in bivariate analysis.

RESULTS

A total of 236 subjects were included in the study. The mean age of the sample population was 52.4 ± 9.8 . Females constituted 54.66%. Table 1 shows the characteristics of the study population. The percentage of respondents with more than 10 years of schooling was 27.12%. Participants were classified into sedentary, moderate and heavy based on their occupational

activities. Majority of the study population i.e. 63.13% (149) were having sedentary type of life style. This was followed by unemployed/retired i.e. 56 (26.73%) and moderate which had only 27(11.44%). Among women, home-makers comprised the highest percentage of those engaged in unpaid work. . Majority of the study population belonged to the lower middle (36.86%) followed by upper middle class (26.73%). The proportion of respondents consumed alcohol in the past 12 months was 11.02%. The total physical activity of the respondents is classified under two categories sufficient and insufficient on the basis of duration for which they perform physical activities of varying intensity. The level of physical activity was insufficient among 44.45% of the respondents. The mean duration of disease was (Mean $\pm$ SD) 5.8 ± 3.8 . Majority of the patients were on oral hypoglycemic agent's i.e.78.81%.

Table 1: Characteristics of the study population (N=236)

Characteristics		Total n (%)
Age in years (Mean $\pm$ SD)		52.4 $\pm$ 9.8
Gender	Male	107 (45.34)
	Female	129 (54.66)
Education (years of schooling)	≤ 10	172(72.88)
	> 10	64 (27.12)
Occupation	Sedentary	149(63.13)
	Moderate	27 (11.44)
	Heavy	4 (1.70)
	Unemployed/ Retired	56 (23.73)
Socio economic status	Upper class	35 (14.83)
	Upper middle	56 (23.73)
	Lower middle	87(36.86)
	Upper lower	44 (18.64)
	Lower	14 (5.94)
Type of medication	OHA	186 (78.81)
	Insulin	9 (4.83)
Alcohol use	Both	41 (17.37)
		26 (11.02)
Physical inactivity		105 (44.45)
Duration of disease (Mean $\pm$ SD)		5.8 $\pm$ 3.8
Presence of other Co-morbidities	Hypertension	126 (53.38)
	Hypercholesterolemia	78 (33.50)
	Heart disease	34 (14.40)

Among the study participants, 53.38% had hypertension and 33.50 % had hypercholesterolemia. The median annual direct cost (Rupees) associated with diabetic care was INR 8450.While calculating median direct cost associated with diabetic care, those who were seeking care in urban health centre& Govt. hospitals (27.96%) were excluded as medicines & care were provided free of cost.

The overall prevalence of poor adherence to diabetic medications i.e. brief medication adherence score ≥ 1

among the participants was 58.89%.Table 2shows the responses of the participants for the Brief Medication Adherence Questionnaire .The mean score of the study participants as 2.11 ± 0.81 . 32.62% of the respondents reported missed days or doses of drug intake while 23.73 % of the respondents stop or interrupt therapy due to late refill or any other reason. 22 (9.3%) number of respondents name the prescribed drug as a drug that bothers him/her.The mean HbA1c in the study participants was 8.9 ± 1.82

Table 2 Responses for the Brief Medication Adherence Questionnaire

BMQ item	N (%)
No. of respondents failed to list the prescribed drug in the initial report	34(14.41)
No. of respondents stop or interrupt therapy due to late refill or any other reason	56(23.73)
No. of respondents report any missed days or doses	77(32.62)
No. of respondents reduce or cut down the prescribed amount per dose	24(10.17)
No. of respondents take any extra dose or more medication than prescribed	12(5.08)
No. of respondents report don't know in response to any Questions	18(7.63)
No. of respondents refuse to answer any questions	8(3.41)
No. of respondents name the prescribed drug as a drug that bothers him/her	22(9.32)

Table 3 Association between poor diabetic medication adherence and glycemic status

Glycemic status	N (%)	Poor adherence n (%)	OR (95% CI)	P value
HbA1c $>7\%$	125(52.96)	87(62.58)	2.59(1	0.0003
HbA1c $<7\%$	111(47.04)	52(37.42)	.52-4.42)	
Total	236(100.00)	139(100.00)		

Association between poor diabetic medication adherence and glycemic status: Table 3 shows the association between poor diabetic medication adherence and glycemic status. There was a significant association between poor diabetic medication adherence level and their glycemic status. The majority of poor-adherent patients (62.58%) had poor glycemic control state as compared to adherent patients (37.42%) (P-value0.0003). The mean HbA1c among poor adherent patients as 9.7 ± 2.4 , while mean HbA1c among adherent patients was 7.1 ± 0.8 .

Factors Associated With Poor Diabetes Adherence: Table 4 shows the factors associated with poor diabetes medication adherence. Although female, frequent change

in drug regimen, higher annual direct cost expenditure had higher percentages of poor medication adherence, none of these variables significantly related to poor medication adherence in the chi-square test ($p > 0.05$). However, it was found that education ≤ 10 years of schooling (OR =2.14; 95% CI 1.19-3.83), duration of disease ≥ 5 years (OR 2.21; 95%CI 1.30-3.76), frequency of dosing thrice daily (OR 4.06; 95% CI 1.62-1016) and presence of other co-morbidities (OR 3.78; 95% CI 1.37-2.33) were significantly related to a low adherence level.

Table 4. Factors Associated With Poor Diabetes Medication Adherence

Variables		N (%)	Poor adherence N (%)	OR (95% CI)	P value
1. Gender	Female	129 (54.66)	79 (56.83)	1.23(0.7 3-2.08)	0.42
	Male	107 (45.34)	60 (43.17)		
2. Education (years of schooling)	≤ 10	172 (72.88)	110 (79.13)	2.14(1.1 9-3.83)	0.009
	> 10	64 (27.12)	29 (20.87)		
3. Duration of disease (years)	≥ 5	127 (53.81)	86 (61.87)	2.21(1.3 0-3.76)	0.002
	< 5	109 (48.18)	53 (38.13)		
4. Frequent change in treatment regimen	Yes	94 (39.83)	57 (41.00)	1.1 (0.66- 1.91)	0.65
	No	142 (60.17)	82 (59.00)		
	Thrice daily	88 (37.28)	59 (42.44)	4.06(1.6 2-1016)	0.001
5. Frequency of dosing	Twice daily	121 (51.27)	71 (51.07)	2.84(1.8 1-6.83)	0.001
	Once daily	27 (11.44)	9 (6.47)		
6. Presence of other co- morbidities	Yes	141 (59.74)	101 (72.66)	3.78(1.3 7-2.33)	0.001
	No	95 (40.26)	38 (27.34)		
7. Annual direct cost (Rupees) associated with diabetic care N=170	≥ 8450	83 (48.82)	54 (56.84)	1.65(0.8 9-3.07)	0.1
	< 8450	87 (51.18)	41 (43.16)		

DISCUSSION

A high percentage (58.89%) of the study subjects was poorly adherent to the diabetic medications indicating an urgent need to improve adherence. Adherence rates to diabetic medications vary in prior studies. A study by Manobharathi et al in Chidambaram, Tamilnadu reported a poor adherence rate of 60.2%.⁽⁵⁾ In contrast a study in Chennai by Shobhana et al reported a very high prevalence of 75% poor adherence to anti diabetic medications.⁽⁶⁾ Shankar et al also reported a high

prevalence (74%) of non-adherence among rural diabetic population of Kerala.⁽⁷⁾ Systematic review of adherence to medication for diabetes both in developing and developed countries showed that average adherence to oral hypoglycemic medications ranged from 36% to 93%.⁽⁸⁾ One of the reasons for this large variation in medication adherence in these studies could be the different methods for measuring adherence. There are a number of approaches to studying medication-taking behavior. Self-report measures have the benefits of easy to administer, non-intrusive, and able to provide information on attitudes and beliefs about medication. Potential limitations to self-report are that the ability to understand the items, and willingness to disclose information, can affect response accuracy and, thus, questionnaire validity.

The main consequence of poor adherence to medications for glycemic control is decreased glycemic control, leading to the known complications of diabetes, including microvascular and macrovascular diseases and altered lipid metabolism.⁽⁹⁾ In diabetic patients good adherence to treatment, including suggested dietary modifications, physical activity has been shown to be effective in reducing complications and disability, while improving patients' quality of life and life expectancy.⁽¹⁰⁾ In addition to their positive impact on the health status of patients with chronic illnesses, higher rates of adherence confer economic benefits.

There are many potential reasons for nonadherence to medication and, frequently, more than one is present for any given patient. The reasons for medication poor adherence are multifactorial. In our study education < 10 years of schooling was significantly associated with poor adherence but higher annual direct expenditure associated with diabetic care was not significantly associated with poor adherence. Although socioeconomic status has not consistently been found to be an independent predictor of adherence, some factors reported to have a significant effect on adherence are: poor socioeconomic status, low level of education, unemployment, high cost of medication. The high cost of medicines and care is consistently reported as an important cause of non-adherence in developing countries.⁽²⁾

Several studies found that lower income groups generally spent a larger proportion of their income on diabetes care; urban populations spent more in absolute terms and that cost of complications added heavily to overall costs. Within the diabetes population, low-income individuals bear the highest burden of diabetes.⁽²⁾

An interesting study by Albaz et al concluded that organizational variables (time spent with the doctor, continuity of care by the doctor, communication style of the doctor and interpersonal style of the doctor) are far more important than socio-demographic variables (gender, marital status, age, educational level and health status) in affecting patients' adherence.⁽¹¹⁾

Duration of disease in our study appears to have a negative relationship with adherence: the longer a patient has had diabetes, the less likely he or she is to be adherent to treatment. Study also shows thrice daily drug regimen was significantly associated with poor adherence. Higher adherence levels were reported by patients required to take less frequent doses (a once-daily dose), compared to those prescribed more frequent doses (three times daily). In general, the more complex the treatment regimen, the less likely the patient will be to follow it. Adherence to oral hypoglycaemic agents has been associated with frequency of dosing. Dailey et al. also reported that patients prescribed a single medication had better short-term and long-term adherence rates than patients prescribed two or more medications.⁽¹²⁾

There have been a number of studies of compliance with OHAs and the majority indicate that adherence declines as the number of drugs increases.⁽¹³⁾ Patients may also become frustrated if their preferences in treatment-related decisions are not elicited and taken into account. For example, patients who felt less empowered in relation to treatment decisions had more negative attitudes towards prescribed therapy and reported lower rates of adherence.⁽¹⁴⁾

Poor glycemic control (HbA1c > 7%) was present in 52.96% of the patients enrolled in our study. Results from the Diabcare India 2011 study also showed mean HbA1c of $8.97 \pm 2.2\%$ where data of more than six thousand diabetic patients from India was analyzed indicating the poor glycemic control in India.⁽¹⁵⁾

CONCLUSION:

A high percentage of the study population was poorly adherent to the diabetic medication. A more concerning fact was the significant association of the non-compliance with poor glycaemic control, which emphasized the role of a repeated patient education regarding drug adherence.

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Usage of personal protective equipments among workers of a foundry in South India: interventional study

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ABSTRACT

Introduction: Occupational hazards exist in every industry. Along with engineering and administrative measures, usage of personal protective equipments (PPE) by the workers is equally important in protecting the workers. However a high level of non-compliance to PPE usage among the workers is commonly noted. South India has several foundries, giving employment to many workers. The objectives of the study were to find out the level of PPE usage among the foundry workers, before and after an interventional program and to assess the relative effectiveness of different strategies of the program in bringing out the improved PPE compliance among them. **Materials and methods:** After obtaining ethical clearance, the study was conducted among 78 permanent workers of a foundry in Coimbatore. First the demographic details of the subjects and their level of usage of PPE were recorded, in the pre-test. Then a comprehensive three faceted interventional program, consisting of strategies such as health education to the workers, peer motivation by co-workers, and posters in the working environment, was implemented simultaneously among all subjects. After three months of implementation of the program, the post-test was conducted and the data were analyzed to measure the effectiveness of the intervention. **Results:** After the interventional program, the workers showed significant improvement in PPE usage ($p < 0.001$) from the 'pre-test' level. Regarding their perception about which of the three strategies relatively contributed to bring out the improvement, most of the workers rated the strategy of peer motivation as 'high' effectiveness, health education- 'average' effectiveness and posters in working environment- 'low' effectiveness. **Conclusion:** Interventional program using multiple strategies in an integrated manner has synergistically enhanced the behaviour change among the workers.

Key Words: Foundry, Personal protective equipment, Intervention.

INTRODUCTION

Foundry¹ is an industry which produces metal castings that are made by pouring molten metal into precise moulds. After the metal has cooled, the casting is removed from the mould and the process of 'fettling' involves cleaning and finishing procedures. Occupational hazards² exist in every industry and the hazards in the foundry are heat, electricity, machinery, vibration, noise, dust & fumes, heavy objects, pointed objects, chemicals like formaldehyde and amines etc. Along with engineering and administrative measures, usage of personal protective equipments (PPE) by the workers is equally important in protecting the workers. Various PPE are expected to be used in foundry, such as helmet, goggles, ear plugs, mask, face-shield, gloves, boots, etc. However, a high level of non-compliance for PPE usage among the workers is commonly noted possibly because of ignorance about benefits, or it may cause discomfort. Research studies³⁻⁶ conducted on non-compliance to PPE usage among industrial workers, found that it is a global problem. A study published by Foundry Management & Technology, USA³ recorded high level of non-compliance to PPE usage. An Egyptian study⁴ among

industrial workers found similar findings. A cross-sectional study from Nepal⁵ detected that only 47.7% of workers use at least one kind of PPE during work. A study conducted among factory workers in India⁶ noted that most workers were aware of the benefits of PPE, but only some workers were using PPE regularly.

Similarly various other studies have been done on the effectiveness of interventional program in bringing out improvement in PPE usage among industrial workers. A study in USA⁷ demonstrated statistically significant difference in the use of PPE before and after an interventional training program. Similarly a Nigerian study⁸ found significant increase in the usage of PPE, after the intervention. Another multi-faceted interventional study done among foundry workers in Italy⁹ showed significant decrease in occupational injuries, after intervention.

Regarding the motivation of workers, Malawi study¹⁰ noted that the workers viewed their high-ability coworkers as a source of motivation. According to WHO¹¹, one of the components essential to community based program and prevention strategies, is that it should

be an integrated program. Each element of the program should support the other elements and the program should be integrated into the settings where people work (e.g. work-sites) or live their lives.

Since behavior change is difficult to sustain unless a good supporting environment is created, we designed an intervention among foundry workers which went beyond just conducting an awareness program. Our design was guided by the Ecological Approach¹¹ to Behaviour Change. This approach addresses the multiple determinants that influence health and health behavior through synergy of multi-pronged interventions. Accordingly a comprehensive interventional program which had three strategies integrated together was adopted, to bring out a synergy of effect. The first strategy was health education to the workers (guided by Health Belief Model¹¹ for behavior change) to create the immediate awareness about the hazards that accrue due to non-usage of PPE. The second one was peer motivation by co-workers and role-models (guided by Social Cognitive Theory¹¹) that will help to translate awareness into practice and to use the peer pressure to ensure compliance with PPE usage. The third strategy was posters in the working environment as constant reminders of the statutory nature of the need to use PPE at the workplace and benefits of usage from the health point of view.

The Objectives of the study were to find out the level of PPE usage among the foundry workers, before and after an interventional program and to assess the relative effectiveness of different strategies of the program in bringing out the improved PPE compliance among them.

MATERIAL AND METHODS

The study was conducted in a foundry at Coimbatore, after obtaining the permission from the relevant foundry authorities and ethical clearance from Institutional Human Ethics Committee. There were two categories of workers, permanent and temporary, in the various sections of production/ manufacturing division of the foundry. It was decided to conduct the study among the permanent workers only, because the temporary workers used to get salary in the week-end and they might go elsewhere in the next week. There were 81 permanent workers in the production division. Those workers, who were missed during a visit, were contacted during the second or third visits. Two workers could not be contacted even after three visits and one worker was not willing to participate in the study. So those 3 workers were excluded and the remaining 78 workers were included in the study.

An interview questionnaire was prepared, translated to local (Tamil) language, and back translated. A pilot study was done among the temporary workers, which helped to refine the interview questionnaire. The finalized questionnaire was then used for the study.

Pre-test: After getting informed written consent, the subjects were interviewed. For each subject, the general personal information and frequency of usage of PPE were recorded.

Interventional program: After the pre-test, all of the following three strategies of the program were started and implemented simultaneously among the subjects.

Strategy 1: 'Health education' sessions were conducted for the workers in batches, each batch consisting about 12-15 workers. Thus six sessions were conducted. Power point presentation was used for health education. During the session, it was explained how the different equipments safe-guard the workers from different hazards. 'Question and answer' method was also used which encouraged the workers to involve and pay attention. Thus every subject received health education once.

Strategy 2: 'Peer-motivation by co-workers' was performed as follows: Some of the workers volunteered to become 'role-models'. These role-models wore PPE throughout the eight hours of work. Apart from that, for the next three months, they talked with other workers once every week, and motivated them for PPE usage. If any worker was found to be resistant to adopt PPE, the role-models talked with them more often and motivated them.

Strategy 3: 'Posters' illustrating the usage of PPE were prepared, laminated and put-up in various prominent places of the working environment. Whenever the workers would see the posters, the posters would remind them to wear PPE.

Post-test: At the end of three months, each subject was interviewed again. Along with the previous questionnaire, some more questions were added to assess the level of effectiveness of each strategy in bringing out the improvement in PPE usage.

Analysis of data: First the data were entered into Microsoft excel sheets and then transferred through SPSS package (Version 19) for analysis. For descriptive analyses, the categorical variables were analyzed by using percentages and the continuous variables were analyzed by calculating mean $\pm$ Standard Deviation. Chi-square test was used to ascertain the association between the independent and dependent variables. A 'p' value of <0.05 was regarded as statistically significant.

RESULTS

The interventional study was conducted among 78 permanent workers of a foundry.

Demography of the study subjects: Table-1 shows the general demography of the study subjects.

Table 1: General demography of the study subjects.

Demographic details	Group	Frequency (N = 78)	Mean $\pm$ SD
Gender	Men	78 (100%)	–
Literacy status	Literate	78 (100%)	–
Training on PPE usage.	All subjects got training.	78 (100%)	–
Age (in years)	< 40 years	1 (1.3 %)	48.38
	40 – 49 years	46 (59.0%)	$\pm$ 5.49
	50 – 57 years	31 (39.7%)	
	Total	78 (100%)	
Work experience (in years)	5 – 9 years	2 (2.6 %)	25.77
	10 & more years	76 (97.4%)	$\pm$ 7.44
	Total	78 (100%)	

All workers were men. All were literate. All were of middle age (Range: 38 – 57 years. Mean $\pm$ SD = 48.38 $\pm$ 5.49). All workers had work experience of more than 5 years (Range: 7 – 40 years; Mean $\pm$ SD = 25.77 $\pm$ 7.44). All subjects got trained in the usage of PPE, at the time of joining the foundry. However the training was not repeated.

Table 2: Usage of PPE by the subjects during the work time.

	Frequency level of usage of PPE during the work time					Total
	Very low	Below average	Average	Above average	Very high	
Pre-test	7 (9.0)	16 (20.5)	38 (48.7)	11 (14.1)	6 (7.7)	78 (100)
Post-test	0	6 (7.7)	17 (21.8)	26 (33.3)	29 (37.2)	78 (100)

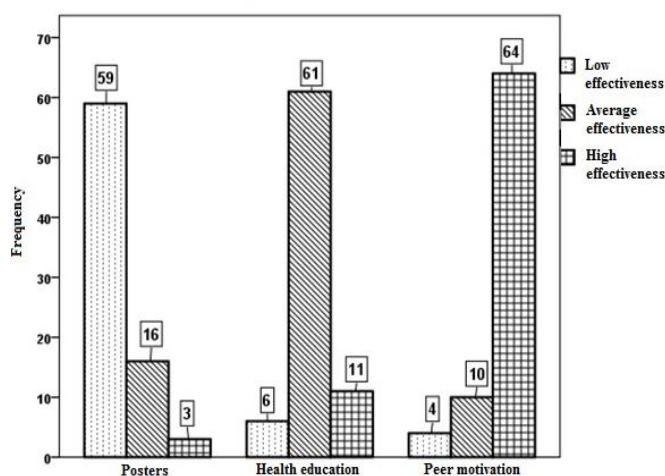
Figures in parentheses are percentage values.

Table 3: Effectiveness of intervention on the workers' usage of PPE during the work time

	Frequency of usage of PPE during the work time (n=78)			X ² value	'p' Value
	Low	Average	High		
Pre-test	23 (29.5)	38 (48.7)	17 (21.8)	38.04	<0.001*
Post-test	6 (7.7)	17 (21.8)	55 (70.5)		

Figures in parentheses are percentage values; 'p' <0.05 is statistically significant*

Figure 1: Perception of workers on the effectiveness of each strategy in bringing out the improvement in PPE usage.



Usage of PPE during the work time, before and after intervention:

During the pre-test, each subject was enquired about his own practice and frequency of usage of PPE during the work time. For this purpose, each subject was asked to select any one of the following five responses viz., very low, below average, average, above average and very high. The response of each subject was recorded. Again during the post-test, the responses for this question were noted. Table-2 reveals the usage of PPE by the subjects during the work time.

In the post-test, all of the 78 (100%) workers reported improvement in the frequency level of usage of PPE. During the pre-test, 7 workers reported that their usage of PPE during the work time as 'very low'. During the post-test, 6 of them reported that their usage of PPE as 'below average' and the remaining one worker reported as

'average'. Similarly the improvement was noted in all categories. Even the six workers who reported in the pre-test 'very high' usage of PPE, reported in the post-test 'still higher level of usage'. However they were included in the same category of 'very high'.

To measure the effectiveness of the intervention, the above table-2 was condensed as follows: The middle category 'Average' was kept as it was. The first two categories were combined together to form one category and named as 'low'. The last two categories were combined together and named as 'high'. Table-3 illustrates the effectiveness of intervention in bringing out PPE compliance by the workers, during the work time.

In the pre-test, 21.8% of subjects reported 'high' level of usage of PPE and 29.5% reported 'low' level of usage. In the post test, 70.5% of workers reported 'high' level of usage of PPE and only 7.7% of workers reported 'low' level of usage. This improvement in PPE usage was statistically significant (Chi square test; $p < 0.001$), with substantial improvement in the effect size (70.5 minus 21.8 = 48.7). This shows that a comprehensive approach is very effective in bringing out the change in behavior.

Evaluation of the workers' perception on effectiveness of each strategy:

The subjects informed at the time of post-test, that all three strategies complemented each other in bringing out the improvement in PPE usage, thus validating the synergy of effect described by the Ecological approach to behavior change.

However the subjects were compelled to evaluate their perception of the relative role of each strategy's 'level of effectiveness' in contributing to PPE compliance. For this, they were asked to select any one of the following responses, viz., 'low' 'average', or 'high'. Their responses are shown in Figure 1.

Regarding the role of posters in the working environment, 59 workers (75.6%) felt that it had 'low' level of effectiveness in bringing out the improvement in PPE usage. On the role of health education, 61 workers (78.2%) felt that it had 'average' effectiveness. However, 64 workers (82.1%) felt that the strategy of peer-motivation by co-workers had 'high' level of effectiveness.

DISCUSSION

The present study found that the intervention program of three strategies integrated together resulted in significant improvement in PPE usage among the workers. This is in line with the Ecological Approach to Behaviour Change which posits the need to address the multiple determinants that influence health and health behavior and so there is synergy of effect in multi-pronged interventions since they address multiple determinants of health behavior.

We wanted to know the workers' perception of the relative role played by each strategy, so that we can address any misconception that required remedial action. Our study findings revealed that the workers rightly recognized the strategy of peer-motivation as having

'high' level of effectiveness. This is in line with Social Cognitive Theory which posits that people not only learn through their experiences but also by observing the action of others and the results of that action. In the present study, the 'role-model volunteers' who were fellow workers, had overcome the commonly perceived inconvenience and discomfort in PPE usage and showed by example that it is possible to practice the good behavior in their work environment. Peer-pressure then forced the other workers to fall in line, to avoid being socially rejected as deviant from the expected norm in behavior. That health education had 'average' effectiveness and posters in working environment had 'low' effectiveness goes to show that such interventions they had experienced in the past without leading to increased usage of PPE.

Other interventional studies conducted in various countries had also recorded similar improvement in PPE usage among the workers. A study on the effect of a training program among laborers in USA⁷ found significant changes in the usage of PPE. It was a participatory, peer-facilitated training program. Most workers (66%) shared the information of the program with their co-workers and friends. A study in Nigeria⁸ also found significant increase in the usage of PPE after intervention. In Italy⁹, a multi-faceted intervention study **was done among the workers in two foundries**. The decrease in occupational injuries was significant ($P < 0.01$). Another interventional study in Nigeria¹² revealed that the usage of PPE among the workers in the interventional group were significantly higher than the control group. A study conducted in Behara¹³ concluded that the intervention was effective and the results had noticeable improvement in the workers' compliance with PPE usage. An interventional program among factory workers in Iran¹⁴ was found to be very effective in improving the usage of PPE. An interventional study in Hamedan¹⁵ revealed that integration of motivational interviewing principles into the safety program had improved the safe behaviors of the workers in the motivational group and resulted in significant change in PPE usage among them. Another study in Iran¹⁶ observed that the intervention program using peers was effective in promoting safe practices of the workers.

Conclusion:

Most workers perceived that the strategy of peer-motivation had 'high' level of effectiveness, health education had 'average' effectiveness, and posters in the working environment had 'low' effectiveness. However, when the intervention program consisting of three strategies integrated together, it synergistically resulted in significant improvement in PPE usage among the foundry workers because each strategy addresses a different factor that facilitates behavior change.

Limitations: We did not do a repeat study after 3 months to see whether the benefit in terms of increased PPE usage was sustained.

Recommendations: 1. Training program on the usage of PPE and health education should be conducted

periodically for the workers, to ensure reinforcement of messages as well as to remove barriers to behavior change.

2. The administration should enforce that the workers should wear PPE during the work time, through promoting the peer workers as role-models and putting up posters at prominent places of the work place, where the work exposure to hazards due to non-usage of PPE take place.

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Clinico-epidemiological study of hand foot & mouth disease

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ABSTRACT

Background: Hand foot mouth disease (HFMD) is a self-limiting viral disease which is mainly caused by Coxsackie virus A16 & Enterovirus 71 with a distinct clinical presentation of oral lesions and characteristic papulovesicular eruptions on distal extremities, mainly affecting the infants and children. **Aim:** To study the clinico-epidemiological features of HFMD during an outbreak in Guntur. **Methods:** A prospective observational study was conducted during the period October 2017 – April 2018. The study included consecutive cases of clinically diagnosed HFMD in children attended to DVL OPD, Guntur General Hospital. **Results:** Seventy cases of HFMD were detected from October 2017 to April 2018. Age ranged from seven months to 13 years. Prodromal symptoms of varying intensity were present in all the cases. All patients recovered without any complications. **Conclusion:** HFMD though occurring as isolated events, rise of epidemics across the globe and India is definitely alarming.

Key Words: Hand Foot Mouth Disease, Andhra Pradesh, Epidemic.

INTRODUCTION

Hand, foot, and mouth disease (HFMD) is a viral infection caused by enteroviruses predominantly affecting children. CA16 and EV71 were reported as the major enterovirus types where as A4, A5, A8, A10, B3 and B7 act as the minor etiological agents causing HFMD.¹ It is highly contagious and is clinically characterized by prodromal fever followed by a combination of exanthems and enanthems. The present study was conducted in a tertiary hospital at Guntur district on the clinical presentation and demography of the affected population with HFMD during the period October 2017 to April 2018. The details were described herein.

Objectives: To study the clinical features and demographic patterns of HFMD occurred during an outbreak in Guntur.

MATERIAL AND METHODS

A prospective observational study was conducted from October 2017 to April 2018 in a tertiary hospital at Guntur, Andhra Pradesh. The patients studied were children brought with papulovesicular exanthems, enanthems to the outpatient department, D.V.L. The history and clinical examination findings of the patients were recorded. Routine hematological workup was done.

Inclusion Criteria:

All patients diagnosed as HFMD on clinical basis. Age < 18 years.

RESULTS

During the period between October 2017 and April 2018, a total of 70 patients who were clinically diagnosed as HFMD were observed. Among them 92% of cases occurred during the months of October and February. **(Table 1)** Age group varied from seven months to 13 years. 96% of HFMD cases were younger than five years, of which 24% were infants. Only four percent of cases were aged above five years. **(Table 2)** Boys were 57% and girls were 43%. All patients presented after one to three days of onset of the disease and were associated with prodromal symptoms of varying intensity (fever, malaise, running nose, irritability). Irritability was observed more in younger children. Extent of skin and oral involvement was proportionate to the prodromal symptoms.

Both skin and oral lesions were present in 80% of cases. **(Table 3)** Papulovesicular lesions on erythematous background were distributed over hands, feet, buttocks, thighs, legs, knees, forearms and elbows (Figure 1,2,3,4,5). Lesions of varying number were present on the trunk in 14% of patients (Figure 6). Oral lesions in the form of aphthous like ulcers were present in 80% and perioral area in 50% of patients. Patients with oral lesions had presented with drooling saliva and refusal of feeds. History of contact with similar cases either in the family or neighbours was found in 80% of cases. All the patients were treated symptomatically. Children with

high fever and extensive lesions with feeding difficulties were given Acyclovir in divided doses. Significant response is noted in these cases. Recurrence was noted in four patients in three months. None of the children had systemic complications.

Table 1. Number of HFMD cases month wise

Month, Year	Number of cases
October, 2017	20
November, 2017	16
December, 2017	14
January, 2018	10
February, 2018	5
March, 2018	2
April, 2018	3

Table 2: Age distribution of the cases

Age	Number of cases (%)
<1 year	16 (24%)
>1year to 5 years	51 (72%)
>5 years	3 (4%)

Table 3: Presenting Symptoms & Signs of HFMD

Symptoms and signs	Number of cases	Percentage
Prodromal symptoms		
Fever	70	100%
Running Nose	39	56%
Irritability	40	57%
Malaise	40	57%
Papulovesicular lesions		
Oral ulcers	56	80%
Perioral	35	50%
Palms	70	100%
Hands	70	100%
Elbows	70	100%
Trunk	10	14%
Buttocks	70	100%
Thighs	70	100%
Knee	70	100%
Feet	70	100%
Soles	70	100%

DISCUSSION

HFMD first diagnosed in child suffering from fever with rash in Toronto in 1957.² Reports from Asia- Pacific region indicated occurrence of epidemics in 1997 (Sarawak)³, 1998 (Taiwan)⁴, 1999 (Perth)⁵, and 2000 (Singapore, Korea, Malaysia, & Taiwan)⁶.

The first epidemic in India was reported from Kerala in 2003.⁷ Subsequently several states of India had reported epidemics. (Table 4) Maximum number of the cases occurred during summer and early autumn.¹⁴ Seasonal similarity noted in the present study. In most instances,

this is a mild self-limiting illness. The skin lesions heal spontaneously without scarring.

Table 4: Epidemiological data of HFMD epidemics in India

State	Year	Number of reported cases
Kerala – Calicut ⁷	2003-2004	81
West Bengal – Multi-centric study ⁸	2007	38
Assam – Jorhat ⁹	2008	34
Orissa ¹⁰	2009	78
West Bengal – Kolkata ¹¹	2010	62
Rajasthan – Udaipur ¹²	2012	38
Telangana ¹³	2016	50



Figure 1: lesions on perioral area



Figure 2: oral lesions



Figure 3: lesions over buttocks, thighs, legs & over trunk



Figure 4 : lesions over both hands

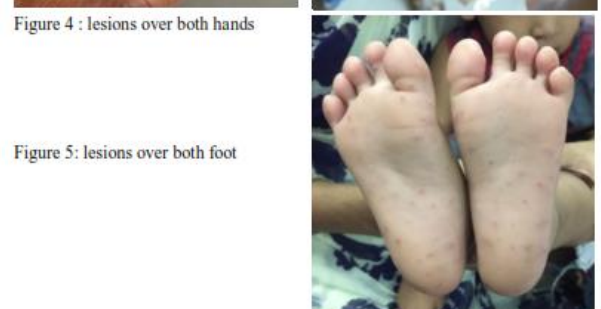


Figure 5: lesions over both foot

It is possible that the emergence of HFMD in India may be related to the mass polio vaccination. At any given time only one type of enteric virus multiplies within the intestine. Polio vaccination has eliminated polioviruses from the gut, thereby increasing the chances of coxsackie and enteric viral infections.

Hand foot and mouth disease (HFMD) is a self-limiting viral disease affecting predominantly children and immunocompromised adults. It is caused by serotypes of picornaviridae family of genus enteroviruses, most frequently CA16 and EV71.¹ They have single positive strand genomic RNA with high mutation rate. Due to the presence of multiple genotypes and subgenotypes repeated epidemics of HFMD have occurred and others are expected in future. An outbreak is usually followed by a quiescent phase of few years. Like all other enteroviruses, children are the most significant target as well as reservoirs.¹⁰

Unlike the HFMD epidemics occurred in India^{7,8,9,10,11,12,13}, in the present study younger children were predominantly affected – 96% were less than five years old of which 24% were infants. It is highly contagious, transmitted through faeco-oral route (principal mode of transmission¹⁰), oro-oral route and by droplet infection. In the present study 80% of cases had a positive contact history.

The incubation period is from three to six days. During epidemics the virus is spread by horizontal transmission. Initial viral implantation in the buccal and ilial mucosa is followed by spread to lymph nodes within 24 hours.¹⁵ Viraemia rapidly ensues with spread to the oral mucosa and skin. After a week neutralizing antibody levels increase and the virus is eliminated with the clinical clearance in one to three weeks.

Clinically HFMD starts with prodromal symptoms of fever, malaise, sore throat, and sometimes vomiting followed by painful oral ulcers on buccal mucosa, tongue, and hard palate. Oral lesions begin as erythematous macules that evolve into two to three millimeters vesicles on an erythematous base, which rapidly become ulcerated. They are painful and may interfere with feeding.¹⁵ Erythematous; papular or vesicular skin lesions usually follow this initial phase of enanthem. These lesions localized predominantly on palms and soles. Less commonly perioral skin and the lateral and dorsal surface of hands and feet can be affected.¹⁶ Buttocks and genitalia can also be involved.¹⁷ Cutaneous lesions usually resolve within two weeks without any complications.

In the present study prodromal symptoms of varying intensity were noted in all the patients. Oral lesions were present in 80% of cases of which 75% of them had drooling of saliva and refusal to feeds. Apart from the classical cutaneous sites involved, strikingly all the cases had classical lesions on buttocks. Few patients also presented with lesions on the trunk.

The differentials for cutaneous lesions include varicella, papular urticaria, impetigo, and pompholyx, but the constellation of features is unique to aid instant clinical diagnosis with certainty in almost all cases. Oral erosions in HFMD are usually more uniform, smaller and mild symptomatic unlike those in herpetic gingivostomatitis, which are painful and coalesce, and those of varicella usually last longer and always crust. Herpangina is a viral infection of the children caused by a Type A coxsackievirus, which presents with similar types of oral ulcers extensively involving the tonsils, pharyngeal mucosa, soft palate and the posterior part of buccal mucosa.¹⁸

The diagnosis of HFMD is mainly based on clinical grounds. The virus can be isolated and identified via culture, immunoassay, serologic testing, polymerase chain reaction and microarray technology. However, laboratory studies are usually needless for diagnosis.

Treatment of HFMD is usually supportive. Adequate fluid intake is needed to prevent dehydration. Fever is treated with antipyretics. Pain may be treated with standard doses of acetaminophen or ibuprofen. Acyclovir had showed dramatic improvement in severe cases.¹⁹

In the present study all the patients were treated symptomatically. The lesions had subsided within three weeks. Children with severe symptoms were given Acyclovir 200 mg in divided doses. Rapid symptomatic relief was noticed suggesting the role of systemic acyclovir in HFMD.

Recurrence is rare, however in present study four patients had recurrence within three months of initial episode. Complications from the viral infections that cause HFMD are rare, but if present, immediate medical treatment is required. A minority of individuals with HFMD may require hospital admission due to uncommon neurologic complications such as encephalitis, meningitis, or acute flaccid paralysis. Non-neurologic complications such as myocarditis, pleural effusion, or bleeding into the lungs may also occur.²⁰ In the present study none of the children had systemic complications.

HFMD is becoming a major public health issue in Asia and has global pandemic potential. It is an emerging infection that has overwhelmed countries in the Asia-Pacific region over the past two decades. On average, more than one million cases have been recorded in China annually since 2008.²¹

In India HFMD epidemics are on the raise. Since 2013 seven states of India had recorded epidemics. This is the first time an epidemic of HFMD was recorded in Andhra Pradesh.

It is well known that E71 infection can be associated with serious neurological and non-neurological complications.²² In a continuous surveillance since 1998 in Taiwan, it has been observed that the disease that was benign

initially, acquired more virulence in the subsequent years.²³

Clinical distinction among the disease caused by different viruses is impossible and in resource poor country like India laboratory confirmation is difficult. Contemplating all these facts, it becomes imperative that close monitoring of the disease in India is essential.

Prevention: Currently, there is no specific vaccine or antiviral therapy against HFMD but such vaccines are being developed.²³ HFMD is highly contagious and is transmitted by nasopharyngeal secretions such as saliva or nasal mucus, by direct contact, or by fecal-oral transmission. Education regarding hygienic precautions is very important to control the spread. These measures have been shown to be effective in lessening the transmission of the viruses responsible for HFMD.²⁴

Declaration of Patient Consent: The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Awareness of medical ethics among medical students in a medical college in Bangalore

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ABSTRACT

BACKGROUND: Medical ethics is a sensitive framework embedded within the professionalism of medical personnel. There are very few medical colleges in India with a standardised ethics curriculum, and with provisions for evaluation. **OBJECTIVE:** This article aims to assess the knowledge of, practices in and attitudes to healthcare ethics among postgraduate medical and interns students. **METHODOLOGY:** A questionnaire-based, cross-sectional study was carried out in a medical college in Bangalore. A total of 225 interns and postgraduate students were interviewed. (Response rate 94%). The questionnaire, which was a 35-item pre-tested, self-administered questionnaire, included both closed and open-ended questions. The proposal for the study was approved by the institutional review board (IRB) and the permission of the respective heads of department was obtained. Written consent was obtained from each participant. The returned questionnaires were analysed using SPSS version. Descriptive analysis was carried out for all the data. **RESULTS:** Medical postgraduates and interns had obtained their knowledge of bioethics from "other sources such as the Internet, newspapers, etc followed by their "undergraduate training" and "experience at work". Nearly 98% of the medical postgraduates knew that their institution had an ethics committee. There was a difference between the postgraduate students and interns in terms of their attitude to and knowledge of healthcare ethics, with the former having a superior knowledge of the subject and a better attitude. **CONCLUSIONS:** The interns and postgraduates come across ethical issues during their training, but are not equipped to resolve the ethical dilemmas they encounter. The incorporation of a bioethics curriculum in the initial period of the postgraduate programme would be beneficial.

Key Words: ethics, negligence, training, curriculum.

INTRODUCTION

Medical ethics is a sensitive framework embedded within the professionalism of medical personnel. Non-adherence to healthcare ethics and unsatisfactory management and solution of the cases not only threaten to impair doctor-patient relationships, but may also lead to suboptimal service delivery and potentially trigger incidences of violence and abuse. The four basic principles of medical ethics (autonomy, justice, beneficence and non-maleficence) form the foundation for health professionals to guide and decide what practices are ethical in clinical settings. These basic ethical principles are grounded on the major documents of healthcare ethics (Hippocratic Oath, Nuremberg code, and Helsinki declaration). There are very few medical colleges in India with a standardised ethics curriculum, and with provisions for evaluation (1).

Medical students undergo intensive training in their specialties and their focus is chiefly on organ specialisation. Medical students need intensive training in bioethics so that they have an appreciation of the patients'

rights, cultural differences and research ethics, and are equipped to resolve ethical dilemmas.

Doctors attending to patients in an emergency health situation have often had to face assaults on account of the recent increase in the awareness of patients' rights in India (2,3).

These may be due to the paternalistic attitude of the doctor or a lack of understanding, or may simply be emotional outbursts. Advances in biomedical technologies such as life support and artificial reproductive technologies have brought new ethical dilemmas in their wake and have exacerbated the problem.

Ethical dilemmas are usually encountered in areas such as abortion, contraception, treatment of a patient with a terminal illness, professional misconduct, maintaining a patient's confidentiality, the doctor's professional relationship with the patient's relatives, religion, traditional medicine, and conflict of interests. The conventional medical course offers students little help in

resolving the ethical dilemmas they will encounter as healthcare professionals. Training in medical ethics has been made mandatory in the undergraduate curriculum by the regulatory body of medical education, the Medical Council of India (MCI); but it has been placed under forensic medicine (4).

The teaching of bioethics should also be holistic. For example, students could be taught about the value of the “heart” over the “mind”, of the system of values and beliefs in a community, and of the need to understand the lived experiences of patients; while also incorporating various ethical approaches (4).

There are varied views on strategising the teaching of bioethics. Most of them emphasise the importance of tailoring the teaching of the subject to the needs of the society concerned (5).

The dearth of specialists in bioethics and a lack of organised human resources has led to lack of appreciation of the urgent need to include bioethics in medical education in India. Further, there are concerns that teaching bioethics as an organised science might be problematic and would not be feasible (5). In India, due to the cultural mosaic, the teaching of bioethics needs to encompass the various perceptions of morality and ethics unique to people from different cultural, socioeconomic and geographical backgrounds (4). The training in this subject should be integrated with the local social and cultural values.

The first step in formulating an ethics curriculum may be to determine the level of the basic knowledge and attitudes of the students in the region. Few standard yardsticks have been designed to measure what is known and practised so as to ensure that educational efforts are better targeted (6).

The objective of this study was to assess the knowledge of, attitude to and practices in healthcare ethics among medical students.

Objectives of study: To assess the knowledge regarding medical ethics among interns and postgraduates; To assess the mode of education obtained on medical ethics during the medical course; To assess the attitude of students towards different aspects of healthcare ethics.

MATERIAL AND METHODS

The present study is a cross sectional study carried out by the Department of Community Medicine, M V J Medical College and Research Hospital. The study was carried out from Dec 2017 to March 2018. The study population comprised of all the interns and postgraduates. Institutional ethical clearance was obtained before the start of the study. The 35-item questionnaire was a self-administered, semi-structured one with both open and close-ended questions, designed to assess the students’ knowledge, attitudes and practices in the sphere of healthcare ethics. The content of the questionnaire was validated before the study. The demographic variables, such as the year in which the student was studying, and his/her specialty, age and gender, were included in the

questionnaire. The second part of the questionnaire consisted of questions regarding the importance of a knowledge of ethics, the source of this knowledge and the source of consultation in case an ethical problem arises. The respondents were asked whether they were aware of the presence of an ethics committee in their institution, and about the role of these committees. The questionnaire mentioned eight roles that ethics committees might play and the respondents were asked to indicate whether they thought the committees played these roles by choosing between “yes”, “no” and “not sure”. In the final part of the questionnaire, the respondents were asked to answer questions on everyday ethical issues. They were asked if they agreed or disagreed with certain statements concerning ethical conduct, autonomy, paternalism, confidentiality, informing patients about wrongdoing and informing relatives about the patient’s condition, informed consent, and the influence of religious beliefs on the treatment. The respondents were required to grade their responses on a Likert scale ranging from 1 to 5.

Statistical analysis The data were analysed using Statistical Package for Social Sciences (SPSS) – version 11.5. Descriptive analyses were carried out for all the data.

RESULTS

A total of 101 interns and 138 postgraduates’ students consented to participate in the study. A total of 225 returned the completed questionnaire. Thus, the response rate was 94%. The mean age of the students was 29.9±3.6 years. As many as 83.8% of the participants in the study were males and the remaining females. Table 1 presents the characteristics of the study participants.

Table no 1 - Participants knowledge about health care ethics

Do the participants know	N=225	Percentage
1. Hippocratic oath	221	98
2. Nuremburg code	47	21
3. ICMR guideline	53	23.4
4. Helsinki Declaration	45	20
5. Importance of ethics in your work	171	76
6. How often do you come across ethical issues.	92	41
7. How often do patients ask you about the diagnosis.	187	83
8. How do you acquire your knowledge of bio-ethics		
9. Have you attended training in Bioethics	72	32
10. Have you taken informed consent	176	78
11. Is there an ethics committee in our institution	221	98

Out of all, 76% opined that the knowledge of ethics was very important. Almost all the participants wanted to be aware of all the ethical issues. The reason cited was to prevent any legal issues.

Table no 2- Responses regarding ethics committee

S.No.	Particulars	N=225	%
1	To ensure standard ethical practices among health care personnel	16	7
2	To advise the faculty during ethical dilemmas	25	11
3	To approve and guide research	173	77
4	To settle conflicts between staff	7	3
5	To settle conflicts between staff and patients	54	24
6	To teach medical ethics to students	119	53

Table no 3- Attitude of the study population towards Ethics

Particulars	N=225	Percentage
Doctors know the best irrespective of the patients opinion	189	84
Patient should always be informed of the wrong doing	164	73
Patients wishes to be adhered too	32	14
It is difficult to maintain confidentiality so should be abandoned	171	76
Consent is not require for tests and medications	200	89
We can charge more from affording patients to compensate for the non-	164	73
Ethical conduct is important only to avoid legal action.	27	12
It is essential to discuss social and legal issues of the patient	52	23
Close relatives must always be told about the patients condition	95	42
Children should never be treated without the consent of their parents	187	83
Patient who behave violently should be refused treatment.	196	87
If a patient wishes to die he should be assisted in doing so	104	46
Consent of the patients is must while conducting intimate clinical	173	77
Privacy of a patients can be ignored for the benefit of the larger group	137	61
If the law does not permit abortion it is ok to conduct for the benefit of the patients	115	51
Ethics should be taught as a part of the curriculum	176	78
It is Ok to receive money from referring patients to another doctor or laboratories	155	69
Are doctors influenced by pharmaceuticals companies	158	70
In order to prevent transmission of infectious diseases disclosure of the	176	78
Given a situation , a male doctor can refuse to examine a female patient if a	182	81

Nearly all them had knowledge of the Hippocratic Oath, but surprisingly, only 23.4% of them had knowledge of the Indian Council of Medical Research (ICMR) guidelines on ethics for research, the Nuremberg Code and the World Medical Association's Helsinki Declaration.

Thirty-five per cent of the study population correctly expanded the abbreviations IRB, ERB (ethical review board) and IEC (institutional ethics committee), while 51% provided the wrong answers, and 14% reported that they had not heard of these terms.

Table 2 presents the responses of the study subjects to questions on their knowledge of healthcare ethics. More postgraduates considered knowledge of bioethics important in their daily practice than the interns. It was obvious because the postgraduates were more exposed to ethical issues and were more involved in decision making process than the interns. The postgraduates had obtained their knowledge of bioethics from sources such as the Internet and newspapers, from their teachers mainly during ward rounds and OPD followed by their undergraduate training and experience at work. Nearly 68% of them had not attended any bioethics training during their post graduation. Nearly 98% of the postgraduates knew that their institution had an ethics committee while only 63% interns knew about it. Most of them were not sure if there was a separate ethics committee for animal and human research. As for the various roles of ethics committees, 76.6% study subjects, felt that the role of ethics committees is to approve thesis work of the postgraduates.

There were 14% students agreed that "During treatment, the patient's wishes must always be adhered to." On the other hand 84.3% students opined that "The doctor should do what is best irrespective of the patient's opinion." 73% students will tell the patients "if something goes wrong" and 86% will tell the truth to "close relatives". 82.6% agreed that "Children (except in emergency) should never be treated without the consent of their parents or guardian." (Table 3). In case of any wrongdoing in treatment, 80.2% of them informed their patients. Nearly 83.8% of them agreed that informed consent was required for treatment such as surgery, but did not feel it was necessary for investigations. Of the study population 11.7% agreed that ethical conduct is required to avoid legal issues. Overall, 92.7% of the participants had obtained informed consent for their research work they carried out. All the postgraduates had taken ethical clearance for their thesis as it was mandatory.

42% students were uncertain while dealing with "patients who behave violently" and 64% disagreed to the suggestion of euthanasia. 55.9% agreed they will refer the patient to another doctor for religious conflict situations. A majority (77.3%) expressed their commitment to take "informed consent and maintain confidentiality" while doing intimate examinations of patients and 68.6% also agreed that it should be followed even for "anaesthetised or sedated patients".

The study population told that when faced with ethical dilemmas, it was the unit heads or the head of dept who were consulted most often followed by the other faculty in the dept.

DISCUSSION

There are probably very few studies done to assess the knowledge, practices and attitudes related to healthcare ethics among medical graduates

Ethical conflicts are common during the initial years of a medical professional's career which makes the inculcation of a sound foundation in medical ethics essential.

The majority of students knew the importance of medical ethics in their professional life, which is similar to the studies done by Hariharan *et al* at the Cave Hill Campus in Barbados in 2003 (7)

The study by Shiraz *et al* (8) of surgical team members in Karachi, in 2004, had found that only 3.96% of surgeons did not consider the teaching of ethics at the undergraduate level to be necessary. Another study by Hariharan (7) and others showed that 52% of senior medical staff and 20% of senior nursing staff at their institution in Barbados knew little of the laws pertaining to their work. Study done by Janakiran C (10) also showed similar results.

The main sources of ethics knowledge as quoted in most of the studies were classroom lectures and books on ethics as part of forensic medicine. But in our study the main source was through internet, newspapers and experience.

A study by L W Roberts (9) in 2004 among medical students at a New Mexico school found that respondents preferred clinical and expert-oriented learning like case conferences, and workshops involving a multidisciplinary approach over the traditional didactic approach which was also shown as significantly [$p < 0.0001$] effective. Discussion by multidisciplinary experts, of experiences in the field, may be helpful to train ethically competent doctors. Most of the students were aware of the existence of the institutional ethics committee and many of them did not know its specific functions. This highlights the need for the administrative section of teaching hospitals to publicise their work at regular intervals for the benefit of trainees. The institutional ethics committee should publish reports related to its involvement in different health-related activities within the institution, and these should be circulated among the students as well.

Students were not very clear about whether "ethical conduct is only important to avoid legal action". Students often expressed contradictory views in different areas of ethical issues e.g.- while dealing with treatment of patients, some of the students agreed to adhering to "patient's wishes", on the other hand nearly 2/3rd of the students opined that "doctor should do what is best" ignoring the patient's opinion. Similarly, while undertaking an intimate examination the majority committed to "maintain confidentiality". At the same time most students said that the privacy of one patient may be ignored for the benefit of teaching purposes. Reasons for this could not be explained properly, but perhaps the students were more interested in developing their clinical acumen rather than in ethics. In some other areas like treating "children", taking "informed consent", telling the

truth about the worsening condition of patients to "close relatives", a majority understood the issues. More students disagreed with the statement that physicians must aid patients who wish to die, regardless of the illness. This too, is similar to the findings shown in the study by Walrond, Jonnalagadda, Hariharan and Moseley (7,10)

While the results of the study show that there was no difference in knowledge with respect to the gender. There was a significant difference when compared with different subspecialties, ie medical, surgical, preclinical year of study. This probably explains the difference between the two as far as appreciation of ethical issues is concerned. The respondents had obtained their knowledge of ethics from various sources. Though it appeared that their postgraduate training was a key source of knowledge, it did not contribute more than their experience at work, their own reading and what they learnt by attending seminars. The undergraduate ethics training does not adequately equip postgraduates to deal with the complex ethical issues they encounter in their daily work, which involves direct and often crucial intervention in others' lives (6). A separate module for bioethics, accompanied by evaluation, needs to be incorporated into the medical curricula.

The present medical curricula, drawn up by the Medical Council of India, do not prescribe evaluation either by a written or oral examination (4). Unless such evaluation is incorporated, medical teaching institutions and students will not feel that the learning of bioethics is important. Bioethics or medical ethics has to be taught by a specialist in medical ethics. At present, the forensic and community medicine faculties teach medical ethics and they focus more on medical jurisprudence (5). There is a need to encourage training of medical faculty in ethics or bioethics and eventually, to create a separate and independent department of medical ethics or bioethics. Bioethicists from different backgrounds, such as the social sciences, philosophy and medical sciences, could be faculty members in the department of bioethics. It is interesting to note that though postgraduates were aware of the difference between animal and human research ethics committees, they did not know about the functions of the ethics committee in their institution. A similar observation has been made by studies conducted elsewhere (7,8,9,10). This could be due to the committees' limited role, which perhaps relates only to research ethics and not to clinical ethics training. Most ethics committees review the research proposals, unless the study is funded. We suggest that health care personnel be trained to use different methods of deliberation on the moral issues (6) involved in clinical cases – a standard practice in western medical training. These methods need the expertise of clinical bioethicists who can form a part of comprehensive training in bioethics for healthcare personnel. We could assess the basic knowledge and attitudes of postgraduate and interns regarding healthcare ethics in order to obtain basic information for the framing of a bioethics course in the medical curriculum. This

study has the limitation that it does not cover a wider range of postgraduates, as well as the fact that it is only descriptive in nature.

Conclusion

Medical students frequently encounter ethical issues in their training, but lack the sensitivity to resolve these dilemmas. The incorporation of a bioethics curriculum in the initial period of the graduation and post-graduation programmes would be beneficial.

This study highlights the lack of improvement in ethics awareness corresponding to increasing exposure to medical education over four years.

To strengthen ethical reasoning and judgment in decision making, clinically oriented pedagogical measures like case studies, seminars, interactive workshops, utilising the work experience of multidisciplinary medical expertise, is needed. This should be an ongoing process, akin to continuing medical education.

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Catastrophic health expenditure and its determinants among households in Rural Puducherry

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ABSTRACT

Background: Health care expenditures exacerbate poverty, with additional 25 million households or more than 100 million individuals globally pushed into poverty every year because of such expenditures. The Government expenditure on healthcare in India is only 1.04% of GDP which is and less than 30% of total health spending. **Aim:** To assess the proportion of catastrophic health expenditure and the factors influencing among households in rural Puducherry. **Materials and Methods:** A community based cross-sectional analytical study was conducted in selected villages within 5 kms of a Medical College Hospital in Puducherry from September 2016 to June 2017. Socio-demographic details and health expenditure of the households were obtained using epicollect5 software from 817 households with 3459 individuals. Data were exported to Microsoft excel and analysed using STATA(v14). Multivariate analysis using binary logistic regression analysis was done to identify the independent effect of various factors on catastrophic health expenditure. **Results:** The mean per-capita expenditure on health care among the households was INR 226.5. About 27% of the households incurred catastrophic health expenditure. Multivariate analysis revealed that households with lower socio-economic status [11.21 (95%CI:5.07-24.82)], presence of vulnerable individuals at home [2.94 (95%CI:1.82-4.01)], alcohol-tobacco consumption [2.37 (95%CI:1.31-3.19)] and no health insurance schemes [6.89 (95%CI:4.74-10.41)] were the factors independently associated with catastrophic health expenditure. **Conclusion:** Catastrophic health expenditure was found in about one-fourth (27.2%) of the households. The household factors influencing catastrophic health expenditure were also identified. Strengthening the ability of health-care systems to provide comprehensive care is essential for reducing the burden of catastrophic health expenditure. Special focus must be given to financing the health care needs of the disadvantaged sections of the population.

Key Words: Catastrophic health expenditure, health care utilisation, rural households, Puducherry

INTRODUCTION

Ill health can have a significant economic impact on a household which can trigger a cascade of asset depletion, indebtedness and cut down on basic necessities.¹ The extensive use of technology in diagnostics and treatment of diseases coupled together with the rising therapeutic knowledge and expectations of the population has led to an increase in the cost of health care, especially in low and middle-income countries (LMICs).² Globally, approximately 44 million households or more than 150 million individuals face catastrophic health expenditure (CHE), and about 25 million households or more than 100 million individuals are pushed into poverty by the need to pay for services every year.³ In most LMICs, a large proportion of the money spent on healthcare comes from the out-of-pocket (OOP) expenditure of patients or their families.⁴ In the South Asian region, this proportion has been estimated to reach up to 60%–70% of total expenditure due to poor public spending on health. Households in such countries experience financial

hardship and are often pushed below the poverty line as a result of their spending on healthcare.⁵

Healthcare access in India is affected with 70:70 paradox; 70 per cent of healthcare expenses are incurred by people from their pockets, of which 70 percent is spent on medicines alone, leading to impoverishment and indebtedness.⁶ For decades, economic planners of India regarded health expenditure as financially non-productive social spending and public financing levels were low and total spending on healthcare was about 4.1% of GDP.⁷ Global evidence on health spending shows that unless a country spends at least 5–6% of its GDP on health and the major part of it is from government expenditure, basic health care needs are seldom met. The Government expenditure on healthcare in India is only 1.04% of GDP which is about 4 % of total expenditure and less than 30% of total health spending.⁸ Additionally, more than 90% of the workforce in India is engaged in informal economic activities. As insurance facilities are available only to workforce in formal sector, majority of such households

are not covered under any social protection scheme. In case of ill health, these households must spend from their own pockets. The high share of OOPE on health care along with inadequate provisioning of health care facilities further worsens the existing poverty.⁹ There is a lack of conclusive data related to health care expenditure patterns among households in our setting. Viewing the above situation, the present study was planned to assess the proportion of catastrophic health expenditure and the factors influencing among households in rural Puducherry.

Objectives: To estimate the proportion of catastrophic health expenditure among households in rural Puducherry; To determine the factors associated with catastrophic health expenditure among households in rural Puducherry.

METHODOLOGY

A community based cross-sectional analytical study was conducted among households in four villages located within 5 km radius of a Medical College Hospital in Puducherry from November 2016 to August 2017. Puducherry is an Union territory with four districts spread across the south Indian states of Tamil Nadu, Kerala and Andhra Pradesh. The district of Puducherry is on the shores of Bay of Bengal, surrounded by state of Tamil Nadu on all the other three sides. The population of district of Puducherry is approximately ten lakhs, with almost 65% residing in the urban areas. All households in the four villages were included for the study.

House to house visits were made in all the four villages by trained field staffs. After establishing rapport with the village heads and individuals, the purpose and procedure of the study was explained. The data were collected from the available individuals (>18 years) in each household. If houses were locked or individual eligible for study was not present during the investigators initial visit, two revisits were made. The identities of the household and individual were kept anonymous from the stage of data collection. Institutional Human Ethics Committee approval was obtained before the study.

A semi-structured interview schedule was used to collect information from the study participants. The questionnaire was converted into electronic format using epicollect5 software and the mobile application was used to collect data. The study tool included details on socio-demographic factors and household health expenditure patterns. Information on religion, type of family, total family income, number of individuals in the family, alcohol-tobacco consumption of the households, presence of vulnerable individuals and health insurance schemes were collected as part of socio-demographic details. The total household out of pocket health expenditures in the previous year was obtained.

The following definitions were used to measure the OOP health expenditure of the families: Household health expenditure was defined as the annual direct OOP health spending by households on medical goods and services and maintenance of good health.^{3,5} Catastrophic health expenditure was defined as the household's

annual health expenditure when exceeds 10 per cent of the total annual household income.^{3,5} Vulnerable individuals includes either presence of children less than 5 years or elderly aged 60 years and above. The households were classified into different socio-economic classes based on modified BG Prasad's classification for year 2018.¹⁰

Data Entry and Analysis: The electronically captured data was exported into excel and analysed using STATA (v 14). Continuous variables were summarized as mean and standard deviation while categorical variables were summarized as frequency and percentages. Bivariate analysis using chi-square test was done to determine the factors associated with catastrophic health expenditure. Multivariate analysis using binary logistic regression analysis was done to identify the independent effect of various factors on catastrophic health expenditure. The strength of the association was expressed as Odds Ratio (OR) for bivariate analysis and Adjusted Odds Ratio (AOR) for multivariate analysis. Statistical significance was set at p value of less than or equal to 0.05. The Inequality in health expenditure among the wealth quintiles was graphically represented as a Lorenz curve (concentration curve).

RESULTS

Table:1 Socio-demographic characteristics of the households (N=817)

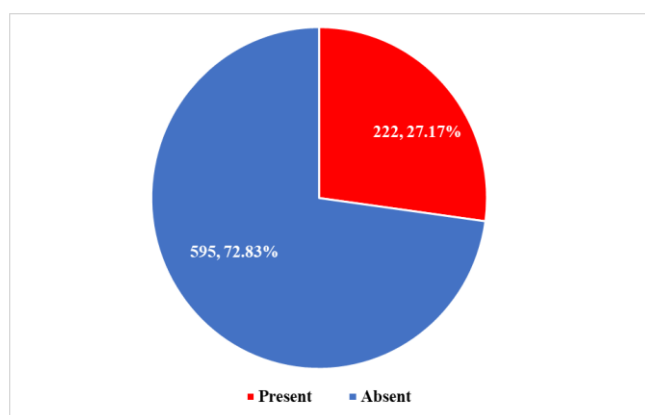
Characteristics	Summary statistics
Age, mean (±SD)	45.8 (±9.3)
Gender of the respondents, n(%)	
Male	333 (40.7%)
Female	484 (59.5%)
Family Type, n(%)	
Nuclear	516 (63.2%)
Joint	266 (32.6%)
Extended	35 (4.3%)
House type, n(%)	
Pucca	436 (53.4%)
Semi-Pucca	223 (27.3%)
Kutcha	158 (19.3%)
Family size, median (IQR)	4 (3-5)
Religion, n(%)	
Hindu	795 (97.3%)
Christian	17(2.1%)
Muslim	5(0.6%)
Socio-economic status, n(%)	
Upper	118(14.4%)
Upper middle	158(19.3%)
Middle	224(27.4%)
Lower middle	198(24.2%)
Lower	119(14.6%)

Table 2: Determinants of Catastrophic health expenditure among the households (N=817)

Characteristics	Total households	Number with Catastrophic Expenditure, n (%)	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Family Type				
Nuclear	516	125 (24.2%)	1	1
Joint	266	82 (30.8%)	1.35 (1.08-1.92)*	1.44 (0.99-2.1)
Extended	35	15 (42.9%)	2.44 (1.19-4.68)*	2.09 (0.98-4.48)
House type				
Pucca	436	105 (24.1%)	1	1
Semi-Pucca	223	66 (29.6%)	0.88 (0.57-1.37)	1.06 (0.67-1.68)
Kutcha	158	51 (32.3%)	0.67 (0.45-0.99)	1.03 (0.67-1.58)
Socio-economic status				
Upper	118	9 (7.6%)	1	1
Upper middle	158	26 (16.4%)	2.38 (1.12-5.34)*	2.38 (1.07-5.32) †
Middle	224	63 (28.1%)	4.7 (2.3-9.9)*	4.75 (2.24-10.07) †
Lower middle	198	66 (33%)	6.2 (3-13.1)*	6.06 (2.83-12.96) †
Lower	119	58 (49.2%)	11.7 (5.4-25.3)*	11.21 (5.07-24.82) †
Family size				
≤ 4	502	97 (18.9%)	1	1
> 4	315	125 (39.7%)	2.75 (2-3.77)*	1.17 (0.81-1.69)
Vulnerable Individuals				
Present	193	98 (50.8%)	4.16 (2.95-5.87)*	2.94 (1.82-4.01) †
Absent	624	124 (19.9%)	1	1
Alcohol-tobacco consumption				
Yes	206	94 (45.6%)	3.17 (2.26-4.43)*	2.37 (1.31-3.19) †
No	611	128 (20.9%)	1	1
Health Insurance				
Yes	136	87 (64%)	7.2 (4.83-10.69)*	6.89 (4.74-10.41) †
No	681	135 (19.8%)	1	1

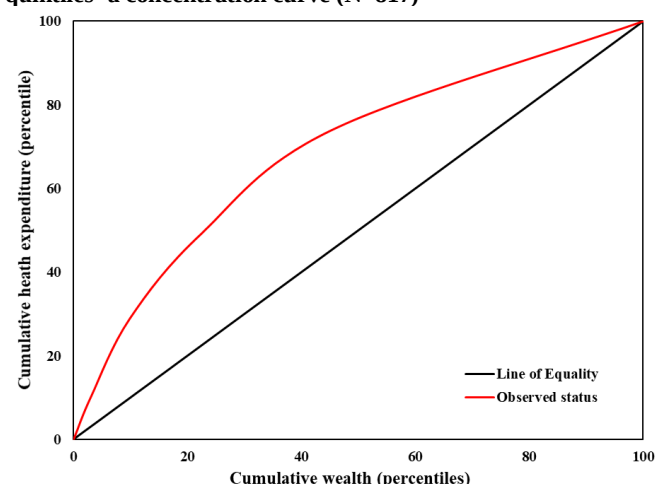
* -p <0.05, by chi-square test; † -p<0.05, by binary logistic regression

Figure 1: Proportion of Households with Catastrophic health expenditure (N=817)



Information on socio-demographic details and various household expenditures were obtained from 817 households consisting of 3459 individuals. The mean age of respondents in the households was 45.8 (± 9.3) and majority were females (59.5%). Most of the households in the surveyed area were pucca in type (71.9%) with nuclear families (63.2%) belonging to Hindu religion (97.3%). Majority of the households belonged to the middle class (27%) and only 16.7% had health insurance schemes available. (Table 1) The mean per-capita

Figure 2: Inequality in health expenditure among the wealth quintiles- a concentration curve (N=817)



expenditure on health care among the households was INR 226.5. About 27% of the households incurred Catastrophic health expenditure. (Figure 1). Bivariate analysis revealed that households with extended family [2.44 (95%CI:1.19-4.68)], low socio-economic status [11.7 (95%CI:5.4-25.3)], family size of >4 [2.75 (95%CI:2-3.7)], presence of vulnerable individuals at home [4.16 (95%CI:2.95-5.87)], alcohol-tobacco

consumption [3.17 (95%CI:2.26-4.43)] and no health insurance schemes [7.2 (95%CI:4.83-10.69)] were significantly associated with catastrophic health expenditure on comparison with other sub groups. However, in multivariate analysis lower socio-economic status [11.21 (95%CI:5.07-24.82)], presence of vulnerable individuals at home [2.94 (95%CI:1.82-4.01)], alcohol-tobacco consumption [2.37 (95%CI:1.31-3.19)] and no health insurance schemes [6.89 (95%CI:4.74-10.41)] were the factors independently associated with catastrophic health expenditure. (Table 2)

Inequality in health expenditure was analysed using concentration curve. Households in the bottom 20% of the wealth quintiles contributed to about 40% of the total health expenditure. Hence, there was inequality in health expenditure with more financial risks to the poor. (Figure 2)

DISCUSSION

The average per capita expenditure on health care among households in the current study (INR 226.5) was more than two-fold on comparison with the Consumer Expenditure Survey (CES) report 2009-10 value of INR 96 for Puducherry.¹¹ The change in reference period, growth in population since the year 2009, and the rising cost of health care could be the possible reasons for the increase in the per capita expenditure on health in the current study.

About 27% of the households incurred Catastrophic health expenditure. The proportion was high when compared to a study by Karthiyayini *et al* where the Catastrophic health expenditure was present only in 18.6% of households.¹² However, TV Sekher reported similar proportions of catastrophic health expenditure (26.5%) among rural households in six states.¹³ Similarly, Anamika Pandey *et al* reported that the proportion of catastrophic health expenditure from national surveys increased 1.47-fold between the 1993–1994 expenditure survey (12.4%) and the 2011–2012 expenditure survey (18.2%) and 2.24-fold between the 1995–1996 utilization survey (11.1%) and the 2014 utilization survey (24.9%).¹⁴ The households with lower socio-economic status, presence of vulnerable individuals at home, alcohol-tobacco consumption and no health insurance were significant predictors of catastrophic health expenditure. Few studies reported that increased health expenditure was more common among the poor,^{11,15} while others report it being more common among the rich.^{13,16} Better-off households can respond more often to medical needs but are less likely to face permanent impoverishment. Whereas, without adequate resources, poor households simply choose to forgo health care to avoid catastrophic health expenditure in the short run, which could have severe long-term consequences for health and earnings. The adverse impact of ill health in poorer households is grossly underestimated because it is not included in identifying catastrophic health expenditure.¹⁷ Older people are less likely to work if they are unhealthy, which could increase the economic burden on their families and society.¹⁸ Evidence from low- and middle-income

countries indicates that households with older people, especially those with chronic noncommunicable diseases or disabilities, experience higher rates of catastrophic health expenditure.¹⁹ Even in some of the wealthiest countries in Europe, older people diagnosed with chronic diseases face catastrophic health expenditure.²⁰ In coming decades, an ageing population combined with the absence of active measures to reduce catastrophic health expenditure will result in more older people falling into poverty and poor health.¹¹ Li *et al* in their study on factors affecting catastrophic health expenditure and impoverishment from medical expenses in China found out that age, sex, education, household size, employment status of the head of household and location were the determinants for the risk of catastrophic health expenditure.²¹ Pal28 in his study on catastrophic health expenditure in India found that the incidence of catastrophic payments goes down with increased income and improved education. He also identified economic and social status of households as key determinants of incidence of catastrophic health expenditure.²² World Health Organisation in their strategy for Health Financing in Asian Pacific Region has identified inadequate access to the healthcare facility as a determinant for catastrophic health expenditure. The Report identifies the distance of health facility as a key determinant for access with distance being a greater barrier for women than for men.²³ Karthiyayini *et al* found that the health insurance coverage of households was high (43%) and it had reduction in financial burdening or hardship.¹² Strengthening the ability of health-care systems to provide comprehensive care by increasing investment and human resources is essential for reducing the burden of catastrophic health expenditure. Special focus must be given to financing the health care needs of the disadvantaged sections of the population, as health expenses can push these households into greater risk of poverty through mobilizing funds to cater their healthcare needs. Healthcare financing system should focus on achieving vertical equity (households of unequal ability should be treated unequally), horizontal equity (households of the same ability should be treated equally) and progressivity in healthcare expenditure. However, in areas where the institutional capacity to organize mandatory nationwide risk pooling is weak, community-based health insurance schemes can be effective in protecting poor households from unpredictably high medical expenses.

The study was subjected to some limitations. Foremost, causal inference is precluded by the cross-sectional study design. As the study was conducted in limited rural field practice area, results may not be applicable for the whole district. The study tried to analyse only the absolute burden of healthcare spending and couldn't categorize the health care expenditures among the households. The household health expenditure incurred was assessed as self-reported that could be unverifiable. Apart from that, household income and expenditure patterns could also be under reported due to respondents' recall bias.

Conclusion:

In this study, catastrophic health expenditure was found in about one-fourth (27.2%) of the households. The households with lower socio-economic status, presence of vulnerable individuals at home, alcohol-tobacco consumption and no health insurance were significant predictors of catastrophic health expenditure. Higher public expenditure on health and the provision of affordable health care are required. In addition, governments should provide financial protection through viable prepayment mechanisms and risk-pooling and ensure health security. To achieve equity in health-care financing, public policy should focus on economically disadvantaged groups. Insurance coverage and the provision of good-quality, subsidized, public health facilities and regulation of the private sector will both improve access to affordable health care and protect the poor against financial catastrophe.

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Effect of Gender Preference of Offspring on Contraceptive Use among Married Women in Urban Areas of Belagavi – A Cross Sectional Study.

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ABSTRACT

Background: Gender preference has been one of the barrier in the use of contraceptives since ages, it may be either male or female gender preference. Even though this is known fact but still it is not adequately investigated. **Objective:** To study the association between gender preference and prevalence of contraceptive use in urban areas. **Methods:** A cross sectional study was conducted in three urban areas of Belagavi. Data was collected using predesigned and pretested questionnaire and analysed using SPSS version 21.0. **Results:** In this study 47.3% of the women had gender preference, among them 31.3% of the women had preference towards male child and 16.0% of the women had preference towards female child. The gender preference of offspring was significantly ($p < 0.001$) associated with prevalence of contraceptive use. **Conclusion:** The findings support the contention that there is still a need to intensify Information Education Communication activities and motivate the population to adopt small family norm by practicing contraception and promote the virtue of gender equality among them.

Key Words: Contraceptive, gender preference, urban area.

INTRODUCTION

The prevalence of contraceptive use is quite low in developing countries especially in India. This has lead to a drastic expansion in population growth which in turn hampered the success of the country. The population is expected to stabilized at about a quarter of a billion by 2050, if family planning programs continue to reduce the birth rate.¹ However there is still great variation in the extent and pace of that decline for individual countries.² The non acceptance may be due to various reasons like illiteracy, fear of complications, religious beliefs, gender preference etc. Many studies have been conducted in this field in various parts of the country to know the determinants of contraceptive use and causes for non acceptance of contraception, as the acceptance of contraceptives and fertility pattern differs in the societies and the factors responsible for varied picture operate at individual, family and community level.³

A strong gender preference may be an obstacle to fertility decline if couples continue having children after reaching their overall family-size goal because they are not satisfied with the sex composition of their children. In developing countries like India gender preference plays an important role in contraceptive use and this may be due to socio-cultural practices that influence gender preference. Prevalence of gender preference has been cited as one of the major reasons for the skewed sex ratio in India⁴ which is also an important amenable reason for

the non-acceptance of contraceptives. In a developing country like India where dowry system is still prevalent in some parts of country, daughters are considered as burden and are who belongs to her husband's family after marriage and son is considered as an asset of the family who will live in the same family.

The present study tries to explore the association between gender preference and contraceptive use in urban areas of Belagavi, where gender preference is still persistent.

MATERIAL AND METHODS

The present study was conducted in three field practice areas namely Ashoknagar, Ramnagar, Rukmininagar of Department of Community Medicine, Jawaharlal Nehru Medical College, Belagavi The study was conducted over a period of one year from 1st September 2016 to 31st March 2017. Sample size was calculated taking prevalence of contraceptive use as 40%⁵.

As population of eligible couple in all three health centres was almost in the same range, so we selected 230 subjects from each urban health centre. About 30 extra subjects from each study area were selected to take care of exclusion criteria. Subject selection was done by computer generated random number. Married women between the age group of 15- 44 years and who were permanent residents of study area were included in the study. Contraceptive methods are the preventive methods

to help women to avoid unwanted pregnancies.⁵ They include both temporary and permanent measures to prevent pregnancy resulting from coitus. Women who has attained menopause, undergone hysterectomy and with primary or secondary infertility were excluded from the study. Gender preference of offspring is the preference towards the male or female child. Data was collected using predesigned and pretested questionnaire by interviewing after taking written informed consent. Statistical analysis was done using SPSS version 21.0.

RESULTS

In the present study, age of the married women ranged from 20 to 42 years and their husbands' age ranged from 24 to 56 years. Majority 585 (97.5%) of the women were literates and only 15 (2.5%) of them were illiterates. More than half 347 (57.8%) of the study participants belonged to nuclear family and 232 (38.7%) of study participants belonged to socioeconomic class II. The mean ($\pm$ SD) age of the marriage was 20.35 ± 2.00 years. Most 226 (37.6%) of the participants had the duration of married life ranging between 6-10 years.

Table No.1: Distribution of married women according to number of children

Number of children	Number	Percentage
None	14	2.3
One	179	29.8
Two	280	46.7
Three	93	15.5
Four	34	5.7
Total	600	100

Table No.2: Distribution of married women according to number of male and female children.

Number of children	Male		Female	
	Number	%	Number	%
None	202	33.7	188	31.3
One child	275	45.8	276	46
Two children	108	18	77	12.8
Three children	15	2.5	51	8.5
Four children	0	0	8	1.4
Total	600	100	600	100

Table No. 3: Distribution of married women according to gender preference

Gender preference	Number	Percentage
Male	188	31.3
Female	96	16
No preference	316	52.7
Total	600	100

Among the 600 respondents, 280 (46.7%) of the women had 2 children followed by 179 (29.8%) with one child, 93 (15.5%) with 3 children, 34 (5.7%) with 4 children and

only 14 (2.3%) of the married women had no children. (Table No :1)

Among the study participants, 202 (33.7%) of the women did not have male child, 275 (45.8%) of the women had one male child followed by 108 (18.0%) had two male children and 15 (2.5%) of the women had three male children. Similarly among the study participants, 188 (31.3%) of the women did not have female child, 276 (46.0%) of the women had one female child followed by 77 (12.8%) had two female children, 51 (8.5%) of the women had three female children and 8 (1.4%) of women had four female children. (Table No :2)

Table No.4: Distribution of married women according to reason for gender preference

Reason for gender preference	Number	Percentage
Male gender preference (n=188)		
Son is an asset	27	14.4
Future source of income	30	16
To control family asset	38	20.2
To continue future generation	93	49.4
Female gender preference (n= 96)		
Take care of parents	55	57.2
They are affectionate	9	9.4
They are equal to male	32	33.4

Table No.5: Association between gender preference by married women and current use of contraception

Contraceptive usage	Gender preference			Total
	Male	Female	No preference	
Temporary methods	24 (17.5%)	19 (13.8%)	94 (68.6%)	137(100%)
Permanent methods	13 (8.8%)	12 (8.1%)	122 (82.9%)	147(100%)
Non usage	151 (47.7%)	65 (20.5%)	100 (31.6%)	316(100%)
Total	188 (31.3%)	96 (16.0%)	316 (52.6%)	600(100%)

$$\chi^2 = 128.32 \quad p < 0.005$$

Table No.6: Association of gender preference of offspring with the number of living children

Number of children	Gender Preference			Total
	Male	Female	No preference	
None	2 (14.3%)	2 (14.3%)	10 (71.4%)	14 (100%)
One child	43 (24.02%)	30 (16.7%)	106 (59.2%)	179 (100%)
Two children	67 (23.9%)	44 (15.7%)	169 (60.3%)	280 (100%)
Three children	48 (51.6%)	19 (20.4%)	26 (27.9%)	93 (100%)
Four children	28 (82.3%)	1 (2.9%)	5 (14.7%)	34 (100%)

$$\chi^2 = 80.1 \quad p < 0.001$$

Out of 600 study participants, 284 (47.3%) of the women had gender preference, among them 188 (31.3%) of the women had preference towards male child and 96

(16.0%) of the women had preference towards female child. (Table No :3)

In the present study, 188 of the married women had gender preference towards male, among them 27 (14.4%) of the women said that the reason for male gender preference is that son is like an asset, 30 (16.0%) of the women said that son is a future source of income, 38 (20.2%) said that son is needed to control family assets and 93 (49.4%) said son is needed to control future generation. Among 96 of the women who had preference towards female gender gave the following reasons, 55 (57.2%) of them said that female children take care of parent ,9 (9.4%) of them said female children are affectionate and 32 (33.4%) of them said that female are equal to male. (Table No :4)

In our study, the gender preference was significantly ($p < 0.001$) associated with prevalence of contraceptive use Both male 151 (47.7%) and female 65(20.5%) gender preference was highest among married women who did not use any contraceptive and it was lowest among the women who were practicing either temporary or permanent method of contraception. (Table No :5)

DISCUSSION

Among the 600 respondents in our study, most 280 (46.7%) of the women had 2 children followed by 179 (29.8%) with one child, 93 (15.5%) with 3 children, 34 (5.7%) with 4 children and only 14 (2.3%) of the married women had no children but, in a similar study conducted in resettlement area of Delhi³¹ showed that, 21.7% of the women had one child, 32.4% of them had two children, 42% had three or more children and 1.9% of them didn't had any child. Similar study done in rural areas of Belagavi⁶ showed that more than 65% of married women became pregnant between 18-21 years and 40% of married women had 2 children, 23% had 3 children and 7% had 4 or more children which are quite similar to our study. Similar results was shown in a community based study done in North West Ethiopia.⁷ In our study 398 (66.3%) of the study participants had atleast one male child and 412 (68.7%) of the married women had atleast one female child and the age of the last child ranged from 1-20 years.

In our study, 284 (47.3%) of the women had gender preference, among them 188 (31.3%) of the women had preference towards male child and 96 (16.0%) of the women had preference towards female child. A similar study done in Bangalore⁸ showed that 24% of the married women had gender preference towards male child and the reasons for preference were 6.9% of women think that son is an asset, 20.84% of women said that to control family assets, 63.88% of them said that they are future source of income and 8.33% of women said that to continue future generation. The reasons for male gender preference in our study were, 27 (14.4%) of the women said that son is like an asset, 30 (16.0%) of the women

said that son is a future source of income, 38 (20.2%) said that son is needed to control family assets and 93 (49.4%) said son is needed to control future generation. The reasons given by the study participants for male gender preference are similar to the reasons observed in our study.

Among 96 of the women who had preference towards female gender gave the following reasons, 55 (57.2%) of them said that female children take care of parent ,9 (9.4%) of them said female children are affectionate and 32 (33.4%) of them said that female are equal to male.

Among the study participants, 202 (33.7%) of the women did not have male child, 275 (45.8%) of the women had one male child followed by 108 (18.0%) had two male children and 15 (2.5%) of the women had three male children. Similarly among the study participants, 188 (31.3%) of the women did not have female child, 276 (46.0%) of the women had one female child followed by 77 (12.782.3%) was highest among the women who had four living children which is similar to a study done in Madya Pradesh.¹¹

In our study, the gender preference was significantly ($p < 0.001$) associated with prevalence of contraceptive use Both male 151 (47.7%) and female 65(20.5%) gender preference was highest among married women who did not use any contraceptive and it was lowest among the women who were practicing either temporary or permanent method of contraception. Studies done in rural South India, ⁹Bangalore¹⁰ and Kolkata¹² have shown that gender preference is also a reason for non-usage of contraceptive and the association was significant. Hence, due emphasis is required on these emerging issues.

Conclusion: In conclusion, the study clearly shows that despite of rapid social and economic progress in the country there is still existence of gender preference of offspring. The findings support the contention that there is still a need to intensify Information Education Communication activities and motivate the population to adopt small family norm by practicing contraception and promote the virtue of gender equality among them. Therefore an attempt to promote reproductive health through increasing use of contraceptives, family planning programmes need to target men specifically at all levels of the programme. Men should be actively involved at knowledge, supportive and acceptor level.

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A Study on the Prevalence of Hypertension and its Risk Factors among Auto-rickshaw drivers of selected areas of Nellore city, Andhra Pradesh.

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ABSTRACT

Back ground: In India auto-rickshaws are main mode of transport in urban and semi-urban areas. Drivers are exposed to harmful environment such as pollutant gases, continuous noise and whole body vibration as well as harmful lifestyle such as irregularity of intake of meals, bad posture while driving and stressful occupational pressures due to their working conditions. **Objectives:** To study the prevalence of hypertension among auto-rickshaw drivers at Nellore city. To study the association of the risk factors with hypertension among auto-rickshaw drivers. **Materials and Methods:** A cross-sectional study was done for a period of two months on 135 auto-rickshaw drivers at the auto-rickshaw stand near Narayana Medical College, Nellore (D), Andhra Pradesh. Data was collected using pre-designed, pre-tested, semi structured questionnaire. **Statistical Analysis:** Data collected is entered in MS Excel, and appropriate statistical analysis is done using SPSS Version 23. **Results:** Prevalence of hypertension among the auto-rickshaw drivers is 43%. Among the study subjects 40.7% were smokers; while 24% of the subjects were chewing tobacco and 52% were alcoholics. **Conclusion:** Prevalence of hypertension among auto-rickshaw was very high; they need regular health check-ups and appropriate treatment is recommended.

Key Words: Prevalence, Risk factors on auto-rickshaw drivers, Hypertension.

INTRODUCTION

In India auto-rickshaws are main mode of transport in urban and semi-urban areas. Drivers are exposed to harmful environment such as pollutant gases, continuous noise and whole body vibration as well as harmful lifestyle such as irregularity of intake of meals, bad posture while driving and stressful occupational pressures due to their working conditions¹. Due to the above said reasons they are likely to develop problems of vision, hearing, gastro-intestinal and life-style disorders like Hypertension, Diabetes, Coronary Vascular Diseases, etc². This study was taken up as there are very few studies showcasing the problems faced by auto-rickshaw drivers.

Objectives:

1. To study the prevalence of hypertension among auto-rickshaw drivers of Nellore city.
2. To study the socio-demographic and risk factor profile of the above said population.

MATERIAL AND METHODS

After approval by Institutional Ethics Committee a cross-sectional study was done for a period of two months on 135 auto-rickshaw drivers at randomly selected auto-rickshaw stands of Nellore City, Andhra Pradesh. After

obtaining informed consent, data was collected using pre-designed, pre-tested, semi structured questionnaire with details about their demographic features, habits, diet, physical activity etc., Anthropometric measurements like height, weight, waist and hip circumference were measured. Blood pressure measurements were made twice at 5 minute intervals and the average of the two was taken as their blood pressure.

Statistical Analysis:

Data collected was entered in MS Excel, and analyzed using SPSS version 23.0. Mean, standard deviation were calculated for continuous data. Frequencies and percentages for categorical data.

RESULTS

Prevalence of hypertension among the auto-rickshaw drivers of Nellore city was found to be 43%. 74% of the 135 study subjects were in the 31-50 years age group. 80% of them were Hindus, 50% belonged to backward class followed by 26% schedule caste. 94% of the subjects were married and 83.7% belonged to nuclear families. (Table: 1) Only 17% of the study subjects had more than high school education. (Fig: 1) and 51% of them were from Upper Middle class (Fig: 2). 72% of the

135 study subjects had own vehicles and almost 81% were working full-time. (Table: 2).

Among the study subjects 40.7% were smokers among whom 49% were smoking for more than 15 years and 27% of them smoked greater 10 cigarettes/day. 24% of the subjects were chewing tobacco and 52% were alcoholics among whom 28.6% were consuming alcohol for more than 15 years (Table: 3)

Table 1: showing the socio-demographic profile of study subjects

Variable	Frequency	Percentage
Age		
21-30 yrs	18	13.3
31-40 yrs	51	37.8
41-50 yrs	49	36.3
51-60 yrs	13	9.6
>60 yrs	4	3
Total	135	100
Religion		
Hindu	108	80
Muslim	9	6.7
Christian	18	13.3
Total	135	100
Caste group		
General	27	20
OBC	67	49.6
SC	35	25.9
ST	6	4.4
Total	135	100
Marital status		
Single	8	5.9
Married	127	94.1
Total	135	100
Type of family		
Nuclear	113	83.7
Joint	22	16.3
Total	135	100

Fig 1: Pie diagram showing the education of study subjects

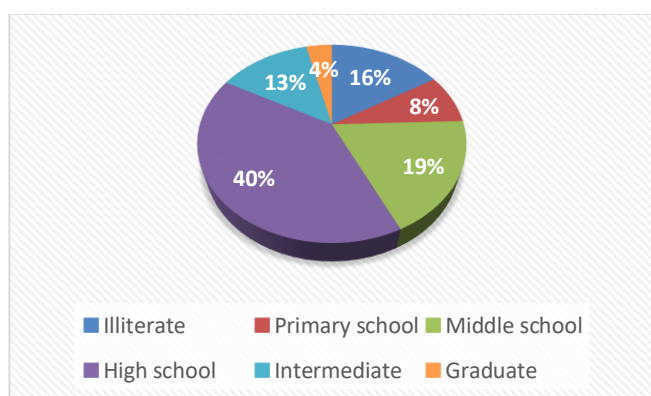


Table2: showing the job profile of study subjects

Variable	Frequency	Percentage
Vehicle		
Own	98	72.6
Rented	37	27.4
Total	135	100
Working pattern		
Full time	109	80.7
Part time	26	19.3
Total	135	100

Fig 2: showing the socio-economic status of the study subjects

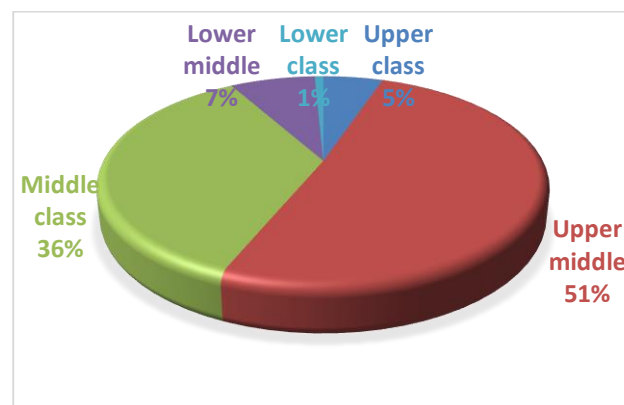
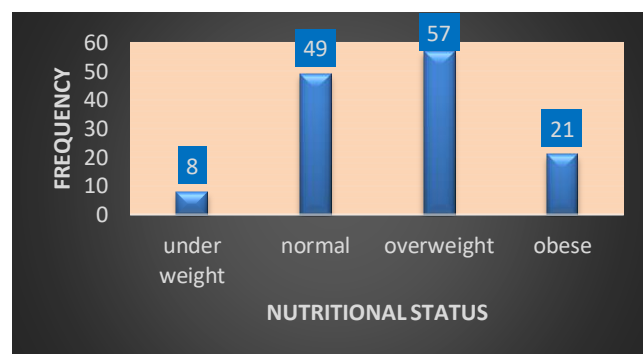


Fig: 3 distribution of study subjects according to their nutritional status



Diet History:

97% of the study subjects were taking mixed diet among whom 25% consumed non-veg. food for 3 days or more. Almost 95% were having the concept of added salt. 40% of the study subjects were consuming fruits only once a week or occasionally. 36% were having fast foods weekly twice. About 90% of the subjects were taking tea/coffee and among them almost 52% were taking 3 or more servings/day. 42% of the subjects were overweight and 15.6% were obese. Only 36% had a normal BMI. (Fig-3). Only 7% had regular physical exercise, among whom 90% were walking. 60% exercised less than 30 minutes/day. Though 99% Of the study subjects were stressed only 4.4% practiced yoga/meditation.

Table 3: showing the distribution of study subjects according to risk factors

Variable	Frequency	Percentage
Smoking		
Yes	55	40.7
No	80	59.3
Total	135	100
Duration of smoking		
<5 yrs	13	23.6
5-10 yrs	12	21.8
11-15 yrs	3	5.5
>15 yrs	27	49.1
Total	55	100
No. of cigarettes/day		
<5	24	43.6
05-Oct	16	29.1
>10	15	27.3
Total	55	100
Tobacco chewing		
Yes	33	24.4
No	102	75.6
Total	135	100
Alcohol		
Yes	70	51.8
No	65	48.2
Total	135	100
Duration of alcohol consumption		
<5 yrs	17	24.3
5-10 yrs	28	40
11-15 yrs	5	7.1
>15 yrs	20	28.6
Total	70	100

DISCUSSION

In this present study, the prevalence of Hypertension among auto -rickshaw drivers is 43%. While a study conducted in the Nagpur city of Maharashtra in 2014 among auto-rickshaw drivers in the age group 20-65 years by S S Chaudhary et al., showed a prevalence of hypertension of 35.14%¹. A study conducted at Davangere city of Karnataka, among auto-rickshaw drivers in the age group of 16-55 years in 2012 by Raghavendraswamy Koppad et al., the prevalence of hypertension was 17%³. A study conducted at Agra city among auto -rickshaw drivers, in the age group of 16-65 years in 2015 by Singh SP et al., the prevalence of hypertension was 30.23%⁴. A study conducted among bus drivers in North Kerala in the age group of 21-60 years in 2008, the prevalence of hypertension was 41.9%⁵. Another study conducted among bus drivers in the age group of 21-60 years in Visakhapatnam, AP, in 2015, by

S. Bhaskara Rao et al., the prevalence of hypertension was 36%⁶.

Conclusion:

Prevalence of Hypertension among the auto-rickshaw drivers was 42% which is high when compared to general population. Risk factor prevalence: 40.7% were smokers among whom 49% were smoking for more than 15 years and 27% of them smoked more than 10 cigarettes/day. 24% of the subjects were chewing tobacco and 52% were alcoholics among whom 28.6% were consuming alcohol for more than 15 years. 99% of the study subjects were experiencing stress. 97% of the study subjects were taking mixed diet among whom 25% consumed non-veg. food for 3 days or more. Almost 95% were having the concept of added salt. 40% of the study subjects were consuming fruits only once a week or occasionally. 42% of the subjects were overweight and 15.6% were obese.

Recommendations:

1. As most of the auto drivers were smokers or alcoholics, they should educated about the long term complications and motivate them to reduce those habits.
2. They should also be told about the positive effects of physical activity and healthy diet. Importance should be given to consumption of fresh fruits, vegetables and dietary fiber.
3. As 99% of the study subjects were stressed, they should be motivated to practice yoga/ meditation or cultivate any good hobbies.
4. Those who were already on treatment for hypertension should be told the importance of drug compliance and how it would help to control their blood pressure.

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Non communicable diseases and lifestyle disorders among laboratory personnel in a private tertiary care hospital in Bangalore, South India – a cross sectional study

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ABSTRACT

Background: Non communicable diseases (NCDs) are the leading cause of death globally. Laboratory personnel working with so many hazards and difficult time schedule report job strain and stress at work place. They are prone for the development of NCDs. **Objectives:** To estimate the prevalence and profile of NCDs and lifestyle disorders and their associated factors among laboratory personnel in a private tertiary care hospital. **Methodology:** A cross sectional study was undertaken in a private tertiary care hospital in Bangalore, South India. Data was collected by interview, conducting medical examination and review of medical records. **Results:** Of the 115 laboratory personnel, majority were females, young (≤ 30 years), graduates and were married; worked in Clinical Pathology, involved in sample processing, permanent workers with a median work experience of 6 years. Obesity was the commonest health issue with a prevalence of 19.1%, followed by hypertension, hypothyroidism and alcohol consumption with prevalence of 14.8%, 12.2% and 12.2% respectively. Obesity was the commonest among most of the subgroups. Alcohol consumption and smoking were common among males, Microbiology and housekeeping workers. By univariate logistic regression analysis, workers in 41-50 years age, lesser educated, ever married, housekeeping, permanent and with more experience had significantly more number of health issues. By multivariate logistic regression analysis, workers with more experience had significantly more number of health issues (Adjusted OR: 5.3, 95% CI: 1.2-23.9) as compared to other groups. **Conclusion:** Findings from our study will provide a base for future interventional studies. Interventions in workplace settings are very cost-effective in preventing NCDs and lifestyle disorders. Healthy workers and healthy workplaces can positively impact even the health of household members of the workers.

Key Words: Non communicable Disease, NCD, Lifestyle disorder, Laboratory personnel, Laboratory workers.

INTRODUCTION

Global Non Communicable Disease (NCD) burden remains unacceptably high. Non communicable diseases (NCDs) are the leading global cause of death and are responsible for 41 million of the world's 57 million deaths which accounted to nearly 71% of deaths worldwide.¹ According to World Health Organization (WHO) NCD Country Profile Report 2018, NCDs accounted for 63% of total deaths in India.² The four major behavioral risk factors of NCDs identified are tobacco use, unhealthy diet, lack of physical activity and harmful use of alcohol are highly prevalent. This has led to four major metabolic risk factors like overweight/obesity, high blood pressure, raised blood sugar and raised blood lipids which are also on the rise.³ Similarly, psychosocial stress and job strain are also some of the identified risk factors for NCDs.^{4,5}

Laboratory personnel form an important part of health care workforce, they receive, process and analyze samples in laboratories. By the virtue of their work they are exposed to various occupational hazards – biological, physical, chemical and also psychological hazards.⁶ Laboratory personnel working with so many hazards,

with a difficult time schedule are prone for work related job strain. Studies have shown that, about one third of the laboratory personnel report stress at work place, owing to the high job demand and physical exertion.⁷ All these factors make them prone for the development of NCDs. Extensive review of literature revealed that there are no studies published in India which focus on NCDs and lifestyle disorders among laboratory personnel working in a tertiary care hospital. Hence the current study was undertaken so that health promotion and lifestyle modification measures can be implemented for these workers, if these issues were found to be prevalent in them.

Objectives: To estimate the prevalence and profile of NCDs and lifestyle disorders and their associated factors among laboratory personnel in a private tertiary care hospital.

METHODOLOGY

A cross sectional study was undertaken in a private tertiary care teaching hospital in Bangalore, South India.

Approval from the Institutional Ethics Committee was obtained. The personnel from the Departments of Clinical Pathology, Biochemistry, Microbiology and Blood Bank services were included in the study. The sampling frame included all those personnel employed in the above mentioned departments. All personnel who were temporarily posted to these departments or transferred out to another department were excluded from the study. A total of 115 workers were recruited for the study. A written informed consent was obtained from the study subjects. An interview was held with each of the personnel during which information regarding demography, work profile and current health status including behavioral risk factors like alcohol consumption and smoking were collected. Medical examination of all the study subjects was conducted. Standard sphygmomanometer was used to document the blood pressure, stadiometer and weighing machine was used to document anthropometric measures. BMI was calculated and cut offs for Asian Pacific region was used – Overweight: 23-24.9 kg/m² and Obesity: ≥ 25 kg/m².⁸ Further, the above efforts were supplemented with review of medical records/ folder of each of the employees to document the morbidities, if any. The data were entered into a Microsoft Excel spread sheet and analyzed using standard statistical software.

RESULTS

Of the 115 laboratory personnel in our study, majority were females and in the age group of < 30 years; mean age being 35 years with a standard deviation of 11.7 years. Nearly two third of the study population were graduates and were married. Large majority of the study population worked in the Department of Clinical Pathology followed by Microbiology, Biochemistry and Blood Bank respectively. Nearly 70% of the workers were involved in actual sample processing followed by clerical and housekeeping staff. Majority were permanent employees with median work experience of 6 years and inter-quartile range (IQR) of 2 to 25 years. [Table 1]

Ten most common health problems identified among the laboratory personnel are as given in Table 2. Among the 115 clinical laboratory personnel examined, obesity was found to be the commonest health problem with a prevalence of 19.1%, followed by hypertension with a prevalence of 14.8%. Hypothyroidism and alcohol consumption formed the next common health related issues with a prevalence of 12.2% each. Diabetes mellitus and smoking formed the fourth common health related ailments with a prevalence rate of 8.7% each.

Distribution of these health issues among different subgroups of the study population is as shown in Table 3.

Gender: Prevalence of obesity, hypothyroidism and hypertension were common among females, whereas behavioral risk factors like alcohol consumption and smoking were common among male workers. There was

Table 1: Demography & Work profile of the study population (n=115)

Characteristics	Number (n)	Percentage (%)
Gender:		
Females	71	61.7
Males	44	38.3
Age group:		
< 30 years	53	46.1
31-40 years	27	23.5
41-50 years	19	16.5
> 51 years	16	13.9
Education status:		
$\leq$ PUC	40	34.8
> PUC	75	65.2
Marital status:		
Ever married	70	60.9
Single	45	39.1
Department wise distribution:		
Clinical Pathology	52	45.2
Microbiology	31	27
Biochemistry	23	20
Blood Bank	9	7.8
Nature of work:		
Sample processing	70	60.9
Clerical	37	32.2
Housekeeping	8	6.9
Employment status:		
Permanent	82	71.3
Temporary	33	28.7
Work tenure:		
≤ 6 years	55	47.8
> 6 years	60	52.2

Table 2: Profile and Prevalence of Health Issues among laboratory personnel (n=115)

Sl No.	Health Issues	Number (n)	Percentage
1	Obesity	22	19.1
2	Hypertension	17	14.8
3	Alcohol consumption	14	12.2
4	Hypothyroidism	14	12.2
5	Diabetes mellitus	10	8.7
6	Smoking	10	8.7
7	Acid Peptic Disease	9	7.8
8	Inter Vertebral Disc Prolapse (IVDP)	8	7
9	Back Pain	7	6.1
10	Dyslipidemia	7	6.1

statistically significant association between behavioral risk factors like alcohol consumption and smoking with gender as shown in Table 4.

Table 3: Distribution of Health Issues with different subgroups of the study population (n=115)

Morbidities		Obesity	Hypertension	Hypothyroidism	Alcohol consumption	Diabetes mellitus	Smoking	Acid Peptic disease	IVDP	Back pain	Dyslipidemia
Gender	Female (n=71)	15 (21.1)	11 (15.4)	12 (16.9)	1 (1.4)	4 (5.6)	1 (1.4)	4 (5.6)	4 (5.6)	5 (7)	5 (7)
	Male (n=44)	7 (15.9)	6 (13.6)	2 (4.5)	13 (19.5)	6 (13.6)	9 (20.4)	5 (11.3)	4 (9)	2 (4.5)	2 (4.5)
Age groups (years)	< 30 (n=53)	7 (13.2)		3 (5.7)	4 (7.5)		2 (3.8)	5 (9.4)		6 (11.3)	1 (1.9)
	31-40 (n=27)	5 (18.5)	4 (14.8)	6 (22.2)	5 (18.5)	1 (3.7)	5 (18.5)	1 (3.7)	2 (7.9)		1 (3.7)
	41-50 (n=19)	6 (31.6)	6 (31.6)	4 (21.1)	2 (10.5)	6 (31.6)	1 (5.3)	1 (5.3)	5 (26.3)	1 (5.3)	3 (15.8)
	> 51 (n=16)	4 (25)	7 (43.8)	1 (6.3)	3 (18.9)	3 (18.9)	2 (12.6)	2 (12.6)	1 (6.3)		2 (12.6)
Education status	≤ PUC (n=40)	10 (25)	10 (25)	7 (17.5)	8 (20)	9 (22.5)	6 (15)	4 (10)	5 (12.5)	2 (5)	5 (12.5)
	> PUC (n=75)	12 (16)	7 (9.3)	7 (9.3)	6 (8)	1 (1.3)	4 (5.3)	5 (6.6)	3 (4)	5 (6.6)	2 (2.6)
Department	Clinical Pathology (n=82)	11 (21.1)	8 (15.3)	7 (13.4)	4 (7.6)	7 (13.4)	2 (3.9)	6 (11.5)	5 (9.6)	4 (7.6)	3 (5.7)
	Blood Bank (n=9)	4 (44.4)	2 (22.2)	1 (11.1)					1 (11.1)		2 (22.2)
	Biochemistry (n=23)	1 (4.3)	2 (8.6)	2 (8.6)					1 (4.3)	2 (8.6)	1 (4.3)
	Microbiology (n=31)	6 (19.3)	5 (16.1)	4 (12.9)	10 (32.2)	3 (9.6)	8 (25.8)	3 (9.6)	1 (3.2)		3 (9.6)
Nature of Work	Sample processing (n=70)	10 (14.2)	7 (10)	7 (10)	7 (10)	2 (2.8)	6 (8.5)	5 (7.1)	5 (7.1)	5 (7.1)	3 (4.2)
	Housekeeping (n=8)		2 (25)	2 (25)	7 (87.5)	1 (12.5)	2 (25)				2 (25)
	Clerical staff (n=37)	12 (32.4)	8 (21.6)	5 (13.5)		7 (18.9)	2 (5.4)	4 (10.8)	3 (8.1)	2 (5.4)	2 (5.4)
Employment status	Permanent (n=82)	17 (20.7)	17 (20.7)	12 (14.6)	11 (13.4)	10 (12.1)	8 (9.7)	6 (7.3)	8 (9.7)	3 (3.6)	7 (8.5)
	Temporary (n=33)	5 (15.1)		2 (6)	3 (9)		2 (6)	3 (9)		4 (12.1)	
Work Tenure	≤ 6 years (n=55)	6 (10.9)	1 (1.8)	4 (7.2)	4 (7.2)		2 (3.6)	4 (7.2)	1 (1.8)	5 (9)	1 (1.8)
	> 6 years (n=60)	16 (26.6)	16 (26.6)	10 (16.6)	10 (16.6)	10 (16.6)	8 (13.8)	5 (8.3)	7 (11.6)	2 (3.3)	6 (9.9)

Table 4: Association between gender and behavioral risk factors among the study population (n=115).

Gender	Behavioral Risk Factors n (%)			Fischer's Exact, 'p' value
	Present	Absent	Total	
	Alcohol consumption			
Females	1 (1.4)	70 (98.6)	71 (100)	0.00,
Males	13 (29.5)	31 (70.5)	44 (100)	< 0.01
Total	14 (12.2)	101 (87.8)	115 (100)	
Smoking				
Females	1 (1.4)	70 (98.6)	71 (100)	0.0007,
Males	9 (20.5)	35 (79.5)	44 (100)	< 0.01
Total	10 (8.7)	105 (91.3)	115 (100)	

Age: Among the younger age group workers, obesity was the commonest morbidity followed by back pain. In 31-40 years age group workers, hypothyroidism was the commonest, followed by obesity, alcohol consumption and smoking. Prevalence of obesity, hypertension and diabetes was high among workers in the age group of 41-50 years. Among the older age group workers, hypertension followed by obesity was the commonest morbidity.

Education: Obesity and hypertension were the commonest morbidities among both the groups with education up to PUC and above PUC in the study.

Nature of Work: Prevalence of obesity was high, followed by hypertension among workers involved in sample processing as well as among clerical staff. Whereas behavioral risk factors like alcohol consumption was the highest among housekeeping workers.

Employment status: Obesity was the commonest morbidity identified among both permanent and temporary workers, followed by hypertension among permanent workers.

Work Tenure: Obesity and hypertension were the commonest morbidities among workers with more work experience followed by hypothyroidism, diabetes mellitus and alcohol consumption. Among workers with less work experience, obesity was the commonest followed by hypothyroidism, acid peptic disease and alcohol consumption.

It was noticed that many of the study subjects had suffered from multiple health issues; with median of one health issue and an IQR of 1 to 3. Majority of the study

Table 5: Number of morbidities among the study subjects (n=115)

Variable	Number of morbidities		Unadjusted Odd's Ratio (95% CI)	'p' value	Adjusted Odd's Ratio (95% CI)	'p' value
	≤ 1	≥ 2				
Age groups (in years)	≤ 30	37 (69.8)	16 (30.2)	1	1	
	31-40	13 (48.1)	14 (51.9)	2.4 (0.95-6.4)	0.06	1(0.2-4.6)
	41-50	3 (15.8)	16 (84.2)	12.3 (3.1-8.3)	< 0.001	0.25(0.05-1.4)
	≥ 51	6 (37.5)	10 (62.5)	3.8 (1.1-12.4)	0.02	1.13(0.16-7.6)
Education status	≤ PUC	13 (32.5)	27 (67.5)	3.3 (1.5 - 7.4)	0.004	0.44(0.1-1.8)
	> PUC	46 (61.3)	29 (38.7)	1		1
Marital status	Ever married	30 (42.9)	40 (57.1)	2.4 (1.1-5.2)	0.02	2.3(0.5-9.7)
	Single	29 (64.4)	16 (35.6)	1		1
	Sample processing	42 (60)	28 (40)	1		1
Nature of work	House keeping	1 (12.5)	7 (87.5)	10.5 (1.2-9)	0.03	0.23(0.02-2.3)
	Clerical staff	16 (43.2)	21 (56.8)	1.9 (0.88-4.4)	0.89	0.72(0.18-2.9)
Employment status	Permanent	37 (45.1)	45 (54.9)	2.4 (1.04-5.6)	0.04	1.06(0.3-3.9)
	Temporary	22 (66.7)	11 (33.3)	1		1
Work tenure (in years)	≤ 6	40 (72.7)	15 (27.3)	1		1
	> 6	19 (31.7)	41 (68.3)	5.7 (2.5-12.8)	< 0.001	5.3 (1.2-23.9)

subjects (30.4%) had one health issue prevailing in them. The association between number of health problems and the various demographic and work profile factors are described in Table 5. By univariate logistic regression analysis, the odds of occurrence of health issues was 12 times more in the workers of age group 41 to 50 years (95% CI: 3.1-8.3) and it was 4 times for workers above 50 years (95% CI: 1.1-12.4) as compared to younger age group workers. There was no statistically significant association for the workers in the age group of 31 to 40 years. Odds of occurrence of morbidities were nearly 3 times more for lesser educated workers (95% CI: 1.5-7.4) as compared to better educated workers. Workers who were ever married had more than twice the number of morbidities (95% CI: 1.1-5.2) as compared to workers who were single. Occurrence of health issues among housekeeping workers were nearly 10 times more as compared to workers involved in sample processing (95% CI: 1.2-9) However, there was no statistically significant association between the workers involved in clerical work and the number of health problems. Odds of occurrence of health problems were more than 2 times in permanent workers (95% CI: 1.04-5.6) as compared to temporary workers and it was 6 times more for more experienced workers (95% CI: 2.5-12.8) than workers with lesser work experience. However, by multivariate logistic regression analysis, after adjusting for all the co-variables, it was found that work tenure was the only significantly contributing factor for number of health issues among

laboratory personnel (Adjusted OR: 5.3, 95% CI: 1.2-23.9).

DISCUSSION

Most common health issue among laboratory personnel was found to be obesity with a prevalence rate of 19.1% followed by hypertension with a prevalence rate of 12.2%. The prevalence rate of obesity in India as per WHO NCD Global Status Report 2018 was 4%.² One of the reasons for huge disparity in the prevalence rate of obesity as per the WHO report and our study is because of the higher BMI cut offs used in the WHO report (BMI ≥ 30 kg/m²). In our study, BMI cut offs for Asia Pacific region were used – Overweight: ≥ 23 kg/m² and Obesity: ≥ 25 kg/m². As per a study conducted to assess the prevalence of obesity among staff of a tertiary care hospital and medical college in Ahmedabad using BMI cut offs for Asia Pacific region was around 48%.⁹ As per the WHO report mentioned above, the prevalence rate of NCDs like hypertension was 24% and behavioral risk factors like smoking was 11% in India which are higher than our study findings, whereas prevalence of diabetes mellitus was 8% which is similar to our study findings.²

A study was done to assess NCD risk factors in four healthcare institutes in Manipal, Karnataka found that poor dietary habits, suboptimal blood pressure and physical inactivity were the most common risk factors, whereas in our study obesity, hypertension and alcohol consumption formed the most common health issues

among the laboratory staff.¹⁰ Another study done in Taiwan among hospital employees can be compared with our study which also had similar findings. Obesity was the commonest morbidity with a prevalence rate of 24.7% followed by hypertension, hypercholesterolemia and type 2 diabetes mellitus.¹¹ Further, in a study done to assess cardiovascular disease risks in health care workers in Mexico, showed that the prevalence of hypertension was 22% and type 2 diabetes 8% which is comparable to our study.¹² A study done in a Tehran Medical University found that the prevalence of overweight (BMI: ≥ 26 kg/m²), obesity (BMI: ≥ 30 kg/m²) and hypertension was 14.7%, 17.8% and 11.7% respectively. In addition smoking was reported by 5.6% of the respondents in this study which is similar to our study findings.¹³ As per a multicenter study, prevalence rate of hypothyroidism in adult population was found to be 10.95% in India and 9.2% in Bangalore, which is slightly lower than our study findings.¹⁴

Prevalence of health issues like obesity and hypertension were higher in females in our study. This can be compared with the WHO NCD Global Status Report 2018, wherein the prevalence of obesity was higher in females though prevalence of hypertension was higher in males.² Hypothyroidism was higher in females and younger age group workers in our study, as compared to the multicenter study mentioned earlier it was significantly higher in females but common in older age group individuals.¹⁴ In our study, prevalence of lifestyle related risk factors like alcohol consumption and smoking were significantly high in male subjects which is similar to the findings in WHO Report on Non Communicable Diseases in the South East Asia Region.³ In comparison to an NCD study done in Thailand among health workers where the prevalence of smoking was 6.2% and alcohol consumption was 54%, our study showed lesser prevalence of these risk factors. However, and as in our study both these behavioral risk factors were significantly higher in males.¹⁵ In our study, workers involved in sample processing and clerical work had a higher prevalence of obesity and ergonomic related issues like back pain, this may be because of their work profile which predominantly included deskbound and sedentary work. A study conducted in a hospital in Singapore found that the prevalence of risk factors like diabetes mellitus, obesity, hypertension and smoking were higher in Non Healthcare Workers (NHWs) than Healthcare Workers. The possible explanation given was that most NHWs were likely to hold administrative jobs that were predominantly deskbound.¹⁶ For unknown reasons, but probably due to peer pressure behavioral risk factors like smoking and alcohol consumption were strikingly high in Microbiology workers and workers involved in housekeeping.

A study done to assess the risk factors score of non-communicable diseases among the staff of a private medical college of Jaipur, India found the prevalence of hypertension, diabetes, smoking, alcohol consumption to

be 15%, 24.4%, 33.9% and 18.9% respectively which are much higher than our study findings. Majority of them had four risk factors and the number of risk factors increased with age.¹⁷ In our study, majority had one health issue and it was also significantly higher among older age group workers. Additionally, in our study, logistic regression analysis revealed that workers with poorer educational status, married workers, workers involved in housekeeping, permanent workers and more experienced workers had higher number of risk factors.

Conclusion

Among the laboratory personnel examined, obesity was the commonest health issue identified with a prevalence rate of 19.1%, followed by hypertension with a prevalence rate of 14.8%. Obesity was the most common health ailment identified in most subgroups of the study population. Whereas behavioral risk factors like alcohol consumption and smoking were strikingly common in some of the sub groups of our study population like male workers, workers involved in housekeeping and worked in Microbiology department. When assessed for the number of health issues, majority of the study subjects (30.4%) had one health issue prevailing in them. Number of health issues was significantly higher in more experienced workers by multivariate logistic regression analysis after adjusting for all the co-variables.

Findings from our cross sectional study will provide a base for future interventional studies. This will aid in planning and provision of primary and secondary NCD prevention services at the workplace. As workplace can be used as a setting for health promotion and preventive health activities not only to prevent occupational injury, but to improve worker's health holistically. Interventions in workplace settings are very cost-effective in preventing NCDs and lifestyle disorders. These interventions have a potential to reach even the homes of the workers. Healthy workers and healthy workplaces can positively impact even the health of household members of the workers.

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Risk of developing Diabetes Mellitus among patients attending a Rural Health Training Centre, Kancheepuram district.

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ABSTRACT

Background: Diabetes as a non-communicable disease is a significant public health problem. The prevalence rate is increasing globally and reaching epidemic proportions. Globally, an estimated 422 million adults were living with diabetes in 2014 and they compared to 108 million in 1980. Over the past decade, diabetes prevalence has raised faster in low- and middle-income countries than in high-income countries. **Objectives:** To assess the risk of type 2 diabetes mellitus using the Indian Diabetes Risk Score (IDRS) among patients attending a RHTC; To measure the Random Blood Sugar levels (RBS) of all the study subjects and classify it according to their risk status. **Materials and Methods:** A cross sectional study was conducted during December 2018 to January 2019 among patients aged 18 years and above attending the Rural Health Training Centre of KIMS&RC, Pulipakkam, Kancheepuram District, Tamil Nadu. The patients were interviewed using a structured questionnaire consisting of socio-demographic details and Anthropometric measurement, Indian Diabetic Risk Score (IDRS) and Random Blood Sugar testing. **Result:** Among 137 study participants, 65 (48%) were >50 years and 87(64%) were females. On evaluating the risk status of study subjects using IDRS, 43.7% had moderate risk and 35.0% had high risk score. With increase in age and BMI there was increase in the risk status for diabetes. Among the study subjects, 16(11.6%) were found to have an RBS value more than the cut off (i.e. >200 mg/dl). **Conclusion:** Majority of the subjects in our study belonged to the high risk and moderate risk category. A statistically significant association was seen between the age, BMI, Waist circumference and Physical activity.

Key Words: Diabetes mellitus, Indian Diabetic Risk Score, IDRS, RBS, Kancheepuram

INTRODUCTION

Diabetes as a non-communicable disease is a significant public health problem and the prevalence rate is increasing globally and reaching epidemic proportions.¹ Globally, an estimated 422 million adults were living with diabetes in 2014 and they compared to 108 million in 1980. WHO in 2016 estimated that “The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population. This reflects an increase in associated risk factors such as being overweight or obese”. Over the past decade, diabetes prevalence has raised faster in low- and middle-income countries than in high-income countries. Diabetes caused 1.5 million deaths in 2012. Higher-than-optimal blood glucose caused an additional 2.2 million deaths, by increasing the risks of cardiovascular and other diseases.²

Unfortunately more than 50% of the diabetic subjects in India remain unaware of their diabetes status, which adds to the disease burden.³ Early detection with life style modification and treatment may reduce the disease burden and complications. This emphasizes the need of mass awareness and screening programmes to detect

undiagnosed diabetes and thus to that reduce the burden of diabetes in India. There is good evidence that screening tests can detect type 2 diabetes during the early stages. In this study we assessed the risk of type 2 diabetes mellitus using the Indian Diabetes Risk Score (IDRS) and measured the Random Blood Sugar levels (RBS) of all the study subjects and classify it according to their risk status among patients attending a RHTC.

MATERIAL AND METHODS

A cross sectional study was conducted during December 2018 to January 2019 among patients aged 18 years and above attending the rural health and training centre of Karpaga Venayaga Institute of Medical Sciences and Research Centre, Pulipakkam, Kancheepuram District, Tamil Nadu.

Inclusion criteria and Exclusion criteria: All individuals aged 18 years and above were included in the study after obtaining their consent. Those individuals who were not willing to participate and known case of diabetes mellitus were excluded.

Study tool: A structured questionnaire was developed, translated into local language Tamil and back into English. The questionnaire included socio-demographic details and Anthropometric measurement, Indian Diabetic Risk Score (IDRS) and Random Blood Sugar testing.

The components of Indian Diabetic risk score include age, waist circumference, physical activity and family history of diabetes. Minimum Score is 0 and Maximum is 100. Interpretation: score <30- low risk, score 30-50- medium risk, score >60- high risk.⁴

Height and weight measurements were taken and BMI was calculated. The BMI cut off values for Asian Indians as recommended by the WHO was used in the present study. A desirable BMI according to the WHO recommended cut-offs for Asians is considered to be between 18.5 and 22.9 kg/m². A BMI of 23–24.9 kg/m² is defined as “overweight” and ≥ 25 kg/m² as “obese”. Random Blood Glucose (RBS) was also estimated using a glucometer.⁵

Data analysis: Data obtained was entered in Microsoft Excel 2007 and analyzed using IBM SPSS version 16. Descriptive statistics was calculated as mean, SD and percentage. Association of difference was found using Chi-square test. A p-value of <0.05 was considered statistically significant.

Ethical Approval: Approval for the Study was obtained from the Institutional of Ethics Committee of Karpaga Vinayaga Institute of Medical Sciences and Research Centre.

RESULT

Among 137 study participants, 65 (48%) were >50 years followed by <35 years 37 (27%) and 35 to 49 years 35 (25%). Majority of the study participants 87(64%) were females followed by males. Among the study participants, 74 (54%) belonged to nuclear family, 95 (70%) were illiterates, 56 (42%) belonged to lower middle class followed by 51 (37%) middle class according to modified BG Prasad classification 2018. Family history of diabetes mellitus was found in 16 (12%). Among the study subjects 35 (25%) had habit of tobacco consumption, 48 (35%) had alcohol consumption and 25 (18%) had smoking habits. Among the study participants 28(21%) were overweight and 36(27%) obese. (Table 1)

On evaluating the risk status of study subjects for Type 2 Diabetes Mellitus using IDRS, 43.70% showed moderate risk, 35.0% showed high risk and 21.10% showed low risk score (Figure 1).

A total of 60 (43.7%) individuals belonged to the moderate risk group, 26 (43.3%) of them were found to be 35 to 49 years of age, 42 (40%) of them were in the age group of more than 50 years and 10 (16.6%) of them were aged less than 35 years. Among 48 (35%) individuals belonged to the high risk group, 40 (83.3%) of them were found to be more than 50 years of age, 8 (16.6%) of them were in the age group of 35 to 49 years. Thus, it is noted that with increasing age group of the study population the

percentage of the individuals belonging to risk group also increased. A statistically significant association was seen between the age of the study subjects and the IDRS risk status ($p = 0.000$) (Table 3).

Table 1: Distribution of socio-demographic characters of the study subjects.(n=137)

Characteristics	Category	Frequency	Percentage
Age	<35	37	27
	35 to 49	35	25
	>50	65	48
Gender	Male	50	36
	Female	87	64
Type of family	Nuclear	74	54
	Joint	63	46
Literacy Status	Literate	42	30
	Illiterate	95	70
SES	Upper class	5	3.5
	Upper middle class	19	13
	Middle class	51	37
	Lower middle class	56	42
	Lower class	6	4.5
Family H/O DM	No family History	121	88
	One parent	16	12
Tobacco consumption	Yes	35	25
	No	102	75
Alcohol consumption	Yes	48	35
	No	89	65
Smoking consumption	Yes	25	18
	No	112	82
BMI	Under weight	10	7
	Normal	63	45
	Overweight	28	21
	Obese	36	27
Total		137	100

Figure 1: Distribution of the study population according to IDRS risk status. (n=137).

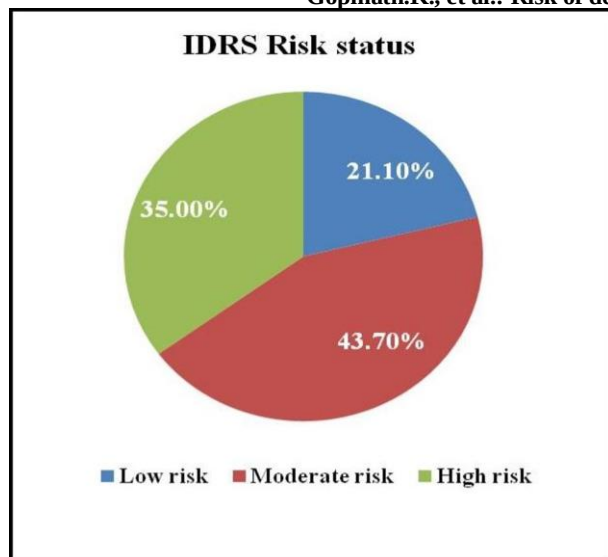


Table 2: Distribution of study subjects according to IDRS system. (n=137)

Particulars	Score	Frequency (%)
Age (years)		
<35	0	37 (27)
36 to 49	20	35 (25)
>50	30	65 (48)
Abdominal obesity		
Waist <80cm (females)	0	54 (39)
<90cm (male)		
Waist 80 – 89cm(females)	10	54(39)
90 -99cm (males)		
Waist >90cm (females)	20	29 (22)
>100cm (males)		
Physical activity		
Exercise (regular)+Strenuous Work	0	-
Exercise (regular) or Strenuous work	20	105 (76)
No exercise and sedentary work	30	32 (24)
Family History		
No family History	0	121 (88)
Either parents	10	16 (12)
Both parents	20	-

Table 3: Distribution of study subjects according to age category and IDRS risk status. (n=137)

Age	IDRS category			Total	p-value
	Low risk (%)	Moderate risk (%)	High risk (%)		
<35 years	27 (93.1)	10 (16.6)	0 (0)	37 (27)	<0.000
35 to 49 years	1 (3.4)	26 (43.3)	8 (16.6)	35 (27.7)	
>50 years	1(3.4)	24 (40)	40 (83.3)	65 (47.4)	
Total	29 (21.1)	60 (43.7)	48 (35.0)	137 (100)	

Table 4: Distribution of study subjects according to BMI category and IDRS risk status. (n=137)

BMI	IDRS category			Total	p-value
	Low risk (%)	Moderate risk (%)	High risk (%)		
Under weight	0 (0)	10 (16.6)	0 (0)	10 (7.2)	<0.001
Normal	18 (62)	27 (45)	18 (37.5)	63 (45.9)	
Over weight	8 (27.5)	7 (11.6)	13 (27.08)	28 (20.4)	
Obese	3 (10.3)	16 (26.6)	17 (35.4)	36 (26.2)	
Total	29 (21.1)	60 (43.7)	48 (35.03)	137 (100)	

A total of 60 (43.7%) individuals belonged to the moderate risk group, 23 (38.23%) of them were found to be overweight and obese. Among 48 (35.03%) individuals belonged to the high risk group, 30 (62.48%) of them were found to be overweight and obese. Thus, it is noted that with increase in BMI of the study population the percentage of the individuals belonging to risk group also increased. A statistically significant association was seen between the BMI of the study subjects and the IDRS risk status ($p = 0.001$) (Table 4).

Table 5: Distribution of study subjects according to waist circumference category and IDRS risk status. (n=137)

Waist circumference	IDRS category			Total	p-value
	Low risk (%)	Moderate risk (%)	High risk (%)		
Waist <80cm (females)	26 (89.6)	24 (40)	4 (8.3)	54 (39.4)	<0.000
<90cm (male)					
Waist 80 – 89cm (females)	0 (0)	29 (48.3)	25 (52.08)	54 (39.4)	
90 -99cm (males)					
Waist >90cm (females)	3 (10.4)	7 (11.6)	19 (39.5)	29 (21.1)	<0.000
>100cm (males)					
Total	29 (21.1)	60 (43.7)	48 (35.03)	137 (100)	

Table 6: Distribution of study subjects according to Physical activity category and IDRS risk status. (n=137)

Physical activity	IDRS category			Total	p-value
	Low risk (%)	Moderate risk (%)	High risk (%)		
Exercise (regular)+Strenuous Work	0 (0)	0 (0)	0 (0)	0 (0)	<0.000
Exercise (regular) or Strenuous work	25 (86.2)	59 (98.3)	21 (43.7)	105 (76.6)	

No exercise and sedentary work	4 (13.8)	1 (1.6)	27 (56.2)	32 (23.3)
Total	29 (21.1)	60 (43.7)	48 (35.03)	137 (100)

Table 7: Distribution of study subjects according to their risk Status and RBS value. (n=137)

RBS value (mg/dl)	IDRS risk status			Total
	Low risk (%)	Moderate risk (%)	High risk (%)	
<200 mg/dl	26 (89.6)	53 (88.3)	42 (87.5)	121 (88.3)
>200 mg/dl	3 (10.3)	7 (11.6)	6 (12.5)	16 (11.6)
Total	29 (21.1)	60 (43.7)	48 (35.0)	137 (100)

A total of 60 (43.7%) individuals belonged to the moderate risk group, 36 (59.9%) of them were found to be in waist circumference category II and III. Among the high risk group, 48 (35.03%), 44 (91.58%) of them were found to be in waist circumference category II and III. Thus, it is noted that with increasing waist circumference of the study population the percentage of the individuals belonging to risk group also increased. A statistically significant association was seen between the waist circumference of the study subjects and the IDRS risk status ($p = 0.000$) (Table 5).

A total of 60 (43.7%) individuals belonged to the moderate risk group, 59 (98.3%) of them were found to be doing physical activity like regular exercise or any strenuous work. Among the high risk group 48 (35.03%), 27 (56.2%) of them were found to be not doing any exercise and sedentary. A statistically significant association was seen between the physical activity of the study subjects and the IDRS risk status ($p = 0.000$) (Table 6).

RBS was measured for all the study subjects irrespective of their risk Status. Among the study subjects, 16(11.6%) were found to have an RBS value more than the cut off (i.e. >200 mg/dl), of which 7 (11.6%) subjects belonged to moderate risk group, 6 (12.5%) belonged to high risk group and 3 (10.3%) persons belonged to low risk group. These subjects were advised for further investigations to confirm the Diabetes status by Fasting and post prandial blood glucose estimation (Table 7).

DISCUSSION

In this study we identified the risk status of undiagnosed diabetics in rural population by using Indian Diabetic Risk Score. Although various risk factor scoring systems (Ramachandran) were developed previously, IDRS developed by Mohan et al is considered to be one of the strongest predictors of incidence of diabetes in India.^{6,7} IDRS uses two non-modifiable risk factors (age and family history of diabetes) and two modifiable risk factors (waist circumference and physical activity) giving a clear message that if the modifiable risk factors are altered the risk score can be considerably reduced.⁸

The present study identified 35% of the subjects to be in the high risk category according to IDRS. In a study by Mohan et al. reported that 43% of their study subjects were in high risk group.⁴ In a similar study conducted by Brinda P et al, they found 26% of their study population to have a high risk score.⁹ In this study, 43.7% of the subjects were found to be in moderate risk category according to IDRS, similar to the findings obtained by Brinda et al.⁹

In present study was noted that with higher the age group of the study population, the percentage of the individuals belonging to the high risk group also increased which is similar to the findings obtained by other studies.¹⁰⁻¹³

In this study 88% of the study subjects did not have any family history of diabetes, similar to the study conducted by Patil RS et al, where 89% of the individuals did not have any family history of diabetes.¹⁰ In a study conducted by Gupta SK et al in urban Pondicherry, their study observed that 68.5% of the respondents had no family history of diabetes.¹⁴ This difference could be due to lack of awareness about the disease and lack of screening tests at the community level to detect the cases of diabetes in rural areas.

Of the 48 subjects who belonged to high risk group according to IDRS in the present study, 12.5% had RBS value >200mg/dl. Similar findings was obtained in a study done by Chythra et al, in which 6% of the subjects in high risk group had RBS value of >200mg/dl.¹⁵

Conclusion: Majority of the subjects in our study belonged to the high risk and moderate risk category. A statistically significant association was seen between the age, BMI, Waist circumference and Physical activity of the study subjects ($p < 0.005$). Among the subjects, 16 (11.6%) were found to have an RBS value more than the cut off (i.e. >200 mg/dl) using IDRS. Hence, our study shows that IDRS is a quick, simple and cost effective screening tool for early identification of people at the risk of developing diabetes.

Recommendation: All the subjects with RBS value more than the cut-off were asked to undergo further confirmatory testing and management. Those belonging to IDRS high and moderate risk category were advised to implement lifestyle modifications and dietary changes.

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