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Original Research Article

Prevalence of Stress and its factors among the medical interns of Central Kerala

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Abstract

INTRODUCTION: Compulsory Rotatory Residential Internship (CRRI) is a period of transition from a medical student to an equipped physician to care for the nation's sick community. Internship period was perceived to be the most stressful period in the life of a medical student. Aim of the study was to find the prevalence of stress among the medical interns and to assess the association between selected factors and stress**. MATERIALS & METHODOLOGY :**A cross-sectional study was conducted among 100 medical interns of Govt. Medical College Kottayam, from 27/10/15 to 26/11/15. Interns who had chronic disease or known psychiatric disease were excluded. Data were collected using semi-structured questionnaire and perceived stress scale (PSS-10) **. RESULT :**It was found that 85% of the interns were found to be stressed (34% mild stress, 29% moderate stress and 22% severe stress). Single interns had more stress when compared to married interns (X^2= 10.485, p= 0.001). Interns who slept <6 hours had stress (96.7%) and found to be statistically significant (X^2=6.745, p=0.034). Among the interns who could not take food on time 96.6% were found to be stressed and was significant (X^2= 19.662, p<0.001). Hostel in –mates had more stress when compared to day scholars (92.1% vs 73%, X^2= 6.663, p= 0.01). Stress was found to be more among those who missed the social/family events (91.5% vs 69%, X^2= 8.236, p= 0.004). Conflicts with the post graduates in the department (X^2= 5.205, p= 0.023), nursing staffs (X^2= 4.713, p= 0.027) and patients (X^2= 4.885, p= 0.027). **CONCLUSION:** Prevalence of stress among interns was found to be 85%. Marital status, duration of sleep, irregular timing of food, place of residence, missing social events and conflicts with Post graduates/nursing staffs/patients were found to be associated with stress.

Keywords: Stress, CRRI, Chronic Diseases, Kerala

INTRODUCTION

Internship refers to the 1 year Compulsory Rotatory Residential Internship (CRRI) required to obtain Bachelor of Medicine and Bachelor of Surgery (MBBS) degree. It begins just after the completion of medical school, and it is a year of tremendous changes. The internship is a kind of experimental learning under the observation of senior faculties during which recent graduates take the opportunity to apply acquired knowledge and skills from their medical school training to real-world situations and it provides an opportunity for medical graduates to integrate and consolidate their thinking and actions. Also, it bridges the gap between the medical school and being board eligible for medical speciality training. The overall goal of medical education is to produce knowledgeable, competent and professional physicians who are equipped to care for the nations' sick community, provide advancements in medical science education and research, and most importantly promote public health care. The major tasks assigned to medical interns are to provide patient care, register new admissions, prepare medical records and to fine skill the procedures of drawing blood, lumbar puncture aspiration, ascitic fluid tap, pleural fluid tap, etc[1]. Newly graduated physicians who undertook internship appreciate that being an intern is the most stressful period in life of a medical doctor[2]. Studies report a statistically higher incidence of stress among medical students when compared to the non-medical students[3,4].

Stress is a subjective phenomenon that results from an event that produces physical or physiological pain. Stress is a normal part of everyday life; it may either be healthy or unhealthy. For example, feeling a small amount of stress until a solution is reached is known as healthy or positive stress. Healthy stress is beneficial as a coping strategy to

keep awareness, balance and connection. Also, it can help to provide desirable effects such as tolerance of ambiguity, self-confidence, and maturity and it may stimulate the acquisition of knowledge and skills[5].

However unhealthy or negative stress which is referred to as excessive stress can interfere with efficient learning, impair memory, increase anxiety, decrease sleep, cause eating habit – related problems, lead to accident proneness and decrease problem solving abilities[6]. Skipping food can alter the metabolic harmony of oneself[7]. Good personal skills can counter the effect of stress to a certain extent, so that the strain can be alleviated. Many studies have assessed the effect of a stressful life of a person on outcomes of his career, especially in medical field[8,6].

Many studies have investigated stress levels among undergraduate students and post-graduate residents. However minor attempts have been made to study the stress levels and pertinent causative factors among newly graduated physician[3].

In the present study, attempts have been made to investigate the prevalence of stress and its severity among interns of Govt. Medical College, Kottayam. Also attempts have been made to evaluate the level of stress and possible stress causing factors associated with clinical rotations, sleep period etc...

MATERIALS & METHODOLOGY

A cross-sectional study was done among the medical interns of Government Medical College Kottayam, Kerala.smaple size was calculated using the formula $n=4pq/d^2$ based on previous study and a sample of 100 interns were selected using non probability sampling technique. Interns who had chronic disease or known psychiatric disease were excluded. Semi-structured questionnaire and Perceived Stress scale(PSS)-10[9] were used as study tools. PSS-10 has 10 questions related to feelings and thoughts in the past 1 month. Perceived stress scale (PSS-10) was used to grade the severity of stress. Out of the 10 questions 6 were negative and 4 were positive questions. Each question has 5 options [0 = Never, 1 = Almost Never, 2 = Sometimes, 3 = Fairly often, 4 = Very often]. PSS scores were obtained by reversing responses (e.g.: 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0) to the four positively stated questions (Q.4, 5, 7, 8) and then summing across whole the scale.Severity of stress were graded as: 0 to 12 - no stress; 13 to 17 - mild stress; 18 to 21- moderate stress and >21 - severe stress

DATA MANAGEMENT AND STATISTICAL TESTS USED: Data were coded and entered in MS Excel and analysed using SPSS V23.0 (Trial version). Pearson Chi Square test was used to find the association between stress and the variables. A p value of <0.05 was set as significant level.

RESULT

Figure 1: Severity of stress among the interns

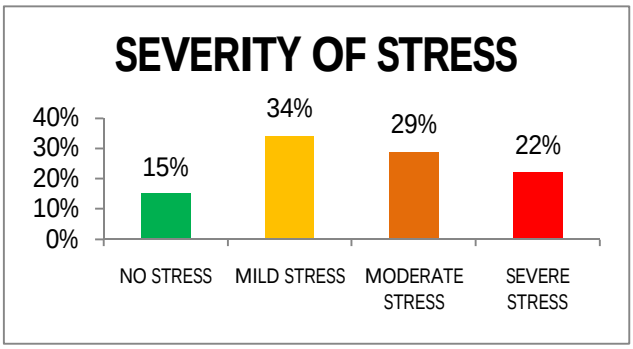

Table 1: General characteristics associated with stress

Factors	Stressed Number (%)	Chi Square value (df=1)	P value
Gender			
Male (n=43)	35(81.4%)	0.769	0.381
Female(n=57)	50(87.7%)	(df=1)	
Marital Status			
Single (n=93)	82 (88.2%)	10.485	0.001
Married (n=7)	3 (42.9%)	(df=1)	
Exclusive Hosteller			
Yes (n=63)	58 (92.1%)	6.663	0.01
No (n=37)	27 (73%)	(df=1)	
Missed social events			
Yes (n=71)	65 (91.5%)	8.236	
No (n=29)	20 (69%)	(df=1)	0.004

Table 2: Work - related factors associated with stress

Factors	Stressed Number (%)	Chi square value (df)	P value
Fear of Hospital Acquired infection			
Yes (n=63)	56 (88.9%)	2.02	
No (n=37)	29 (85%)	(df=1)	0.155
Working hours			
<8 hours (n=20)	13 (65%)		
8-12 hours (n=51)	43 (84.3%)	11.41	0.003
>12 hours (n=29)	29 (100%)	(df=2)	
Relaxation time			
<2 hours (n=18)	18 (100%)		
2-5 hours (n=53)	46 (86.8%)	6.913	0.032
>5 hours (n=29)	21 (72.4%)	(df=2)	
Duration of sleep			
< 6 hours (n=30)	29 (96.7%)		
6-8 hours (n=62)	51 (82.3%)	6.745	0.034
>8 hours (n=8)	5 (62.5%)	(df=2)	
Food intake on-time			
Yes (n=36)	23 (63.9%)	19.662	<0.001
No (n=64)	62 (96.9%)	(df=1)	

The mean age of the study population was 23.64±0.62years with minimum age 23 years and maximum age 25 years. Among the study population 43% were males and 57% were females.

It was found that the prevalence of stress was 85% among the medical interns (34% mild stress, 29% moderate stress and 22% severe stress).

Table 3: Interpersonal relations and Stress

Factors	Stressed	Chi –Square value	P value
	Number (%)	(df)	
Conflicts with senior faculty			
Yes (n=25)	24 (96%)	3.163	0.075
No (n=75)	61 (81.3%)	(df=1)	
Conflicts with Post Graduates			
Yes (n=32)			
No (n=68)	31 (96.9%)	5.205	0.023
	54 (79.4%)	(df=1)	
Conflicts with co-interns			
Yes (n=21)			
No (n=79)	17 (81%)	0.342	0.559
	68 (86.1%)	(df=1)	
Conflicts with nursing staff			
Yes (n=53)			
No (n=47)	49 (92.5%)	4.713	0.027
	36 (76.6%)	(df=1)	
Conflicts with Patients/their relatives			
Yes (n=31)	30 (96.8%)	4.885	0.027
No (n=69)	55 (79.7%)	(df=1)	

DISCUSSION

Stress was equally prevalent in both the genders. Studies done previously shows a female predominance of stress[10,11]. It was interesting to find that the single interns were more stressed (88.2%) than the stressed among married interns (42.9%) and the association of single interns and stress was found to be statistically significant(Chi-square value 10.485, p value 0.001). The prevalence of stress is more among exclusive hosteller when compared to the day-scholar (92.1% vs 73%, Chi-square value 6.663, p value 0.010). Attending social events is part of human life. It was found that 91.5% of those who missed the social events were stressed (Chi-square value 8.236, p value 0.004). the findings were consistent with the result by Saini et al[12]. Fear of exposure to infectious agents in medical profession can cause stress but our study could not bring out an association between the two. As given in table 2, the prevalence of stress increased with increase in working hours and it was statistically significant. Similar finding was observed by previous study[13]. It was also found that the prevalence of stress increased with decrease in the time for relaxation per day and duration of sleep and was statistically significant. Increase in work time with reduced relaxation has deleterious effects on health[14] Disturbance in sleep causes neuroendocrine stress system imbalance[15]. Interpersonal relation in our work area can influence the stress[16]. Good interpersonal relationship results in job satisfaction[17,18]. In table 3, it was evident that the conflicts with post graduates, nursing staffs and the patients/ their relatives were found to be associated with stress among interns.

CONCLUSION : Prevalence of stress among interns was found to be 85%. Marital status, duration of sleep, irregular timing of food, place of residence, missing social events and conflicts with Post graduates/nursing staffs/patients were found to be associated with stress.

LIMITATION: Single centre study

Conflict of interest: Nil

Source of funding: Nil

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Original Research Article

Prevalence and barriers of physical activity among urban women in Kerala, South India - A Cross sectional study

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Abstract

Background: Data on physical activity among women in limited in India. The study explores the prevalence ,patterns and barriers of PA (Physical Activity) among women**. Methods:** A cross-sectional survey was conducted among 150 women aged 30 to 60 years in the residential area around Trivandrum medical college. Two stage sampling method was done. Streets were selected by simple random sampling in the first stage. Systematic random sampling was applied in the second stage to select the women. A Semi structured questionnaire incorporating the Global Physical activity questionnaire (GPAQ) was used to capture the patterns and barriers of PA. The physical activities captured in minutes were converted to metabolic equivalent scores (MET scores) to categorize the levels of physical activity. **Results:** The prevalence of self reported adequate physical activity was 28%. Majority of Women were aged between 30 to 45 (64%). Most of the participants were home makers(80.6%), degree holders(78.6%) and belonged to upper and middle socio economic status(74.6%). Women who were in the low PA level (<600 METS/week), moderate PA (600-3000METS/week) and high PA(>3000 METS/week) were 52.6%, 40.6% and 6.6% respectively. More than half of the women (56.6%) were involved in sedentary activities(excluding sleeping) for more than 12 hours./day.The mean (SD) duration of television watching was 5.67hrs (1.2). Women who use "walking" as a mode of transport to nearby places were 62 (41.3%) in number. Only 4 women had the habit of regular physical exercise. Parenting demands, lack of interest, improper time management and lack of encouragement were the major barriers reported. **Conclusions:** The study provides evidence to design effective strategies to promote physical activity to slow down the pace of the escalating burden of non-communicable disease among women of Kerala.

Keywords: Physical activity, Prevalence, Women, GPAQ

INTRODUCTION

Globalization and rapid economic growth over the years has dramatically changed the life style of the population, including eating pattern, physical activity, market, social structures and environmental factors. With the expansion of cities and rural-urban migration, there is a trend in adopting a more urbanized lifestyle, which has a high saturated fatty diet and low levels of physical activity [1].Such changes have paved the way for non communicable or lifestyle diseases as called so. This emerging burden of non-communicable diseases may most likely erode the "demographic-dividend" of India and could hinder the progress of national growth and development. In societies which are undergoing epidemiological transition, there is a loss of biological delay in the onset of cardiovascular risk factors and diseases in women. This phenomenon suits Kerala more as it is ahead of all the other Indian States in terms of health transitions. Studies focusing on hospital admissions for acute coronary syndrome indicate a steady decline in the male to female ratio from 23:1 to 4:1 from 1967 to 2007 in Kerala [2,3].

Physical inactivity is not only a risk factor for premature death, but also has a role in some chronic diseases and obesity [4]. Women compared to men generally engage in lower levels of physical activity [1]. A significant proportion of women with gradual decline in their metabolic rate after the age of 35 years become a victim to this sedentary lifestyle [5].The world health organization has recommended 150 minutes of moderate-

intensity aerobic physical activity throughout the week or at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity for adults aged 18- 64 years. [6]. The study was designed to find out the prevalence, patterns and barriers of physical activity among urban women of Kerala. It is essential to have a deep understanding of the patterns and barriers of physical activity patterns which would help to devise effective interventions to promote physical activity.

METHODS

Design and Subjects: A cross-sectional survey was conducted in the residential area around the Medical college area in Trivandrum city. It is located in an area with good access to health care and all other facilities like markets, schools, college, electricity, and water. Taking 40 % as the prevalence of physical activity among urban women, a sample size of 150 was calculated, fixing alpha error as 0.05 with a power of 80%[1]. Women between 30 and 60 years who were permanent residents of these areas were included in the study. Pregnant women and those with mental and physical disabilities were excluded. Two stage sampling method was done. In the first stage simple random sampling was used to select the streets by using lot method. Systematic random sampling was applied in the second stage to select the women.

Data collection tool: The Global Physical Activity Questionnaire (GPAQ) was used to capture the levels of physical activity. The instrument captures physical activity across four domains, namely workplace, travel, leisure time and sedentary activities [7]. Physical activity was defined as activities which were continued for at least 10minutes leading to either sweating or an increase in heart rate. For easy understanding the participants were provided with culture appropriate "Activity list" and "show cards" to show different types of vigorous and moderate intensity physical activities. Anthropometric measurements like weight and height were captured in kilograms and centimetres respectively using standardized scales. Body mass index (kg/m2) was classified as normal, overweight, and obese, according to WHO Asian criteria [8]. Details regarding their socio-demographic characteristics, perceived barriers and self reported co-morbidities were also collected.

Ethics Statement: The study was approved by the Institutional ethical committee of Government Medical College, Trivandrum. Informed verbal consent was obtained from the participants.

Statistical analysis: The physical activities captured in minutes were converted to metabolic equivalent scores (MET scores)[7]. Women with MET score < 600/week were classified as low levels of physical activity, those with MET score 600-3,000/week as moderate levels of physical activity and those with MET score > 3000 / week as high levels of physical activity. SPSS version 16 was used for statistical analysis. Descriptive statistics were used for measures of physical activity. Bi variable association was studied using chi-square tests and odds ratios.

RESULTS

The socio demographic and anthropometric details of the participants are given in Table 1. One fourth of the subjects (24.6%) were obese and 64.6% of the women were overweight. Out of the 150 women interviewed only 42 (28%) were adequately physically active satisfying the WHO criteria. The mean (SD) age, weight, height and BMI of the participants were 38.64years (6.8), 65.9kg (8.2), 155.2cm (6.97) and 27.45(3.56) respectively. Levels of physical activity are presented in Table 2. About 52.6% of the women had very low levels of physical activity of <600 METS/ week.

Table 1. Socio demographic and anthropometric characteristics of the participants

Variable	Category	N (150)	%
Age	30 – 45 years	81	54
	45- 60 yrs	69	46
Education	Low (upto 10 th std)	32	21.3
	High	118	78.6
Occupation	Housewife	121	80.6
	Working	29	19.3
Socio-economic status	Upper and middle	112	74.6
	lower	38	25.3
Housing	Katcha	21	14
	Pucca	129	86
Type of family	Nuclear	136	90.6
	Joined	14	9.3
BMI	Normal (18.5 – 22.9)	16	10.6
	Overweight (23 – 24.9)	97	64.6
	Obese (>25)	37	24.6

Table 2. Levels of Physical activity of the participants

Levels	Frequency (n=150)	%
Low (<600 METS/week)	79	52.6
Moderate (600-3000METS/week)	61	40.6
High (>3000 METS)	10	6.6

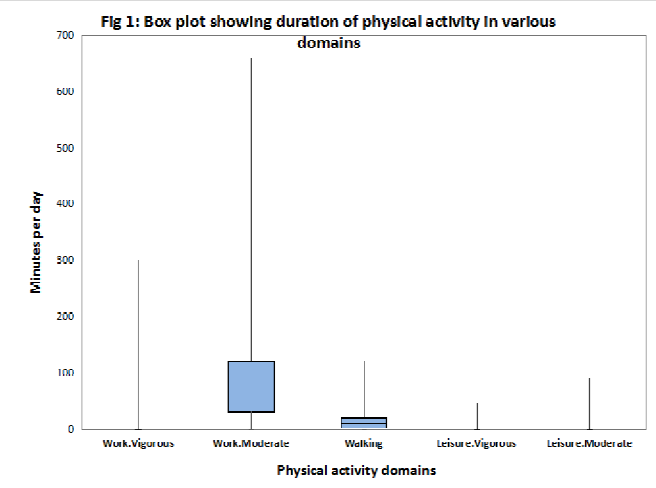
Table 3. Association between BMI and other socio demographic variables with physical activity

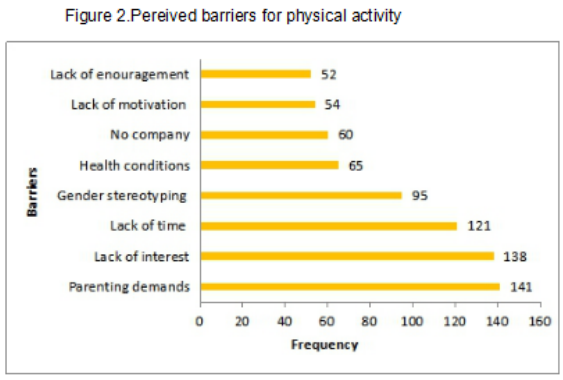
Variable	Inadequate n= 108	Adequate n=42	chi square	p value	OR (95% CI)
BMI					
Overweight& obese	102	32	10.57	<0.001	5.31 (1.61,18.07)
Normal	6	10			
Age					
30 – 45 yrs	63	18	2.92	0.087	1.87 (0.8, 4.09)
45 – 60 yrs	45	24			
Education					
Higher education	86	32	0.21	0.644	1.22
Lower education	22	10			(0.48, 3.08)
Occupation					
Housewife	98	23	25.1	<0.001	8.1
Working women	10	19			(3.06, 21.8)
SES*					
Upper & middle	88	24	9.47	0.002	3.3
Lower SES	20	18			(1.41,

*** Socio economic status**

Table 4. Association between self reported co morbidities and physical activity

Variable	Inadequate n= 108	Adequate n=42	chi square	p value	OR (95% CI)
Diabetes					
Yes	15	17	6.038	0.014	2.7
No	29	89			(1.20, 6.09)
Hypertension					
Yes	14	21	1.271	0.26	1.427
No	30	85			(0.284, 1.586)
CAD*					
Yes	1	3	0.418	0.518	2.442
No	43	103			(0.149, 39.93)
Hyperlipediemia					
Yes	10	7	8.044	0.005	4.16
No	34	99			(1.468,11.786)
Osteoarthritis					
Yes	9	16	0.643	0.423	1.446
No	35	90			(0.586, 3.576)





Out of the total participants 85 women (56.6%) were involved in sedentary activities like television watching, sitting, chatting (excluding sleeping) for more than 10 hours/day. The mean (SD) duration of television watching was 5.67hrs (1.2). Women who use waking as a mode of transport to nearby places were 62 (41.3%) in number. Only 4 women had the habit of regular physical exercise. The mean (SD) duration of physical activity was 72.02 (38.53). The duration of physical activities in each domain is shown in Figure 1. The association between BMI and other socio demographic variables and self reported co-morbidities with physical activity is showed below in Table 3 and Table 4 respectively. The prevalence of diabetes and hypertension were 21.3% and 23.3% respectively. Women who were overweight or obese, housewives and belonging to upper and middle socio economic status were associated with inadequate physical activity. Diabetes and hyperlipedimea were associated with inadequate physical activity. Household chores, lack of interest and lack of encouragement were the major perceived barriers for physical activity for the participants. (Figure 2)

DISCUSSION

The prevalence of adequate physical activity was only 28% which needs to be addressed immediately. ICMR-INDIAB study has reported the prevalence of physical activity among urban women to be even much lower in states like Chandigarh, Maharashtra and Tamil Nadu [9]. Though in our study, it was better compared to the above said parts of country, it needs to be addressed with emergency taking into consideration about the burden of non communicable diseases in Kerala. About 72% of the women in the study had inadequate physical activity which can be attributed to changes in economy and increased mechanization. This adds to the existing evidence of increasing physical inactivity in India, especially in urban areas which is comparable with the West[10]. Violet Jayamani et al has reported the prevalence of high level of physical activity (>3000 METS) to be 32.3% in a study done at Vellore, much higher than our study. The proportion of women who

were overweight and obese in the study was alarmingly high. This indicates the obesogenic environment in which women of urban Kerala live in [11]. Findings from various other studies too point out the high prevalence of obesity and overweight among women of Kerala [12,13] The study further adds to the evidence that inadequate physical activity is associated with overweight and obesity .Human body's energy expenditure is largely determined by one's physical activity which in turn has a major role in the body's energy balance and weight control. An imbalance between energy expenditure and energy intake leads to obesity, which is the most obvious sign of physical inactivity [14].

The study shows that housewives were associated with inadequate physical activity. This may be due to the fact that their involvement in household chores leaves them with little time for physical activity. It is noteworthy mentioning that majority of women in the study had reported household chores as major barrier for physical activity. There was a significant association between upper socio economic status and inadequate physical activity. This can be explained by the fact of increased mechanization for household works and increased dependence of motor vehicles for transport as the socio economic status increase in developing countries. This finding was supported by evidence by Sullivan et al in India [15]. This finding was contradictory to findings from western countries were physical inactivity increases as the level of socio economic status (SES) decreases due to lack of knowledge and lesser accessibility to physical activity among the lower SES group[16,17]. The proportion of women with sedentary activity was also high in the study. This was supported from evidence from Singh RB et al who has reported the high prevalence of sedentary behavior among physical activity can be attributed to various reasons. Rapid urbanization, labour saving devices both at home and work place, the dominance of auto mobiles for travel and increased dependence on computers and telecommunication technology plays a major role in promoting sedentary lifestyle [18]. One of the explanations can be that cultural values held by the people do not encourage people to be physical active. It is a hard core fact that many people in Asia believe that a larger body is associated with better health than being thin[19].It was further substantiated from the finding that majority of the women in the study reported that they were not interested in physical activity. Majority of the women reported parenting demands and lack of time as major barriers. This was supported from evidence from various parts of the world where the cultural belief is that women are meant to perform domestic duties over all other activities [20,21] .Parenting and care taking responsibility leaves women with very less time for physical activity. This was also supported from evidence presented by Azaar Farooq et al and Aliya Darr et al[22,23].

Kerala is the **"**Diabetic capital of India". Different states in India's are at different stages of demographic and epidemiological transition. Hence, a higher prevalence of diabetes could be expected in Kerala since Kerala has the highest proportion of elderly in the country [24].The prevalence of diabetes in the study population was very high (21.3%) compared to other parts of the country. This is substantiated by evidences generated by Regi et al and Vijayakumar G et al from different studies in Kerala [24,25] . Even with the limitation that the co morbidities were self reported, the study further adds to the evidence of association between inadequate physical activity and CVD risk markers like diabetes and hyperlipedimia [15] .Similar findings were reported by K.R. Thankappan et al in the same geographic location [26]. There is always an element of recall bias and impreciseness in subjective measurement of physical activity. In spite of such limitations, subjective methods still remains as the most dominant tool in countries like India as it is relatively easier for the participants and well as its low cost. The study brings to the limelight the low prevalence of physical activity and its barriers among urban women which would provide evidence to design effective strategies at individual and community level to promote physical activity. Such interventions could slow down the pace of the escalating burden of non communicable in the state of Kerala. In the long run, such practices would culminate healthy behaviour and change the gender stereotyping among women of Kerala.

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Original Research Article

A STUDY ON PREVALENCE OF LIFE STYLE DISEASES AND ITS ASSOCIATION WITH BEHAVIOURAL PRACTICE AMONG DIFFERENT OCCUPATIONAL GROUPS IN MARAIMALAI NAGAR

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Abstract

Introduction: Lifestyle diseases are health problems that react to changes in lifestyle. They are emerging in India due to economic transition, westernization, adopting unhealthy behavioral practices such as smoking and alcohol consumption, change in diet pattern due to availability of cheaper junk foods, lack of awareness and sedentary lifestyle. India is projected to experience more deaths from non-communicable diseases in the next few decades. **Aim:** To estimate the prevalence of lifestyle diseases among different occupational groups and its association with their behavioral practices. **Methodology:** A cross sectional comparative study using Stratified random sampling was conducted with 495 subjects. Questionnaire was self- administered and interviewed in few subjects .Data was analyzed using SPSS 17. **Results:** Among the Teachers (79), IT professionals(89), Industry workers (78), Shopkeepers (92), Drivers (99), Retired persons and housewives (58), theoverall prevalence of Diabetes 18.8%, Hypertension 6.6%, Obesity 7%, Heart disease 5.5%. We found significant association between lifestyle diseases and smoking and alcohol (p- 0.01, 0.001). Lifestyle disease was common among drivers with frequent alcohol intake (p-0.01). Retired personnel and housewives who did not exercise regularly suffered from lifestyle diseases (p-0.01). There was significant association between the shopkeepers, drivers and IT professionals who consumed junk food on a daily basis and lifestyle diseases. Higher BMI was recorded among them (p-0.005). Of the 39% population with lifestyle diseases, 37.5% has positive family history. 47% lacked awareness about lifestyle diseases and 40% of them were not interested in any awareness program. 46% exercised regularly and walking was the most commonly employed exercise. **Conclusion:** This study shows unhealthy behavioral practice, lack of physical activity and consumption of junk food are risk factors for diseases, especially between the ages of 20 and 50 years, where lifestyle changes can be easily implemented for disease prevention and reduction of complications.

Keywords: Lifestyle diseases, behavioral practices.

Introduction:

Lifestyle diseases are health problems that react to changes in lifestyle. They are emerging in India due to economic transition, westernization, adopting unhealthy behavioral practices such as smoking and alcohol consumption, change in diet pattern due to availability of cheaper junk foods, lack of awareness and sedentary lifestyle. India is projected to experience more deaths from non-communicable diseases in the next few decades. Non Communicable diseases (NCD) contributed to 53% of all deaths in 2011[(1)]. More than one-third of all the mortalities worldwide are due to several threatening behaviors resulting from inappropriateness of individual and social lifestyle most of them are inappropriate diet, low physical activity, smoking and inappropriate sexual behavior. Challenges are more in tackling lifestyle diseases, research shows that social and cultural differences influence women's day to day physical activities[(8)]. Increase of NCD is due to lifestyle changes and growing prosperity, hence there should be more research related to lifestyle diseases at community level and state level to target the prevention activity at all levels. Community need based assessment is necessary for delivering quality care in treatment and to deliver the health education programs.Studies have shown that there is a positive relationship between health promotion activities and quality of life[(10)]. Hence the present study

was performed to estimate the baseline data on the prevalence of lifestyle diseases and its association with behavioral practice, in the population covered by Urban Maraimalainagar primary health center (PHC).

Objectives:

This study aims to estimate the prevalence of lifestyle diseases among different occupational groups and to determine the association between lifestyle diseases among them and their behavioral practices.

Methodology:

Study population: Population belonging to different occupational groups in Maraimalainagar was the target population. 100 subjects each from School, Industry, IT professionals, Shopkeepers, Drivers, Retired personnel and housewives were included in the study.

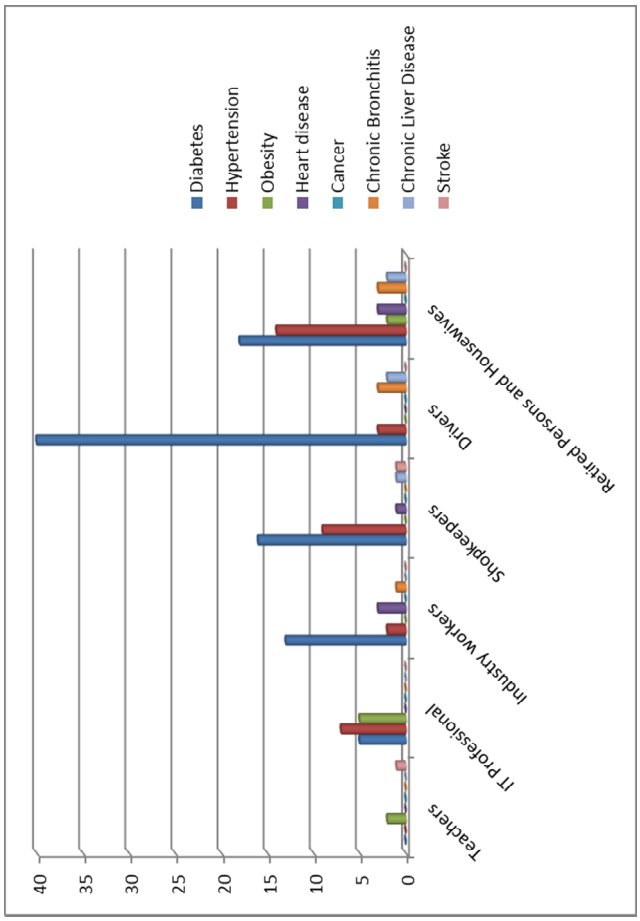
Study design: A cross sectional comparative community based study. Target population were divided into 6 groups school industry,IT professionals, shopkeepers, Drivers, general public(retired person and housewives) sample was collected using Stratified random sampling technique 100 subjects from each group. Keeping prevalence rate as 40% and 5% error sample size were calculated, 495 subjects belonging to different occupations between December 2016 and February 2017 in the field practice area of Department of Community Medicine i.e. Urban health training center, Maraimalainagar of SRM Medical College Hospital and Research Institute, Kattankulathur, Kancheepuram district. Questionnaire covered questions on demography, chronic illness, family history, behavioral practices, stress cope up activity, recent health evaluation. Questionnaire was interviewed after obtaining consent. Out of the 600 issued pre tested questionnaires, 105 questionnaires were incomplete.

Study Analysis: Data entry and analysis was done using Statistical Package for Social Sciences (SPSS) version 17.0. Frequency distribution and Chi square analysis was used and p <0.05 was considered statistically significant.

Results:

Mean age of the population was ~40 years and 73% were married. Among the Teachers (79), IT professionals (89), Industry workers (78), Shopkeepers (92), Drivers (99), Retired persons and housewives (58), the overall prevalence of lifestyle diseases was 41% with the following distribution. Diabetes was 18.8%, Hypertension 6.6%, Obesity 7%, Heart disease 5.5%, Chronic Bronchitis 1.3%, Cancer 1.2%, Chronic Liver disease 0.9%, and Stroke 0.4%.11% of subjects had more than one disease.

Figure 1.Lifestyle diseases among participants



And 24.7% of our study population were smokers, 5.2% of smokers had 20 pack years and 12.2% had 10 pack years smoking history. 5% of subjects used tobacco in other forms mainly betel nut and hans. 30.5% of this study population was chronic alcohol consumers. 4.1% of subjects gave history of daily alcohol consumption. . We found significant association between lifestyle diseases and smoking and alcohol (p- 0.01, 0.001). Lifestyle disease was common among drivers with frequent alcohol intake (p-0.01). 42.2% of subjects exercised regularly. Walking was the most commonly employed exercise followed by cycling and yoga.Prevalence of obesity of 7%, we found significant association between BMI and smoking (p- 0.017) and lack of exercise (p- 0.002). There was significant association between the shopkeepers, drivers and IT professionals who consumed junk food on a daily basis and lifestyle diseases. Higher BMI was recorded among them (p-0.005).

Of the 39% population with lifestyle diseases, 37.5% had positive family history with single parent diseased and 4.5% both parents diseased.

Table 1: Distribution of Behavioural practice, Occupation and Life style disease

Occupation	Behavioural practice(N)	Lifestyle Diseases(N)
Teachers	Smoking(0) Alcohol(0) Lack of exercise-55(70%) Junk foods-35(44.3%)	Obesity-2(2%) Hypertension(0) Diabetes(0) Heart disease(0) Cancer(0) Chronic bronchitis(0) Chronic liver disease(0) Stroke-1(1%)
Industry workers	Smoking-27(35%) Alcohol-30(38.4%) Lack of exercise-48(62%) Junk food-30(38.4%)	Obesity(0) Hypertension-2(2%) Diabetes-10(12%) Heart diease-3(3.8%) Cancer(0) Chronic bronchitis-1(1%) Chronic liver disease(0) Stroke(0)
IT Professional	Smoking-19(21.3%) Alcohol-30(34%) Lack of exercise-48(54%) Junk food-30(34%)	Obesity-5(5.6%) Hypertension-7(7.8%) Diabetes-5(5.6%) Heart disease(0) Cancer(0) Chronic bronchitis(0) Chronic liver disease(0) Stroke(0)
Drivers	Smoking-28(28.2%) Alcohol-79(80%) Lack of exercise-42(42.2%) Junk foods-16(16.1%)	Obesity(0) Hypertension-3(3%) Diabetes-40(40%) Heart disease(0) Cancer(0) Chronic bronchitis-3(3%) Chronicliver disease-2(2%) Stroke(0)
Shop keepers	Smoking-8(8.6%) Alcohol-8(8.6%) Lack of exercise-42(46%) Junk foods-23(25%)	Obesity(0) Hypertension-9(9.7%) Diabetes-16(17.3%) Heart disease-1(1%) Cancer(0) Chronic bronchitis(0) Chronic liver disease-1(1%) Stroke-1(1%)
Retired persons and housewives	Smoking-10(17.2%) Alcohol-20(34.4%) Lack of exercise-27(47%) Junk food-7(12%)	Obesity-2 (3.4%) Hypertension-8(13.7%) Diabetes-11(18%) Heart disease-2(3.4%) Cancer(0) Chronic bronchitis-2(3.4%) Chronic liver disease-1(1.7%) Stroke(0)

Table 2: Distribution of family history and lifestyle diseases

Diseases	Family history	Lifestyle diseases
Diabetes	19.80%	18.80%
Hypertension	9.30%	6.60%
Obesity	1.40%	7%
Heart disease	7.70%	5.50%
Chronic bronchitis	0.40%	1.30%
Cancer	1.80%	1.20%
Stroke	0.40%	0.40%

Table 3: Association of family history with life style diseases

Lifestyle disease	Chi square	P- value($p<0.05$)
Diabetes	14.047	0.000178
Hypertension	1.875	0.1707
Obesity	20.5218	0.000006
Heart disease	23.0059	0.000002
Chronic bronchitis	60.624	0
Cancer	53.666	0
Stroke	60.624	0

44% of subjects underwent recent health evaluation. 10.7% had blood glucose level checked, 13.7% blood pressure, 1.4% blood cholesterol, 0.8% Master health check-up and 17.4% of subjects had other investigations done.

Table 4: Distribution of stress cope up activity

Stress Cope up Activity	**Percentage**
Listening to music	34%
Reading books	22.40%
Meditation	20%
Yoga	10%
Playing games	6.80%
Gym workout	3.70%
Dancing	3.50%
Watching television	3.20%
Alcohol consumption	0.60%
Painting	0.20%

47% of our study population lacked awareness about lifestyle diseases and 40% of them were not interested in participating in any awareness program.

Discussion:

24.7% of our study population were smokers which is similar to the findings of Smoking prevalence and attributable disease burden in 195 countries and territories, 1990-2015: a systematic analysis from the Global Burden of Disease Study 2015, which showed that worldwide, the age- standardized prevalence of daily smoking was 25.0%.[2]

The prevalence of lifestyle diseases and unhealthy behavioral practice was significantly lower among the teachers. Though there was lack of regular exercises, the avoidance of unhealthy behavioral practices may be attributed to the fact that the sensitive role of teachers as effective human forces in development and evolution of our society and also considering that students follow their patterns and lack of necessary information from teachers as described by a study Charkazi et al (2009).[3]

42.2% of subjects exercised regularly. Walking was the most commonly employed exercise followed by cycling and yoga. This is much lower than the study by Sadeghi et al (2000) where the results showed that 70% of the study subjects somehow had physical activity and exercise, most common of which were walking and morning exercises.[4]

Prevalence of obesity of 7% is higher than a study by Thomas et al in 1995 which showed obesity of 2.2%, which further highlights that changing behavioral practices are affecting lifestyle diseases in the 21st century[5]. There was significant association between the shopkeepers, drivers and IT professionals who consumed junk food on a daily basis and lifestyle diseases. Higher BMI was recorded among them (p-0.005). This correlates with findings from study by Arjun Lakshman et al where Age > 35 years, being married, supporting more than 4 family members, taking main meals from restaurants on most working days, eating egg on most days, BMI ≥ 23 kg/m2, and longer duration of employment as bus driver were strongly associated with HTN[6].

Retired personnel and housewives who did not exercise regularly suffered from lifestyle diseases (p-0.01). Combined, overweight and obesity contributed to 30% of morbidity. Bhadra et al in 2004 showed 17.6% obesity among Bengali women.[7]. However they describe a difference in obesity prevalence in north and south India with higher rates in north. This may be attributed to different cultural practices and different ethnicity affecting day to day activities in women.[8]

In this study overall prevalence of lifestyle disease were assessed and we tried to list out the unhealthy behavior of the study population which can directly or indirectly be related to lifestyle disease, and we found there is an significant relationship between their behavioral practices and lifestyle disease. The community is in an acute need to change their unhealthy lifestyle, hence promoting healthy behavior among their population.[10] This can be carried out through health education and proper care in management of lifestyle disease and complication prevention. Limitation of the study was information collected for the study was based on self-reporting. Verification of the behavior and diagnosis of the disease were not done.

Conclusion: This study shows unhealthy behavioral practice like smoking and consumption of alcohol, lack of physical activity and consumption of junk food are high and these are the risk factors for diseases, especially between the ages of 20 and 50 years. So awareness programmes on lifestyle changes which include change in eating food pattern, physical activity, avoiding of alcohol and smoking has to be implemented among them for prevention of disease and reduction of complications in future.

Recommendations: Lack of awareness of lifestyle diseases and lack of motivation to change the lifestyle behavior among people at risk are the greatest challenges we face in managing these lifestyle diseases. Awareness programs at a wide scale regarding lifestyle diseases will be a stepping stone towards control of this epidemic. Structured programs regarding diet and exercise for each occupation can be publicized [11]. By following some preventive measures like eating healthy foods (rich in omega 3 fatty acids and antioxidants), maintaining a healthy weight, with good physical activity, quit smoking and drink only in moderation, controlling stress with proper relaxation and adequate sleep can improve this downward spiral of lifestyle diseases affecting us[12][13]. Encouraging people to walk or use bicycle for short distance travelling as an additional means of exercise can be employed.

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Original Research Article

Prevalence of alcohol dependence among men residing in an urban slum of north Chennai- A cross- sectional study

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Abstract

Background: Problems of alcohol use in India have widely attracted the attention of public, policy makers and research workers, a recent national house hold survey of drug use in the country, the only effort to document the national wide prevalence of drug use, reported that alcohol use in men was 21% and 5% among women[1]. ***Objective*:** the study was aimed to estimate the prevalence of alcohol dependence and its associated factors among urban slum dwelling men. ***Methodology:*** By multi-stage sampling technique zone III of Chennai Corporation and Bhakthavachalam colony, a designated urban slum was selected. A house to house survey was conducted and 700 individuals who fulfilled the inclusion criteria were administered with basic socio demographic profile, risk assessment scale, general health questionnaire and alcohol user dependence identification test[3, 4]. ***Results:*** The study revealed that the prevalence of alcohol dependence was 6.57% and harmful drinking was 9.8% in men aged 15-65 years. Chi-square test was applied, and the results showed that alcohol dependence was significantly associated with age, religion, drug use, smoking history, family history of alcohol drinking, peer group pressure, chronic illness and migrant status. There is significantly high prevalence of alcohol dependence and harmful drinking which are to be addressed by the health providers.

Key-words: alcohol use, harmful drinking alcohol dependence, GHQ, risk assessment scale and AUDIT

Introduction

Alcohol use has been showing a rising trend all over the world including India, perhaps as a result of stresses related to rapid changes in lifestyles. There is a spectrum of use among those who consume alcohol, which can range from one time use, occasional use, regular use, hazardous use and harmful use to dependence. The proportion of people indifferent groups of this spectrum varies considerably among different societies and there are differences even within each individual country. Alcohol dependence is a condition characterized by the harmful consequences of repeated alcohol use, a pattern of compulsive alcohol use and physiological dependence on alcohol (i.e., tolerance and withdrawal symptoms). This disorder is diagnosed only when these behavior become persistent and disabling or distressing. Individuals with this disorder may continue to abuse alcohol despite the knowledge that continued drinking poses significant social or interpersonal problems for them. A recent national house hold survey of drug use in the country, the only effort to document the national wide prevalence of drug use, reported that alcohol use in men was 21% and 5% among women[1]. Alcohol usage not only affects the individual but also has a greater economic impact on the family, society and the whole country. An alcohol dependent individual spends more than they earn, take loan to drink and lose an average of 20 years of their potential life expectancy. One fourth of all emergency hospital admissions, one third of all suicides and one half of all murders/domestic violence were attributed to alcohol[2]. In spite of so much is known about the alcohol dependence the data on urban slum dwellers is lacking. So this study was done to explore the burden of alcoholic dependence and factors associated with it in an urban slum area of north Chennai.

Methodology

The study was conducted in Bhakthavachalam colony, an urban slum in division 36 under zone 3 of Chennai Corporation during January-July 2014. This zone 3 of

Chennai Corporation has more than 20 slums out of which this slum was selected by simple random table method. The selected slum has 32 streets, 2780 households with a total population of 14510. A total of 712 male study participants aged 15-65 years were interviewed by house to house survey using AUDIT questionnaire after getting informed consent. The age group of 15-65 years was chosen because it is the economically productive age. Out of the 712 individuals 4 suffered from serious mental disorder and 8from cerebro-vascular conditions were excluded from the study. House to house survey was conducted and individuals who fulfilled the inclusion criteria were administered with basic socio demographic profile, risk assessment scale, general health questionnaire and alcohol user dependence identification test[3, 4]. If the score was > 2 in risk assessment scale then considered positive for high risk behavior and > 3 in General Health Questionnaire [GHQ] then diagnosed with some psychiatric morbidity. Similarly AUDIT questionnaire was administered for alcohol dependence wherein the study participants with score > 15 were diagnosed as alcohol dependence and those with > 8 were diagnosed as harmful alcohol drinkers.

Results

Table-1 Prevalence of alcohol dependence and harmful drinking

Pattern of alcohol intake	Frequency	Percentage
Life time intake	320	45.7
Harmful intake	69	9.8
Dependence	46	6.57
Non-user	380	54.3

A total of 700 participants were included in this study of which the majority of the population 38.8% (272) were in the age group of 15 to 29 years and 84% were Hindus. Among the study population 95% were literate, 12% were unemployed and 85% belonged to class III and class IV socio-economic status according to modified kuppuswami scale. Of the study population unmarried men constituted 33.7% and 37% ofthem had history of high risk behavior. Family history of alcohol drinking was present in 64.8%, peer group pressure in 69.85%, psychiatric morbidity in 27% and chronic illness in 38.5% of the study participants. Around 50% of the population was ex-smokers and current smokers and 4% had history of drug usage. Among the total study population 45.7% had consumed alcohol in their lifetime, and the remaining 54.3% were non-users. The prevalence of alcohol dependence and harmful drinking or abuse were 6.57%

Table – 2 Alcohol dependence and associated risk factors

Variable	Alcoholic dependence present	Alcoholic dependence absent	Total	Chi –square value	Df	P value
Age group						
15 – 29	1	271	272	53.85	3	<0.001
30 – 39	11	103	114			
40 – 49	29	131	160			
50 – 65	5	149	154			
Total	46	654	700			
Religion						
Hindu	32	556	588	24.4	2	<0.001
Christian	13	47	60			
Muslim	1	51	52			
Total	46	654	700			
Marital status						
Married	36	386	422	17.28	4	<0.01
Unmarried	3	233	236			
Divorced	1	2	3			
Separated	2	10	12			
Widowed	4	23	27			
Total	46	654	700			
Migrant status						
Present	17	40	57	49.73	1	<0.001
Absent	29	614	643			
Total	46	654	700			
Family history						
Present	15	439	454	23.06	1	<0.001
Absent	31	215	246			
Total	46	654	700			
Peer group pressure						
Present	40	449	489	7.03	1	<0.01
Absent	6	205	211			
Total	46	654	700			
Chronic Illness						
Present	11	259	270	4.78	1	<0.05
Absent	35	395	430			
Total	46	654	700			
Psychiatric morbidity						
Present	34	155	189	58.28	1	<0.001
Absent	12	499	511			
Total	46	654	700			
Smoking history						
Present	29	315	344	58.28	1	<0.001
Absent	17	339	356			
Total	46	654	700			
Drug history						
Present	6	22	28	9.94	1	<0.01
Absent	40	632	672			
Total	46	654	700			
High risk behavior						
Present	4	255	259	16.85	1	<0.01
Absent	42	399	441			
Total	46	654	700			
Education						
Graduate	6	56	62	12.01	4	<0.01
Intermediate	5	116	121			
High school	6	160	166			
Middle school	11	167	178			
Primary school	18	114	132			
Total	46	613	659			
Occupation						
Clerical / Shop owners	22	127	149	16.59	4	<0.001
Skilled and semiskilled	11	213	224			
Unskilled	11	98	109			
Unemployed	2	84	86			
Total	46	522	568			

and 9.8% respectively [Table I]. Alcohol dependence was associated significantly with age, religion, marital status,

family history of drinking, peer group pressure, chronic illness, psychiatric morbidity, smoking history, drug history, high risk behavior and educational status [Table II].

Discussion

The results in this study showed that a high prevalence of life time intake of alcohol when compared to studies conducted Punjab and all over India were it was 18.3%[5,6] The prevalence of alcohol dependence too was higher than the Delhi and Rajasthan studies which reported a prevalence of 1.7% and 3.6% respectively [7, 8]. Though this higher prevalence be attributed to diverse cultural practices and varied methodological approaches, the role of government in Tamil Nadu cannot be negated. In this study 40-49 years age group was the peak age group for alcohol dependence where 63% of the dependent were found even though they constitute 23% of study population. This is of concern as this age group is the most economically productive one. The prevalence of alcohol dependence was highest among Christians followed by Hindus where as it was negligible among Muslims similar to the study by V K Verma study[9]. In this study the prevalence of alcohol dependence was 29.8% among migrants which was only 4.51% among non-migrants, the difference was found to be significant. This may be because of frustration, unemployment, discrimination, away from relatives and feeling of loneliness associated with migration. The prevalence of alcohol dependence was 8.5% among married and living with spouse and 66% among single living (unmarried, divorced, widowed, separated) and it was statistically significant. This study revealed alcohol dependence was significantly associated with smoking history, drug history and high risk behavior which was comparable to the Paulose Biju et al study[10]. Even though this study has showed the results similar to other Indian and international studies, each differed in terms of methodologies, tools used and characteristic of the study population. Since this study was done as a cross sectional one, the casual relationship between alcohol dependence and the factors should be considered with caution. Certain factors like number of liquor shops in the locality, its distance, time of availability, presence of bar facilities which influence the drinking habits of any population was not studied.

Conclusion

Our results have showed that there was significantly high prevalence of alcohol users andalcohol dependence in the study population. Individuals with family history of drinking and belonging to economically productive age group had greater prevalence. Hence our focus should be more inclusive involving the whole family and community rather than the user alone. School based alcohol awareness program, sensitizing & training medical/paramedical personnel's at primary care level and involvement of social & religious movements may help in tackling the menace of alcohol in long run.

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Conflicts of interest

The authors had declared no conflict of interest

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Original Research Article

Self-Medication Practices: An unrealised threat in the country- Community Based Survey from a rural area of Puducherry, South India

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Abstract

Background: Self-medication is the use of non-prescription medicines by people on their own initiative.Pharmacists have a key role to play in providing them with assistance, advice and informationabout medicines. **Objectives:** To find the prevalence of self-medicationamong rural people in Puducherry; to compare the self-medication practices between Non Communicable Diseases (NCD) and other diseases; to evaluate the role of the pharmacist in self-medication. **Methods:**A cross sectional study conducted in Bahour village from August to November 2014. A semi-structured questionnaire was administered to 112 people after taking informed consent. Chi-square test was used to assess the significance and $p< 0.05$ considered as statistically significant. **Results:**The overall prevalence of self-medication was 57.7%. Among self-medication practices, NCD accounts for 23.2% and most common conditions were Diabetes and Hypertension. Myalgia and fever were common in other disease. Commonly purchased NCD drugs were Metformin and Atenolol whereas in other disease Paracetomol and cough syrups were purchased. Significant differences were found in terms of awareness on drug type, frequency of intake and opinion on self-medication between NCD and other diseases ($p<0.05$). Most common reason stated for practicing self-medication was convenience and lack of time. The role of the pharmacist as a drug provider was more noticeable before obtaining the drug. More than 90% of the participants obtain information about doses, duration of treatments from the pharmacist, however only 30.7% meet pharmacist during adverse-effects. **Conclusion:** The prevalence and contribution of the pharmacist in self-medication practices is high. Though the practice of self-medication is alarming, improved awareness about the role of pharmacist as a drug consultant/Councellor for cautious use of medicines and periodic health check-ups would increase the treatment compliance of NCD.

Keywords: NCD, Pharmacist, Self-medication

Introduction:

World Health Organization (WHO) defines Self-medication as "the use of drugs to treat self-identified symptoms, or use of prescribed drug continuously or intermittently for chronic or recurrent diseases without periodic consultation with health care provider.[1]It may alsoconsist ofuse of herbs and traditional medicines; Apart from this, use of old prescription and reuse of old prescription drugs also included in self-medication practices".[1]

Compared with the developed countries, self medication was widely prevalent in developing countries. In India self-medication became an important public health issue, it is an important concern which delays the universal access to health care.[2] Various studies reported that major issues in delaying health care seeking was due to self-medication which also results in paradoxical heavy economic loss. Majority of the people practice self-medication for non-communicable diseases due to their time and economic constrains. Also studies stated that unchecked use of antibiotics as self-medication likely to cause decreased drug effectiveness of the drug, worsening clinical conditions and to the extreme it causes severe drug resistance in the community and hence, there needs to be a proper control on these practices. [3-5]

Growing pharmaceuticals is also important challenges in regulating self-medication. Introduction of new drugs in the market also one of the contributing factor for self-medications. Increasing self-medication practices has many drivers which includes unchecked

sales, economic and time constrains, influence of family and friends, consumer attitudes and media campaigns.[6] Another important challenge faced in recent decade is growing empowerment which results in increased literacy status and greater access to information along with increased interest with personal health care results in increased demand for self-medication.

In general self-medication plays an important role in minor illness and chronic illness; also pharmacist plays a vital role in treating both minor and chronic illness. In past two decades pharmacist role has been changing from supplier of medicine and medicinal products to effective member involved in provision of healthcare to the community members. Pharmacist has greater responsibility towards the community and customers in providing proper health care and also providing them with assistance, advice and informationabout medicines.

In India only fewer studies were conducted to assess the self-medication practices at community level and assessed pharmacist role in self medication.These kinds of studies will provide useful information and detailed reasons about self-medication practices and this information might help the policy makers and drug authority to regulate the drug distribution process, streamline the list of essential medicines and its safety issues for over the counter use. With this background, the present study was conducted to compare selfmedication practices between non-communicable diseases and other diseases in arural Puducherry. This study also focused to evaluate public perception on role of the pharmacist in self-medication practices.

Aims and Objectives: To compare the self-medication practices between Non Communicable Diseases (NCDs) and other diseases &To evaluate public perception on role of the pharmacist in self-medication practices.

Methodology

Type of study: It was a community based Cross-Sectional study conducted during August 2014-November 2014

Study area & Population: The study was conducted in Bahour village, Bahour commune, Puducherry (South India). This village is situated 24 kms away from Pondicherry and agriculture being its major occupation. The total households in this village are 7570.[7]

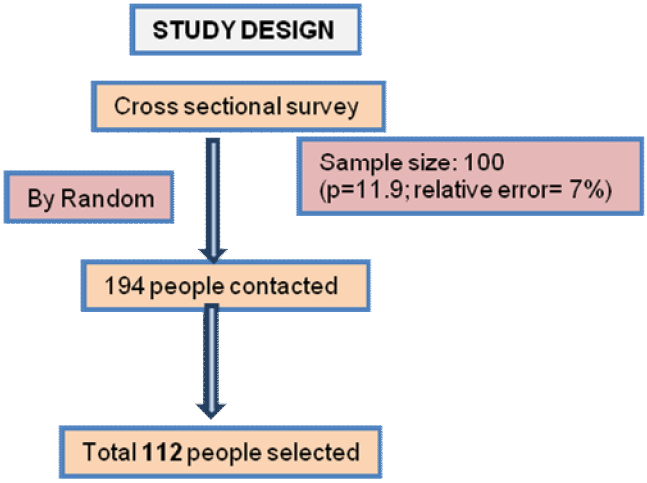
Inclusion criteria:

1. People practices self-medication for common ailments atleast for one time in past one year
2. Adults more than 18 yrs of age
3. Willing to participate

Sample size and Sampling procedure:

Sample size was calculated by using the following formula, $n = (z\alpha)^2 pq/l^2$, with 7% absolute error and 95% confidence. Considering the prevalence of self medication in Puducherry is 11.9%.[8]Sample size was calculated to be around 100 (including 10% non-response rate).

Simple random sampling was done to select houses in the village. Adults more than 18 years of age from the village were selected. One adult male member (preferably head of the household) of each randomly selected house was interviewed. If the house was locked or no member is fulfilling the inclusion criteria in the house, again random selection was done.



Data collection Procedure: After obtaining informed consent from the participant in a local language, data were collected by trained ANMs using pre-designed and pre-tested proforma. House to house survey was conducted by the interviewer. Information's regarding the participant's socio-demographic characteristics; personal history and treatment history were obtained. Questionnaire containing items for assessing the practices and determinants of self medication and the role of pharmacist in self-medication were also surveyed.

Data management and statistical analysis: The data was analyzed using Statistical Package for the Social Sciences software for Windows (SPSS Inc., Chicago, Illinois, USA) version 17.0. Percentages, Ratios and Chi-square test were applied to assess the self medication practices among study subjects. p value < 0.05 was considered as statistically significant.Subject confidentiality was maintained during and after information collection.Informed oral consent obtained before start of the study. After collecting information, health education regarding adverse effects of self-medication was given to the participants.

Results

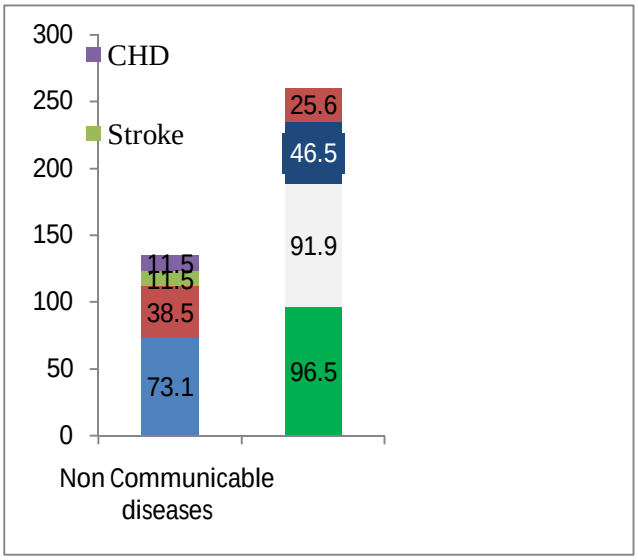
Total 194 participants conducted for the survey, 112 participants were practising self medication and participated in the study.

Table 1: Socio-demographic characteristics of the study participant (n=112)

Characteristics		*Frequency*	*Percentage*
Gender	Male	59	52.7
	Female	53	47.3
Age in years	<30	25	22.3
	30-40	23	20.5
	40-50	21	18.8
	>50	43	38.4
Employment status	Employed	31	27.7
	Unemployed	44	39.3
	Students	5	4.5
	Labour	32	28.6
Literacy status	Literate	94	83.9
	Illiterate	18	16.1
Religion	Hindu	101	90.2
	Christian	7	6.2
	Muslim	4	3.6
Socio-economic status	I	10	8.9
	II	29	25.9
	III	29	25.9
	IV	39	34.8
	V	5	4.5

Table 1 shows the socio-demographic characteristics of the study. Gender wise distributions of study participants were nearly equal. One third of the study participants belonged to the age group more than 50 years. Unemployment was most prevailed among study participants. Three fourth of the subjects were literate. Around 95% of them were belongs to above poverty line.

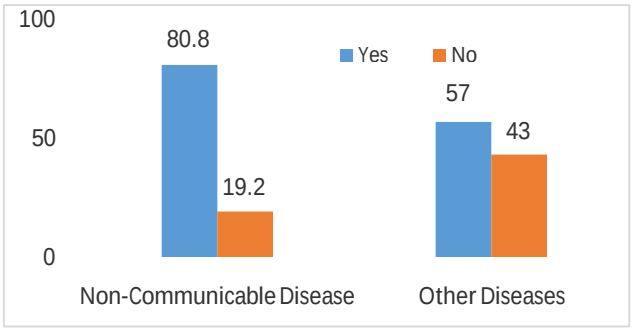
Figure 1: Comparison of common conditions for practicing self medication among NCD (n=26) and other diseases (n=86) *



***Multiple responses**

Diabetes and Hypertension were being the common conditions for practicing self medication among NCDs. Headache, Myalgia and Fever were being common among other diseases. (figure 1)

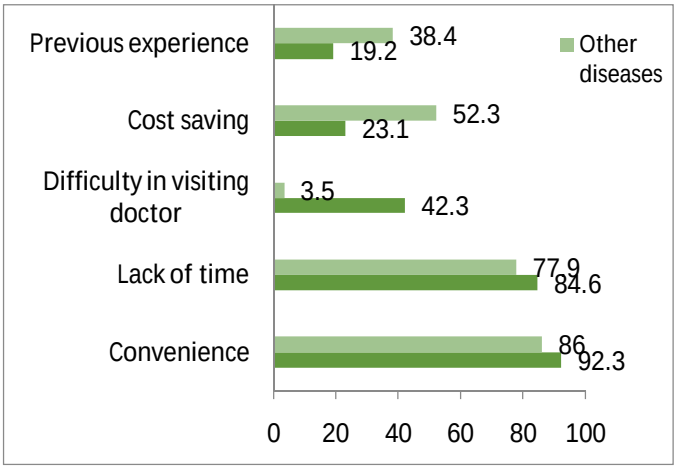
Figure 2: Awareness on self-medication drugs among NCD and other diseases



It was evident in the present study that awareness on self-medication was high among those who use drugs for NCDs (80.8%) than other diseases (57%). (Figure 2)

On a multiple responses question regarding commonly used self-medication drugs for NCDs were Metformin (38.5%) followed by Atenalol (15.4%) and Amlodipine (11.5%) respectively. Similarly for other diseases, Antipyretics (87%) were commonly used followed by pain killers (85%) and antibiotics (65%) respectively.

Figure 3: Reasons for self-medication practices among the study participants.



***multiple response**

Convenience and lack of time are the common reason reported by both the groups. Around 42.3% of the participants who practised self-medication for NCDs reported difficulty in visiting doctor whereas only 3.5% in other diseases group reported difficulty in visiting doctor as a major reason. (figure 3)

Table 2: Attitudes and practice regarding the self-medication drugs

Characteristics		*NCD (n=26)*	*Other diseases (n=86)*	*Frequency (n=112)*	*p-value*
Source of self-medication drug	Using Previous prescriptions	17 (65.4)	15 (17.5)	32 (28.6)	4.81
	Community pharmacies	6 (23.1)	42 (48.8)	48 (42.8)	0.028
	Leftover from previous prescription	3 (11.5)	29 (33.7)	32 (28.6)	
Request for drugs at medicine shop	Brand & type of Drug	17 (65.4)	23 (26.7)	40 (35.7)	16.99
	Indications for use	6 (23.1)	59 (68.6)	65 (58)	0.0002
	Price of Drug	3 (11.5)	4 (4.7)	7 (6.3)	
Ever checked the instructions in the drug package	Yes, always	18 (69.2)	31(36)	49 (43.8)	9.1
	Yes, sometimes	5 (19.2)	29 (33.7)	34 (30.3)	0.01
	Never	3 (11.6)	26 (30.3)	29 (25.9)	
Level of understanding of instructions in the drug package	Fully understood	9 (34.6)	16 (18.6)	25 (22.3)	11.98
	Partly understood	11 (42.4)	17 (19.8)	28 (25)	0.007
	Did not understand at all	3 (11.5)	27 (31.4)	30 (26.8)	
	Never read instruction	3 (11.5)	26 (30.2)	29 (25.9)	
Ever checked the expiry date of the drug	Yes, always	19 (73.1)	17 (19.8)	36 (32.1)	30.57
	Yes, sometimes	5 (19.2)	13 (15.1)	18 (16.1)	0
	Never	2 (7.7)	56 (65.1)	58 (51.8)	
Ever switched off to another drug during course of self-treatment	Yes, always	1 (3.8)	22 (25.6)	23 (20.5)	13.49
	Yes, sometimes	1 (3.8)	19 (22.1)	20 (17.9)	0.001
	Never	24 (92.4)	45 (52.3)	69 (61.6)	
Adverse reaction during self-medication	Yes	1(3.8)	12 (14)	13 (11.6)	1.98
	No	25 (96.2)	74 (86)	99 (88.4)	0.158

Table 3: Association of self-medication practices among NCD and other disease

Characteristics		*NCD n (26)* ***n (%)***	*Other diseases n(86)* ***n (%)***	*Total n(112)* ***n (%)***	Chi square p-value
Education status	Literate	18 (69.2)	76 (88.4)	94 (83.9)	5.42
	Illiterate	8 (30.8)	10 (11.6)	18 (16.1)	0.019
Employment status	Employed	19 (73.1)	44 (51.2)	63 (56.2)	3.89
	Unemployed	7 (26.9)	42 (48.8)	49 (43.8)	0.048
Socio economic status	I	5 (19.2)	5 (5.8)	10 (8.9)	8.59
	II	9 (34.6)	20 (23.3)	29 (25.9)	0.072
	III	4 (15.4)	25 (29.1)	29 (25.9)	
	IV	6 (23.1)	33 (38.4)	39 (34.8)	
	V	2 (7.7)	3 (3.4)	5 (4.5)	
Awareness on drug type	Yes	21 (80.8)	49 (57)	70 (62.5)	4.82
	No	5 (19.2)	37 (43)	42 (37.5)	0.028
Frequency of self-medication intake	<5 times	1 (3.8)	10 (11.6)	11 (9.8)	30.07
	5 to 10 times	9 (34.6)	67 (77.9)	76 (67.9)	<0.000
	>10 times	16 (61.5)	9 (10.5)	25 (22.3)	
Opinion on self-medication	Good	2 (7.7)	13 (15.1)	15 (13.4)	6.52
	Acceptable	18 (69.2)	35 (40.7)	53 (47.3)	0.038
	Not Acceptable	6 (23.1)	38 (44.2)	59 (52.7)	

Table 4: Public perception on role of pharmacist(n=112)

Characteristics		*Total* n (%)
Do you ask pharmacist about the choice of drug?	Yes	102 (91.1)
	No	10 (8.9)
Do you ask pharmacist about the recommended dose of drug?	Yes	106 (94.6)
	No	6 (5.4)
Do you Consult pharmacist about duration of drug intake?	Yes	108 (96.4)
	No	4 (3.6)
Do you report the incidence of drug adverse effect to pharmacist?	Yes	82 (73.2)
	No	30 (26.8)
Do you Consult pharmacist when prior drug does not work?	Yes	97 (86.6)
	No	15 (13.4)
Do your pharmacists identifies and resolves your problems?	Yes	88 (78.6)
	No	24 (21.4)
Do you see your pharmacist consistently ensures that you are receiving safe and effective medicines?	Yes	75 (67)
	No	37 (33)
Do you see that your pharmacist collaboratively works with other health care providers to ensure you to achieve positive health?	Yes	77 (68.8)
	No	35 (31.2)
Do you see your pharmacists provide services like adherence to medication and health screening advice?	Yes	87 (77.7)
	No	25 (22.3)

The common source for self medication was community pharmacist though 33.7% of the participants in other diseases groups reported they took medicine from the leftovers of previous prescriptions. Around 65% of the NCD group participants requested drug in the pharmacist with the drug brand name and type of drug whereas in other groups mostly they requested with the indication for use (68.6%). Regarding levels of understanding of instructions in the drug packages, only 11.5% in NCD groups did not understand the instruction, in contrary around 30% of the other disease groups did not understand the instruction with significant differences. There were significant differences found between NCD and other disease in terms of attitudes and knowledge regarding the self-medication drugs. (Table 2)The common reason stated for discontinuation of former drugs among other diseases group was former drug did not work (48.8%). Only 2.4% participants in NCD group reported due to higher cost. Around 39% of them stopped taking the drug and 33% of them consulted doctor for adverse reactions.

Table 3 shows the factors associated with self medication practices among NCD and other diseases groups. Participants education status, employment status , awareness on drug types, frequency of medication intake and opinion on self medication shows significant association with NCD group than other diseases with $p<0.05$.

Majority of the participants reported that pharmacist plays a major role in providing health care. More than 90% of them reported that they would ask their pharmacist for choice of drug, recommended dose and duration of drug intake. Around 80% of them reported pharmacists provide services like adherence to medication and health screening advices. (table 4).

Discussion:

The present study was done in Bahour village in Puducherry. The principal focus of the current study was to assess the prevalence of self-medication practices and to compare the self medication practices between non-communicable diseases and other diseases. Also this study aims to find public perception on role of pharmacist in self-medication practices.

In the current study area, study participants were equal in gender and no sex difference observed and one third of them belong to more than 50 years of age. Though more than 80% of them were literate, around 39.3 % of them were unemployed in the study group. More than 50% of the self-medication practices were observed in middle class people. This may be due to low purchasing power, high cost of medicine and inaccessibility to health care in the rural areas.

Prevalence of self-medication practices was 57.7% in the current study area which was lower than the study conducted by Balamurugan et al[9] in coastal area of Pondicherry. In contrast study conducted by kalaiselvi et al[8] in Pondicherry reported 11% as self medication prevalence. High prevalence of self-medication in the study area may be due to high literacy level or uncontrolled check of drug sale. Also neglecting nature of mild illness among the participants leads to self-medication practice. Hence needs to have proper check and monitoring on drug sale in the study area.

In the present study, diabetes and hypertension were being common conditions for practising self-medication among non-communicable groups whereas headache, Myalgia and fever were common in other diseases group.Among different self-medication, common drugs purchased were antipyretics, pain killers, antibiotics in other group and in NCDs group Metformin and Atenalol were purchased. Our study findings were similar to the studies conducted in rural Pune, Western Nepal and Nagpur.[10-12] Regarding awareness on self-medication drugs non-communicable disease group people were more

aware of their drugs when compared to the other diseases group. The common reason stated for practising self-medication for non-communicable diseases were convenience, lack of time and difficulty in visiting doctor more frequently. This finding stresses the fact that, participants with chronic illness were commonly practicing self-medication due to difficulty in accessing health care. This finding agrees with other studies in the medical literature.[13,14]

In the present study common source for self medication was previous prescriptions, community pharmacist followed by leftovers of previous prescriptions. This finding was concordant with other studies conducted in India.[10, 12, 15] This shows that inaccessibility to health centre and non- availability of doctors on time in rural area might tempted people to use old prescriptions. Around two third of the NCD group participants requested drug in the pharmacist with the drug brand name and type of drug whereas in other groups mostly they requested with the indication for use. Regarding levels of understanding of instructions in the drug packages, only fewer participants in NCD groups did not understand the instruction, in contrary around more than one third of the other disease groups did not understand the instruction with significant differences. The factors that associated with self-medication practices in non-communicable disease group were education status, employment status, awareness on drug types, frequency of medication intake and opinion on self medication.

Pharmacists can play a vital role in self medications by providing the information of warning symptoms needing urgent medical aids and about the adverse effects.[16,17]In the present study majority of the participants reported that pharmacist plays a major role in providing health care. participants opined that pharmacist is the one who collaboratively works with other health care providers to ensure patients to achieve positive health and also he ensures that patient are receiving safe and effective medicines.

The limitations of this study were it restricts the use of self-medication to allopathic drugs alone. This study does not compare with those who do not take self-medications to find the possible factors. Recall bias was common as the study participants recalls the self-medication practices for past year so the study was limited to observe the pattern of drug usage in last episode of self medication.

Conclusions:

The prevalence of self medication in the study area was high though it is very serious and yet highly ignored in our country. Easy availability of drugs, low cost to purchase medicine and lack of time were the most detrimental cause for self medication. Though participants from NCD group were more aware of their conditions and have more knowledge on drugs, they are the one practising self-medication due to lack of time and feasibility to purchase the drug with old prescription. Government should ensure people to have access to adequate health care services in rural areas. Regular follow-up should be made to all patients with chronic diseases for their drug adherence and check-ups.

Contribution of the pharmacist in self-medication practices is high. Though the practice of self-medication is alarming, improved awareness about the role of pharmacist as a drug consultant/Councellor for cautious use of medicines and periodic health check-ups would increase the treatment compliance of NCD and other disease groups.

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Original Research Article

Prevalence of Anemia among elderly population attending Rural Health Training Center in Kancheepuram, Tamil Nadu

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Abstract

Background: Iron deficiency anemia is the most common cause of anemia in India. It affects all age groups but more prevalent among geriatric population. Large numbers of studies including NFHS-4 have quantified the prevalence of anemia among other age group than the elderly population. Most of the studies have studied the prevalence of anemia among maternal and child population and there is lack of studies among the elderly population especially in rural areas. **Aim & Objectives:**To estimate the burden of anemia and its associated factors among the rural elderly population older than 60 years of age. **Material and Methods:** A cross sectional study was done among the patients aged 60 yrs and above who visited SRM RHTC, Mamandur during the period between July – December 2016. Socio demographic factors and other determinants were recorded using a semi-structured questionnaire. Clinical examination was done in all study subjects and Hemoglobin levels were detected using Sahli's technique. Informed consent from all participants was obtained. Data was entered on excel sheet and analyzed using statistical software SPSS. **Results:**Out of 240 study subjects 112 were males and 128 were females. Majority of them had mixed diet (85.83%) and were having normal BMI (70.42%). The study revealed that based on WHO definition of anemia, 67.08% of study population was anemic. The Mean ± SD Hb% was 9 ± 1.4. The prevalence of anemia was higher among females (72.66%) than males (60.71%). Among 161 subjects who were anemic, dyspnoea was present in 107 (66.46%), pallor in 78 (62.4%)and both were statistically significant. **Conclusion**: Anemia in elderly is often underreported and it is pertinent to do larger studies in India to identify the prevalence of anemia among elderly which will provide baseline data for planning appropriate interventional strategies.

Key words: anemia, elderly population, rural

Introduction

Globally, the number of persons aged 60 years or over is expected to nearly triple, increasing from 673 million in 2005 to two billion by 2050[1].In India, 8% of total population are above 60 years in 2010 and is likely to rise to 21% by 2050[2]. Although the percentage of aged persons to the total population is low in comparison to the developed countries, nevertheless, the absolute size of aged population is considerable. Among the morbidities affecting elderly population, Iron deficiency (ID) is the most prevalent nutritional deficiency worldwide among elderly. The main consequence of iron deficiency is anaemia, a common condition and significant problem in the older population. According to the WHO, ID is by far the most common and widespread nutritional disorder worldwide[3], with estimated one billion people affected, thus constituting a public health condition of epidemic proportions.Anaemia is a late indicator of iron deficiency, so it is estimated that the prevalence of iron deficiency is 2.5 times that of anaemia[4,5]. One of the largest population survey, i.e., the third US National Health and Nutrition Examination Survey (NHANES III), indicated that 10.2% of women and 11% of men >65 years of age were anaemic. These fractions rose to 26.1 and to 20.1% in subjects older than 85 years old, in males and females,

respectively[6]. The estimated prevalence of anaemia in developingcountries is 39% in children <5 years, 48% in children 5–14 years, 42% in women 15–59 years, 30% in men 15–59 years, and 45% in adults >60 years[4]. These staggering figures have important economic and health consequences for low- and middle-income countries.

Anemia is a major health problem in India. In the 2005-2006 National Family Health Survey (NFHS-3), a household survey aimed at having national and state representative data on population health and nutrition, reported the prevalence of anaemia as 70% in children aged 6–59 months, 55% in females aged 15–49 years, and 24% in males aged 15–49 years[7].Anaemia in the elderly is an under-diagnosed condition often not reported to the patient because its mostly perceived as a mere consequence of aging or as a disease marker. Iron Deficiency Anaemia reduces not only functional capacity and mobility of a person but also quality of life. However, many physicians continue to neglect the significance of anaemia as a serious clinical condition in the elderly.

Hemoglobin concentrations slightly below the lower limit of normal are a common laboratory finding in the elderly, but scant evidence is available on the actual occurrence of mild anemia despite its potential effect on health[8]. Although the NFHS-3 showed that the prevalence of anaemia was higher in rural areas, there is a paucity of data about the epidemiology of anaemia in rural settings.

The aim of this study is to describe the prevalence of anaemia and its associated factors among the rural elderly population older than 60 years of age who attended the outpatient clinics of a rural hospital in Tamilnadu, India.

Materials and Methods

A cross sectional study was done among the patients aged 60 yrs and above who visited the outpatient department of rural health centre of SRM medical college & RC at Kancheepuramduring the period between July – December 2016. Socio demographic factors and other determinants were recorded using a semi-structured questionnaire. Socioeconomic status was obtained by using Modified Udai Pareek Scale and categorized as Low, Middle and High Income groups. Presence of breathlessness was graded into 5 categories (Grades 1-5) by using MRC Breathlessness Scale[9]. Anthropometry and Clinical examination was done in all study subjects by the investigator andBMI score was used to categorize nutritional status as underweight (<18.5), normal (18.5 – 24.99), overweight (25.0 – 29.99) & obese (>30.0). Venous blood sample was collected from all subjects and Hemoglobin levels were detected using Sahli's technique. Anemia was defined as hemoglobin < 12g/dL in women &< 13g/dL in men, in accordancewith World Health Organization (WHO) criteria[10].All consenting subjects aged 60 years and above of both genders were included in the study after obtaining informed consent from all participants. Institutional Ethical Clearance was obtained for the study. Data was entered on Microsoft excel sheet and analyzed using statistical software SPSS version 15.Descriptive statistics such as frequencies, proportions, mean and standard deviation were used. Chi-square used to check the association and p value <0.05 considered as statistically significant.

Results

During the study period, a total of 240 subjects were included. Of which 112(46.67%) were males and 128 (53.33%) were females. Majority of them (67.92%) were in the age group of 60 – 69 years. Hindus contributed major share (89.17%) of the sample and more than half (55.83%) of them were Illiterates. Socio demographic characteristics are shown in Table 1.

Table 1. Socio demographic characteristics of the respondents (n=240)

Category	Number	Percentage (%)
Gender		
Male	112	46.67
Female	128	53.33
Age group		
60 – 69 years	163	67.92
70 years& above	77	32.08
Religion		
Hindu	214	89.17
Muslim	21	8.75
Christian	5	2.08
Education		
Illiterate	134	55.83
Primary school	76	31.67
High school	23	9.58
Graduation & above	7	2.92
Occupation		
Business	24	10
Skilled	38	15.84
Semi-skilled	17	7.08
Coolie/unskilled	95	39.58
Unemployed/retired	66	27.5
Socio economic status		
Low	145	60.42
Middle	87	36.25
High	8	3.33

Haemoglobin levels were calculated for all 240 study subjects. The study revealed that based on WHO

definition of anemia[10], 67.08% (161 subjects) of study population was anemic. The prevalence of anemia was higher among females (72.66%) than males (60.71%). The Mean ± SD Hb% was 9 ± 1.4. Females (8.76 ± 1.29) had a lesser Mean Hb% compared to males (9.26 ± 1.53). This is depicted in Figure 1.

Figure 1. Gender wise Haemoglobin levels Mean(±S.D)

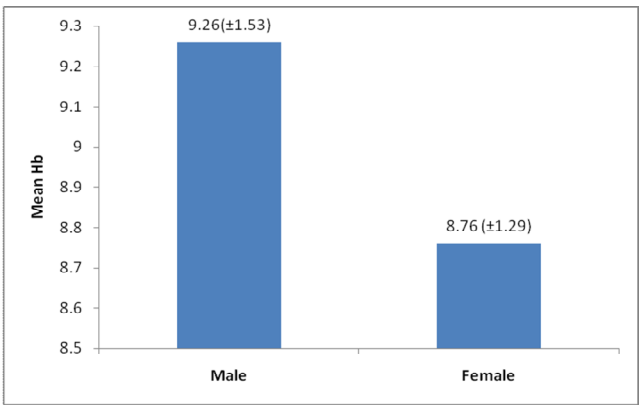

Table 2. Association between anaemia and study variables using Chi-Square test

Category	Anaemia n (%)	Normal n (%)	Total (n)	Chi square testp-value
Diet				
Veg	13 (38.24)	21 (67.76)	34	0.054*
Mixed	148	58 (28.16)	206	
Pallor				
Present	78 (62.4)	47 (37.60)	125	<0.0001*
Absent	27 (23.48)	88 (76.52)	115	
Dyspnoea				
Absent	54 (46.96)	61 (53.04)	115	<0.0001*
Mild/Moderate	93 (87.74)	13 (12.26)	106	
Severe	14 (73.68)	05 (26.31)	19	
BMI				
Underweight	12 (66.67)	06 (33.33)	18	
Normal	125	44 (26.04)	169	0.786
Overweight & Obese	24 (45.28)	29 (54.72)	53	
Gender				
Male	68 (60.71)	44 (39.29)	112	0.345
Female	93 (72.66)	35 (27.34)	128	
Age group				
60 – 69 years	106	57 (34.97)	163	0.234
70 years& above	55 (71.43)	22 (28.57)	77	
Socio economic status				
Low	102	43 (29.66)	145	0.113
Middle& High	59 (62.11)	36 (37.89)	95	
Total	**161**	**79**	**240**	

*significant as p-value <0.05

Variables like Gender, socioeconomic status, age group, clinical pallor, diet, presence of dyspnoea and BMI were studied to find out any association with presence of anaemia among the study subjects. For ease of analysis, dyspnoea grades were regrouped into 3 categories as follows: [1 – no dypnoea, 2 & 3 - mild & moderate and grades 4 & 5 – severe]. BMI score of > 24.99 were included as single category (overweight & obese). As very few subjects belonged to high socioeconomic status, middle and high income groups were analysed as one group. Out of these factors,subjects with mixed diet (71.84%), clinical pallor (62.5%) and presence of dyspnoea had higher chance of being anaemic and these differences were found to be statistically significant with a p-value of 0.054, <0.0001, <0.0001 respectively using Chi-square test analysis.

Discussion

The study revealed that 67.08% (161 elderly subjects) were aneamic which is similar to the study done by Agarwal S et al[11] in a rural area of Maharashtra, which reported that 62.6% of the population aged > 60 years suffered from anemia. A study carried out among urban slums in Bangalore reported a higher prevalence of anemia (82.9%) in the 60 years and above age group[12]. The prevalence of aneamia among elderly in developed countries is considerably low (10%[6],14.2%[8], 21.1%[13]). This difference might be due to better nutritional status among people in the developed countries compared to developing countries. The Mean ± SD Hb% was 9 ± 1.4 in the present study. Also, the study found that females (8.76 ± 1.29) had a lesser Mean Hb% compared to males (9.26 ± 1.53). A study done in Austria[13] among elderly aged 64 years and above reported that Median hemoglobin was 13.7 g/dL which is higher than the value found in the present study and womengenerallyhadlower hemoglobin levels than did men (median 13.4 g/dL versus 14.3 g/dL; *P*<0.001).Similarly, Subasinghe AK and others in their study[14] done in Andhra Pradesh reported that women were more deficient in iron than menin both low income (P = 0.001) and 'not low' income families(P,0.001). But M Tettamanti et al in their study[8]done in Italy found anaemia in elderly with a significantly higher frequency (*P*=0.0001) in men (15.2%, 95% CI: 13.9-16.6) than in women(13.6%, 95% CI: 12.7-14.6).Various studies[8,13,15] have reported that the prevalence of anaemia increases with increase in age. In the present study also 70 years and above subjects had higher (71.43% vs 65.03%) prevalence of anaemia compared to 60 – 69 years subjects, but statistical correlation was not obtained (p-value, 0.234). Though Yarlini et al[16] in their study reported that anaemia is disproportionately concentrated in low socioeconomic groups, the present study did not reveal any difference in anaemia based on socio economic class(p-value, 0.113). Majority of the subjects with normal BMI (73.96%) were aneamic compared to underweight (66.67%) which was not statistically significant (p-value, 0.786). But a study[17] done among Korean elderly population revealed that lower body mass index is an independent risk factor for anaemia. There is evidence to suggest that people who

consume highly bioavailable forms of iron like red meat promote high bodily iron stores compared to those who consume phytates like grains which decreases the stores[18]. But in the present study diet did not influence the presence of anaemia. This may be because the number of vegetarian subjects was very less (34 compared to 204). Among the 161 anaemic subjects, presence of pallor (78 subjects) and dyspnoea (107 subjects) were statistically found significant (p-value, <0.0001). This stresses the importance of clinical examination and history taking in the management of anaemia in the elderly.

Conclusion: The present study has highlighted a high prevalence of anaemia among the elderly in the rural area of Tamilnadu, India.Geriatric patients should be routinely screened for anemia and etiological causes of anemia individually assessed toallow timely initiation of appropriate therapy.Strengthening of geriatric health care services in accordance with the common existingproblems, especially preventive and promotive services in the community are required. Further qualitative research is needed toexplore the depth of the problems of the geriatric age group.

Recommendations: Anemia in elderly is often underreported and it is pertinent to do larger studies in India to identify the prevalence of anemia among elderly which will provide baseline data for planning appropriate interventional strategies.

Limitations: The study included subjects only who reported to the outpatient clinic the rural centre. Hence, the estimated prevalence of anaemia might be overestimated.

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Original Research Article

STUDY ASSESSING THE PROPORTION OF ALCOHOL USE AMONG ADULT MALES ATTENDING A RHTC IN MAMANDUR,TAMIL NADU

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Abstract

Introduction: Alcohol dependence is a cluster of behavioral, cognitive and physiological phenomena that may develop after repeated alcohol use. Screening for alcohol consumption among patients in Primary care provides an opportunity to educate patients about low-risk consumption levels and the risk of excessive alcohol use. **Objective:** To estimate the proportion of Alcohol use among Adult Males and to find out the association of demographic variables with the risk levels of the subjects. **Methodology**: A cross sectional study was carried out in the Rural Health and Training Centre (RHTC) in Mamandur, Tamil Nadu for a period of one and half month from March 16th to April 30th 2016.The study included 160 adult males attending the OP clinic of the RHTC who were interviewed using a questionnaire for data on socio demographic profile and WHO-AUDIT questionnaire for alcohol use. **Results**: Mean age of the subjects was 47±15.1 S.D. Majority of the subjects (80.63%) were married and 30.63% were illiterate.The proportion of alcohol intake among the study participants was 42%. AUDIT scoring showed 5.6% were alcohol dependent and 9.4% had harmful and hazardous drinking pattern.**Conclusion:** The present study showed that more than half of the patients were current alcohol users. Strengthening primary care services and adopting simple screening tools for Alcohol Use Disorder through the incorporation of simple screening tools like AUDIT in national programs, can be an efficient intervention to tackle the problem of alcohol use.

Key words: RHTC, AUDIT, dependence, Drinking pattern

INTRODUCTION

Alcohol consumption and problems related to alcohol vary widely around the world, but the burden of disease and death remains significant in most countries. Alcohol consumption is the world's third largest risk factor for disease and disability and is the greatest risk in middle-income countries.[1]Alcoholism or alcohol dependence is defined by the American Medical Association as a "Primary, Chronic disease with genetic, psychosocial and environmental factors influencing its development and manifestations". Hazardous drinking is a pattern of alcohol consumption that increases the risk of harmful consequences for the user or others. Harmful use refers to alcohol consumption that results in consequences to physical and mental health.Alcohol dependence is a cluster of behavioral, cognitive, and physiological phenomena that may develop after repeated alcohol use.[2] Worldwide consumption in 2010 was equal to 6.2 litres of pure alcohol consumed per person aged 15 years or older, which translates into 13.5 grams of pure alcohol per day. In 2012, about 3.3 million deaths, or 5.9% of all global deaths, were attributable to alcohol consumption [1].Despite the large health, social and economic burden associated with harmful use of alcohol, this problem has remained a relatively low priority in most of the public health policies. Many factors contribute to the development of alcohol-related problems mainly ignorance of drinking limits and risks associated with excessive alcohol consumption. Screening for alcohol consumption among patients in a Primary care setting provides an early opportunity to educate patients about low-risk consumption levels, the risk of excessive alcohol use and also offers helps the practitioners to take preventative measures that have proven effective in reducing alcohol-related risks.[3] The objectives of the study are to study the proportion of Alcohol use among Adult Males attending a Rural Heath Training Centre (RHTC) and to find out the

association of selected demographic variables with the risk levels of the subjects. The current study will be useful for understanding the problem of alcohol use and for taking specific interventional measures at the community level.

MATERIALS AND METHODS

A cross sectional study was carried out in the Rural Health and Training Centre (RHTC) in Mamandur, Tamil Nadu for a period of one and half month from March 16th to April 30th 2016. A sample size of 160 was calculated taking the prevalence of alcohol use as 38% as per a previous study conducted in a rural area in Tamil Nadu[4] and relative precision of 20% and non-response rate of 10%. All adult males attending the OP clinic of the RHTC were interviewed using a questionnaire for data on socio demographic profile and AUDIT[3] (Alcohol Use Disorders Identification Test) questionnaire was used to assess the pattern of alcohol use after obtaining written informed consent from them. A subject who consumed alcohol in the past 12 months was taken as the criteria for defining alcohol use. Data on hazardous level drinking (items: frequency of drinking, quantity and frequency of heavy drinking), dependence symptoms (items: an impaired control over drinking, an increased salience of drinking and morning drinking) and harmful alcohol use (items: guilt after drinking, blackouts, alcohol–related injuries and others which were concerned with drinking) were assessed, based on the scoring of above items in respective categories. Total scores of 8 or more were recommended as indicators of hazardous and harmful alcohol use, as well as possible alcohol dependence.Data entry and analysis was done using Microsoft Excel and Epi Info. The findings were expressed in terms of proportions and mean. Association of selected demographic variables with the risk levels of the subjects and statistical significance was estimated in terms of Odds Ratio and its 95% confidence interval and Chi square test.

RESULTS

A total of 160 adult males who attended the OP Clinic of RHTC, Mamandur were included in the study. Mean age of the subjects was 47±15.1 S.D. Majority of the study participants (80.63%) were married. Around 49 (30.63%) of the subjects were illiterate. The skilled and unskilled workers constituted 51% of the study population. Almost half of the study participants (46.25%) belonged to the Upper Middle class. Illiterates constituted 32.5% of the study population.

According to AUDIT scoring, majority of the study participants around 58% showed low risk drinking or abstinence. Overall, the prevalence of alcohol use was found to be 42%. Prevalence of hazardous or harmful use of alcohol was 9.4% and alcohol dependence was 5.6%. This has been depicted in Table 1.

Table 1: Risk level of alcohol use among study participants

RISK LEVEL	INFERENCE	NUMBER (N=160)	%
I	Low Risk drinking or Abstinence	95	59.4
II	Alcohol use in excess of low risk guidelines	41	25.6
III	Harmful and hazardous drinking	15	9.4
IV	Alcohol Dependence	9	5.6

Table 2: Association of certain demographic variables with the risk levels of the study participants

DEMOGRAPHIC VARIABLE	HIGH RISK n (%)	LOW RISK n (%)	OR (95% CI)	p value
1. Education				
Illiterate	23 (47)	26(53)	1.39 (0.7-2.76)	0.43
Literate	43 (38)	68 (62)		
2.Occupation				
Employed	65(43)	85 (57)	6.88 (0.85-55.7)	0.8
Unemployed	1(10)	9 (90)		
3. Marital status				
Single and Widower	13 (42)	18 (58)	1.04 (0.47-2.29)	0.9
Married	53 (41)	76 (59)		
4. Socio Economic Status				
Upper Middle Class	20 (49)	21 (51)	1.29 (0.64-2.6)	0.6
Lower and Middle class	54 (43)	73 (57)		

The illiterate study participants had higher high-risk alcohol use when compared to the literate participants [OR=1.39, 95% C.I =0.7-2.76]. Those employed had higher high-risk alcohol use when compared the unemployed patients[OR=6.88, 95% C.I=0.85-55.7]. The above differences were not statistically significant. The difference in prevalence of high-risk alcohol use among Single/widower participants (42%) and married patients (41%) with an Odds Ratio of 1.04 was not statistically significant. There was no statistical difference in the prevalence of high-risk alcohol use among patients belonging to upper class (49%) and Lower/middle class (43%). These details are given in Table 2.

DISCUSSION

The study included 160 adult males who attended the OP clinic of RHTC, Mamandur. The mean age of the study participants in this study was found to be 47±15.1 S.D which is higher than what was seen in a study done by Dutta et al in rural Tamil Nadu. [4]Majority of the study participants were married (80.63%) which is similar to another study done in rural south India by John et al in 2009[5]. In this study the overall proportion of alcohol use was found to be 42%. This is similar to the findings of the study done by Dutta et al where prevalence was 37.1% [4]. The current study shows that illiterate participants (47%) showed high-risk alcohol use. This is high when

compared to a study in Mumbai by Prakash et al where in prevalence was 25.6% among illiterate participants.[6]The current study shows a higher rate of alcohol consumption among subjects belonging to upper class (49%) which was found to be different from a previous study wherein subjects belonging to lower class were found to have higher rate of alcohol consumption (46%).[4]

CONCLUSION

The present study was undertaken with the objectives to assess the proportion of alcohol use among adult males attending the OP clinic of RHTC, Mamandur and to compare the demographic variables with the risk levels of the subjects. Overall, the proportion of alcohol use was found to be 42% where the prevalence of hazardous or harmful use of alcohol was 9.4% and alcohol dependence was 5.6%. Increasing awareness among the population and necessary rehabilitation and self-help programs starting from the primary care level will help in bringing down the prevalence of alcoholism and in turn the harmful effects caused due to alcohol to the individual and his/her family.

RECOMMENDATIONS

Strengthening primary care services and adopting simple screening tools for Alcohol Use Disorder through the incorporation of simple screening tools like AUDIT in national programs, can be an efficient intervention to tackle the problem of alcohol use.

Conflict of Interest: None

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Original Research Article

A Cross Sectional Study On Perceived Stress Among The Professional Students Of A Campus In North Kerala

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Abstract

Background: Students studying in professional colleges experience more stress during their education period because of vast curriculum, frequent examinations, lack of sleep and extracurricular activities etc. If we do not identify early and give support, long term stress may create more serious psychological problems (anxiety, depression and suicidal tendencies etc.). So, this study was conducted to assess the levels of stress among the students. **Objectives:**To assess the level of perceived stress and some factors affecting it among students of a campus in Kannur, North Kerala. **Materials and Methods:**A cross sectional study was conducted at Anjarakandy Integrated Campus, Kannur which includes students of different courses (Medical, Dental and Pharmacy). A sample of 818 students was collected using purposive sampling method. After getting the informed consent, data was collected using Cohen's Perceived Stress Scale (14 items) by visiting classes. Descriptive statistics and associations were analysed. **Results:**Among 818 students, 40% were males and 60% were females. 52.2%, 28.4% and 19.4% were medical, dental and pharmacy students respectively. The mean stress score was 27.29±5.1. About 93% and 3% of the students were having moderate and high perceived stress respectively. There was no association between the stress and gender and courses they were studying. The common perceived reasons among students for stress was study overload and staying away from home. They felt that very good family support, extracurricular activities and timely counselling will help in reducing the stress.**Conclusion:**The proportion of students having moderate perceived stress was very high and it was not associated with gender and course they were studying. Giving adequate support like family support, lessons on time management and counselling along with increasing the extracurricular activities may play an important role in reducing the stress, otherwise these students with moderate stress may end up with high stress levels which may give rise to other psychological disturbances such as depression, anxiety and suicidal tendency.

Introduction:

Humans in present time are running against time to accomplish their life goals which is making them feel pressurised to fit into the ever challenging and changing world. Inability to cope with this pressure often leads to stress.[1]Stress is a dynamic process and is defined as "a particular relationship between the person and the environment that is appraised by the person astaxing or exceeding his or her resources and endangeringhis or her well-being".[2] Stress can manifest either as 'eustress' or as 'distress'. Eustress is positive form of stress which motivates an individual to continue working whereas distress is a negative form of stress or 'bad stress' wherein stress becomes too much to bear or able to cope with. [3] If stress is longstanding, there is no longer any fun in the challenge and it impairs the person's wellbeing. [1,3]

Various studies show that students in professional colleges experience mild to moderate stress very often.[1,3–11] Professional college students experience various degrees of stress during their education because of vast curriculum, frequent examinations,high competitiveness, lack of time, lack of sleep, less extracurricular activities etc.Excessive stress results in an increased prevalence of non-communicable diseases such as hypertension and cardiovascular diseases and also increases the prevalence of psychological problems such as depression, anxiety, substance abuse, suicide ideation etc. Early identification of stress among the students and providing appropriate

support systems helps in combating stress and its problems.

So, with this background, we conducted this study with the objective to assess the level of perceived stress and few factors affecting it among students of a campus in Kannur, North Kerala.

Material and Methods:

It was a cross sectional study conducted at Anjarakandy Integrated Campus (AIC), Anjarakandy, Kannur.The students of AIC studying in different professional courses such as medical, dental and pharmacy and students who were willing to participate were included in the study. It was conducted over a period of two months (August 2016- September 2016).There were about 1100 students studying in these different professional courses at the campus, out of that 818 students participated in the study.Data collection tool consists of two parts – I. Basic details (age, sex, course, year of course, family income, residence and parent's occupation) II. Cohen's Perceived Stress Scale-14 (PSS-14) questionnaire was used to assess the stress.[12]

*PSS-14 Questionnaire and Scoring:*PSS-14 is the most widely usedpsychological tool for measuring the perception of stress which was having established validity and reliability.[12,13] It is a measure of the degree to which situations in one's life are perceived as stressful. The questions in the PSS deals about the feelings andthoughts of the students during the past month. The PSS-14 consists of 14 questions, in that seven were positive and seven were negative. The negative element intends to assess helplessness while positive element assess the self-efficacy of the individual to cope with the existing stressors. Each item was rated ona five-point Likert scale from 0='never' to 4='very often' and ranging from zero (0)=never, one(1)=almost never, two (2)=sometimes, three(3)=fairly often andfour(4)=very oftenon the basis of their occurrence duringone month prior to the survey. The PSS scores are obtained by reversing theresponses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 and 4 = 0) to the seven positively stated items (items 4, 5, 6, 7, 9, 10, 13) and then summingacross all the items. The scores ranged from 0 to 56.[12]Scores were divided into 'low perceived stress' (0-18), 'moderate perceived stress' (19-36) and 'high perceived stress' (37-56).[14]

The study was conducted after taking ethical clearance from the Institutional Ethics Committee, Kannur Medical College.The data was collected by visiting each class rooms after the permission from respective colleges. After explaining the purpose of the study and written informed consent was taken from those who were willing to participate in the study. Data was collected by administering questionnaire to the students with the instructions to choose best answer how they felt over past one month.Data were entered in Microsoft Excel and analyzed using EpiData Analysis. Descriptive statistics such as frequencies, proportions, mean and standard deviation were used. Chi-square used to check the association and p value <0.05 considered as statistically significant.

Results:

Socio-demographic Details:
A total of 818 students participated in the study and the mean age of the study population was 20.7±1.7 years. Among the participants 60% (491) were females and 40% (327) were male students. About 52.2% (427) students were medical students, 28.4% and 19.4% were dental and pharmacy students (Table 1).

Table 1: Distribution of study participants by gender and mean age in years.

Course	Male n (%)	Female n (%)	Total n (%)[#]	Mean Age (SD)[*] in years
Medical	171 (40.0)	256 (60.0)	427 (52.2)	19.9 (1.4)
Dental	97 (41.8)	135 (58.2)	232 (28.4)	21.4 (1.7)
Pharmacy	59 (37.1)	100 (62.9)	159 (19.4)	21.7 (1.1)
Total	327 (40.0)	491 (60.0)	818 (100)	20.7 (1.7)

[*]*SD- Standard deviation*
[#]*Column percentage.*

Perceived Stress and factors associated with it:
The overall mean score of the perceived stress score (PSS) among the students was 27.3 with a standard deviation (SD) of 5.1 (95% CI 26.9-27.6). The mean PSS was higher among pharmacy students (28.3) followed by dental and medical students (Table 2).

Table 2: Mean Perceived Stress Score (PSS) among the different course students.

Course	Mean PSS	Standard Deviation	95% CI
Medical	26.9	5.2	26.4-27.4
Dental	27.4	4.9	26.8-28.0
Pharmacy	28.3	5.0	27.5-29.1
Total	27.3	5.1	26.9-27.6

About 93% (759) of the students were having moderate stress, 4% and 3% were having mild stress and high stress respectively (Fig.1). High stress was more among females and pharmacy students whereas moderate stress was more

among the males and dental students and there was no statistical significance between the stress and gender and course in which they were studying (Table 3).

Table 3: Association between Perceived Stress, gender and course of study among the study population.

Factors	Low Stress n (%)	Moderate Stress n (%)	High Stress n (%)	Total	p value
Gender					
Male	12 (3.7)	308 (94.2)	07 (2.1)	327	0.343
Female	21 (4.3)	451 (91.9)	19 (3.9)	491	
Course					
Medical	20 (4.7)	394 (92.3)	13 (3.0)	427	
Dental	06 (2.6)	219 (94.4)	07 (3.0)	232	0.732
Pharmacy	07 (4.4)	146 (91.8)	06 (3.8)	159	
Total	33 (4.0)	759 (92.8)	26 (3.2)	818	

The common reason mentioned by the students for the stress was study overload (33.9%), followed by home sickness (22%), family issues (14.2%) and sleep deprivation (11.2%) [Fig.2].

Solutions felt by students for reducing the stress:

Around39.6% students felt that recreation will help to reduce the stress, 27.4%, 21.4% and 11.6% felt that family support, timely counselling and adequate sleep will help in combating stress respectively.

Discussion:

College students experience stress at various levels and this is slightly more among the professional college students. The mean perceived stress score in our study was 27.3 and was similar to studies done in India by Abhay MB et al and Shriram V et al.[7,10] But, it was lower compared to studies done outside India by Shah M et al (Pak), Waqas A et al (Pak), Civitci A (Turkey).[8,15,16] In our study, there was no association found between stress and gender of the students which was similar to Shriram V et al and Waqas A et al, but there was an association found between stress and gender in the study of Shah M et al.[8,10,15]

In our study, compared to medical and dental students, stress was more among the pharmacy students which was different compared to study done by Abhay MB et al which showed more stress among dental students, similar stress among medical students and lowest stress among pharmacy students. However, in our study, there was no association between courses students were studying which was different compared to study done by Waghachavare VB et al which showed students studying in medical and dental had more stress compared to engineering students.[3]

The common reasons for stress felt among the study particapants were study overload, away from home, lack of sleep which was similar to other studies.[7,8,15]The solutions felt by students to combat stress were better family support, extracurricular activities and counselling similar to study done by Abhay MB et al and Satheesh BC et al.[1,7]

The limitations of the study were other socio-demographic factors such as type of residence, income, occupation of parents etc were not used for analysis because of more missing data for these variables. More proprtion of medical students were included in the study, the probability proportional size sampling would have been ideal sampling method to use. Also, engineering and nursing students were not included in the study because of examinations.

Conclusions and Recommendations:

The proportion of students having moderate perceived stress was very high and it was not associated with gender and course they were studying. The commonest reasons for stress were study overload and staying away from home. The main stress relieving factors mentioned were very good family support, extracurricular activities and timely counselling. Based on our study results, we recommend to conduct lessons on time management, to promote extracurricular activities, providing timely family support along with counselling to cope the stress. Otherwise students with moderate stress may end up with high stress levels which may give rise to other psychological disturbances such as depression, anxiety and suicidal tendency.

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Declarations:

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Original Research Article

Self-care Activities among Diabetic patients in rural areas of Trichy District, Tamil Nadu

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Abstract

Background: Self-care practice is the key aspect of diabetes Management. **Objectives:** To assess the level of self-care practice and to find out the factors associated with self-care practice among rural diabetes patients in Trichy district. To correlate the self-care practice level with random blood sugar of DM patients. **Methodology:** A cross-sectional study was conducted among 160 Diabetes patients in OPD of rural health centres,Sangenthi and Pullambadi during Dec 2016. A pretested semi-structured Questionnaire was adopted from Summary of Diabetes Self-care Activities (SDSCA) and Morisky adherence Scale. Data were entered in Microsoft Excel and Analysed by using SPSS Version 20. Chi-square test and Spearman correlation test were applied. **Results:** Out of 160 samples, 83 were males and 77 were females with mean age of 57.5 years. Almost half of them were in the age group of46 -60 years (52.5%), studied upto 10th standard (59.4%) and Socio-economic class of 4 (47%). Almost 60% were obese based on BMI (≥25). Around 40% of subjectswere having adequate self-care practice (Score≥10). Self –care practice includes eating habits, physical activity, Adherence to medications, Foot care, Fundus careand investigations like Blood sugar, Lipid profile, ECG. Upper and Upper Middle class subjects were having more adequate self-care practice compare to Lower and Lower middle class (X^2 =9.6, P =0.008). Only 36% subjects were control in blood sugar level (GRBS≤180mg/dl). Negative correlation was found between self-care activity score and Blood sugar level (r=-0.382, p=<0.001). ↑↑ Self-care activity - ↓↓GRBS level.Adequate Self-care activity was significantly associated with Glycaemic Control (p=0.011). **Conclusion:** Only 40% were adequate level of self-care and significant association was found on glycaemic control. Thus there is a need of health education among diabetes patients in regarding self-care and their good practice.

Key Words: Self-care Activity, Rural, Diabetes, Glycaemic Control

Introduction:

Diabetes is characterised by a state of chronic hyperglycaemia, which is due to many environmental and genetic factor acting combinely.[1] Diabetes is the one of the most common disease whose incidence is raised so rapidly over years to become a public health problem. A worldwide study in 2015 shows that totally 415 million people have diabetes among, that India harbours 69.1 million cases with the prevalence of 8.7 % among the adult population.[2] India ranks among the top three countries with diabetic population.[3] This tremendous raise is due to life style modification and urbanisation.

One in 20 adult deaths is due to diabetes and its related complications which have a significant impact on quality of life and economic health cost of the people. The progression of diabetes is mainly influenced by awareness and self-care practice among the patients.[4] Self-care practice in diabetes is defined as behaviours undertaken by people with or at risk of diabetes in order to successfully manage the disease on their own.[5-10]Proper self-care is the key to reduce the most of the complications of diabetes. Self-care refers to mannerisms done by the community like proper eating practice, regular exercise, a good adherence to medication, a regular medical follow up, regular checking of blood sugar level and other blood parameters, regular fundus examination, daily self-foot examination and regular ECG monitoring.

Patients with good knowledge and good self-care practice have high chance to attain a good glycaemic control and reduced CVS risk and vice versa.[11-14] Thus, it is essential to have an awareness and proper self-care practising among the diabetic population for better life. There have been very few studies addressing self –care practices in diabetes; very few in rural areas.SugunaA et al[15] have done in a Taluk hospital based setup. Since very less amount of study about self-care awareness and practice among the diabetic population in rural areas of India, Thus,this study to assess the level of self-care practice and find out the factors associated with self-care practiceamong rural diabetic patients in Trichy district. This study also correlates the self-care practice level with random blood sugar of DM patients.

Methodology:
A facility based Cross-Sectional Study was conducted at the month of December 2016 and January 2017. The study was conducted at the medical outpatient department of rural health and training centre at Sangenthi and government primary health centre Pullambadi. These two rural health training centres situated 20 kms away from our teaching hospital. Sample size was calculated to be 160 based on prevalence of self-care practice level of 40.6%[15], relative precision 20%, non-response rate of 10% with the confidence interval of 95%. Type 2 diabetic patients who are from 18 years and above and willing to participate where included in the study and those diabetic patients that were too ill to participate, pregnant women and newly diagnosed (less than six months) were excluded.

Data collection: Data were collected using a pre-test semi structured questionnaire, which contains socio demographic details, medical history, details about diabetes mellitus, various self-care practices and anthropometry measurements. This questionnaire was adopted from Summary of Diabetic Self-care Activities (SDSCA)[16]on various domains of self-care. Self –care practice includes domains of eating habits, physical activity, Adherence to medications, Foot care, Fundus care and investigations like Blood sugar, Lipid profile,ECG and Blood pressure monitoring. The Domain of Eating habits include avoids high sugar containing food, avoid high fat containing food and eat more vegetables and fruits. Adherence to medication was assessed using Morisky Medication Adherence Scale-4 (MMAS-4).[17]every domain of self-care was assessed and given a score of 0 or 1, except adherence to medication which is given a score of 0 – 4,which gives a total score of 14. A score of <10 is considered as not adequate self-care. A score of ≥10 is considered as adequate self-care.A spot random blood sugar test(GRBS) was done to all subjects at the time of interview after taking informed consent. This GRBS was done by using calibrated one touch glucometer. Patients with GRBS of ≤180 were considered as adequate control, and ≥181 were considered as not adequate.[15]

Statistical Analysis: Data were entered in excel sheet and analysed using SPSS version 20. Descriptive statistics of the Socio-demographic variables and details of diabetes were reported using frequencies and percentage. Mean with Standard deviation and Median with Inter-quartile range was given for self-care activity score and Glucose Random Blood Sugar Score. Spearman's correlation test and Chi-square test were used to find out association between self-care activities score and glycaemic control. Pearson's chi square test were used to find out association of self-care activities with age group, gender education, occupation, family history of diabetes, socioeconomic status, financial dependency and duration of diabetes. Spearman's correlation test was used to find out association between self-care activities score and glycaemic control.

Results:
Socio-demographic Details: Out of 160 diabetes patients studied, 83 (52%) were males, 77 (48%) were females with mean age of 57.5 years with range 29-85 years. Around 28% of the rural diabetic population were illiterate, 60% studied upto class 1 - 10th standard and only 13% studied higher secondary and more. One-fourth of the study population were unemployed, subjects involved in unskilled and semi-skilled occupation were 22.5% and 12.5% respectively. Nearly 35% of the study subjects were involved in own business/farming with own land/clerical job and only 5% were involved in professional activities. Most of the study population were Hindus (82.5%), Christian and Muslims were 13% and 4.5% respectively. More than half of the study population were in Upper Lower and Lower class according to Modified Prasad's Classification 2016, more than one-fourth were in Lower middle class and the rest were in Upper middle and Upper class .

Profile of the Study Subjects: More than one-third (37.5%) of the study population have family history of Diabetes. Around one-fifth of the population were current smokers (18.8%) and current alcoholics (17.5%). Around 60% of the diabetic subjects were obese (BMI≥25) and 14% of them were overweight (BMI =23-25) according Asian BMI classification. Mean age at diagnosis of diabetes of study population was 51.8 years with standard deviation of 9.4. Around 24% (n=38) of study subjects were having diabetes six months to two years in duration, 42% were having diabetes two years to five years in duration and the rest were more than five years in duration of diabetes. Out of160 diabetic subjects, 156 (97.5%) were being treated with Oral Hypoglycaemic agents (OHA's). (Table 1)

Table-1 Risk factors of Diabetes Mellitus among study population (n=160)

Sl.No.	Domains	Category	Frequency	Percentage
1	Family history of diabetes mellitus	Yes	60	37.5
		No	100	62.5
2	Habits	Smoking		
		Yes	30	18.8
		No	130	81.3
		Stopped	8	26.6
		Alcoholic		
		Yes	28	17.5
		No	132	82.5
		Stopped	9	32.1
3	Body mass index	Normal(18.5-22.9)	43	26.9
		Overweight(23-24.9)	22	13.8
		Obese(>25)	95	59.4
4	Waist hip ratio	Male-Normal(<=0.9)	32	38.6
		Central obesity(>0.9)	51	61.4
		Females-Normal(<=0.85)	12	15.6
		Central obesity(>0.85)	65	84.4

Self-care activity of diabetes: In the domain of Diet, around 80% of the study population were following avoid sweets and sugar in hot drinks like coffee, tea and three-fourth (75%) were following avoid high fat like mutton and oil foods. More than 60% were regularly ate vegetables and fruits in their diet. Around 65% of the study population were involved in moderate level of activity in daily occupation or doing exercise regularly.

Around 94% of the diabetes patients were regularly checking blood sugar by health worker. Nearly half of the study subjects (48%) were examined their feet regularly. Only 18% were done fundus examination and only 24% were testing investigations other than Blood Sugar. Ninety five percentages of diabetic patients were checking Blood Pressure every visit and only 15 % were checked ECG regularly (table 2).

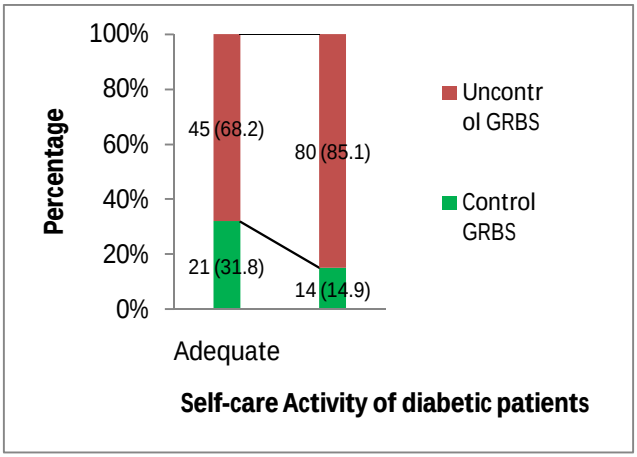
Table-3: Self-care activity of diabetic patients among study population (n=160)

Sl.No.	Domains	Variables	Frequency	Percentage
1	Diet-Avoid sugar	Followed	128	80
		Not followed	32	20
2	Diet-Avoid fat	Followed	121	75.6
		Not followed	39	24.4
3	Ate fruits and vegetables regularly	Yes	102	63.8
		No	58	36.3
4	Doing exercise regularly	Yes	103	64.4
		No	57	35.6
5	Adherence to medications(Morisky scale)	1	5	3.1
		2	30	18.8
		3	63	39.4
		4	62	38.7
6	Check blood sugar by health worker	Regular	150	93.8
		Irregular	10	6.3
7	Self foot care examination	Followed	77	48.1
		Not followed	83	51.9
8	Fundus examination	Done	29	18.1
		Not done	131	81.9
9	Investigations other than blood sugar	Done regularly	38	23.8
		Not done regularly	122	76.3
10	Check blood pressure	Done regularly	152	95
		Not done regularly	8	5
11	ECG	Done regularly	24	15
		Not done regularly	136	85

According to Morisky scale, around 80% of the study subjects were got higher level of medication adherence (score of 3 or 4) and the rest 20% were got lower level of medication adherence (score of 1 or 2). The overall median score of self-care activity was 9 with Inter-quartile range was 8-10 and range was 4-14. Adequate self-care activity (score ≥10) was found in 41.3% and the rest 58.7% study subjects were inadequate self-care activity of Diabetes management.

Self-care activity and Glycaemic Control: Median glucose random blood sugar (GRBS) level was 196 mg/dl with Inter quartile range was 164- 236 mg/dl. Nearly 22% of the diabetic population were having good Glycaemic control (GRBS ≤180) and the rest 78% were not. A significant association was found between Adequate self-care activity and good glycaemic control, χ^2 value= 6.5, p=0.011 (Fig 1). A significant negative correlation was found between score of self-care activity and GRBS (r=-0.38, p=<0.001). Increase in self-care activity would decrease the GRBS and Glycaemic control could be achieved.

Fig 1: Association between self-care activity and glycaemic control of diabetic patients



χ^2-Chi Square test: 6499 *-p value significant(p<0.01)

Table 3: Association between self-care activity and other factors

Sl.No.	Domains	Variables	Self-care activity		P value	χ^2 value (df)
			Adequate	Inadequate		
1	Age group	≤45 years	8(42.1%)	11(57.9%)	0.671	0.799 (2)
		46-60 years	32(38.1%)	52(61.9%)		
		>60 years	26(45.6%)	31(54.4%)		
2	Gender	Male	38(45.8%)	45(54.2%)	0.227	1.462 (1)
		Female	28(36.4%)	49(63.6%)		
3	Education	No formal education	20(45.5%)	24(54.5%)	0.34	2.156 (2)
		Class upto 10th standard	35(36.8%)	60(63.2%)		
		Higher secondary and graduates	11(52.4%)	10(47.6%)		
4	Occupation	Unemployed	15(37.5%)	25(62.5%)	0.078	8.401 (4)
		Unskilled	13(36.1%)	23(63.9%)		
		Skilled & semiskilled	4(20%)	16(80%)		
		Shop owner,farmer,clerk	30(54.5%)	25(45.5%)		
		Professional & semi-professional	4(44.4%)	5(55.6%)		
5	Socio-economic status	Lower and upper lower class	25(30.1%)	58(69.9%)	**0.008***	9.596 (2)
		Middle class	21(48.8%)	22(51.2%)		
		Upper and upper middle class	20(58.8%)	14(41.2%)		
6	Financial dependency	Yes	13(35.1%)	24(64.9%)	0.389	0.743 (1)
		No	53(43.1%)	70(56.9%)		
7	Family history	Yes	25(41.7%)	35(58.3%)	0.934	0.007 (1)
		No	41(41%)	59(59%)		
8	Duration of diabetes mellitus	<2 years	12(31.6%)	26(68.4%)	0.382	1.925 (2)
		2-5 years	24(44.4%)	30(55.6%)		
		>5 years	30(44.1%)	38(55.9%)		

****-p value significant, χ^2- Chi Square, df-degree of freedom***

Association between Self-care activity and demographic variables: There were no significant association found between Age group, Gender, Education and occupation status among the study population with self-care activity of Diabetes. Similarly, Financial Dependency, Family History of Diabetes and Duration of diabetes among study subjects were also no significant association with self-care activity of diabetes. But higher socio-economic status was significantly associated with self-care of

diabetes compare to lower socio-economic class. [χ^2=9.6, p=0.008]. (Table 3)

Discussion:

The present study is a rural health centre based cross-sectional study conducted among type 2 diabetic population in those rural areas and mainly focused about the level of self-care practice and their glycaemic control. Overall, adequate Self-care practice was found 41% of the type 2 diabetic patients in this study. This was quite comparable to study done in Bangalore by Sugunaet al[15], where they found 40.6% of diabetic were having moderate self-care activity and 9% were good self-care practice. Moreover, In our study around 70% of the diabetic patients followed advised on diet, this was similar to the study done in Andra Pradesh,Padma K et al[18] found 76% were followed healthful eating plan. Similarly, around 65% of the study population were involved in regular physical activity, Sugunaet al[15] found only in 45% of diabetic and Padma K et al found in 39%.[18]This difference was due to the difference in Socio-demographic patterns and social issues. Present study was done in remote rural areas of Trichy district. But Suguna A et al was done in semi-urban areas of Bangalore and Padma K et al found in a teaching hospital of AndraPradesh.

Similarly, Adherence to medications was found around 77% in the present study. This was quite comparable to the study done by SugunaA et al[15] (73%) and Padma K et al[18] (68%). In the domain of foot care, Suguna A et al found only 4% and Padma K et al found only 13%, whereas the present study found 48% of the diabetic foot care. This may due to the difference in social cultural difference of Tamil Nadu with other areas. In the rural areas of Tamil Nadu, the regular practice of washing the feet every timewhen they go inside the house from outing. Moreover, the regular advices from the doctors and health workers regarding self-care activity was changed in the recent years, awareness of foot care examination was quietly improved in the recent years. This could be the reason for increased foot care in this study.

In the domain of regular blood sugar testing, in the present study found 95% of the study population regularly checking the blood sugar by Health Worker. This is quite comparable to the study done in Andra Pradesh by Padma K et al,[18] 90.6% of study subjects testing the blood sugar regularly. Other domains like Fundus examination, Investigation other than blood sugar, Checking Blood Pressure and ECG Monitoring were done only in the present study. No other studies have found these domains. These domains were also important in the management of diabetes. Checking Blood Pressure, We all know that Diabetes and Hypertension are similar in most of the conditions. Thus checking blood pressure should be mandatory by each and every time of follow up. Similarly, Fundus examination would be important test for finding retinal changes in eyes. Investigations other than Blood Sugar like Renal Function test, Liver Function Test and Lipid Profile should be done among diabetes to rule out co-morbidities of Kidney, Liver as well as better management of diabetes status among patients.

In the present study found that there was a significant association found between self-care activity score and Glycaemic control. This was similar to various studies done on diabetic patients. Moreover, in the present study only 22% of the diabetic patients were having glycaemic control. This finding was similar to the study done by Suguna A et el,[15]where they found 25% of the diabetic patients were having good glycaemic control.

In the present study found that there were no significant association between self-care activity with age, gender, education status, Occupation status, financial dependency, family history of diabetes and duration of diabetes. Study done by SugunaA et al[15]; Chiau et al[19]; Tang et al[20] and Xu and Pan[21] have found that Higher educational status were associated with better self-care. They also found that higher income status was associated with better self-care; this was similar to the present study. A significant association has been found between Upper class with self-care of diabetes.

Strengths: Most of the studies related to self-care of diabetes considered the domains of self-care included were followed advise on diet, Physical activity, Foot care, Adherence to medications, Regular Blood Sugar testing and follow up. In the present study include Fundus Examination; Investigation Other than Blood Sugar, Blood Pressure Check-up and ECG testing were also included as domains along with above domains mentioned. These domains would be giving the correct picture to manage diabetes and prevent the secondary complications like diabetic Nephropathy, Diabetic Neuropathy, Diabetic Retinopathy and CVDs. The present study was done in rural diabetes patients in the remote rural area of Trichy district also the strength of this study.

Limitations: Limitations of this study include first, the use of GRBS values to decide the glycaemic control. HBA1c could be the correct parameter for glycaemic control, but this test was not available in rural areas and affordability of test also questionable. Second, convenient sampling method was used. Third, Social desirability bias may be existed in this study while this is questionnaire based interview study.

Conclusion: Overall, adequate level of self-care of diabetes was 40% in these rural areas and self-care practices of diabetes were significantly associated with good glycaemic control. Among the Self-care practice, good practice of diet, regular physical activity, and adherence to medications was found to be around 70% of rural diabetics. Thus, all the diabetic patients should have been aware about self-care practice and further reduce the complications through proper practice.

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Original Research Article

A CROSS SECTIONAL STUDY ON SYSTEMIC HYPERTENSION AND ITS RELATIONSHIP WITH WAIST TO STATURE RATIO(WSR)IN AN URBAN POPULATION IN CHENNAI

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Abstract

BACKGROUND: Hypertension is a Silent Killer disease. Worldwide , the most frequent disease causing Cardiovascular morbidity and mortality is Systemic Hypertension . It is expected that approximately 1 in 3 adults aged above 20 years will have the disease by the year 2025 . **OBJECTIVES:**To study the Prevalence of Systemic Hypertension , Mean Waist-to-Stature ratio (WSR) and its screening potentialin an urban Chennai population. **METHODS:**A total of 440 study participants aged 20 to 60 years selected by two stage Simple Random sampling from T.P.Chathram, an urban locality in Chennai, the field practice area attached to Govt. Kilpauk Medical College were administered a structured Questionnaire in 2015 for Socio demographic data and basic anthropometric measurements. **RESULTS:** The Overall prevalence of hypertension was 27.5% with 95% C. I. of 23.33% to 31.67% . The Mean Waist to stature Ratio was 0.506 (±0.03) with 95% C.I. of 0.503 to 0.509.The Receiver operating Characteristic (ROC) Curve analysis done revealed area under the curve (AUC) of WSR > Waist Hip Ratio > Body Mass Index. The Maximum Sensitivity of 96.7% and Specificity of 26.6% of WSR as a predictor of Hypertension was established at 0.502 . Waist to Stature Ratio can be used for initial screening for hypertension at the Community level.

KEYWORDS: Hypertension, Waist to Stature Ratio, Waist Hip Ratio, Area under the Curve (AUC) , Receiver operating Characteristic (ROC)Curve.

BACKGROUND

Hypertension is a Silent Killer disease. Worldwide , the most frequent disease causing Cardiovascular morbidity and mortality is Systemic Hypertension [1].It is expected that approximately 1 in 3 adults aged above 20 years will have the disease by the year 2025[2]. Prevalence of Systemic hypertension in India, for the last three decades has increased by 30 times among residents in urban area[3].In developing countries like India, several epidemiological studies to assess the prevalence of hypertension are needed for determining the baseline against which future trends in risk factors can be assessed and henceforth preventive measures can be planned . Amidst a background of increasing prevalence of Hypertension, compounded by increasing mortality and morbidity from cardiovascular diseases, we were interested to investigate the prevalence of Systemic Hypertension and various screening anthropometric measurements among adults of 20 to 60 years of age in our field practice area T.P.Chathram, Ward no.59, zone VIII attached to Department of Community Medicine, Government Kilpauk Medical College, Chennai .In many cross sectional studies , the relationship of the different measurements of fat distribution with the prevalence of disease has been extensively evaluated[4].Abdominal obesity has been recognized as a better predictor for cardiovascular disease. Waist to Stature ratio (WSR) as an anthropometric indicator of risk of Hypertension and Cardiovascular diseases has emerged as a new option that is more feasible, practical and attractive when compared to other indices[5] .While Body mass index (BMI) has been always considered as the reliable indicator of obesity, BMI does not take into account the muscle mass, which could incorrectly indicate obesity.

Our objective here is to estimate the prevalence of Systemic Hypertension and Mean Waist to Stature ratio

in an urban Chennai population and to estimate the screening potential of Waist to Stature Ratio (WSR) as an indicator of Systemic Hypertension and to compare it with other anthropometric indices.

METHODOLOGY

An analytical cross-sectional study was carried out in the urban population of Chennai during February 2015 to May 2015 among adults aged twenty years and above up to 60 years in the study area so that it can help in initiating a specific community based risk factor intervention **for** the Urban population of Chennai. 1200 families in 24 streets of T.P.Chathram (an urban locality in zone VIII Chennai), constituted the study population. Adults in the age group of 20 years and above upto 60 years of age, living in T.P.Chathram constituted the Study population, with an average family size of 4 and an average size of 2/ family in the age group of 20 to 60 years.Those unable to stand erect, Pregnant women were also excluded .

For an expected prevalence (p) of 20% with Z value of 1.96 at 95% confidence interval, and with limit of accuracy (L) at 20 % of p (Relative precision) , the sample size required was 440 study participants aged 20 to 60 years **(z_α pq/L^2)**with an expected non response rate of 20%.To achieve a sample size of 440, with an average size of 2 members between 20 and 60 years of age in a family, an estimated 220 families were required to be sampled. A two stage random sampling method as used. In first stage, 10 streets were selected from the list of 24 streets of the field practice area. In second stage, 22 families were selected from each street using Family registers maintained by Urban Health Nurses at the urban health centre of T.P. Chathram as the sampling frame. Simple random sampling was employed to select Families by Random number Tables from each street . A house-to-house visit was made in the morning and in the evening time to enroll all members of the family. The objectives of the study and the benefits to the people being examined were explained to the adults and their oral informed consent was obtained.

Data collection was done only by the Principal Investigator. The selected family was approached . Informed consent was taken from them for their participation after clarifying all their doubts. This study was approved by theInstitutional Ethical Committee of Kilpauk Medical College and data collection was done duringthe months of February and March 2015.

Using a structured Questionnaire, Sociodemographic data regarding Non modifiable risk factors such as Age, Sex and Modifiable risk factors such as Alcoholism, Smoking, Physical activity was collected and entered by the investigator besides Name, Residential address, Hypertension status, Occupation and Education.Modified KUPPUSWAMY Scale (All india consumer price index – November 2014) was used to assess the Socio economic status of the family.

In this study, a person, either male or female aged 20years and above is considered hypertensive if " his/ her systolic blood pressure (SBP) is 140 mmHg or greater, diastolic blood pressure (DBP) is 90 mmHg or greater or taking any antihypertensive medication. **(JNCVII criteria)**[6].The definition recommended by Indian Heart Journal in 2006 was followed to categorise smoking and Alcoholism as Current, Past and Non smoker/alcoholic. The definition recommended by Exercise Physiology "Energy, Nutrition and Human Performance" was followed to grade physical activity as Bedridden, Sedentary, Moderate and Rigorous activity.

All Anthropometric indices were measured using standardized protocols. According to the WHO Stepwise Approach to Surveillance (STEPS) protocol, " the Waist Circumference should be measured at the midpoint between the top of the iliac crest (hip bone) and the lower margin of the last palpable rib [21] (WHO 2008)", which is the method most commonly used. Mean of two readings was taken as WC. Hip circumference was measured at the level of maximum extension of the buttocks. Auscultatory method was used to record blood pressure with a standard Diamond mercury sphygmomanometer. The accuracy of the instrument was periodically checked and compared with another mercury sphygmomanometer. All the subjects detected to be hypertensives were referred to the nearest health center for further investigations, management and follow-up.

The data was entered in Microsoft excel after double checking. Statistical analysis was done with SPSS 20.0 Trial version. The Prevalence of hypertension is expressed as Proportion with 95% confidence intervals. The Mean Systolic and Diastolic Blood pressure, Mean Waist circumference, Waist Hip ratio and Waist Stature ratio are expressed with 95% confidence intervals. The Risk of Hypertension for each risk factor was estimated by Univariate analysis with logistic regression model (SPSS 20.0 trial version software) . To adjust for all the risk estimates , we then used theMultivariate logistic regression model. The covariates considered were age, sex, education, occupation, Socio Economic status status, smoking, alcohol, level of physical activity, Waist Hip Ratio, Waist Stature Ratio and Body Mass Index. Then ROC curve (Receiver Operator Characteristic Curve) analysis was done to determine the capacity of Waist Stature Ratio as a predictor of Systemic Hypertension compared to Waist Hip ratio and BMI.

RESULTS AND DISCUSSION

In this study, as shown in Table 1, there were 222 females and 218 males and were equally distributed among the 4 age groups. About 80% of the population had completed high school as shown in Educational status of the study population in Table 1. About 55.23% of

the study population was unemployed ,largely contributed by the House wives.The overall prevalence of Systemic Hypertension in the study population was 27.5% (with 95% C.I. of 23.33% – 31.67%) as shown in Table 1.

TABLE 1 : DISTRIBUTION OF THE BASIC SOCIODEMOGRAPHIC CHARACTERISTICS OF STUDY POPULATION

STUDY VARIABLE	TOTAL SUBJECTS	TOTAL NUMBER OF HYPERTENSIVES
I. AGE GROUP IN YEARS, p< 0.001 *		
20-29	110 (25%)	13 (11.82%)
30-39	111 (25.2%)	21 (18.92%)
40-49	109 (24.8%)	41(37.61%)
50-59	110 (25%)	46 (41.82%)
II. GENDER, p = 0.9		
Male	218 (49.55%)	60 (27.5%)
Female	222 (50.45%)	61 (27.48%)
III. EDUCATION, p = 0.15		
Professional	6 (1.4%)	3 (50%)
Graduate or post graduate	96 (21.8%)	18 (18.75%)
Intermediate or post high school diploma	137 (31.1%)	39 (28.5%)
High school	110 (25%)	35 (31.8%)
Primary school	49 (11.1%)	19 (38.8%)
Middle school	40 (9.1%)	6 (15%)
Illiterate	2 (0.5%)	1 (50%)
IV. OCCUPATION, p = 0.09		
Professional	45 (10.23%)	14 (31.1%)
Semi professional	6 (1.36%)	2 (33.3%)
Clerical,shop owner or farmer	61 (13.86%)	19 (31.1%)
Skilled	65 (14.77%)	21 (32.3%)
Semi skilled	18 (4.09%)	7 (38.9%)
Unskilled	2 (0.45%)	0
Unemployed	243 (55.23%)	58 (23.9%)
TOTAL	440 (100%)	121 (27.5%)

The prevalence of hypertension was almost similar among males compared with females (27.5 versus 27.48 %).With increasing age groups , the prevalence of Systemic Hypertension also increased, and the maximum prevalence (42.59%) was observed in the older age group of 50 to 59 years . Although overall prevalence of Hypertension in males and females were similar, there was a difference in age wise prevalence of Hypertension between males and females in the different age groups which was not statistically significant .The increase in prevalence of Hypertension with the increasing age groups was statistically significant. (Chi square test for Trend , $p < 0.001$.Mohan V et al [7] reported a prevalence of 20% in his study, lower than the estimated prevalence of systemic hypertension in our study whereas Prabhakaran D et al [8] reported a prevalence of 30% in his study.

Table 2 shows the baseline anthropometric characteristics of our study population.The Mean Waist to Stature Ratio in our study population was 0.506 with standard deviation of 0.03 and 95% confidence interval of 0.503 to 0.509. The Mean Waist to Stature Ratio in males was 0.505 (± 0.03) with 95% C.I. of 0.501 to 0.509 and in females was 0.508 (± 0.03) with 95% C.I. of 0.504 to 0.512

TABLE 2: DISTRIBUTION OF ANTHROPOMETRIC MEASUREMENTS

ANTHROPOMETRIC MEASUREMENTS	MEAN	95% C.I. FOR MEAN		SD	MIN.	MAX.
		LOWER BOUND	UPPER BOUND			
WAISTCIRCUMFERENCE(CM)	83.82	83.36	84.27	4.88	74	100
HIP CIRCUMFERENCE (CM)	90.01	89.49	90.53	5.58	78	112
WEIGHT (KG)	63.5	62.5	64.5	10.72	45	100
HEIGHT (CM)	165.69	165.04	166.35	7.02	148	186
BMI	23.18	22.8	23.55	3.96	14.45	40.57
WAIST HIP RATIO (WHR)	0.932	0.928	0.936	0.039	0.769	1.05
I. WHR MALE	0.937	0.932	0.942	0.037	0.833	1.05
II. WHR FEMALE	0.927	0.922	0.933	0.042	0.769	1.023
WAIST STATURE RATIO (WSR)	0.506	0.503	0.509	0.032	0.43	0.629
I. WSR MALE	0.505	0.501	0.509	0.033	0.43	0.629
II. WSR FEMALE	0.508	0.504	0.512	0.03	0.438	0.61

The Mean Systolic Blood Pressure in our population was 126.41 mm of Hg and Mean Diastolic Blood pressure in our population was 79.68 mm of Hg. There was a difference of 1.27 mm of Hg in Systolic Blood pressure between Males and Females in our study population which was not statistically Significant ($p = 0.23$).

The Prevalence of Systemic Hypertension in Overweight and Obese individuals as determined by various anthropometric criteria is shown in Table 3.

We took a

1) BMI of ≥ 25, (WHO STANDARDS[9])
2) BMI of ≥ 23, (WHO Asian Criteria [9] for BMI classification)
3) WSR of ≥ 0.5 ,
4) WHR of ≥ 0.85 in Female s, ≥ 0.9 in Males as Overweight and Obese and calculated the prevalence of Hypertension .

Of all the Criteria, WHR determined the Prevalence of Overweight and/or Obesity as 86.81%, the highest as compared to WSR (53.18%) and BMI ≥ 23(46.14%).

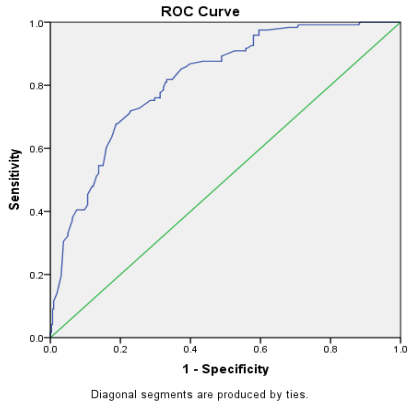
About 51.28% of the study participants classified as Obese and / or Overweight by WSR Criteria had Systemic Hypertension compared to 31.41% by WHR Criteria. Waist Hip Ratio Criteria , on the other side classified 86.81 % of the study population as overweight and obese, but only 31.4% of those identified had Systemic Hypertension.

TABLE 3: PREVALENCE OF OVERWEIGHT AND OBESITY BY VARIOUS ANTHROPOMETRIC INDICES WITH HYPERTENSION

ANTHROPOMETRIC CRITERIA (n = 440)	OVERWEIGHT AND OBESE INDIVIDUALS		HYPERTENSIVES IN OVERWEIGHT AND OBESE INDIVIDUALS	
	NUMBE	%	NUMBER	%
BMI ≥25	134	30.45	44	32.84
BMI ≥23 (ASIANS)	203	46.14	60	29.56
WSR ≥0.5	234	53.18	120	51.28
WHR ≥ 0.85 Female ≥ 0.9 Male	382	86.81	120	31.41

ROC CURVE ANALYSIS - PREDICTOR OF HYPERTENSION:

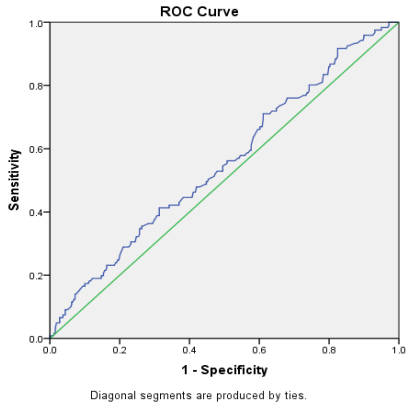
FIGURE 1: WAIST HIP RATIO – ROC CURVE



Area under the Curve: 0.816 (with 95% C.I. 0.774 – 0.858) , p < 0.001 Maximum (97.5% sensitivity and 41% specificity) at Waist Hip Ratio of 0.913511.

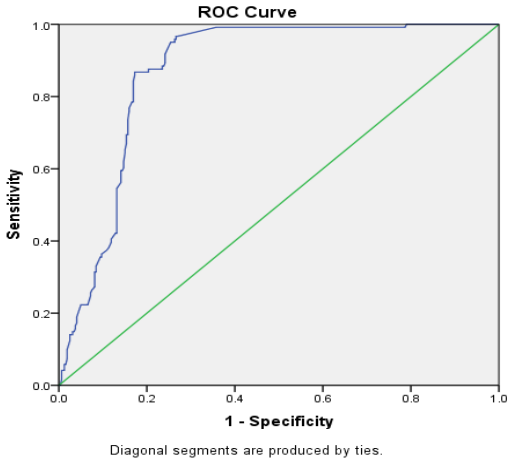
In our ROC curve analysis we found that area under the curve for different anthropometric indicators as a predictor of Hypertension were in the order of WSR > WHR > BMI. AUC for WSR was 0.871 with 95% C.I. of 0.838 – 0.904 , p = 0.000. The Maximum sensitivity and specificity was attained at WSR of 0.502859. A Maximum of 96.7 % sensitivity and 26.6 % specificity was attained at this point as shown in Figure 5.

FIGURE 2: BODY MASS INDEX – ROC CURVE



Area under the Curve: 0.541(with 95% C.I. 0.480 – 0.602), p = 0.187 Maximum (71 % sensitivity and 39 % specificity) at BMI of 21.23841

FIGURE 3: WAIST STATURE RATIO – ROC CURVE



Area under the Curve: 0.871(with 95% C.I. 0.838 – 0.904), p < 0.001
Maximum (96.7 % sensitivity and 26.6 % specificity) at WSR of 0.502859

In our study we found that WSR had the Maximum sensitivity of 96.7% although Specificity was low. WSR identifies the Population at cardiometabolic risk with single cut off point of 0.5 unlike Waist Hip Ratio which has genderwise different cut off points, but at the cost of False positives upto 73.4%.

Hence WSR may prove to be a very good initial screening tool but of very little value in definitive risk of Hypertension when compared with Waist Hip Ratio in terms of Specificity and Sensitivity. Lee meta analysis [10] also found that the AUC values were ranked in this order:WSR (highest)> WHR > BMI (lowest). WSR is considered to be superior in discriminating cardiometabolic risk because WSR takes into account height, which is important particularly in individuals who are short[11].

Risk factors contributing to Hypertension were analysed independently by finding the association and strength of

association.The risk factors which had statistically significant association in univariate analysis in our study were subjected to Multivariate logistic regression modeling to adjust all risk estimates for covariates. Possible covariates considered were either Modifiable or Non Modifiable. The Risk factors such as Age, Sex, Occupation, Education, Socio-economic status, Smoking, Alcohol intake , Level of physical activity, Body Mass Index, Waist Hip ratio, Waist Stature Ratio were subjected to Univariate analysis initially as shown in Table 4.

The Risk factors that had statistically significant association by Univariate analysis were Age, Smoking, Level of Physical activity ,Waist Stature Ratio and Waist Hip Ratio and were subjected to Multivariate analysis.

TABLE 4: UNWEIGHTED UNIVARIATE ANALYSIS OF RISK FACTORS FOR HYPERTENSION

VARIABLE	Examined (n=440)	Hypertensives		OR	95%CI		p value
		No.	%				
I. AGE GROUP IN YEARS							
20-29	110	13	11.8	1	Reference		
30-39	111	21	18.9	1.74	0.823	3.681	0.147
40-49	109	41	37.6	4.5	2.242	9.029	1
50-59	110	46	41.8	5.36	2.685	10.71	1
II. GENDER							
Female	222	61	27.5	1	Reference		
Male	218	60	27.5	1	0.66	1.523	0.991
III. SOCIO ECONOMIC CLASS							
Class I	29	7	24.1	0.64	0.174	2.329	0.495
Class II	275	78	28.4	0.79	0.287	2.184	0.652
Class III	86	18	20.9	0.53	0.175	1.605	0.261
Class IV	32	12	37.5	1.2	0.357	4.038	0.768
Class V	18	6	33.3	1	Reference		
IV. ALCOHOLISM							
Non – Alcoholic	397	107	27	1	Reference		
Alcoholic **	43	14	32.6	1.31	0.666	2.57	0.435
V.SMOKING							
Non – smoker	400	96	24	1	Reference		
Past Smoker	5	1	20	0.79	0.087	7.168	0.835
Current smoker	35	24	68.6	6.91	3.265	14.62	<0.001
VI. BODY MASS INDEX							
< 18.5	31	5	16.1	0.52	0.189	1.407	0.197
18.5 – 22.99	206	56	27.2	1	Reference		
23 – 24.99	69	16	23.2	0.81	0.427	1.53	0.514
25 – 29.99	108	33	30.6	1.18	0.707	1.966	0.529
≥ 30	26	11	42.3	1.96	0.851	4.534	0.114
VII .LEVEL OF PHYSICAL ACTIVITY							
Sedentary	234	105	44.9	10.1	5.417	18.76	0
Moderate	174	13	7.5	1	Reference		
Heavy/rigorous	32	3	9.4	1.28	0.344	4.778	0.712
VIII . WAIST HIP RATIO							
< 0.85 (Females) < 0.9 (Males)	58	1	1.72	1	Reference		
≥ 0.85(Females) ≥ 0.9 (Males)	382	120	31.4	26.1	3.57	190.8	<0.001
IX . WAIST STATURE RATIO							
WSR < 0.5	206	1	0.49	1	Reference		
WSR ≥ 0.5	234	120	51.3	216	29.7	1565	<0.001

** There were no past alcoholics in our study

TABLE 5: MULTIVARIATE ANALYSIS OF RISK FACTORS FOR SYSTEMIC HYPERTENSION

Contributing risk factors	Odd's Ratio	95% CI		p value
		Lower	Upper	
1.Age group (in years)				
20-29	1			
30-39	1.838	0.6	5.33	0.26
40-49	6.032	2.2	16.9	0
50-59	13.589	4.2	44.3	0
2.Level of physical activity				
Sedentary	21.919	9.1	52.8	0
Moderate	1			
Heavy/rigorous	1.875	0.4	9.01	0.43
3.BMI (kg/m^2)				
< 18.5	0.461	0.1	3.33	0.44
18.5 – 22.99	1			
23 – 24.99	0.444	0.1	1.37	0.16
25 – 29.99	0.317	0.1	0.76	0.01
≥ 30	1.02	0.2	4.44	0.98
4.Smoking				
Non Smoker	1			
Current Smoker	8.617	1.8	40.9	0.01
Past Smoker	0.677	0	22.5	0.83
5.Waist Stature Ratio				
< 0.5	1			
> 0.5	459.156	56	3764	0
6.Waist Hip Ratio				
< 0.85 Female , < 0.9 Male	1			
≥ 0.85 Female , ≥ 0.9 Male	10.691	1	115	0.05

R^2 = 0.516 , Pseudo R^2 = 0.746

The individual risk factors that were identified as playing a major role in developing hypertension by univariate analysis from our study were then subjected to a multivariate analysis and the findings are as follows:

Age related increase of hypertension is a common but not a universal phenomenon. The study revealed that there is a strong association between the age and the risk of systemic hypertension. These findings compare well with that of other studies. In CURES 52 study done among 26,001 individuals, Mohan V et al [12] showed that there is a strong association of age with hypertension. In our study we explored the association of hypertension with **smoking** and found that the risk of hypertension was 8.6 times higher among current smokers when compared to non-smokers.[OR:8.6 (95%CI:1.8-40.9) (p = 0.007)] as shown in Table 5, when adjusted for other covariates . Gupta R et al. also in their study among 2122 subjects

aged 20 years or more found that smoking was independently associated with higher prevalence of hypertension in both sexes. [13].Regular **aerobic physical activity** is adequate to achieve at least a moderate level of physical fitness.

In our study increased levels of physical activity had protective effect on hypertension in Moderate Workers in Comparison to Sedentary workers. When Compared to Moderate Workers, Sedentary Workers had 21.9 times higher odds of hypertension [OR: 21.9 (95%CI:9.1- 52.8) (p = 0.000)].Paffenbarger RS. et al showed that, When compared to their fit and more active peers , the Sedentary and unfit normotensive individuals, in the next few years, had 20% to50% increased risk of developing hypertension [14].Various studies across the Globe and India indicated that Sex [15,16](Male) , **alcohol use** [17]and **socio-economic status** [18]were risk factors of hypertension. However, in our study Sex, Alcohol use and Socio-economic status were not found to be associated with hypertension and the difference was not statistically significant as shown in Table 4.

In our study, the association of BMI with Systemic Hypertension was weak. Obese people with BMI ≥ 30 had 1.02 times greater odds of Hypertension compared to those with BMI in the Range of 23 to 24.99 as shown in Table 5 [OR: 1.02(95%CI: 0.235 – 4.435), p = 0.979] which was not statistically significant.In CUPS study , with increase in BMI , there was increase in prevalence of Hypertension in various age groups .[19]The **Framingham Heart study** [20]showed that for gain in weight of every 900 gram , there was a rise of one mm of Hg in systolic blood pressure.

The reason for insignificant association in our study could be because a person with a small skeletal frame could have a BMI that underestimates their true body fat therefore categorizing them as underweight and people with excess weight around the waist face more health risks than those who carry more weight around the hips.[21]

In Multivariate analysis, the odds of Hypertension among those with WHR above the defined criteria was about 10.7 times higher than those with WHR below the defined levels (OR = 10.69 [95% C.I. of 0.996 to 114.821]) at a p value of 0.05 as shown in Table 5. As the 95% confidence interval includes 1, the significance of Waist Hip Ratio as a Risk Factor for hypertension was lower than Waist Stature Ratio, but was greater than BMI.

In the Atherosclerosis Risk in Communities (ARIC) Study, Harris [22] examined the relation between high blood pressure and fat distribution in 15,063 African American and White participants between the ages of 45 to 64 years in Maryland, Mississippi, Minnesota and North Carolina using BMI, waist-to-hip ratio (WHR), and waist to stature ratio as indices.

Studies have shown that the fat deposits present centrally in the abdomen, that is the intra abdominal fat, release a huge amount of free fatty acids when compared to the fat deposits which are present peripherally (gluteal fat and the subcutaneous fat), which in turn reduces the hepatic clearance of insulin . Insulin levels had also begun to emerge as an independent risk factor for Hypertension [23] . In our model we used the cut off point for Waist to Stature Ratio as 0.5 as used by many authors[24] in previous studies which was also revealed by our ROC curve analysis as shown in Figure 7. In our Multivariate Regression model ,people with Waist to Stature Ratio ≥ 0.5 had 469 times higher odds of Hypertension than those with WSR < 0.5. [OR: 469 (95%CI: 56 - 3764)] as shown in Table 5 and this observed difference was statistically highly significant (p=0.000). There are many factors why Waist to Stature Ratio will be the most useful anthropometric index to determine cardiometabolic risk.The results from our study and the meta-analyses done by Lee CM et al [24] , together, justify the use of Waist Stature Ratio as a single screening anthropometric tool for predicting the risk of Systemic Hypertension and Cardiometabolic risk than other indicators.

One of the greatest advantages with Waist to Stature Ratio over BMI is the ability to use only one single cutoff point (0.5) in all ages, both sexes, and all ethnicities.[25]The association of Height/ Stature is usually inverse with cardiometabolic morbidity and mortality[26] because Stature besides a genetic component , indirectly explains general early life exposures .The explanation lies in the fact that high visceral fat depots within the abdominal cavity [27] have high metabolic and inflammatory activity when compared to depots which are subcutaneous in other parts of the body such as the gluteo-femoral region.

Measurement of Body Mass Index requires Weight and Height , While WSR measurement requires Height and Waist Circumference which requires a simple tape rather than a weighing apparatus and also Self-assessment of Weight is less accurate than that of Height [28]. With Waist Circumference being measured at different sites by different authors , it has been demonstrated that there is no alteration in risk prediction[29] . WSR has an important advantage of a simple , single boundary value for men and women of all ethnic groups and may be also for children [5]. The mean proposed boundary value for WSR was 0.5. Within these study populations, there were subjects with various (Caucasian, Asian and Central American) ethnic backgrounds [25].

CONCLUSION

The Overall prevalence of hypertension was 27.5% with 95% C. I. of 23.33% to 31.67% .The Mean Waist to Stature Ratio was 0.506 (±0.03) with 95% C.I. of 0.503 to 0.509.AUC of Waist to Stature Ratio > Waist Hip Ratio > BMI as a predictor of Hypertension. The

Maximum Sensitivity of 96.7% and Specificity of 26.6% of WSR as a predictor of Hypertension was established at a level of WSR of 0.50286.

The use of only one single cutoff point (0.5) in all ages, sexes, and ethnicities, simplicity and feasibility of Waist to Stature Ratio (WSR) adds to its screening potential compared with other anthropometric indices.

CONFLICT OF INTEREST: Nil or Nothing to disclose

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Original Research Article

A study on Assessment of adherence to medication among hypertensive patients in rural area, Kancheepuram district, Tamil Nadu.

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Abstract

Background: Hypertension is the one of the major preventable non-communicable disease. It exerts a public health burden on cardiovascular diseases, stroke and renal diseases worldwide. The prevalence of hypertension in India is 29.8%. The treatment for hypertension is usually lifelong and this brings about problems regarding patient compliance. So, this study aims at evaluating the treatment adherence for patients with hypertension. **Objectives:**To assess patient's adherence to hypertensive treatment and to analyze the association between various socio-demographic factor and adherence to anti- hypertensive treatment. **Methods:** The study was carried out as a cross sectional study among 430 hypertensive patients, using simple random sampling technique in the field practice area of a medical college. The patient's adherence was assessed using Morisky's Scale consisting of 4 questions and the reason for non-adherence was studied. Grading was done based on answers marked and analyzed using SPSS. **Results:** The prevalence of adherence to hypertensive medication by the patients was found to be 25.1%. Various reasons such as age, female sex, illiteracy and knowledge about normal blood pressure were identified for non-adherence. This study showed a new insight to the problem. **Conclusion:** The prevalence of patient's adherence to hypertension management was only 25.1% in this study population. The poor adherence will definitely affect the health of the individual leading to many complications. It is our duty to increase the adherence to medication by addressing the issues through various health programmes and health education.

Keywords: Patient Compliance, Non- Communicable Disease, Blood Pressure.

INTRODUCTION:

Non-communicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behaviours factors [1]. People of all age groups, regions and countries are affected by NCDs. These conditions are often associated with older age groups, but evidence shows that 17 million of all deaths attributed to NCDs occur before the age of 70. Of these "premature" deaths, 87% are estimated to occur in low- and middle-income countries [1]. Children, adults and the elderly are all vulnerable to the risk factors contributing to NCDs, whether from unhealthy diets, physical inactivity, and exposure to tobacco smoke or the harmful use of alcohol. Among the various non-communicable diseases, hypertension, diabetes and cancers are of global burden.

Hypertension also known as high blood pressure is a long term medical condition in which the blood pressure in the arteries is persistently elevated.Blood pressure is expressed by two measurements, the systolic and diastolic pressures, which are the maximum and minimum pressures, respectively. As per JNC 8 guidelines, in patients 60 years or older who do not have diabetes or chronic kidney disease, the goal blood pressure level is now <150/90 mm Hg.In patients 18 to 59 years of age without major co morbidities, and in patients 60 years or older who have diabetes, chronic kidney disease (CKD), or both conditions, the new goal blood pressure level is <140/90 mm Hg [2].Raised blood pressure is a major risk factor for coronary heart disease and ischemic as well as hemorrhagic stroke. It is a major health problem in developing and developed countries, and its increasing incidence is a serious warning to take more attention to this silent disease. In 2015, there were 1.13 billion people living with high blood pressure worldwide [1]. The

prevalence of hypertension worldwide is of about 40% [1]. In India, the prevalence is around 29.8 %. In Tamil Nadu, the prevalence is of about 19.1% [3].

Adherence to anti-hypertensive medications has been found to be a major concern. This study aims at assessing the adherence to hypertensive medications and to analyze the association between various socio demographic factors and adherence to hypertensive treatment.

METHODOLOGY:

This study is acommunity based descriptive cross sectional study conducted in the rural field practice area (Padappai) of Sree Balaji Medical College and Hospital in Kancheepuram district, Tamil Nadu. The Study periodwas6 Months (October 2016 to March 2017).The study population includes hypertensive patients belonging to all age group and who are under medication for at least 6 months. Those not willing to participate in the study and those patients who are mentally retarded and pre-eclampsia patients were excluded from the study. Based on the study done by Venkatachalam J et al in the year 2015 in Kancheepuram, TamilNadu the sample size was calculated (The percentage of adherence to Hypertensive treatment was 24.1%) [4].The sample size was calculated with 95% confidence interval and a precision of 18% of the prevalence using the formula $4pq/l^2$ where p is 24.1, q is 75.9 and l is 4.32 .Also accounting 10% for non response the final sample size was adjusted to 430. From the 600 registered hypertensive patients who are taking treatment from the field practice area 430 samples were selected using simple random sampling method with the help of computer generated random number tables. Using a pre- tested structured questionnaire containing socio demographic details, details regarding treatment adherence, morisky's 4 item questionnaire. The adherence to hypertensive medication was assessed using morisky's medication adherence 4 item questionnaire which consists of 4 questions. Response to the questions was of yes or no type, if the patient gives a negative response for all the 4 questions it means adherence is present. If the response is yes for any one of the 4 questions it means the patient is non adherent. The data was entered in MS excel and analyzed using SPSS 15 version. Descriptive statistical analysis done by using the percentage, proportions and statistical association calculated using the chi-square test and p value estimation. Informed consent was obtained from all the participants.

RESULT:

Table 1 depicts the socio demographic characteristics of the study participants. 51.2% of the study participants belonged to 41 to 60 years of age. 46.3% were males and 53.7% were females. Almost 86.5% were married. 30.9% were primary school followed by 24.4% who had a middle school qualification and 20% who had high school education. 38.4% are suffering from hypertension for less than 5 years while the rest are suffering from hypertension for more than 5 years. 61.4% have a negative family history for hypertension.

Table 1:SOCIO DEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS

S.NO	SOCIO – DEMOGRAPHIC CHARACTERISTICS		FREQUENCY (N=430)	PERCENTAGE
1	AGE	21-40	87	20.20%
		41-60	220	51.20%
		61-80	111	25.80%
		More than 80	12	2.80%
2	SEX	Male	199	46.30%
		Female	231	53.70%
3	MARITAL STATUS	Married	372	86.50%
		Unmarried	22	5.10%
		Widow	36	8.40%
4	EDUCATION	Illiterate	21	4.90%
		Primary School	133	30.90%
		Middle School	105	24.4.%
		High School	86	20%
		Graduate	40	9.30%
		Post Graduate	45	10.50%
5	DURATION OF HYPERTENSION	Less than 5 years	165	38.40%
		5 – 10 Years	163	37.90%
		More than 10 years	102	23.70%
6	FAMILY HISTORY	Yes	166	38.60%
		No	264	61.4.%

Figure:1ADHERENCE TO ANTI- HYPERTENSIVE DRUGS

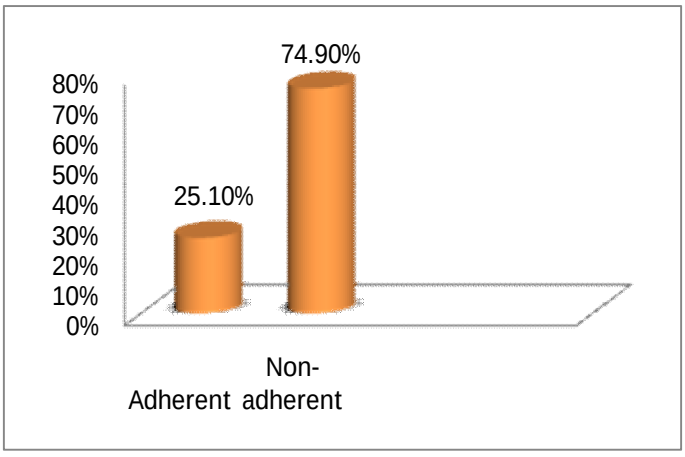

Fig 1 represents the percentage of hypertensive patient's adherent and non adherent to the treatment. 25.1% of the hypertensive patients are adherent to treatment while

74.9% were found to be non adherent to hypertensive medication.

Table :2ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND ADHERENCY TO ANTI-HYPERTENSIVE MEDICATION.

SOCIO – DEMOGRAPHIC CHARACTERISTICS		Adherent (108)	Non-Adherent (322)	Chi Square	Degrees of freedom	P Value
AGE	21-40	9 (8.3%)	78 (24.2%)	22.119	3	0.000*
	41-60	60 (55.5%)	160 (49.6%)			
	61-80	31 (28.7%)	80(24.8%)			
	More than 80	8 (7.4%)	4 (1.2%)			
SEX	Male	45 (41.6%)	154 (47.8%)	1.234	1	0.267
	Female	63 (58.3%)	168 (52.1%)			
EDUCATION	Illiterate	0 (0%)	21 (6.5%)	19.986	5	0.001*
	Primary School	31 (28.7%)	102 (31.6%)			
	Middle School	23 (21.2%)	82 (25.4%)			
	High School	32 (29.6%)	54 (16.7%)			
	Graduate	15(13.8%)	25(7.7%)			
	Post Graduate	7(6.4%)	38(11.8%)			
DURATION	Less than 5 years	41 (37.9%)	124 (44%)	2.312	2	0.315
	5 -10 Years	36 (33.3%)	127 (39.4%)			
	More than 10 Years	31 (28.7%)	71 (22%)			
KNOWLEDGE ABOUT NORMAL BLOOD PRESSURE	Yes	82(75.9%)	125(38.8%)	44.6	2	0.000*
	No	26(24.1%)	197(61.1%)			

*P value less than 0.05, which is statistical significant.

Table 2 shows the association between socio-demographic factors and adherence to hypertensive medications. There is a statistically significant association between various socio-demographic factors such as sex, education, knowledge about normal blood pressure with non-adherence to hypertensive medications. People belonging to the age group 41-60(49.6%) are more non-adherent to anti-hypertensive treatment when compared to other age groups. Females (52.1%) are more non-adherent than males (47.8%). People with primary school education (31.6%) are more non-adherent. People with poor knowledge about the normal blood pressure (61.1%) are non- adherent when compare to those who are having good knowledge about the normal blood pressure.

DISCUSSION:

Blood pressure control in hypertension patients was being considered as a long-standing challenge. We were living in a rapidly changing environment. Throughout the world, human health was being shaped by the same powerful forces: demographic ageing, rapid urbanization, and the globalization of unhealthy lifestyles [5]. One of the key risk factors for cardiovascular disease is hypertension. Hypertension kills millions of people every year. But this risk did not need to be so high. Hypertension can be prevented.

The overall adherence to medication in our study was 25.1%as compared to a similar study, the adherence was 24.1% in a study by J. Vengatachalam, in kancheepuram district, tamil nadu[4] , also compared to an Iranian study by Hadi which was 48.7%[6] This variation might be due to difference in sociodemographic profile of two countries and 24% in a Malaysian study by Kamran.A[3] which was also because of the same reason as mentioned before. In our study, non- adherence was found to be higher among people age group between 41-60 years of age (49.6%) and females (52.1%) being non-adherent and also primary school qualified people (31.6%) were more non-adherent to anti-hypertensive medication. Similarly in a study from Iraq, Erbil city by Qadir[7], the compliance was less among patients aged 46-55years of age(50%) and females(62.7%)were significantly more non-compliant than males and also primary school qualified people(90.2%) were non-adherent towards anti-hypertensive medication . Another study carried out in Pakistan among 460 hypertensive, showed that adherence increases with age and highest mean adherence rate was in the age group of 70-80 years [8]. This might be due to the support given by care takers.

CONCLUSION:

In this study the prevalence of patient's adherence to hypertensive medication was found to be only 25.1%, which is very low. The association between non-adherence and various socio demographic factors such as age, literacy, knowledge about normal blood pressure and family history was statistically significant. Interventions aimed at building adherence in hypertension patients are very much essential to prevent further complications.

RECOMMENDATIONS

Poor adherence affects blood pressure control. Developing intervention programs to address some of the factors identified is necessary to improve adherence and, in turn, to improve blood pressure control. A multidisciplinary approach with greater involvement of patients in managing their conditions should be adopted to promote better adherence. Counselling to improve compliance to anti-hypertensive medication by the treating physician at primary care level itself is important. It is also recommended to improve the knowledge and perception about the complications and consequences due to non-adherence.

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Original Research Article

A STUDY ON ADHERENCE TO DIABETIC MEDICATION IN A RURAL AREA OF KANCHEEPURAM DISTRICT, TAMILNADU

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Abstract

Background: Diabetes mellitus is a growing global health problem that affects patients of all age groups. Adherence to anti-diabetic medicines has been found to be major challenge in the management of diabetes mellitus. This study aims at assessing the adherence to medication and to identify the factors associated with non-adherence to treatment of diabetes mellitus patients.**Objectives:** To assess the adherence to medication in the treatment of diabetes mellitus in the study population, to identify the factors associated with non-adherence to medication in the treatment of diabetes mellitus.and to determine association between adherence to medication and diabetic control in the study population. **Materials and Methods:** This study is a community based descriptive cross sectional study conducted in the field practice area of SBMCH; among 360 diabetic patients were studied using Simple random sampling method. Data collection was done using a structured questionnaire. The adherence to treatment was assessed using Morisky's medication adherence scale and the reasons for non-adherence were questioned. Percentage of adherence was calculated. **Results:** Among the 360 diabetic mellitus patients studied, males were 177(49.2%) and 183(50.8%) were females. The adherence to anti-diabetic medication was found to be only 35.8% and non adherence to anti-diabetic treatment was 64.2%.The reasons for non-adherence were identified as increased cost of treatment, side effects of the drugs, multiple drugs, opting to alternate treatments, lack of proper knowledge. **Conclusion:** The results of the study tell us that adherence to anti-diabetic drugs was low. Various reasons for non-adherence were identified. Hence it is necessary to recommend proper education of the patients and proper prescribing of drugs by physicians as intervention measures to combat non adherence.

Key Words:– Compliance, Diabetes Mellitus, Diabetic Drugs, Treatment.

INTRODUCTION:

Non communicable diseases (NCDs) also known as chronic diseases is a medical condition or disease that is not caused by infectious agents (non-infectious or non-transmissible).They are of long duration and generally slow in progression. The 4 main types of non communicable diseases are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes. Non communicable disease is the leading cause of death globally. Non communicable diseases (NCDs) kill 38 million people each year [1]. Almost three quarters of NCD deaths - 28 million occur in low and middle income countries. . The increase in rates in developing countries follows the trend of urbanization and lifestyle changes, including increasingly sedentary lifestyles, less physically demanding work and the global nutrition transition, marked by increased intake of foods that are high energy-dense but nutrient-poor. Tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets all increase the risk of dying from an NCD.

Diabetes mellitus is an iceberg disease and is one of the major non communicable diseases. It is characterised by a state of chronic hyperglycaemia. India ranks second next to China in the overall burden of diabetes. Diabetes may become world's seventh largest killer by 2030 as per WHO [2]. According to World Health Organization (WHO) report in 2016 [1], Diabetes currently affects 422 million worldwide and prevalence of diabetes is 8.5%. The fastest prevalence increase is expected to occur in Asia and Africa, where most people

with diabetes will probably live in 2030.In India more than sixty two million are affected by diabetes, the majority of the people have type 2 diabetes mellitus (90%). Nearly one million Indians die due to type 2 diabetes mellitus every year. In Tamil nadu the prevalence of diabetes is 9.8% and in total 42 million persons are affected by diabetes. 1 in 10 is diabetic in Tamil Nadu as per 2016 statistics [2].

India has more people with diabetes than does any other country in the world, according to the International Diabetes Foundation, although more recent data suggest that China now has more people with diabetes than does India.There are 3 main types of diabetes mellitus as per WHO , they are diabetes mellitus, impaired glucose tolerance and gestational diabetes mellitus. Treatment of diabetes mellitus includes medical management, lifestyle modification and surgery. Adherence to anti-diabetic medicines has been found to be a major concern.

This study aims at assessing the adherence to diabetic medications and to identify the factors associated with non-adherence in diabetes mellitus patients.

MATERIALS AND METHODS:

This study is acommunity based descriptive cross sectional study conducted in the rural field practice area (Padappai) of Sree Balaji Medical College and Hospital in Kancheepuram district, Tamil Nadu. The Study period **is** 3 Months (January to March 2017).The study population includes diabetic patients belonging to all age group and who are under medication for at least 6 months. Those not willing to participate in the study and those patients who are mentally retarded and Gestational diabetes mellitus patients were excluded from the study.Based on the study done by Uma Shankar in the year 2013 in a rural area of Kerala which recorded adherence to diabetes medication as 26%..The sample size was calculated at 95% confidence interval and keeping the precision as 5 using the formula $4pq/l^2$ where p is 27.8, q is 72.2 and l is 5% of P. Also accounting 10% for non response the final sample size was adjusted to 360.From the 600 registered diabetes mellitus patients who are taking treatment from the field practice area 360 samples were selected using simple random sampling method with the help of computer generated random number tables. The study tool used consists of apre tested structured questionnaire containing socio demographic details, details regarding treatment, Morisky's 4 item questionnaire. The data was entered in MS excel and analyzed using SPSS 15 version. Descriptive statistical analysis done by using the percentage, proportions and statistical association calculated using the chi-square test and p value estimation. Informed consent was obtained from all the participants of the study.

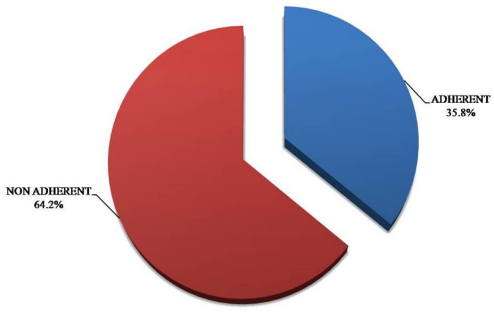
RESULTS:

Among the 360 diabetic mellitus patients studied, males were 177(49.2%) and 183(50.8%) were females. Most of the patients belonged to the age group of 40-60 years accounting for 50% (180). From the study adherence to diabetic medication was found to be only 35.8% (shown in FIGURE 1) and 64.2% were found to be non adherent to diabetic medication. On comparing the sex wise adherence percentage, females have better adherence of 60.5% compared to males whose adherence was only 39.5%(as you can see from FIGURE 2). On estimating age wise adherence levels the age groups were divided into 4 strata's 1-20 years,21-40 years,41-60 years and >60 years. Adherence was higher in the older age groups than the younger age groups.non adherence was also comparatively higher in the older age group due to more disease burden in that age group than the younger counterpart. The socio demographic details of the study population are shown in TABLE 1.

TABLE 1: SOCIO DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

SOCIO DEMOGRAPHIC CHARACTERISTICS		FREQUENCY	PERCENTAGE
AGE	0-20 Years	3	0.8%
	21-40 Years	39	10.8%
	41-60 Years	180	50%
	> 60 Years	138	38.4%
SEX	Male	177	49.2%
	Female	183	50.8%
EDUCATION	Illiterate	59	16.3%
	Primary school	46	12.7%
	Middle school	40	11.1%
	Higher secondary	52	14.4%
	Post high school diploma	53	14.7%
	Graduate or post graduate	47	13.05%
	Profession	63	17.5%
DURATION OF DIABETES MELLITUS	< 5 years	150	41.7%
	5-10 years	102	28.3%
	>10 years	108	30%
FAMILY HISTORY OF DIABETES MELLITUS	Yes	198	55%
	No	162	45%

FIGURE 1: PERCENTAGE OF ADHERENCE AND NON ADHERENCE



Common reasons for non adherence was identified from the study and they include multiple drugs, lack of knowledge, side effects due to medication, alternative medications and cost of treatment. Among these multiple drugs was the most common reason for non adherence accounting for 25%.next comes cost of treatment, side

effects, alternative medication as reasons for non adherence with 19.4% each. Lack of knowledge was the least reason with 16.8%. Some other findings of the study are, 27.5% of the patients are taking government drugs and 72.5% patients are taking medications from private facility. And 55.5% of the patients had a positive family history of diabetes mellitus and 44.5% of the patients didn't have diabetes in the family.55% of the patients had co morbidities and 45% had no co morbidities.

FIGURE 2: FREQUENCY OF ADHERENCE IN BOTH SEXES

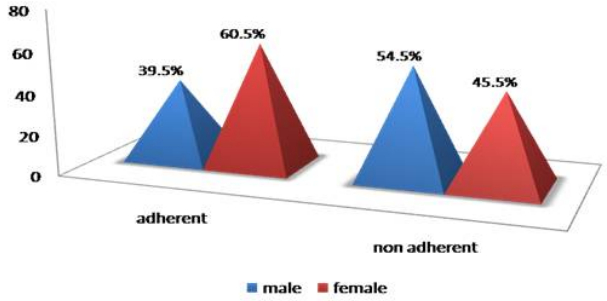


FIGURE 3: REASONS FOR NON ADHERENCE

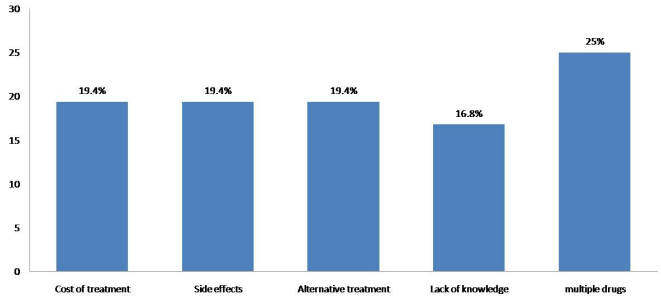


TABLE2: ASSOCIATION BETWEEN ADHERENCE TO DIABETIC MEDICATION AND DIABETIC CONTROL.

SUGAR VALUE	ADHERENCE		NON ADHERENCE		TOTAL		
	Frequency	%	Frequency	%	Frequency	%	Chi-Square value is 215.3 (Degree of freedom =1)
<140 mg/dl	117	81.20%	27	18.80%	144	100%	
>140 mg/dl	12	5.50%	204	94.50%	216	100%	
	129		231		360		P=0.000

From the study we can also find that there was statistically significant association between the adherence to diabetic medication and diabetic control, p value was< 0.0001 which also supports this association between the adherence to diabetic medication and diabetic control. And the p value is highly significant. Among patients whose blood sugar value was less than 140 mg/ dl , 117(81.2%) were adherent to their diabetic medication and 27(18.8%) were non adherent to their diabetic medication. Good diabetic control among them was due to their strict adherence to diabetic medication. Among patients whose blood sugar was more than 140 mg/ dl,12(5.5%) were adherent to their diabetic medication and 204(94.5%) were non adherent to their diabetic medication. The reason for their high diabetic value was their non adherence to diabetic medication.

DISCUSSION:

Adherence to medication is an essential part in the management of diabetes. Adherence is affected by socioeconomic status, literacy, memory of the patient, lack of proper knowledge and awareness, duration of therapy and certain other factors. Non adherence may lead on to poor diabetic control, worsen the disease and lead on to various complications of the disease.

The result of the study is consistent with results obtained from previous studies one such study was done in 2015 by Uma Shankar in a rural area of Kerala in which the adherence level was 26%, which is low [3]. In north India a study done by Sharma recorded the adherence as 16.6% [8], In Kolkata a study done by Mukherjee recorded an adherence of 57.7% [10].In Tamil Nadu a study was done in the year 2014 by Elizabeth Mampally Mathew which recorded an adherence level of 50.1% [11].In a study conducted in oromia of Ethiopia 68.8% respondents were adhered to anti-diabetic medication [16]. Mohammed ARIFULLA conducted a study in UAE in which adherence rate to anti-diabetic drugs was 84%. The most common reason for non-adherence was forgetfulness, and the adherence rate was similar in both genders [15].In a study done in Tamil nadu by Prabhu and Ramya 30% had good adherence [17].Another study done in north western Ethiopia by Mastewal Abebaw in 2015 the adherence was 85.1% which was very high compared to other studies. Manobharathi conducted a study in Chidambaram district of Tamil nadu in which the adherence percentage was 39.8% [18].In a study conducted in Puducherry by Arulmozhi adherence was 49.3%.[19].In another study conducted in Nigeria by Fatima Iyabo Abdulazeez the adherence was 26.4% [20].The reasons for non adherence were also similar to the results obtained from other studies.

CONCLUSION:

The results of the study tell us that adherence to anti-diabetic drugs was only 35.8% in the study population.

Various reasons for non-adherence were identified in the study population. There was a positive statistical significant association between adherence to diabetic medication and diabetic control (p<0.0001).The poor adherence will definitely affect the health of the individual leading to many complications.Interventions aimed at building adherence in diabetic patients are very much essential to prevent further complications.

RECOMMENTATIONS:

From the results of my study as a community medicine professional I recommend proper motivation and education of the patients towards adherence and to inform them about the harmful effects and complications associated with non adherence through various available Medias. Physicians also should prescribe appropriate drug combinations in order to avoid side effects and multiple drugs.Creationof public awareness about diabetes and drug adherence through various health education campaigns and outreach activities at the community level. Coverage of the NCD control program should be increased and the strengthening of the health sector by allocating more funds on health promoting activities must also be done.

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LIMITATIONS:

Not all the reasons for non adherence was taken into account in this study and only the important reasons associated with non adherence were studied.

Conflict of interest: Nil

Source of funding: Nil

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Original Research Article

A Community based study on alcohol dependence and treatment seeking behaviour among ever alcoholics in a rural area of Puducherry.

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Abstract

Background: Alcoholism is a social evil, alcohol related morbidities and incidents even though significantly alarming, are almost neglected by primary care physicians and policy makers. So, it needs exploration to find nature and effect of dependence and treatment non seeking behavior among them which often leads to disruption of normal socio-economic-physical health. **Objectives:** To find prevalence of alcohol dependence and to explore the reasons of treatment seeking behavior among ever alcoholics in a rural area of Pondicherry.**Methods:** A community based cross-sectional study was conducted among 370 adult males aged more than 20 years in a rural area of Pondicherry during July- September 2016. Data were collected by systematic random sampling method. Alcohol dependence was measured using Alcohol dependence Audit scale. In-depth interview was conducted to explore the reasons of treatment seeking behaviour. Data was analyzed using SPSS. Chi-square test was used for analysis. **Results:** Among 370 total respondents, 229 (61.9%) were ever alcoholic and 56% of them had alcohol related symptoms. Around 7% of the ever-alcoholics have severe dependence. Age, literacy status, occupation, socio-economic status influence the alcohol dependence with significant association ($p<0.05$). Among ever alcoholics, 86% of them never prefer health care facility for alcohol related health problems. Majority of them reported that they don't know where to seek treatment followed by social stigma. Participants opined that alcohol consumption by males is an accepted norm in their community. **Conclusions:** Socio-demographic conditions are highly influencing the alcohol dependence. Occupation related physical aches and cultural acceptance of male alcohol consumption seems to be responsible for dependence. Treatment non-seeking behaviours were high due to social stigma and lack of awareness on treatment availability. The present scenario can be improved through enhancing IEC activities and training of health workers focusing on social stigma and management on alcohol related diseases.

Keywords: Alcohol, Dependence, non-seeking behaviour

Background:

Alcoholism is one of the leading causes of death and disability in India.[1] About two billion people worldwide consume alcoholic beverages and one-third is likely to have one or more diagnosable alcohol use disorders. In India, the estimated numbers of alcohol users in 2005 were 62.5 million, with 17.4% of them being dependent users[2] and 20-30% of hospital admissions are due to alcohol-related problems.[2]

Alcoholism is one of the major public health issues in both developing and developed countries.[3] The international classification of Diseases (ICD-10) published by the World Health Organization uses the term 'harmful use' to indicate a pattern of alcohol use similar to alcohol abuse. In India, the extent of an alcohol use and alcohol related problem have a significant impact on public health[4]. World Health Assembly declared that "problems related to alcohol and particularly to its excessive consumption rank among the world's major public health problems and constitute serious hazards for human health, welfare and life".[5]

All forms of drinking including excessive drinking also cause substantial risk or harm to the individual. These include high- quantity of drinking, repeated episodes of drinking and drinking that makes alcohol-dependent and leads to intoxication.[6] Therefore, the identification of drinkers with various types and degrees of at-risk alcohol consumption has a great potential to reduce all types of alcohol-related problems.[6]

Alcoholism is a social evil, and alcohol related morbidities and incidents even though significantly alarming, are almost neglected by primary care physicians

and policy makers. Alcoholism is very much prevalent among rural community and needs exploration to find out cause, nature and effect of such dependence which often leads to disruption of normal socio-economic-physical health. So this study was conducted to find the prevalence and determinants of alcohol dependence among adult males in the rural area of Puducherry and also to explore the reasons of treatment seeking behaviour among ever-alcoholics.

Methodology:

Type of study: It was a community based Cross-Sectional study conducted during July 2016 to September 2016.

Study area & Population: The study was conducted in Manapet village, Bahour commune, a coastal village in Puducherry (South India). This village is situated 20 kms away from Pondicherry town and fishing being its major occupation followed by agriculture. The total households in this village are 3570.[7] The study population comprised of adult males aged above 20 years of age.

Sample size and Sampling procedure:

Sample size was calculated by using the following formula, $n = z\alpha^2pq/l^2$, with 5% relative error and 95% confidence. Considering the prevalence of alcohol consumption among males in south India is 46.7.[8] The sample size was calculated to be around 369 (including 10% non-response rate).

Systematic random sampling was used to select study subjects in the village. The sampling

Interval was calculated to be 9. The starting house was selected using random number table after which every 9th house was selected. One adult male member (preferably head of the household) of each house was selected and interviewed. If the house was locked or no member is fulfilling the inclusion criteria in the house, consecutive house was selected.

Data collection Procedure: Data were collected by trained interns using pre- designed and pre-tested proforma after obtaining informed consent from the participant in a native language. House to house survey was conducted by the interviewer. Information's regarding the participants socio-demographic characteristics, personal history, detail history of alcohol consumption were obtained. Individuals with history of alcohol consumption (both current and past) were considered as ever drinkers and individuals who had never consumed an alcoholic drink in their lifetime were considered as non-alcoholics. Alcohol dependence was measured using Alcohol dependence Audit scale.[9] In-depth interview was also conducted among ever drinkers to explore the various reasons of non-treatment seeking behaviour.

Data management and statistical analysis: The data was analyzed using Statistical Package for the Social Sciences software for Windows (SPSS Inc., Chicago, Illinois, USA) version 17.0. Percentages, Ratios were applied to assess the alcohol dependence. Content analysis was done to explore the reasons of treatment non-seeking behaviour among ever drinkers. Subject confidentiality was maintained during and after information collection.

Results:

Total 370 study participants were included for the study. Out of 370, 155 (41.9%) were belonged to the age group of 31-40 years followed by 21-30 years (32.2%). Mean age of the participants was 34.7±2.1 years. Regarding occupation majority of them were working in fishing (69%) and fishing related works followed by agriculture (11%). Around 20% of the study participants were unemployed. Eighty six percentages of the study participants were married. Around 38.8% of the study population who consume alcohol were completed their primary education and 15.5% completed their higher secondary education.

Out of 370, 229 (61.9%) of them were ever alcoholic in the present study. Among them, mean age of initiation of alcohol was 18.1±2.7. Around 56% of the ever alcoholics reported that they had alcohol related symptoms.

Table 1: Severity of alcohol dependence scoring of study participants (n=370)

Dependence Scoring	n (%)
NA (Never drinker)	141 (38.1)
0 (Drinker but No dependence)	76 (20.6)
1-7 (Mild dependence)	56 (15.1)
8-15 (Moderate dependence)	53 (14.3)
16-19 (Moderately-severe dependence)	18 (4.9)
≥ 20 (Severe dependence)	26 (7)

Table 1 shows the severities of alcohol dependence were calculated. Out of 370, 229 (61.9%) of them were ever alcoholic in the present study. Among them 141 (38.1%) were never drinker, 53 (14.3%) of them were had moderate dependence and 26 (7%) of them had severe dependence.

Table 2: Dependence audit of ever alcoholics (n=229)

Selected Indicators (Last one year)	**Never** n (%)	**Less than Monthly** n (%)	**Monthly** n (%)	**Weekly and daily** n (%)
Six or more drinks on one occasion	129 (56.3)	30 (13.1)	25 (10.9)	45 (19.7)
Not able to stop drinking once started	135 (59.0)	48 (21.0)	14 (6.1)	32 (13.9)
Failed to do work because of drinking	136 (59.4)	61 (26.6)	26 (11.4)	6 (2.6)
Needed a first drink in the morning to get going	136 (59.4)	41 (17.9)	14 (6.1)	38 (15.6)
Had a feeling of guilt after drinking	144 (62.9)	33 (14.4)	16 (7)	36 (15.7)
Unable to remember what happened last night	153 (66.8)	39 (17)	14 (6.1)	23 (10.1)

From the table 2, 19.7% of them reports that they consume alcohol six or more drinks in a week, 13.9% reports that they cannot able to stop drinking once started, 15.6% reports that they need a first drink in the morning

after a heavy drinking session, 10.1% of them unable to remember because of drinking and only 15.7% were feeling guilty after drinking.

Table 3: Determinants of alcohol dependence

Characteristics		Ever Alcoholic n=229 (%)	Never Alcoholic n=141 (%)	Total n (%)	p-value (chi-square; df)
Age	21-30	83 (36.2)	36 (25.5)	119 (32.2)	**<0.001** (48.72;df=2)
	31-40	115 (50.2)	40 (28.4)	155 (41.9)	
	>40	31 (13.6)	65 (46.1)	96 (25.9)	
Marital status	Married	196 (85.6)	122 (86.5)	318 (86)	0.8 (0.06; df=1)
	Unmarried	33 (14.4)	19 (13.5)	52 (14)	
Literacy status	Literate	89 (38.9)	112 (79.4)	201 (54.3)	**<0.001** (57.88; df=1)
	Illiterate	140 (61.1)	29 (20.6)	169 (45.7)	
Occupation	Fishing	149 (65)	106 (75.2)	255 (69)	**<0.001** (42.88; df=2)
	Agriculture	13 (5.8)	28 (19.8)	41 (11)	
	Unemployed	67 (29.2)	7 (5)	74 (20)	
Socio-economic status	V	7 (3)	6 (4.2)	13 (3.5)	**<0.001** (80.32; df=4)
	IV	21 (9.2)	44 (31.2)	65 (17.6)	
	III	34 (14.8)	53 (37.6)	87 (23.5)	
	II	78 (34.1)	10 (7.1)	88 (23.8)	
	I	89 (38.9)	28 (19.9)	117 (31.6)	
History of alcohol intake in	Yes	178 (77.7)	97 (68.8)	275 (74.3)	0.05 (3.65; df=1)
	No	51 (22.3)	44 (31.2)	95 (25.7)	
of smoking *	Yes	78 (34.1)	89 (63.1)	167 (45.1)	**<0.01** (OR=0.3;df=1)
	No	151 (65.9)	52 (36.9)	203 (54.9)	

*Odds ratio

Age, literacy status, occupation, socio-economic status influence the alcohol dependence with significant association ($p<0.05$). As per odds ratio calculation, inverse relationship exhibited between alcohol and smoking. (Table 3)

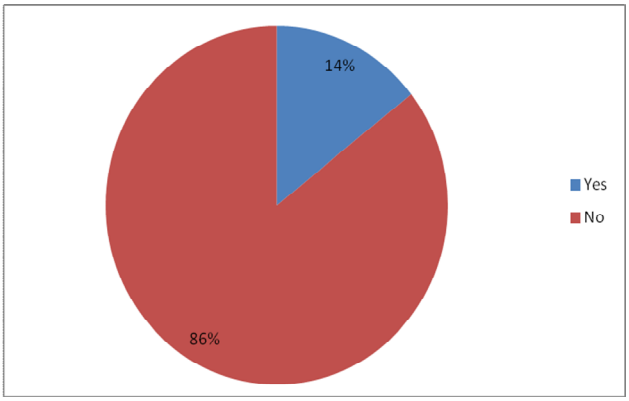

Figure 1: Preference of health care facility for health problems related with alcohol among ever alcoholics (n=229)

More than three fourth of the ever alcoholics never seek health care facility for their health problems related with alcohol (Fig 1)

Table 5: Reasons for treatment non-seeking behaviour among ever alcoholics who do not prefer HCF (n=196)

Characteristics		n (%)
Reasons for treatment non-seeking behaviour*	Don't know where to seek treatment	113 (57.7)
	Social stigma	101 (51.5)
	Medicine has no effects	98 (50)
	Alcohol is the best medicine for side effects	83 (42.3)
	Poor quality of care in health centres	81 (41.3)
	Doctors not available around the clock	78 (39.8)
	Medicine can be bought over the counter if symptoms persists	43 (21.9)
	Self management	56 (28.6)
	Cost of medicine is high	34 (17.3)
	Others	12 (6.1)

***Multiple responses**

Out of 229 ever alcoholics, 196 of them never seek treatment for alcohol related health problems and Table 5 explains the reasons for treatment non seeking behaviour among them. Majority of the ever alcoholics do not prefer Health Care Facility (HCF) for treatment because they do not aware of the treatment seeking places (57.7%). Around 51.5% of them feel seeking treatment for alcohol related diseases were social stigma in the society. Forty two percentages of them reported that alcohol itself is the best medicine for its side effects.

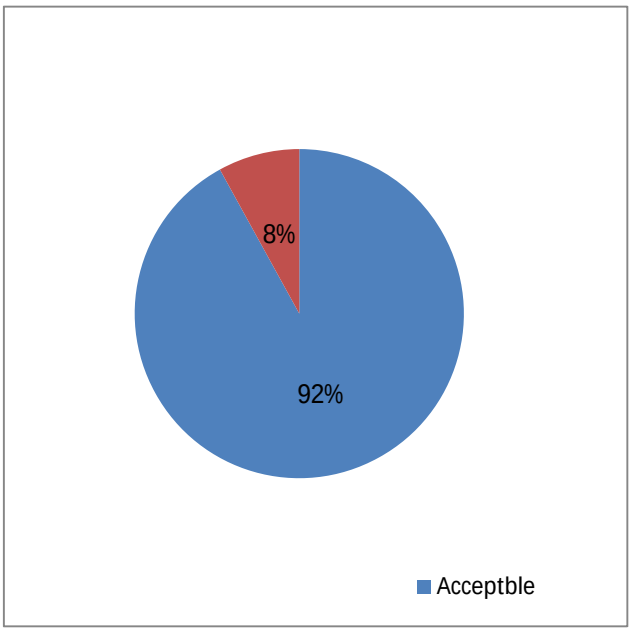

Figure 2: Opinion on alcohol consumption among adult males in the community (n=370)

Majority of the participants opined that alcohol consumption by males is an accepted norm in their community.

Discussion:

The present study was done in a Manapet village in Puducherry district. The principal focus of the current study was to assess the prevalence of alcohol dependence and its determinants and also to explore the various reasons for treatment non-seeking behaviour among ever alcoholics in the village.

A per 2011 census in Pondicherry, the literacy status among males were 80%. In our present study, only 54.3% of the adult males were literate. This shows that literacy rate is very low in the study area compared to that of census. The mean age of the participants was 34.7±2.1 years which was similar to the study conducted in Tamilnadu.[10] Regarding occupation in the present study, majority of them were working in fishing (69%) and its related works; around 20% of the study participants were unemployed. This stresses the fact that predominant work in the study area is fishing and its related works.

In the present study, the prevalence of ever alcoholics was 61.9% whereas studies conducted in southern and northern parts of India reported lower prevalence ranges from 13-40%.[10-12] High prevalence of alcoholism shows the prevailing socio-cultural norms and relaxation in laws for the use and sale of alcohol in the study area. The mean age of initiation of alcohol consumption among ever alcoholics was 18.1±2.7 years which shows the early consumption of alcohol in the study area. In contrast to our study, wide differences in mean ages of initiation of alcohol [20-40 years] were found in other studies.[10,13-16] Among the study participants, around 41% of them have some level of dependence for alcohol ranges from mild to severe. This shows that alcohol dependence were common among ever alcoholics.

Regarding alcohol dependence audit, around 20% of them reports that they consume alcohol six or more drinks in a week, 13.9% reports that they cannot able to stop drinking once started, 15.6% reports that they need a first drink in the morning after a heavy drinking session, 10.1% of them unable to remember because of drinking and only 15.7% were feeling guilty after drinking.

In the present study, alcohol dependence was found significantly associated with age (higher in age group less than 40 years), literacy status (higher in illiterates), occupation (higher in fishing and unemployment) and socio-economic status (poor SES) which was similar to the study conducted by Sundaram AK et al.[17] In the current study, marital status was not associated with alcohol dependence which was similar to the study conducted in Tamilnadu.[10] In contrary, study conducted by Sundaram AK et al[17] reported that Marital status highly influence the alcohol dependence. In the current study, majority of the person who consumes alcohol were never smokers (63.8%) which imply there is negative association between the smoking and alcohol consumption which shows opposite to the study done by Karen.[18]

We found that only marginal group of ever alcoholics sought treatment or communicated their alcohol related problems with health care workers. Treatment seeking behaviour for alcohol related diseases widely varies throughout India. [19,20] The main reason in some measure was due to lack of awareness on availability of services, lack of public treatment services and inaccessibility of private services and most likely contributes to both the reduced demand for treatment services. Around 42% of them said alcohol itself is the best medicine for its side effects. This stresses the fact that participant's awareness was very low in the community. Health Workers plays a vital role to increase the level of utilization of services and their awareness by implementing screening and brief intervention programmes.

Another major concern to be addressed was social stigma in the community. More than 50% of the ever alcoholics reported that social stigma as the major cause for not seeking treatment for alcohol related diseases. Participants also opined that alcohol consumption by males is an accepted norm in their community. These finding states that implementing programmes for ever alcoholics in the community without addressing social stigma leads to failure.

Strengths and Limitations:

This was a first population based study conducted to survey the alcohol use and probed treatment non seeking behaviours among alcoholics in Pondicherry. Widely validated (AUDIT) screening tool was used to identify participants who had alcohol use disorders.

This study was based on self-reported questionnaire; the validity depends of participant's social desirability and the individual's willingness. Participant's unwillingness to acknowledge their drinking status and their specific problems are likely to have biased our prevalence estimates downward.

Conclusion:

Alcohol consumption and dependence was more common among the study participants in the present study. Common reasons for starting drinking were to relive stress and out of curiosity. Socio-demographic conditions are highly influencing the alcohol dependence. Occupation related physical aches and cultural acceptance of male alcohol consumption seems to be responsible for dependence. Treatment non-seeking behaviours were high due to social stigma and lack of awareness on treatment availability. The present scenario can be improved through enhancing IEC activities and training of health workers focusing on social stigma and management on alcohol related diseases.

Conflict of interest : None
Source of support : Nil

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Original Research Article

A study on awareness of depression amongst patients attending a rural health centre in Kancheepuram, Tamilnadu, India.

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Abstract

Introduction : Depression has turned out to be one of the most important public health concerns of today. WHO statistics concluded that mental disorders affect at least 25% of the individuals once in their lives of which depression is the most common, Depression was ranked as the fourth leading cause of global disease burden and expected to reach second place in the ranking of disability adjusted life years calculated for all ages by the year 2020.**Methodology**: A cross sectional study was conducted amongst patients attending the outpatient department of rural health centre of SRM medical college & RC at kancheepuram. Data were collected between January to March 2017 for a period of about 2months in the rural health centre. **Results:** Of the 150 participants who participated in the study 57 (38%) were males and 93 (62%) were males. About 52% of the study subjects were aware of the disease called depression and about 36% of the subjects admitted that they were not aware of the disease called depression. Most of the individuals (44%) believed that depression is a result of god's wrath due committing sins in the past and 21.8% of the individuals did not have any idea if depression is a result of god's wrath. About 52.5% of the individuals felt that depression needs medical attention 37.5% felt that it does not require any treatment.**Conclusion:** Depression happens to be one of the important causes of DALY across the globe and Asian countries are one of the significant contributors of the world's burden of depression. Information dissemination strategies specifically targeting the people living in rural areas should be devised and implemented for the betterment of knowledge and awareness regarding depression.

Keywords: Depression Awareness, RHTC patients.

Introduction

Depression has turned out to be one of the most important public health concerns of today. WHO statistics concluded that mental disorders affect at least 25% of the individuals at least once in their lives of which depression is the most common, Depression was ranked as the fourth leading cause of global disease burden and expected to reach second place in the ranking of disability adjusted life years calculated for all ages by the year 2020[1].

An estimated 3-4% of India's 100 crore plus pop ulation suffers from major mental disorders and about 7-1 0% of the population suffers from minor depressive disor ders. In the southeastAsian region, 11% of DALYs and 27 % of YLDs are attributed to neuropsychiatric disease.Glo bal Burden of Disease (GBD) study (GBD 1990 Study) la unched by the WHO in the 1990s showed that Depressive disorders account for 3.7% of total DALYs and 10.7% of totalYLDs. GBD 2000 study (WHO 2001) showed that d epression accounts for 4.46% of total DALYs and 12.1% of total YLDs. This clearly highlights a trend of increasin g burden of disability secondary to depression[2].

Depression is a debleating condition with considerable emotional, physical and socioeconomic consequences, but often goes unrecognized and untreated and one reason for this is that there is lack of mental health literacy on this part of the public. Moreover, negative attitudes and beliefs about depression hamper the health seeking behaviour among lay individuals[1]. This study was intended to evaluate the knowledge and awareness about depression amongst the patients attending a Rural Health centre located at Mamandur village in Kancheepuram district.

Materials and methods

A cross sectional study was conducted amongst patients attending the outpatient departmentof rural health centre of SRM medical college & RC at kancheepuram. Data were collected between January to March 2017 for a period of about 2months in the rural health centre.

A total of 150 patients were included for this study. One fifty patients who attended the OPD between January to March 2017 and gave consent were selected as study subjects. Each subject was approached individually and an informed consent was obtained and all the study subjects were assured of confidentiality, patients who were not willing to participate and did not give consent were excluded from the study. Patients who were already diagnosed as cases of depression were excluded from the study.

A pretested semi structured questionnaire comprising questions regarding the knowledge and awareness about depression was used. Data were entered on excel sheet spread sheet. Descriptive statistics were used and results were expressed as proportions.

Results

Of the 150 participants who participated in the study 57 (38%) were males and 93 (62%) were males. Majority of the study subjects (43%) were in the age group between 30-60yrs, about 38% of the individuals were in the age group above 60yrs and a minority of the study subjects (19%) were in the age group between 18-30yrs. Mean age of the study participants was 37.2± 0.93. Majority of the study subjects 56% were farmers by occupation and a proportion of about 23% were daily wagers, rest of the study subjects belonged to other variety of employment categories which has been mentioned as miscellaneous in the present study. Amongst the female study subjects most them 77% were not employed and the rest of the female study subjects 23% were employed (refer Table.1)

About 52% of the study subjects were aware of the disease called depression and about 36% of the subjects admitted that they were not aware of the disease called depression. Most of the individuals (44%) believed that depression is a result of god's wrath due committing sins in the past and 21.8% of the individuals did not have any idea if depression is a result of god's wrath. About 52.5% of the individuals felt that depression needs medical attention 37.5% felt that it does not require any treatment. Majority of the study subjects 42% felt that the disease depression is curable and 34% felt that depression cannot be cured.

Table.1- Socio-demographic variables (n=150)

Table.1- Socio-demographic variables (n=150)

s.no	Variable	No	Percentage
1	**Sex**		
	Male	57	38
	Female	93	62
2	**Age**		
	18-30yrs	28	19
	30-60yrs	65	43
	>60yrs	57	38
3	**Occupation**		
	Farming	31	56
	Daily wagers	15	23
	Miscellaneous	11	21

Table.2- Knowledge, Awareness and beliefs regarding depression (n=150)

s.no		No	Percentage
1	Ever heard of depression before?		
	Yes	54	36
	No	78	52
	Not sure	18	12
2	Depression is a god's punishment for sin?		
	Yes	66	44
	No	51	34.2
	Not sure	33	21.8
3	Do you think there is stigma attached with depression?		
	Yes	91	60.7
	No	26	17.2
	Not sure	33	22.1
4	Are you aware of a psychiatric facility nearby?		
	Yes	33	22
	No	106	70.7
	Not sure	11	7.3
5	Do you think depression needs medical attention?		
	Yes	79	52.5
	No	56	37.5
	Not sure	15	10
6	Do you think depression is curable?		
	Yes	63	42
	No	51	34
	Not sure	36	24

A proportion of about 60.7% felt that there is some form of stigma attached to the treatment seeking behaviour of depression and 22.1% of the individuals had if there is any stigma attached to seeking treatment for depression. Majority of the study subjects in the present study had no idea where the nearest mental health facility was located and only 22% of the individuals knew where the nearest mental health facility was located. Regarding the causes of depression, about 18.30% of the individuals

felt that the important cause for depression is social, it was felt by 29.14% of the individuals that the cause for depression is financial. About 6.23% of the individuals felt that depression is caused do to stressful work atmosphere and 33.20% of the individuals felt that old age causes depression.

Discussion

The present study shows that 36% of the study subjects were aware of the disease depression and 52% of the individuals had not heard about the disease depression, about 12% of the individuals were not sure if they had heard of the disease depression before. A similar study conducted by Sadia R S et amongst the adult population of Aligarh, Uttar Pradesh demonstrated a higher awareness of 87.2% which is comparatively higher than the awareness level of the study subjects in the present study[3]. This difference could be due to the urban population tend to have higher level of awareness when compared to rural population due to ease of access to information through mass media. About 52.5% of the individuals felt that depression needs medical attention and it needs to be treated and only minority of them felt that depression does not need any medical attention.

In the present study 42% of the individuals believeddepression is a curable disease and 32% of the individuals felt that it is not a curable illness. In an analysis done and published by Reddy M S found that the community had a similar belief in this regard[4]. Regarding the stigma and misbeliefs about depression, majority of the study subjects felt and believed that there is some sort of stigma attached with depression and getting treated for the same(refer Table.2). A study done by Subudhi C in the central university of Tamilnadu displayed similar results and they are found to be consistent with the findings of our present study[5]. Some of the reasons for these misbeliefs are due to poor knowledge and awareness about the disease and difficulty in access to information since it is a rural area.

Majority of the study subjects were not aware of where the nearest mental health facility was located and only about 22% of the subjects were aware of the location of the nearest mental health facility. This reflects on the poor awareness regarding depression and in particular the health seeking behaviour of the population in regard to mental health. Some of the important reasons for developing depression according to the study subjects are not having a very good social environment to live in, poor economy, old age and loneliness. Minority of the study subjects also did feel that not having a health work place environment could also contribute to developing depression. Sadia S R et al's study amongst the adult population of Aligarh presented with similar results and are consistent with the findings of the present study[3].

Conclusion: Depression happens to be one of the important causes of DALY across the globe and Asian countries are one of the significant contributors of the world's burden of depression. Depression takes a toll onthe lives of people who suffer of it and often goes un noticed and untreated. Though the population is aware of the disease depression, complete understanding and awareness about the illness is poor. Overall the treatment seeking behaviour of the study population is poor and there is some stigma attached to it.

Recommendations: There is a need to provide essential knowledge about depression to the general population. Programs meant to improve the general awareness on depression, its causes, symptoms and treatment seeking behaviour can be supplemented along with the National program for mental health and other programs related to mental health in India. Information dissemination strategies specifically targeting the people living in rural areas should be devised and implemented for the betterment of knowledge and awareness regarding depression.

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Conflict of interest: Nil

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Original Research Article

Concomitant Behavioral Risk Factors of Non Communicable Diseases and its Associated Factors among Adults in the Selected Rural Areas of Puducherry, South India: A Community Based Cross-sectional Study

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Abstract

Background: Considering that knowledge of the burden of these risk factors in a community can aid in developing need based preventive strategies. Hence, attempt was made to profile the known risk factors of Non- Communicable Diseases among adults in in the selected rural areas of Puducherry, South India and to estimate the prevalence of concomitant risk factors and socio-demographic factors associated with having higher number of risk factors concomitantly. **Materials and Methods:**A community based cross-sectional analytical study was conducted in the selected rural areas of Puducherry. House to house enumeration survey was conducted in the purposively selected rural areas during September-2016 to February-2017. From adults in the enumerated houses information on alcohol use, tobacco use, non-consumption of adequate fruits/vegetables, high salt intake and physical inactivity were extracted using modified WHO STEPS-1 questionnaire. **Results:**Of the total 1844 enumerated individuals, 1423 (78.6%) were above 18 years of age. Of the 1423 participants, mean (SD) age was 41.9 (16.2) and 53.8% were females. The prevalence of self-reported hypertension and diabetes was found to be 7.2% (95%CI=5.9%-8.6%) and 5.7% (95%CI=4.6%-7.0%) respectively. The reported prevalence of behavioral risk factors were; Tobacco use- 6.6% (95%CI=5.4%-8.0%), alcohol use-9.3% (95%CI=7.8%-10.9%), physical inactivity- 76.4% (95%CI=74.1%-78.6%), low fruit intake- 68.2% (95%CI=65.7%-70.6%), low vegetables intake- 57.1% (95%CI= 54.4%- 60.0%) and high salt intake- 86.5% (95%CI=84.4%-88.3%). Out of 1423 individuals, 885 (62.2%, 95% CI- 59.7%-64.7%) had three or more concomitant risk factors. The multivariate generalized poisson model analysis showed that being male, lower socio-economic class, unemployed and backward class were independently associated with concomitant risk factors.**Conclusion:**The current study shows alarmingly high burden of risk factors and more so with concomitant risk factors. There is need for behavioral change communication and social mobilization activities to reduce physical inactivity and to improve the intake of fruits and vegetables.

Keywords: Non-communicable diseases, Behavioral Risk Factors, Concomitant Risk Factors, Tobacco Use, Physical Inactivity.

Introduction

Worldwide, Non-communicable diseases (NCD) are responsible for almost 70% of deaths and almost 75% of all NCD related deaths occur in low and middle income countries. Similarly 82% premature deaths i.e deaths among those aged between 30 to 70 years occur in these LMIC and MIC.[1] In India nearly 60% of deaths were due to Non-communicable diseases.[2] It was estimated that an economic loss of 3.55 trillion USD was incurred in India due to diabetes, cardiovascular diseases, cancers and chronic respiratory diseases during the period 2012-2030.[3] The general Assembly of United Nations had called for reducing the premature deaths due to four NCD namely diabetes, cardiovascular diseases, cancers and chronic respiratory diseases. It has been agreed by the countries to reduce the premature deaths by 25 % from the 2010 levels by 2025.[4] The main strategy proposed to achieve the set target is by reducing the highly prevalent common risk factors of non- communicable diseases.

The behavioral risk factors for non-communicable disease are unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol.[2] Worldwide, 2.7 deaths were attributable to low consumption of vegetable and fruits. It has been shown that 31% of coronary heart diseases, 19% of gastrointestinal cancer and 17% of stroke were caused by low consumption of fruits and vegetables.[5] One third of the global population have inadequate physical activity and physical activity alone attribute to 6- 10% of Major non-communicable diseases. Tobacco kills half of its users and nearly 6 million deaths were due to tobacco use. Tobacco is a risk factor for six out of eight leading cause of deaths worldwide.[6] According to WHO's Global status report on alcohol and health 2014, worldwide 16% of drinkers engage in heavy episodic drinking. Around 3.3 million deaths were caused by alcohol consumption, which corresponds to one in every twenty deaths. The highest number deaths due to alcohol consumption were from cardiovascular diseases.[7] Also, it has been reported that there is a positive interaction between these risk factors in causing the non-communicable diseases. Hence, the individual with the concomitant modifiable risk factors are more prone to develop NCDs.

With known untoward impact of these risk factors on the health of the individual, it is necessary to monitor the extent of these risk factors in the community and plan for strategies to reduce the same. World Health Organization has recommended STEPS tool, a stepwise approach to surveillance for chronic diseases and their risk factors. The STEPS tool has three steps namely step 1, step 2 and step 3 in which the step 1 was designed to obtain information about socio-demographic profile and behavioral risk factors of NCD namely inadequate fruits and vegetables intake, high salt intake, physical inactivity, alcohol use and tobacco use.[8] Considering that knowledge of the burden of these risk factors in a community can aid in developing need based preventive strategies. Hence, attempt was made to profile the known risk factors of Non- Communicable Diseases among people aged more than 18 in in the selected rural areas of Puducherry, South India. Also, in the current study we estimated the prevalence of concomitant risk factors and socio-demographic factors associated with have higher number of risk factors concomitantly.

METHODOLOGY

Study design and Study setting: A community based cross-sectional analytical study was conducted among the adults residing in rural areas of Puducherry. 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.

Study Population and Sample size: We included all the individuals aged more than eighteen years and residing in the selected areas of rural Puducherry. The sample size was calculated using nMaster version 2.0. The minimum sample size was calculated to be 1028 adult individuals, assuming the prevalence of not being screened for hypertension to be 70%, with a relative precision of 5% and adjusting for design effect of 1.5. The design effect was used to minimize the clustering due to selection of villages as primary sampling units and also for including all the individuals in the enumerated houses.

Four villages namely Bahourpet, Pillaiyarkuppam, Kuruvinatham and Irulansanthai were selected conveniently, which were located closer to the parent institute, Mahatma Gandhi Medical College & Research Institute. In each of these selected villages, all the houses were enumerated. Interviews were conducted by trained MBBS students supervised by the faculties and residents from the Department of Community Medicine. Interviews were done among available individuals using semi-structured interview schedule and information about those not available at the time of interview was extracted from the informant. If houses were locked or individual eligible for study was not present during investigators initial visit, two revisits were made.

Study Tool and Study variables: A semi-structured interview schedule was used to collect information from the study participants. A paper based semi-structured interview schedule was used in two villages and mobile app (Epicollect5 software) based forms were used in other two villages. The study tool included details on socio-demographic factors and known risk factors of non-communicable diseases.

Information on age, gender, occupation status, education status, total family income, number of individuals in the family and type of family were collected as part of socio-demographic details. The information on tobacco use, alcohol use, intake of fruit and vegetables, physical activity and total salt intake in the family per month was collected to profile the non-communicable disease risk profile of the participants.

The following operational definitions adapted from WHO-STEPS survey to assess

Tobacco use: Use of tobacco in any form in last one year.
Alcohol use: Consumption of alcohol in any form in last one year.
Inadequate fruit intake: Not consuming five servings of fruit per day.
Inadequate vegetable intake: Not consuming five servings of vegetables per day.

Inadequate physical activity: Not doing 150 minutes of leisure time physical activity per week.
High salt intake: Consuming more than 6 gram of salt per day (calculated based on monthly raw ration of the family).
Concomitant risk factors: Individuals having more than one risk factor concomitantly was considered as having concomitant risk factors.

Data Entry and Analysis: The information collected using questionnaire using paper based forms were entered using EpiData software version 3.1. The data was entered directly during data collection in the two surveys where Epicollect5 mobile application was used. Data was analyzed using EpiData analysis software and Stata 12 software. Percentage was used to summarize the categorical variables. 95% confidence interval was calculated for all outcomes of interest. The count data of number of concomitant risk factors was considered as outcome variable for assessing the factors associated with having concomitant risk factors. As there was underdispersion in the outcome count data (*Pearson dispersion= 0.602*) and hence we used Generalized Poisson Model for assessing the association between socio-demographic characteristics and concomitant risk factors. Generalized Poisson Model after adjusting for clustering at village was used to assess independent association of socio-demographic factors with concomitant risk factors. Prevalence ratios (as it is numerically same as Incidence Rate Ratios) with 95% confidence interval was used to express the association in both univariate and multivariate model.

Results

In total, 1423 people were included in the study. Of total 1423 participants, 397 (27.9%) were from Pillayarkuppam village, 517 (36.3%) were from Bahourpet, 299 (18.0%) were from Kuruvinatham and 253 (17.8%) individuals were from Irulansandhai village. The mean (SD) age of participants was 41.9 (16.2) and 765 (53.8%) were females. Of the 1423 individuals participated in the study, 402 (28.3%) had no formal education and 258 (18.2%) were graduates. Among study participants, 749 (52.7%) were unemployed/ housewife and 1093 (76.8%) were married. Of the total participants, 147 (12.6%) were from upper socio-economic class, 200 (17.2%) were from lower socio-economic class and majority (73.8%) of the participants were from schedule caste. The socio-demographic characteristics of study participants were shown in Table-1.

The prevalence of self-reported hypertension and diabetes was found to be 7.2% (95%CI=5.9%-8.6%) and 5.7% (95%CI=4.6%-7.0%) respectively. The prevalence of tobacco use was 94 (6.6%, 95% CI- 5.4%- 8.0%) and alcohol use was 132 (9.3%, 95% CI-7.8%- 10.9%). Among study participants, 970 (68.2%, 95% CI- 65.7%-

Tables 1: Socio-demographic characteristics of adults in the selected villages of rural Puducherry, N=1423

Socio-demographic characteristics	Frequency (%)	Socio-demographic characteristics	Frequency (%)
Age (in years)		**Marital Status**	
18-29	399 (28.0)	Never Married	267 (18.8)
30-44	437 (30.7)	Married	1093
45-59	343 (24.1)	Widow/Separated	63 (4.4)
60 and above	244 (17.2)	**Socio-Economic status (Modified BG Prasad's Classification)***	
Gender			
Male	658 (46.2)	Upper	147 (12.6)
Female	765 (53.8)	Upper Middle	178 (15.3)
Education		Middle	315 (27.0)
No formal Education	402 (28.3)	Lower Middle	325 (27.9)
Primary	190 (13.4)	Lower	200 (17.2)
Secondary	302 (21.0)	**Caste***	
Higher Secondary	157 (11.1)	Forward Caste	3 (0.3)
Intermediate/Diploma	114 (8.0)	Backward Caste	196 (16.8)
Graduate and above	258 (18.2)	Most Backward Caste	107 (9.2)
Occupation		Scheduled Caste	861 (73.8)
Unemployed/Housewife	749 (52.7)	**Village**	
Unskilled	279 (19.6)	Pillayarkuppam	397 (27.9)
Semiskilled	138 (9.7)	Bahourpet	517 (36.3)
Skilled	130 (9.1)	Kuruvinatham	299 (18.0)
Semi-professional and Professional	127 (8.9)	Irulansandhai	253 (17.8)

* Data was available only for 1167 individuals

Table 2: Distribution of known and concomitant NCD risk factors among adults in the selected villages of rural Puducherry, N=1423

NCD risk factor	Frequency, (%, 95% CI)
Tobacco Use	94 (6.6, 5.4-8.0)
Alcohol Use	132 (9.3, 7.8-10.9)
Inadequate intake of fruits	970 (68.2, 65.7-70.6)
Inadequate intake of vegetables	812 (57.1, 54.4-60.0)
Physical Inactivity	1087 (76.4, 74.1-78.6)
High Salt Intake	1006 (70.7, 68.3-73.1)
Concomitant Risk Factors	
Zero	68 (4.8, 3.7-6.0)
One	172 (12.1, 10.4-13.9)
Two	298 (20.9, 18.8-23.1)
Three	291 (20.5, 18.4-22.7)
Four	531 (37.3, 34.8-39.9)
Five	42 (2.9, 2.1-3.9)
Six	21 (1.5, 0.9-2.2)

70.6%) had inadequate intake of fruits and 812 (57.1%, 95% CI- 54.4%- 60.0%) had inadequate intake of vegetables. Of total 1423 study individuals, 1087 (76.4%, 95% CI- 74.1%- 78.6%) had physical inactivity and 1006 (70.7%, 95% CI- 68.3%- 73.1%) have consumed high salt intake. Out of 1423 individuals, 531 (37.3%, 95% CI-34.8%-39.9%) had four concomitant risk factors, 42 (2.9%, 95% CI-2.1%-3.9%) had five concomitant risk factors and 21 (1.5%, 95% CI- 0.9%-2.2%) all the six concomitant risk factors. The distributions of known and concomitant NCD risk factors are shown in Table-2.

Table 3: Association of socio-demographic characteristics with concomitant NCD risk factors among adults in the selected villages of rural Puducherry, N=1423

Characteristic	Total	Rate of Concomitant risk factor	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
Age (in years)				
18-29	399	2.75	1	1
30-44	437	2.86	1.04 (0.98-1.10)	1.01 (0.96-1.07)
45-59	343	2.97	1.08 (1.02-1.15)	1.02 (0.97-1.07)
60 and above	244	3	1.10 (1.02-1.17)	1.01 (0.98-1.04)
Gender				
Male	658	2.95	1.07 (1.03-1.12)	1.11 (1.05-1.17)
Female	765	2.82	1	1
Education				
No formal Education	402	3.06	1.13 (1.06-1.21)	1.06 (0.93-1.22)
Primary	190	2.92	1.09 (1.01-1.18)	1.07 (0.95-1.20)
Secondary	302	2.73	1.02 (0.95-1.09)	0.98 (0.87-1.10)
Higher Secondary	157	2.98	1.08 (0.99-1.18)	1.03 (0.95-1.11)
Intermediate/Diploma	114	2.92	1.07 (0.97-1.17)	1.02 (0.97-1.08)
Graduate and above	258	2.68	1	
Occupation				
Unemployed	749	2.87	1.06 (0.97-1.15)	1.07 (1.02-1.12)
Unskilled	279	2.95	1.11 (1.01-1.21)	1.10 (0.95-1.28)
Semiskilled	138	3.16	1.14 (1.03-1.27)	1.03 (0.97-1.10)
Skilled	130	2.68	1.01 (0.90-1.12)	0.97 (0.80-1.19)
Professional	127	2.71	1	1
Marital Status				
Never Married	267	2.83	1.03 (0.97-1.09)	-
Married	1093	2.89	1	
Widow/Separated	63	2.86	0.99 (0.88-1.12)	
Socio-Economic status				
Upper	147	2.83	1	1
Upper Middle	178	3.04	1.04 (0.96-1.12)	1.05 (0.96-1.15)
Middle	315	3.16	1.08 (1.01-1.15)	1.08 (0.96-1.22)
Lower Middle	325	3.21	1.09 (1.02-1.17)	1.08 (0.93-1.26)
Lower	200	3.28	1.13 (1.05-1.22)	1.12 (1.08-1.15)
Caste				
Forward Caste	3	3	1.23 (0.88-1.72)	1.10 (0.96-1.27)
Backward Caste	196	3.08	1.05 (0.97-1.14)	1.06 (1.03-1.10)
Most Backward Caste	107	2.88	1	1
Scheduled Caste	861	3.18	1.09 (1.02-1.17)	1.10 (0.98-1.24)

Table 3 shows the univariate analysis and multivariate analysis to assess the socio-demographic factors associated with concomitant risk factors. The univariate analysis showed that the factors like age, gender, education, occupation, socio-economic status and caste were associated with concomitant risk factors. The marital status was not associated with concomitant risk factors. The multivariate generalized poisson model analysis showed that being male 1.11 (95% CI- 1.05-1.17), lower socio-economic class 1.12 (95% CI-1.08-1.15), unemployed 1.07 (95% CI-1.02-1.12) and backward class 1.06 (95% CI- 1.03-1.10) were independently associated with concomitant risk factors.

Discussion

A community based cross-sectional analytical study was conducted among the adults residing in the selected rural areas of Puducherry to profile the NCD risk factors. There was high prevalence of physical inactivity, high salt intake, low intake of fruits and vegetables. Around 95% of the study participants had more than one known risk factor for non-communicable disease. Male gender, being in lower socio-economic status, belonging to backward class and being unemployed were independently associated with having concomitantly higher number of behavioral risk factors.

Though previous studies have estimated the burden of known risk factors, very few studies have reported the burden of multiple risk factors. A study conducted by Zaman et al in Bangladesh showed that the prevalence of three or more than three non- communicable risk factors was 37%. Also, a study conducted by INDEPTH in rural India showed prevalence of multiple risk factors (three or more) to be not exceeding 25%.[9, 10] However in the current study just more than 60% of the participants had three or more risk factors. There is alarmingly high burden of concomitant risk factors among the adults in the current study setting. Worrying fact is that the previous studies included more than six risk factors but had relatively lower burden. Whereas, in the current study we explored only six behavioral risk factors of which three or more were present among higher proportion of participants compared to previous studies. The study population across the studies were comparable, except for the fact that the current had relatively higher proportion of the elderly compared to previous studies. The reason for this high burden of concomitant risk factors might be the potential reason for high burden of NCDs. However the relationship between the presence concomitant risk factors and early onset of NCDs needs to be explored in the current study setting.

The previous study conducted in Bangladesh showed that the ageing was associated with clustering of risk factors which was not found in this study population, but male gender were associated with clustering of risk factors in both the studies.[9] In the present study socio-economic status and caste were independently associated with concomitant risk factors. However similar association were not explored in the previous studies.

The present study population had 76.4% inadequate physical activity, which was much higher when compared to the reported prevalence from the same setting (54.2%).[10] The prevalence of high salt intake was 70.7% among the study participants, which was similar to the study conducted in Chennai.[11]These studies have shown that the amount of salt intake in both rural and urban settings were high when compared to the WHO recommendation of not more than 6g per day. The present study and a study conducted in Kerala, both showed very high prevalence of inadequate fruits intake, which was 68.2% and 87% respectively.[12] Similarly, more than half of the study participants were consuming inadequate amount of vegetables.The prevalence of low vegetable intake was relatively lower when compared to the study conducted in similar setting.[13]A study conducted among Asians showed that 100% of men and 99.8% of women in India were consuming inadequate fruits and

vegetables.[10]The proportion of alcohol use and tobacco use in the present study population was 9.3% and 6.6% respectively, which was relatively lower when compared to the studyconducted in Kerala that showed the prevalence of alcohol use and tobacco use was 15.4% and 28% respectively.[14]However social desirability bias might have led to under reporting the behavioral risk factors and hence the under estimation of the same.

The current study has few strengths. First, the study had relatively good sample size to estimate the burden of known risk factors and also presence of concomitant risk factors. Second, standard guidelines adapted from STEPS were used to measure the known risk factors. Third, the investigators monitored in field for the completeness of data during the data collection. Fourth, the data management tools like EpiData software and Epicollect5 were used for data entry and hence ensuring the data quality during data entry. Fifth, we used generalized poisson model for assessing the association of socio-demographic factors with multiple risk factors. The previous studies had categorized the outcome (concomitant risk factors) using arbitrary cut-off of either three or four. As there are no standard guidelines for defining concomitant risk factors and also there are inherent problems in statistical inference on dividing the outcome into binary, we used generalized poisson model. The used model considered the outcome as the count data, with necessary adjustments for the under dispersion in the outcome data.

The study had few limitations. First, we failed to include the biochemical and anthropometric risk factors of non-communicable diseases. Including these risk factors would have given a better estimate regarding the concomitant risk factor burden. Second, the non-probability sampling was used to select the villages which were considered to be primary sampling units. However, socio-demographically the selected villages were comparable to the villages in the study setting. Third, multiple teams were involved in data collection. However we maintained at most standards in training and also field level assessment of risk factors. Fourth, the sample size might not have been adequate for exploring the association between socio-demographic factors and having multiple risk factors.

The current study shows alarmingly high burden of risk factors and more so with concomitant risk factors. There is need for qualitative exploration of reasons for this high level of risk factors in the community and also potential interventions to reduce the same. There is need for behavioral change communication and social mobilization activities to reduce physical inactivity and to improve the intake of fruits and vegetables. The self-help groups can be involved in raising the awareness regarding the known risk factors of NCDs and also to actively advocate for healthy lifestyle among their own community. Improving the access to physical activity through parks, play grounds and regular provider initiated sports completion needs to be tried. The availability and cost of fruits and vegetables can be optimized through community cooperative cultivation of the indigenous fruits and vegetables.

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There was no conflict of interest during the conduct and reporting of this research findings. No funding was availed for the current study.

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Original Research Article

FoodSwitch: Can a smart phone app help consumers switch to healthier food choices? A Pilot Study.

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Abstract

Background: The national burden of diseases determined by diet related life-styles of the population is on the rise in the past two decades. Two third of consumers visiting supermarkets own a smart phone and use of mobile apps is high among educated youth and adults in India. The George Institute of Global Health and Bupa Australia, developed FoodSwitch India app and launched in India, in December 2015 with the aim to support healthier food choices. **Objective:** This study aims to 1. Determine the willingness of the consumers to use FoodSwitch smartphone application to make healthier food choices. **Materials and methods:** This is an experimental-intervention study conducted during May-June 2016 in 10 different supermarkets in the sub urban region of Chennai, of Tamil Nadu. As a pilot study, 50 consumers with smart phones arriving at supermarkets with the intent of purchasing food products were included in the study after obtaining written informed consent. They participated in the study by downloading FoodSwitch app on their smartphones after demonstration by the researchers and used it for their purchases. **Results:** 46% of the study participants are of 18-28 years, 54% are females. 88% are graduates and 28% are professionals, 20% are house-wives. Only 12% of them choose food products using nutritional label. Overwhelming majority of them (98%) are not aware of the app called FoodSwitch. 76% of them feels that the FoodSwitch app is very easy to use.56% expressed willingness to use this app regularly in future. **Conclusion:** This study revealed awareness about FoodSwitch app is low among consumers and only half of them are willing to use regularly hereafter. This is a relatively small sample and hence further studies are required.

Key Words: Diet-related life style, smart phone application, FoodSwitch, nutrition label.

Introduction:

Studies show that food labeling on packages help consumers understand the nutritional content of foods and help them make informed and healthier choices [1, 2]. Earlier studies have evaluated the potential of smart phones, which are a recent advance to transform public health landscape tremendously[3]. Authors claimed that there are 7000 documented cases of smart health apps globally [3, 4]. About two third of consumers visiting supermarkets own a smart phone and use of mobile apps is high among educated youth and adults in India. FoodSwitch, is a free smart phone application which works on Android smartphones and Apple mobile devices that could potentially minimize the ill effects of processed foods by helping the consumers find out what is in the food they are eating, so that they can switch to healthier food choices[5]. It is launched in India, in December 2015, and is an extension of an app already available in several countries including Australia, New Zealand, Britain, China and South Africa. A version of app for USA is in development[5]. FoodSwitch India App was developed by The George Institute of Global Health and Bupa Australia with the aim to support healthier food choices and help prevent diet-related health disorders[5, 6]. There are totally thousand downloads of this FoodSwitch app made by people of India in Google play store. FoodSwitch works by scanning the barcodes of packaged food using smart phone camera and receive immediate, easy to understand nutritional information with a consumer friendly traffic

light type of color coded rating for four key food components (total fat, saturated fat, sugar and salt) along with energy in kilojoules. In the traffic light system red indicates the food is less healthy, amber indicates the food is ok and green is healthier choice. Vegetarian status is displayed by a green side bar and the word "VEGETARIAN" will appear on the side. Then the app also lists out some of the similar food that are healthier alternatives of the food which is scanned. The scanned food items are matched with the database and information is displayed. Nutritional information of the scanned food products comes from independent packed food database for India[5]. The difference between FoodSwitch India and other countries is the health star rating system and the filters[7]. Only classic filters which helps in making overall health choices are present in FoodSwitch India. Other country foods witch app contains separate filters like salt switch, gluten switch, fat switch, energy switch, sugar switch. Shop ethical, shop well, sea food guide are the some of the other food choosing apps and traffic light food tracker, my food intolerance list, the Monosh university low fod map diet are other traffic light coding food apps available. But FoodSwitch India is the only app introduced for choosing healthier food products in India with traffic light coded system which also shows alternative food choices. The national burden of non-communicable diseases (NCDs) is on the rise in the past two decades[8]. Non communicable diseases (including heart disease, stroke, cancer and diabetes) are responsible for 43 million death each year which is almost 80% of all deaths worldwide[9]. A simple change in choosing healthier food products can reduce the incidence of non-communicable diseases. Food products we choose to consume at individual and family level directly influence the epidemic of obesity among children and adults. As India ranks third in the world's most obese countries list[10], interventions targeting the prevention of NCD-related risk factors such as obesity are the need of the hour[11, 12]. The regular use of technology enhanced smart phone applications will empower consumers to make informed decisions on their food consumption behaviors. Real world research though challenging is needed to understand the willingness and use of this recently introduced app and its influence on consumer's food purchasing behavior.

Materials and methods:

Study Design: Experimental-Intervention Study Design. **Study type:** Pilot study. **Study Period:** 1st May 2016 – 30th June 2016 (Two Months). **Study site:** This study was conducted in ten different supermarkets-(TKS Shanmuga provisions, Murugan supermarket, AP Supermarket, VM Supermarket, More supermarket, Jayam supermarket, Sri Krishna supermarket, Heritage fresh supermarket, Bloom gold departmental store and Sri Venkateshwara supermarket in OMR region which is a sub-urban area of Chennai, of Tamilnadu. **Study Population:** Consumers arriving at supermarkets with the intent of purchasing food products available with nutrition label. **Sample size:** Five consumers shopping at each supermarket (N=10) where included in the study. Totally 50 consumers shopping at the supermarkets where included in the study. **Selection criteria: Inclusion Criteria:** Consumers aged above 18 years, Owning a smart phone either with functional internet connection or Bluetooth connectivity, Shop at supermarket at least once a week, Regular main shopper for the household, able to read and understand English, Willing to participate in the study by downloading FoodSwitch app on their smartphones, Provide written consent. **Exclusion Criteria:** Another family member already enrolled. **Informed consent procedure:** Informed written consent was obtained from the supermarket managers or supermarket incharge before conducting the study. During the study informed written consent was obtained from all the 50 study participants. **Study Area:** Supermarkets situated in a residential upmarket area in a metropolitan city is randomly selected and approached with this study proposal. Management, which is favorable and agrees for the conduction of the study among its consumers in shop premises are included in the study after getting an informed written consent from the manager or the supermarket incharge. As this is a pilot study on smart phone app, which is introduced in India recently, only 50 participants are included as sample size. The consumers shopping at the supermarkets where approached with the study proposal. Consumer at the supermarket who are favorable and volunteering for participating in this study by downloading FoodSwitch app through internet or installing the app through Bluetooth or other sharing apps like SHAREit are included and informed written consent was obtained from them. Participants of the study where directed to install the app in their smart phones. Participants where explained how to use the FoodSwitch app by scanning the barcodes of the chosen food products with the mobile camera. After the food label appeared on the screen they were explained about the traffic light model and alternative healthier food choices shown in the screen .Then the participants were made to try the FoodSwitch app on their own. Later they were administered a questionnaire, which collects information on the socio-demographic profile, and practices of smartphone usage and attitude towards FoodSwitch app. FoodSwitch tells the consumer its health weightage i.e. how high the food is in salt, fat, sugar and kilojoules. It also suggests healthier alternatives in the same food category, thereby comparing the product of one company with the other in the above aspects. As a food item is scanned, FoodSwitch shows more information in the form of a color code, red amber and green about the nutrition in the product. In the 'Traffic Light' labelling mode, color-coded ratings project on the screen if a product is low (green), medium (amber)

or high (red) for key food components (total fat, saturated fat, sugar and salt). Red is less healthy, amber is ok and green is a healthier choice. This inbuilt feature in the app will provide the consumers with options and empower them to make informed choices regarding purchase of healthier food products. Data collection procedure: After obtaining informed written consent, the content of the questionnaire was explained to the participants. Self-administrated questionnaire was given to the participants and data was collected. Ethical consideration and confidentiality: Institutional ethical committee approval was obtained before starting the study. Confidentiality of the study participants is maintained in all phases of the study.

Result:

Study was conducted among fifty consumers shopping at ten different supermarkets which included TKS Shanmuga provisions, Murugan supermarket, AP Supermarket, VM Supermarket, More supermarket, Jayam supermarket, Sri Krishna supermarket, Heritage fresh supermarket, Bloom gold departmental store and Sri Venkateshwara supermarket in sub-urban area of Chennai. Forty six percent of the study participant's fall in the age group of 18-28 years, fifty four percent of them are females and forty six percent where males. Eighty eight percent of them being graduates and above education level. Twenty eight percent of the study population belongs to upper socioeconomic class according to Kuppuswamy's socioeconomic status scale, forty percent study participants are semiprofessionals and twenty eight percent of them are professionals, twenty percent of the study population who are unemployed are house wives. Fifty six percent of the study population always wanted to make healthier food choices and forty percent of the population wanted to make healthier food choices sometimes. Forty two percent of them occasionally have the habit of choosing food products by seeing the calorie value and nutritive value in the label. Nutritive value is first most to be considered in the label by twenty eight percent of the study participants and thirty two percent of them consider price as important part in food label. Majority of them (98%) forty nine members of the study population are not aware of the app called FoodSwitch. Eighteen percent of them said they have used other apps like calorie carb and fat counter, zomato, domino's pizza app, food recipes app and food panda app which are not actual food choosing apps but they are food delivery apps and food recipe apps for choosing their food products. Seventy six percent of them feels that the FoodSwitch app is very easy to use. Thirty percent population of the study wanted other features such as including data about all food products, improvement in auto focus, suggesting more alternative food choices and the study population also wants the app to suggest healthier food choices separately for male, female, children, aged and also suggestions for people suffering from diseases to be included. Fifty six percent and thirty six percent of the study population are willing to use and

Table 1: Profile of the study participants (N=50)

Profile	N (%)	Profile	N (%)
Age:		**Occupation:**	
18-28	23(46)	Profession	14(28)
29-38	16(32)	Semi profession	20(40)
39-48	8(16)	Clerical, shop owner, farmer	3(6)
49-60	3(6)		
Gender:		Semi -skilled worker	2(4)
Male	23(46)	Unskilled worker	1(2)
Female	27(54)	Unemployed	10(20)
Education:		**Socio economic class*Modified Kuppuswamy's scale**	
Profession course	16(32)		
Graduate or post graduate	28(56)		
Intermediate or post high school diploma	1(2)	Upper class (I)	14(28)
High school certificate	4(8)	Upper middle class (II)	31(62)
Middle school certificate	1(2)	Lower middle class (III)	5(10)

Table 2: Smart phone usage by study population (N=50)

S.no	Usage	N (%)
1	**Smart phone brand:**	
	Sony	7(14)
	Samsung	21(42)
	Micromax	7(14)
	Lava	2(4)
	HTC	7(14)
	Others*	6(12)
2	**Service provider:**	
	Airtel	23(46)
	Aircel	8(16)
	Vodafone	6(12)
	BSNL	4(8)
	Reliance	3(6)
	Tata docomo	4(8)
	MTS	1(2)
	Idea	1(2)
3	**Duration of smart phone usage:**	
	1 year	4(8)
	More than 1 year	21(42)
	More than 5 year	20(40)
	More than 10 year	5(10)
4	**Data recharge pack:**	
	Continuously without break	17(34)
	Only if needed	33(66)
5	**Total number of apps used:**	
	<5 app	13(26)
	5-10 app	24(48)
	10-20 app	12(24)
	20 app	1(2)

**Others – Motorola, Moto G2, ASUS, Apple I phone, ELITE.*

will try to use the FoodSwitch app in future respectively to make healthier food choices. Eight percent of the study population are not willing to use the FoodSwitch app to make healthier food choices in future. Fifty four percent of the study population feels that the FoodSwitch app helped them in making healthier food choices, forty percent of them feel it helped them in making healthier food choices but still can be better and six percent of them feel FoodSwitch app was not useful for them in making healthier food choices. Downloading the FoodSwitch app in the smart phones of the study participants was challenging due to poor network connectivity. Auto focus in cameras of the smart phone of the study population were not good enough to scan the bar codes quickly. Socio-Demographic profile**:** As in Table 1: Forty six percent of the study participant's fall in the age group of 18-28 years, fifty four percent of them are females and forty six percent where males. Eighty eight percent of them being graduates and above education level. Twenty eight percent of the study population belongs to upper socioeconomic class according to Kuppuswamy's socioeconomic status scale, forty percent study participants are semiprofessionals and twenty eight percent of them are professionals, twenty percent of the study population who are unemployed are house wives. Practice (Smart phone usage):As shown in Table 2:Forty six percent of the study participant's fall in the age group of 18-28 years, fifty four percent of them are females and forty six percent where males. Eighty eight percent of them being graduates and above education level. Twenty eight percent of the study population belongs to upper socioeconomic class according to Kuppuswamy's socioeconomic status scale, forty percent study participants are semiprofessionals and twenty eight percent of them are professionals, twenty percent of the study population who are unemployed are house wives. The main use of smart phone app and internet service by the study population (N=50) is for Google search and web access, online shopping, chatting and social networking, games. Six (12%) of them had other health related app in their phone such as pedometer, weight loss app, medical dictionary, physiotherapy app, medical news app. Attitude towards choosing food products**:** As shown in Table 3: Fifty six percent of the study population always wanted to make healthier food choices and forty percent of the population wanted to make healthier food choices sometimes. Forty two percent of them occasionally have the habit of choosing food products by seeing the calorie value and nutritive value in the label. Nutritive value is first most to be considered in the label by twenty eight percent of the study participants and thirty two percent of them consider price as important part in food label. Attitude towards FoodSwitch app**:** As in Table 4: Majority of them (98%) forty nine members of the study population are not aware of the app called FoodSwitch. Eighteen percent of them said they have used other apps like calorie carb and fat counter, zomato, domino's pizza app, food recipes app and food panda app which are not actual food choosing apps but they are food delivery apps

Table 3: Attitude of the study population (N=50) towards choosing food products.

S.no	Choosing food products	N (%)
1	**Wanted to make healthier food choices**	
	Always	28(56)
	Sometimes	20(40)
	No	2(4)
2	**Habit of choosing food products by seeing calorie value and nutritive value in label**	
	Always	6(12)
	Occasionally	21(42)
	Rarely	13(26)
	No	10(20)
3	**First most to be considered in label**	
	Nutritive value	14(28)
	Price	16(32)
	Brand name	10(20)
	Manufacturing date	10(20)

Table 4: FoodSwitch app usage by the study population (N=50)

1	**Awareness about FoodSwitch app**	
	No	49(98)
	Yes, but not used before	1(2)
2	**Used other apps to choose food products**	
	Yes	9(18)
	no	41(82)
3	**Easy usage of FoodSwitch**	
	Very easy to use	38(76)
	Difficult to use	12(24)
4	**Features to be added to this app**	
	Yes	15(30)
	No	35(70)
5	**Willingness to use the app in future**	
	Willing to use	28(56)
	No	4(8)
	Will try to use	18(36)

and food recipe apps for choosing their food products. Seventy six percent of them feels that the FoodSwitch app is very easy to use. Thirty percent population of the study wanted other features such as including data about all food products, improvement in auto focus, suggesting

more alternative food choices and the study population also wants the app to suggest healthier food choices separately for male, female, children, aged and also suggestions for people suffering from diseases to be included. Attitude towards FoodSwitch app: As in Table 4: Majority of them (98%) forty nine members of the study population are not aware of the app called FoodSwitch. Eighteen percent of them said they have used other apps like calorie carb and fat counter, zomato, domino's pizza app, food recipes app and food panda app which are not actual food choosing apps but they are food delivery apps and food recipe apps for choosing their food products. Seventy six percent of them feels that the FoodSwitch app is very easy to use. Thirty percent population of the study wanted other features such as including data about all food products, improvement in auto focus, suggesting more alternative food choices and the study population also wants the app to suggest healthier food choices separately for male, female, children, aged and also suggestions for people suffering from diseases to be included. Willingness of consumers in using the FoodSwitch app: As shown in figure 1: Fifty six percent and thirty six percent of the study population are willing to use and will try to use the FoodSwitch app in future respectively to make healthier food choices. Eight percent of the study population are not willing to use the FoodSwitch app to make healthier food choices in future. Perception of the study population about the usefulness of the FoodSwitch app in making healthier food choices during their first use in the study: As in the figure 2: Fifty four percent of the study population feels that the FoodSwitch app helped them in making healthier food choices, forty percent of them feel it helped them in making healthier food choices but still can be better and six percent of them feel FoodSwitch app was not useful for them in making healthier food choices.

Figure 1: Chart showing willingness of the study population in using the FoodSwitch app in the future.

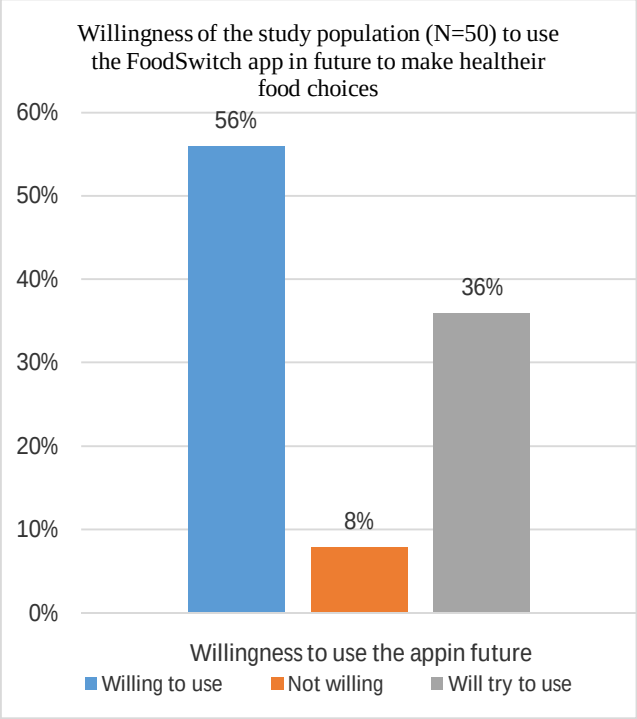
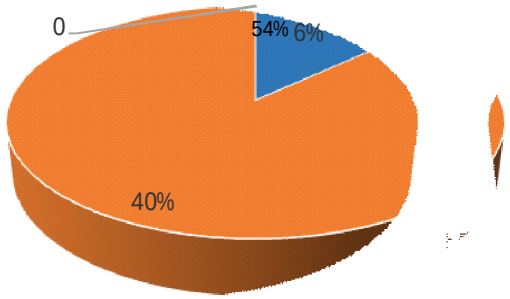


Figure 2: Perception of the study population about the usefulness of the FoodSwitch app in making healthier food choices during their first use in the study.



54% -Helpful in making healthier food choices
40%-useful but still can be better
6%-Not useful in making healthier food choices

Discussion: This study attempted to understand the willingness and perception of consumers about a food app, FoodSwitch in making healthier food choices. Participation in the study was voluntary and one time use of the mobile app during the interview for the study has been reported. As this is a relatively new app which is released in India, published literature on consumers experiences using this app are rare to be found. The widespread use of smart phones and access to internet is revolutionizing the way consumers address food related decisions. The food choices have an implication on the health of the family. FoodSwitch is a food app, introduced in India in Dec 2015, and found in our study 98% of them are not aware of this food app. This study gave them an opportunity to interact with medical students and learn about the features of the app and used it, which was consumer-friendly. As FoodSwitch is designed to help consumers make healthy food choices, in our study population, all the approached consumers, demonstrated willingness to use it at the time of the study and 56% self-reported willingness to use the app in future when making healthier food choices as they are impressed with the efficiency of the food app in helping them identify better healthier options of food items in a given category. Seventy six percent of the study participants also expressed that the app is easy to use and a substantial proportion (40%) of the study participants felt that the app can be improvised for better consumer experience, incorporating features for automatic barcoding scanner etc. About (54%) of the study participants reported that FoodSwitch app was helpful in making healthier food choices. This is less when compared with other studies.[13, 14 and 15] Though there is a recent shift in trends of consumers opting for healthier food choices [16], it is not

greatly reflected in our study as only 42% of the study participants make food choices based on nutritive value of the foods. Thirty two percent of study population still expressed that food price is an essential element when choosing food products. This brings to attention that government should make a comprehensive policy to bring down the prices of healthier food options like fruits and vegetables and encourage the population to consume less of the cheaper and calorie dense foods to address the epidemic of non-communicable diseases. No challenges were faced when interacting and facilitating the use of the app as consumers expressed satisfaction being made aware of this new app. We believe that raising awareness about these apps will enhance the consumer's abilities in choosing healthier food choices, and this study is an attempt towards this.

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2. Indian Council Of Medical Research – Short Term Studentship.
3. Supermarket managements.
4. Consumers at supermarket.

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Conflict of interest: Nil

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Original Research Article

Impact of lifestyle on weight and Body Mass Index of medical students studying in Guntur Medical College, Guntur.

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Abstract

Background: Transition from high school to college among young adults can be a stressful lifestyle due to Urbanization, unhealthy eating patterns and reduced physical activity. Body mass index (BMI) is an important cardiometabolic parameter. **Aims and Objectives:** The present study aims to identify the prevalence of overweight and influence of lifestyle factors on BMI of medical students in Guntur Medical college, Guntur. **Materials and Methods:** It is a cross sectional study conducted among third semester students of Guntur medical college. Students were interviewed using predesigned and prestructured questionnaire. BMI was calculated based on height and weight of the students measured using stadiometer and weighing scale respectively.Data was entered and analyzed by using SPSS version 16.**Results:** A total of 195 students participated in the study out of which 127 were females and 68 were males. Overweight and obesity was found in 14.8%(29) students and it is significantly more among junk food eaters and people who skip breakfast.

Keywords: Urbanization, overweight, physical activity

Introduction

The burden of obesity has increased exponentially, affecting all socio-economical groups of both developed and developing countries, irrespective of age, sex and ethnicity in recent decades. This prompted WHO to describe obesity as an escalating global epidemic.[(1)].

In India, there is a nutritional from typical carbohydrate diet to fast food dietary habits, particularly young adults like medical students have been affected [(2).] The causes of adult obesity include a variety of factors like diet, genetic predisposition, lack of physical activities and other behavioral factors.[(3)]

Mothers play a key role in developing a home environment that fosters healthful eating and physical activity among children and adolescents. Mothers shape their children's dietary practices activity, sedentary behaviors, and ultimately their weight status in many ways.[(4)]Body mass index (BMI) is a cardio-metabolic parameter. It is the most commonly used parameter for assessing the overweight among the population.

The present study aims to identify the prevalence of overweight and obesity and the influence of lifestyle factors on body mass index of medical students in Guntur Medical college, Guntur.

Methods & Materials

This was a cross sectional descriptive study which was undertaken among 6th semester undergraduate students of Guntur medical college. A total of one hundred and ninety five undergraduate medical students were recruited into the study by convenience sampling after obtaining verbal informed consent.

Anthropometric measurements of the subjects were taken using standard apparatus. The measurements included weight, height, waist and hip circumference. The weight was measured with calibrated standard electronic

weighing scale to the nearest 0.1 kg. Height was measured to the nearest 0.5 cm using a portable meter rule. Body mass index (BMI) was calculated as weight (kg) divided by the square of height (m2) and then categorized according to WHO recommendations to define underweight (BMI ≥ 18.5), healthy weight(BMI,18.5-24.99), Overweight (BMI, 25.0 - 29.9) and obese (BMI > 30) individual.

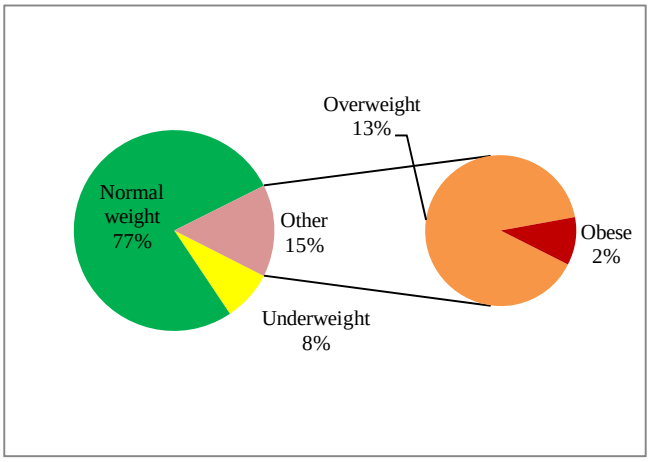
Data was entered and analyzed using SPSS version 16. In this study, both descriptive (percentage, mean and standard deviation) and inferential statistics were used to analyse the data. The Chi-square test was used to find out association between overweight/obesity characteristics and life style factors. All tests for statistical significance were two tailed and pvalue set at < 0.05.

Results :

This study comprises of 127 females and 68 males 195 with age ranging from 19-22Years. Mean BMI among the students is 22.09±2.87 among which male 21.66±2.63 and female is 22.32±2.97

Out of 195 study subjects, 16 (8.2%) were underweight, 150 (76.9%) were normal and 29 (14.9%) were considered as overweight/obese, of which 26(13.3%) were overweight and 3 (1.5%) were obese according to BMI. (Fig-1).

Fig-1: Prevalence of Obesity based on BMI



Body mass index (BMI) and sociodemographic factors

Among girls, 20 (15.7%) were overweight/obese compared to 9(13.2%) among boys. The difference was not statistically significant (chi square=1.087, p value=0.587)(Table-1). The prevalence of obesity increased significantly (P = 0.03) with the better educational status of the mother.Maternal occupation plays an important role in weight of the child.Overweight and obesity are found to be higher among students whose mothers are working(22.5%) and it is found to be statistically significant (p=0.034). Place of stay of the student has found to be not influencing the weight patterns of the students as both the places have shown nearly 15% obesity (p=0.956)

Table-1: Body Mass Index (BMI) and Sociodemographic features

PARAMETER	CATEGORY	UNDERWEIGHT	NORMAL WEIGHT	OVERWEIGHT AND OBESE	P VALUE
Gender	Male	4(5.9%)	55(80.9%)	9(13.2%)	0.587
	Female	12(9.4%)	95(74.8%)	20(15.7%)	
Maternal education	Primary and illiterate	2(4.5%)	34(77.3%)	8(18.2%)	**0.039**
	Secondary and inter	5(8.2%)	49(80.3%	7(11.5%)	(Significant)
	Graduate	9(11.2)	62(77.5%)	9(11.2)	
	Professional	0	5(50%)	5(50%)	
Maternal occupation	Housewife	13(10.5)	98(79%)	13(10.5%)	**0.034**
	Working mother	3(4.2%)	52(73.2%)	16(22.5%)	(Significant)
Place of residence	Hostel	6(7.5%)	62(77.5%)	12(15%)	0.956
	Home	10(8.7%)	88(76.5%)	17(14.8%)	

Body Mass Index and Lifestyle Factors:

Of the participants who practice vegetarian diet, Underweight was 1(5.8%) , Normal weight 15(88.2%) , and Overweight only 1 (5.8%). Higher percentage (29,16.2%)of obesity was found in mixed diet students than that of vegetarians though tests of significance cannot be considered because of very less amount of vegetarians.(Table-2). Frequent skipping of breakfast is seen more in obese male (6,20.7%)and female (12,27.9%)students. The results are statistically significant among females(p value 0.016) only compared to male students(p value 0.265). Obesity and overweight are found to be higher among students taking junk foods more than thrice a week. Male (637.5%)and female14, 63.6%)and it is found to be statistically significant in both male(p value0.003) and female students(pvalue0.000). Overweight/obesity was found in 8,18.6% males and 18,20.9% females subjects who were not engaged in physical exercise (a minimum of 5 days in a week and 30 min/day).and is statistically significant both among male and female students(p value 0.05 and 0.065 respectively)

Fig-2 Types of physical activity by students

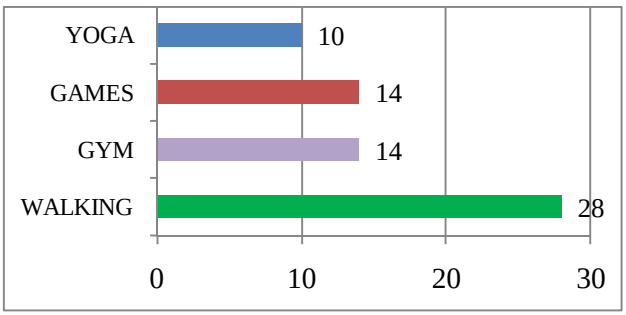


TABLE-2 Body Mass Index and Lifestyle Factors

VARIABLE	SEX	CATEGORY	UNDERWEIGHT	NORMAL WEIGHT	OVERWEIGHT AND OBESE	TOTAL	P VALUE
Diet	Male (N=68)	Vegetarian	0(0%)	5(100%)	0(0%)	5	1.276
		Mixed	4(6.3%)	50(79.4%)	9(14.3%)	63	
	Female (N=127)	Vegetarian	1(8.3%)	10(83.3%)	1(8.3%)	12	0.609
		Mixed	11(9.6%)	85(73.9%)	19(16.5%)	115	
Frequent skipping of breakfast	Male (N=68)	Yes	2(6.9%)	21(72.4%)	6(20.7%)	29	0.265
		No	2(5.1%)	34(87.2%)	3(7.7%)	39	
	Female (N=127)	Yes	5(11.6%)	26(60.5%)	12(27.9%)	43	**0.016** (Significant)
		No	7(8.3%)	69(82.1%)	8(9.5%)	84	
Junk food intake	Male (N=68)	<3times/wk	4(7.7%)	45(86.5%)	3(5.8%)	52	**0.003** (Significant)
		>3times/wk	0(0%)	16(100%)	6(37.5%)	16	
	Female (N=127)	<3times/wk	11(10.5%)	88(83.3%)	6(5.7%)	105	**0** (Significant)
		>3times/wk	1(4.5%)	7(31.8%)	14(63.3%)	22	
Physical activity	Male (N=68)	Yes	0(0%)	24(96%)	1(4.0%)	25	**0.05** (Significant)
		No	4(9.3%)	31(72.1%)	8(18.6%)	43	
	Female (N=127)	Yes	4(9.8%)	35(85.4%)	2(4.9%)	41	**0.065** (Significant)
		No	8(9.3%)	60(69.8%)	18(20.9%)	86	

Walking (28, 42%) is the activity opted by majority of the students among those who were doing regular physical activity(N=66)(Fig-2)In a study conducted by Goyal et al [(10)]it wasfound that the important influencing factors for overweight and obesity were low levels of physical activity and consuming junk foods.

Discussion:

The purpose of this study was to assess overweight and obesity rates among medical college students in Guntur medical college and to correlate their body weight status with sociodemographic and lifestyle factors. The current data demonstrated that 14.9% of the students were above the normal body weight. It is higher than that of the study conducted among medical undergraduates in Kancheevaram District(8.6%[(5)]) and New Delhi(11.7%[(6)]) and much lesser than that of the studies conducted among medical undergraduate students of Kerala(37.6%[(7)] , 25.7%[(8)])

Overweight and obesity was found to be not significantly associated with gender of the student.Similarly no significant gender difference was found in study conducted among university students in Nigeria.[(9)] .Maternal education and occupation was significantly increasing the obesity patterns of the students. Similar significance with maternal education and occupation was found in the study conducted in North India[(10)].

Our results revealed that skipping breakfast was significantly correlated BMI among girls.similar findings were found in the study conducted by Bertone et al[(11)] and Amin TT et al[(12)]

In the present study, consumption of junk food or snacking is significantly associated with overweight/obesity as seen by various investigators[(13),(14),(15)].

Our study found out a statistically significant association of decreased physical activity with overweight/obesity. Similar results were also seen in by Goyal et al [(15)] andGupta et al.[(16)]

Conclusions

Obesity is found to be nearly 15%among study subjects. Lack of exercise, consumption of junk food, were found to be highly prevalent risk factors of obesity in the study participants.Lifestyle modification is important to improve healthier habits earlier in life. Emphasis should be given to implementing interventions aimed at increasing physical activity and encouraging healthier diets among students thereby reducing their future risk of chronic diseases. Sports should be promoted, especially among women as many of them were found to be physically inactive. Nutrition education classes should be included in the curriculum to address the issue of malnutrition.

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Original Research Article

Internet Enabled Identification of Challenges in Management of Cardiovascular Disease: A Systematic Review of Videos

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Abstract

Background Cardio vascular diseases (CVD) are one of the most common diseases related to lifestyle diseases that accounts for increased hospitalization, economic burden, mortality and morbidity. The challenges faced by clinicians are varied and understanding these will enable to identify solutions and successfully apply in the management of CVD. Internet videos are a dynamic pool of resources with wider perspectives and content can be assessed in short time. **Objectives:** To review the videos available on internet to identify the clinician-mentioned challenges and solutions in management of CVD **Methods:** A comprehensive content analysis and review of videos available on internet through open source including clinician interviews across primary, secondary level of care is performed. **Results :**55 videos with total viewing time of 3 hours 6 minutes 6 seconds were included for review. *Clinician-centered* challenges were: incompetency to address the psychological emotions of the patients (33%), delayed diagnosis of CVD (25%), failure in adapting to technical advancements (7%) and patients reliance on information available on internet (4%). *Patient-centered* challenges were: failure to adapt diet and exercise related life style modifications (17%), late presentation of disease with complications (16%), and patient's financial status (4%) as a challenge in prescribing treatment options. Solutions proposed were: improved doctor-patient communication through effective listening and building of trust, patient education through inclusive management plans along with patients, lifestyle modifications by incorporating physical activity into daily living, risk stratification using screening tools, organization of services (home visits, multi-center study), usage of digital sensors in primary care initiatives and employment of heart failure specialist nurses. **Conclusion:** This study reveals briefly about the clinicians challenges and solutions in the management of CVD.
Keywords: Cardio vascular diseases, clinician challenges, solutions.

Introduction

Cardiovascular disease (CVD) is the leading cause of non communicable disease death with an increasing worldwide incidence. In 2012, of the 56 million global deaths, 38 million, or 68%, were due to non communicable diseases[1]. India also bears the burden of cardiovascular disease as it claims3.7 million deaths or a quarter of all deaths annually in the South East Region (2.0 million among males and 1.7 million among females)[2].In this digital age, the easy accessibility of internet has made it to pave its way even into research[3].
However there is a gap to bridge this knowledge of internet into the current scenario of data collection. This paper aims to make use this wide range of resources as a platform to identify the challenges faced by a clinician and to bring about appropriate solutions. This web based initiative will make our task easier and save time.
Quantitative research is the process of collecting, analyzing, interpreting, and writing the results of a study, while qualitative research is the approach to data collection, analysis, and report writing differing from the traditional, quantitative approaches[4]. As we are interested in internet interventions we opted for a qualitative methodology rather than a quantitative methodology(such as a questionnaire study that would have forced participants to choose between predefined criteria generated by the researcher).We attempted searching for meta-analysis studies in the literature with similar methodology of reviewing the video content available on open source platform on management of life style diseases and to our knowledge we could not find any studies either in international arena or national research

areas. This is a first of its kind attempt made to harness the potential of easy accessible platform in internet enabled digital tools to understand the global challenges in the management of lifestyle diseases and we tried to arrive at solutions that we have been implemented or proposed by the clinicians attending to lifestyle diseases. We believe this to be an effective and time optimizing research exercise to identify challenges and solutions in an innovative manner from the interviews of care giving physicians across the globe.

Material and methods

A comprehensive content analysis and review of videos available on internet through open source including clinician interviews across primary, secondary level of care was performed.We searched for interview videos containing information regarding risk factors, mortality, interventions designed to reduce CVD, treatment strategy. An intense search was made by using terms such as cardiologist interview, lifestyle diseases video, challenges faced by cardiologist, Drexel cardiologist, Scripps cardiologist, interviews of Indian cardiologist. Thus videos available on the internetwere chosen if the content fits into the challenges and interventions designed for the management of CVD. In order to get apt and precise information interviews of doctors from various specializations like cardiology, internal medicine, and family medicine were included in the review. Each video link was opened and the researcher viewed the content and identified the themes and subthemes under the heading of "Challenges in the management of cardiovascular diseases". The researcher, while watching the videos had made an entry into an excel sheet all the themes identified as significant challenges in the management of life style diseases and also the solutions proposed by the clinical experts. Later the entries were analyzed and most common and recurring themes were grouped under main challenges as against the solutions.

Results

There were 55 videos[5-58]with total viewing time of 3 hours 6 minutes 6 seconds included for review. Thus a thorough analysis of the interview videos was made and seven themes were identified which were found to fall under two broad categories namely ‘clinician centered challenges’ and ‘patient centered challenge’ as listed in (Table 1).

The clinician cantered challenges was further diverse in terms of addressing the psychological emotions of the patients, fatal and serious consequences of delayed diagnosis of CVD, failure in adapting to technical advancements in management and care provision by care givers and patients reliance on information available on internet. As presented in (Table 2), the leading challenge identified as faced by the clinician was addressing the psychological emotions of the patients, which accounted for 33% followed by delayed diagnosis which accounts for 25% of the challenges faced. Failure in adapting to technical advancements by busy care givers is posing a challenge to the clinicians which accounts for 7% and patients' reliance on informationavailable on internet accounted for 4% of the challenges faced by clinicians.

Table 1Category of identified themes under challenges in management of life style diseases after video content analysis

Clinician centered challenges	Patient centered challenges
Addressing the psychological emotions of the patients	Failure to adapt diet and exercise related life style modifications
Delayed diagnosis of CVD	Late presentation of disease with complications
Failure in adapting to technical advancements	Patient's financial status
Patients reliance on information available on internet	

Table 2Clinician-centered challenges for management of CVD after video content analysis

Addressing the psychological emotions of the patients	33%
Delayed diagnosis of CVD	25%
Failure in adapting to technical advancements	7%
Patients reliance on information available on internet	4%

Despite the clinician's efforts in managing CVD certain patient centered factors like failure to adapt to diet and exercise related lifestyle modifications, late presentation of the disease with complications, financial status were also imposed as a challenging burden upon the clinician in managing CVD(Table 3).As shown below, 17% of the patient centered challenges are related to failure in making life style modifications, 16% of them presenting in late staged when complications were set in, and also poor financial status of the patients contributing to 4% of the challenges mentioned in the video content analyzed.

An attempt was made by the researcher to summarize the findings for content analysis, for the challenging obstacles with a specific solution against each in the form of a matrix as in (Table 4).

Table 3 Patient-centered challenges towards prescribing treatment options after video content analysis enabled by internet

Failure to adapt diet and exercise related life style modifications	17%
Late presentation of disease with complications	16%
Patient's financial status	4%

Table 4 Challenge-Solution Matrix for the management of cardio vascular diseases as identified from internet enabled video content analysis.

Challenges	Solutions
Handling of psychological emotions and making patient's convey their complaints	Building trust through effective doctor-patient communication
Delayed diagnosis of CVD	Regular usage of risk stratification tools, organization of comprehensive services (home visits, multi-center study), provision for special measures like primary care initiatives and heart failure specialist nurses
Poor diet and inadequate exercise	Health education for promotion of Paleo-diet,regular exercise monitoring
Patients who are in advanced stages on ineffective medications or geriatrics who are medically unfit for undergoing surgical procedures	Providing patient education at appropriate time by explaining to the patient the disease outcomes through effective doctor-patient communication
Improper lifestyle habits	Lifestyle modifications (eg: smoking cessations),awareness programs, regular screening procedures
Practical difficulties in updating with new technical advancements	Clinicians should be updated with inbuilt in-service training programs, and design new need specific solutions
Availability of immense information to the public	Providing evidence based patient education through doctor patient communication and by proving leaflets with latest advances from authentic and validated sources of information such as WHO or high impact factor journals
Poor financial status of the patient	Bring about cost effective procedures(surgical treatment)
Failure to adapt diet and exercise related life style modifications	17%
Late presentation of disease with complications	16%
Patient's financial status	4%

Discussion:

In this study, we identified two sets of challenges for the management of CVD from the video content analysis as: clinician centered challenges and patient centered challenges. The major challenge faced by the clinician was addressing the psychological emotions of the patients[9,12,13,25,32,34,42,48,51,52,53,56,58] which accounted for 33%. This was a major concern because of the patients' inability to express their symptoms due to improper patient interaction process carried out in busy clinical setting. Hence the clinicians are unable to provide the convincing treatment plans. Establishing an effective doctor-patient communication by providing compassion, empathy and establishing trust can overcome this challenge[6,7,9,12,22,24,25, 26,27,29,32,33,47,52,54,56]. Cicely Kerr et al, in their study focused on interactive health communication applications (IHCAs) that combine high-quality health information with interactive components, such as self-assessment tools, behavior change support, peer support, or decision support, are likely to benefit people with long-term conditions[63]. Employing these applications in trustworthy environment may help to overcome this challenge.Jean A. Wagner,in her study titled 'Top ten challenges in heart failure management' also identified failure to recognize the signs and symptoms of disease by patients, addressing life style modifications, references to advances in therapy by knowledge updation as challenges similar to our findings from content analysis of the videos[62].

Most of the patients consult the clinicians only during the later stages of the disease, because chronic diseases are mostly symptomless and even if there are signs of illness the patients are unaware of their symptoms poor health literacy. This could lead to lead to delayed diagnosis[6,8,13,14,15,18,22,45,58] with late presentation involving complications, which accounts for 25% of the challenges faced. Early diagnosis could be made by risk stratification using screening tools such as mentioned by Lee, Kyoung Suk[61],ie providing symptom diary along with education and counseling session, may be effective in identifying patients in early stages by also monitoring the patient's blood pressure, blood glucose, BMI, cholesterol and triglycerides during regular visits to the clinic.Margaret Glogowska[60],have shown that a nurse and nurse practitioner-run program, under the supervision of a cardiologist, decreases patient morbidity, emergency department visits, hospital admissions, overall utilization and cost.

A wide variety of digital innovations are revolutionizing healthcare but in a busy clinical practice the clinicians are unable to update themselves to these advancements. This imposes a challenge to the clinicians, which accounts for 7% as they were not able to make use of these advancement which are minimally invasive to the patient[35,41,57]. This could be overcome by regular updation to the new technical advancements and acquiring adequate practice to perform those procedures.With digital revolution and technological advances unfolding rapidly, there are many platforms for clinicians to upgrade their skill set with simulation programs and also through employment of artificial intelligence (AI) tools.

Internet and mobile technologies provide 365 days/24hour wide and easy also low-cost/no-cost accessibility to a large amount of data and the web developers and advertisers misuse this by providing a huge amount of misleading information to the public. Literate patients rely upon this available information to improve their understanding so much that it accounts for 4% of the clinician faced challenges[26]. It is the responsibility of the clinician to convince such a misguided patient by providing evidence based health education and also having health educators/clinical counselor as part of team to further clarify the doubts of patients and guide them in decision making. In their study,Kerr et al mention the need to provide practical information to the patients by directing to the websites which provide authentic information so as to minimize the misinformation available to patients though it cannot be controlled completely[63]Cicely Kerr et al.

Despite the clinician's efforts in managing CVD certain patient centered factors like failure to adapt to diet and exercise related lifestyle modifications, late presentation of the disease with complications, financial status were also imposed as a challenging burden upon the clinician in managing CVD. Most of the patients are unable to adapt to sudden changes like diet and exercise related lifestyle modifications which is a leading challenge accounting for 17% of the patient centered challenges in our study[5,17]. Inability of the patients to bring about lifestyle modifications leads to poor outcomes such increased morbidity and mortality. Educating patients about incorporating exercise into daily life activities such as parking the car at the furthest spot of the supermarket while going on a car ride and taking a walk from there onwards has been identified as successful integration of physical activity into daily activities. Regarding dietary habits following a paleo diet might be really effective as mentioned in studies[17]. Alex Cotterez, BS et al in their meta-analysis study of impact of web based strategies on self-management of diabetes mellitus-2, found web based tools to be a viable option. Promoting these self-management strategies among patients may result in better patient engagement and accountability in their disease management[59].

The burden of rising health care costs definitely has an implication upon the care seeking behavior and accounts for about 4% of the patient centered challenges. This is mainly because most of the surgical treatment procedures are expensive imposing a financial burden upon the patient. But if new researches on cost effective procedures [43]could be made it will definitely assist to overcome this problem.

Limitations: Despite our vigorous attempts to identify relevant videos of Indian clinician interviews it is possible that they might have been missed. Hence the study was performed by making use of videos which are mostly from clinicians who are US based.Secondly there might be some practical difficulty towards implementing these solutions in the current hospitals based in Indian scenario due to the above mentioned primary limitation. With our utmost efforts the solutions mentioned by the clinicians for the specific challenges was drafted in the form of a matrix, which might be more applicable to US scenario since they are video contents from US clinicians. Thirdly being a first of its kind study we could not find relevant articles for in-depth comparison.

Conclusion: Internet enabled solutions identified from global clinical settings can be tried in local settings by adapting certain components to meet the local requirements.

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Original Research Article

PROBLEMATIC USAGE OF MOBILE PHONES AMONG ADOLESCENTS IN CHENNAI – A CROSS SECTIONAL STUDY

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Abstract

ABSTRACT: Introduction: Mobile phones have become an essential commodity. The rate of usage of mobile phones and the addiction towards it among the adolescent age group has spiked up to a great extent after the launch of smart phones in the market. **Aims and Objectives:** To assess mobile phones usage and estimate the correlates of problematic usage among school going adolescent population. **Materials and Methods:** A cross sectional study among adolescent population of two schools in zone X of Chennai Corporation selected by simple random sampling method during the month of February 2017. Students with personalized mobile phone for more than one month were the study participants. **Study tool**: Our study has utilized the standardized and validated Problematic Usage of Mobile Phones (PUMP) questionnaire after getting the approval through email from the author. **Data collection**: Written permission from the schools principal for conducting the study was obtained and questionnaire was administered to the study participants in their class rooms on the fixed date and time assuring confidentiality. **Data Analysis:** The data analysis was done using SPSS Software version 21. The results were expressed in percentages and student't' test was performed to test the hypothesis. **Results:** A total of 190 study participants consisting males-105(55.3%) and females-85(44.7%) with a mean age of 13.6 years and PUMP scale scoring ranged between 20 to 87 with the mean of 59 and SD of 13. The PUMP Scale based on the criteria of substance use disorders assessing the tolerance, withdrawal, craving, social or interpersonal, physical and psychological criteria showed positive correlation with male gender, joint family, living away from family and leaving besides during sleep whereas the other variables like peer group influence, using mobiles without parents knowledge were not significant. **Conclusion:** The problematic usage of mobile phones was significantly high among this study population.

Key words: Adolescent, Cell Phones, Substance-Related Disorders, Problematic Usage, PUMP Scale

INTRODUCTION:

Smart phones replaced PCs as a mean of access to the internet[(1)].Smartphone addiction is closely related to Internet addiction, which is considered an impulse-control addiction. Cell phone usage is so strongly integrated into young people's behavior that symptoms of behavioral addiction, such as cell phone usage interrupting their day –to-day activities despite of the positive benefits like using cell phone to connect/call family[(2)].“Problematic mobile phone use” is defined as any pattern of mobile phone use resulting in subjective distress or impairment in important areas of functioning. It is important to distinguish “problematic” use from “very frequent” use[(3)].Teens who are addicted to mobile phones tend to experience an increased likelihood to consume alcohol and use tobacco[(4)] ,have poor dietary habits[(4)],Increased levels of social loneliness[(5)], Digital eye strain[(6)] ,Text neck[(7)], Car accidents[(8)] and Decreased brain connectivity[(9)].While evidence is scarce regarding a true “addiction” to mobile phones, data from recent studies suggest that some mobile phone users exhibit serious problematic behaviors analogous to the diagnostic criteria for substance use disorders or pathological gambling[(10,11,12,13)].

AIMS AND OBJECTIVES:

1. To assess the usage of mobile phones among adolescent age group.
2. To estimate the correlates of problematic usage among adolescent population.

MATERIALS AND METHODS:

The study was conducted as a cross sectional studyamong the school going adolescent age groupand the selection criteria was school students who had a personalized mobile phone for more than one month. An email for approval for the usage of Problematic Usage of Mobile Phones (PUMP) questionnaire was sent and it was accepted by the author. Simple random sampling method was adopted for selection of two schools in T-Nagar. Consent forms for getting approval of the class teachers on behalf of all the students were prepared. A permission letter was given to the head of the institutions and the study was conducted in the time allotted in their respective classrooms. Students of age group 12-16 were the study participants .The purpose of the study, and the questionnaire were explained in brief to the willing students before starting. Confidentiality of their results was assured. The students' individual queries regarding the questions were explained personally to them. The questionnaire was collected back after ensuring that it was complete and it was finished in the stipulated time. The study participants summed up to be 190 in total and it was conducted in two months January 2017-February 2017.The assumed prevalence of 50% problematic usage of mobile phones and the precision of 15%, the calculated sample size was 177.($p = 50$, $q = 100 - p = 50$, $4 \times p \times q / d^2 = 4 \times 50 \times 50 / 7.5^2 = 10{,}000/56.25 = 177.77 = 178$ $d = 15/100 \times 50 = 7.5$)The calculated optimum sample size was 178.The sample data collected was 190. The collected data were entered in Microsoft Excel 2010 and analyzed using SPSS Software 21.The data were expressed in percentages and student't'test was done to assess the hypothesis testing.

PUMP SCALE QUESTIONNAIRE[3]:The PUMP Scale is based on the criteria of substance use disorders assessing ten criteria such as tolerance, withdrawal, craving, social or interpersonal problems due to mobile phone usage, knowledge about physical hazard due to the usage of mobile phones, physical and psychological problems, using for longer time than intended, great deal of time spent, activities given up or reduced and failure fulfilling role obligations .The questionnaire consisted of about twenty question with two questions under each criterion. The responses were Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree with scores ranging from 5 to1.

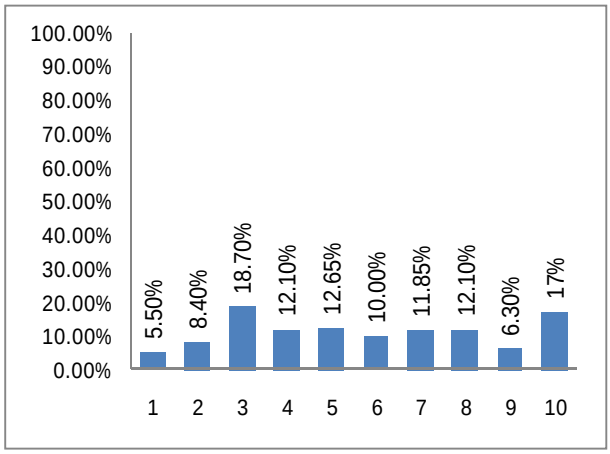
RESULTS:

The sample constituted about 105(55.3%) of males and 85(44.7%) is females and the frequency distribution can be seen in Table 1. The mean age of the study participants was calculated to be 13.6 and the Mean score was 48.96 ranging from 20 to 87 and the standard deviation (S.D) is 13.461.Among the study population 154(81.1%) of them lived in a nuclear family. 11(5.8%) of them did not live with their family in the present study population. Siblings were present for 150(78.9%).The number of students who bought a mobile phone due to the influence of their peer group was assessed to be 38(20%) and those who were having mobile phones due to their parents concern summed up to 115(60.5%).Around 47(24.7%) of them left their mobile phones bedside during sleep and 150(78.9%) used their mobile phones without their parents knowledge. Only 145(76.3%) had revealed their unlock codes to their parents. The PUMP scale criteria were assessed and following are the results. The tolerance status was assessed among the participants and 19(10%) strongly agreed that they intolerably use their mobile

Table: 1 Frequency distribution of the study population (N=190)

S.No	VARIABLES	RESPONSE	FREQUENCY	PERCENTAGE %
1	GENDER	MALE	105	55.3
		FEMALE	85	44.7
2	TYPE OF FAMILY	JOINT	36	18.9
		NUCLEAR	154	81.1
3	LIVING WITH FAMILY	YES	179	94.2
		NO	11	5.8
4	SIBLINGS PRESENT	YES	150	78.9
		NO	40	21.1
5	OWNS DUE TO INFLUENCE OF PEER GROUP	YES	38	20
		NO	152	80
6	LEAVE BESIDES DURING SLEEP	YES	47	24.7
		NO	143	75.3
7	USAGE WITHOUT PARENTS KNOWLEDGE	YES	40	21.1
		NO	150	78.9
8	PARENT KNOWS UNLOCK CODE	YES	145	76.3
		NO	45	23.7

Figure: 1 PUMP Scale Criteria outcome



Key;

1. failure fullfilling role obligations	6. tolerance
2. activities given up or reduced	7. withdrawal
3. great deal of time spent	8. craving
4. longer time than intended	9. knowledge of physically hazard
5. despite physical or psychological problem	10. despite social or interpersonal problem

Table: 2 Association between study variables and mean PUMP scale using student 't' test (n=190)

S.No	VARIABLES	RESPONSE	FREQUENCY	PERCENTAGE %	MEAN	STANDARD DEVIATION	p VALUE (<0.05)
1	GENDER	MALE	105	55.3	51.32	13.425	
		FEMALE	85	44.7	46.05	13	0.007*
2	TYPE OF FAMILY	JOINT	36	18.9	54.77	13.135	
		NUCLEAR	154	81.1	47.65	13.225	0.004*
3	LIVING WITH FAMILY	YES	179	94.2	48.21	13.017	
		NO	11	5.8	61.18	15.315	0.002*
4	SIBLINGS PRESENT	YES	150	78.9	48.78	13.221	
		NO	40	21.1	49.65	14.482	0.717
5	OWNS DUE TO INFLUENCE OF PEER GROUP	YES	38	20	51.68	14.083	
		NO	152	80	48.28	13.262	0.164
6	LEAVE BESIDES DURING SLEEP	YES	47	24.7	53.19	14.061	
		NO	143	75.3	47.57	13.011	0.013*
7	USAGE WITHOUT PARENTS KNOWLEDGE	YES	40	21.1	50.68	14.983	
		NO	150	78.9	48.51	13.042	0.367
8	PARENT KNOWS UNLOCK CODE	YES	145	76.3	49.16	13.477	
		NO	45	23.7	48.33	13.543	0.72

phones. Around 23(11.85%) strongly agreed that they cannot withdraw from the habit of using it. Surprisingly 66(33.1%) of them strongly disagreed of not having any craving towards mobile phone use and 12(6.3%) of them are using their mobile phones even after knowing that it is physically hazardous to them. Despite of social or interpersonal problems 33(17.1%) are still using their mobile phone. And 23(12.65%) are using in spite of physical or psychological problems.

DISCUSSION:

The original studywith the PUMP scale had a mean score of 38.40 and the score ranged from 20 to 82 whereas the present study comparatively had a significantly higher mean of 48.96 with score ranging from 20 to 87 which show the increased prevalence of problematic mobile usage in the present study population. In the present study significant p values(<0.05) as seen in Table 2 were found for the following variables, male gender, family type, living away from their familyand leaving besides during sleep and the Figures 1 and 2 show the Strongly Agree response percentage for the PUMP scale criteria.

It was suggested as early as 1982 in a study done in USA (i.e., well before the widespread use of mobile phones) that pathological use of technology may exist in the form of "techno dependence"[14].A Japanese study on Cellular Phone Dependence Questionnaire(CPDQ) has shown that mobile phone use may become addictive[15].On the basis of Mobile Phone Problem Use Scale in Australia they tried to determine the psychological predictors of illegal or dangerous use of the mobile phone which revealed that problematic use of the mobile phone is predicted by low self-esteem and high extraversion[16].A study conducted in 2012 at Austria indicates that chronic stress, low emotional stability, female gender, young age, depression, and extraversion are associated with problematic usage[17].Overall prevalence of problematic mobile phone usage in the Mobile Addiction Test (MAT) was 6.3% in a study conducted among high school students in 2011 and it was associated with other behavioral addictions like compulsive buying[18].Parents and caregivers express that teenagers are addicted and obsessed with texting, while some of them feel that it distracts the teenagers from their study time and other important activities in a study done at Unitec Institute of Technology, New Zealand[19].

CONCLUSION:

Our study results had explored that there is a high mean score for Problematic Usage of Mobile Phones among the adolescent population and the risk factors which significantly associated were male gender, living in a joint family, retaining it aside during slumber in addition to distant living from family. Further large scale studies are to be conducted in order to assess exactly the current trend of mobile phone usage among this vulnerable population.

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