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Prevalence of Hypertension and Associated Risk Factors of Hypertension Among School Teachers in Cheyyar Town, Tamilnadu.

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ABSTRACT

Objective: To find out the prevalence of hypertension and assess the various risk factors and determinants of hypertension among school teachers in Cheyyar town. **Material and Methods**: **Study setting:** The present study was a Community Based Cross Sectional study conducted at government and private schools located in Cheyyar town. **Sample size and Sampling:** The required sample size was calculated as 198. The sampling technique used was Simple Random Sampling. **Data collection tool:** A questionnaire was provided to the participants after obtaining informed consent, to record information regarding socio-demographic characteristics and cardiovascular risk factors. Physical activity of the respondents was assessed using The International Physical Activity Questionnaire (IPAQ), with 7 day recall period. Perceived Stress Scale (PSS) was used to measure the level of psychological stress experienced by the respondents. Anthropometric measurements were done and blood pressure was recorded. **Analysis:** The data collected was entered and analyzed using SPSS software package (Version 21). Descriptive statistics and appropriate Tests of significance (Chi-square test) was applied to establish the relation between the study variables. A p value of less than 0.05 was considered to be statistically significant. **Results**: Increasing age, place of residence (indicating travel to workplace), Socioeconomic status, Tobacco use, Alcohol consumption, Increased Body mass index, Decreased physical activity, High levels of Stress were significantly associated with pre-hypertensive & hypertensive states.**Conclusion and recommendations**: There is an urgent need for periodic monitoring and screening programs for hypertension among the teaching faculty. It would serve the dual purpose of self awareness and spread of health awareness to the students by the teachers.

Key-words: Hypertension, Teachers,Physical activity, Perceived Stress

INTRODUCTION

Cardiovascular disease (CVD) is attributed to about one-third of deaths globally, and this number continues to rise in developing and developed countries. Although majority of the risk factors can be controlled, monitored and prevented, there is relative scarcity in its early identification and prevention, especially in developing countries. Individual targeted initiatives are needed for effective control and prevention of cardiovascular diseases and its complications.[1-2] Hypertension is directly responsible for more than half of all deaths due to cardiovascular disease in India. In Urban India, the prevalence of Hypertension has been reported to have a steady rise over the years from 1.24% in 1949 to 36.4 % in 2003.[3] Studies suggest that this rising trend is due to life style changes like addictions (smoking and alcohol abuse), dietary changes, and psychological stress.[4-6] Urbanization has led to physical inactivity due to technological advances. The demand for education has also seen a dramatic rise over the years due to urbanization, leading to an increased demand for quality educational institutions, therein increasing the burden of the teachers. The increased workload in turn requires them to do overtime work, improper dietary practices and restricted physical activity along with increasing levels of psychological stress. These factors tend to have a negative impact on the health of the teaching faculty, making them more prone for diseases like Hypertension and Diabetes mellitus.[7-9] The commonly explored occupational health problems of the teachers are voice problems, musculoskeletal disorders, contact dermatitis and psychological stress. The present study is aimed to find the prevalence of hypertension among the teachers and find the role of various determinants of hypertension among the study population in the surrounding area, such as to plan and implement targeted interventions to benefit the study population in the future years.

MATERIAL AND METHODS

Study area: Cheyyar is a town located in Tiruvannamalai District in the Tamil Nadu state of South India.[10]Cheyyar is located at 12.6580°N 79.5424°E on the banks of Cheyyar River in the north-eastern corner of Thiruvannamalai district of Tamil Nadu.

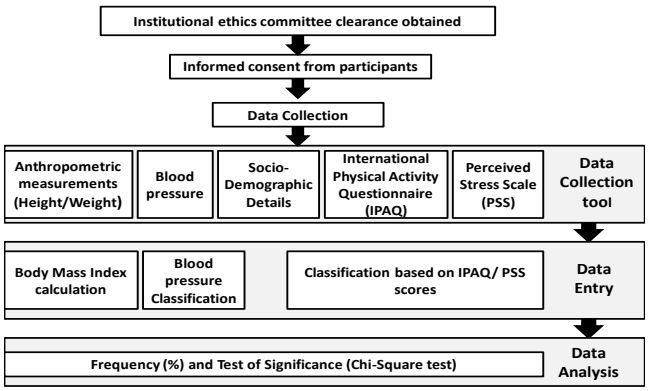
Study Design & Setting: The present study was a Community Based Cross Sectional study, conducted at government and private schools located in Cheyyar. The methodology of the study is depicted in Fig 1.

Study duration: The study was started after approval from the Institutional Ethics Committee of Meenakshi Medical College

Hospital & Research Institute and completed within one and half years. The study was conducted in the year of 2016-2017.

Sample size and Sampling: Considering the prevalence of hypertension and its associated risk factors among School Teachers to be 13.25%, 95% confidence interval, 80% power the minimum sample needed for the study was calculated to be 183. Bearing in mind, factors like refusal to consent / non response, and additional 15 participants were added. The final sample size was taken as 198. [11] The sampling technique used was Simple Random Sampling.

Fig 1: Methodology of the study



Data collection Tool: Data collection was done during working hours at a time feasible to the respondents. The study was conducted in the school premises after obtaining prior permissions from the concerned authorities. After obtaining informed consent from the participants, a questionnaire was administered to collect the data. The questionnaire covered information on socio-demographic information, duration of employment, presence of various cardiovascular risk factors like smoking, alcohol, dietary practices. Family history of hypertension, diabetes and coronary heart disease were collected. International Physical Activity Questionnaire (IPAQ) was used to measure physical activity and Psychological stress was measured using Perceived Stress Scale (PSS) among the respondents. Anthropometric measurements like Height, Weight were measured and Body Mass Index was calculated. Blood pressure was measured and recorded for all the participants.

Anthropometric measurements:

Standing weight and height of participants was measured with light clothes and no shoes, using standardized methods. Weight was measured with a conventional bathroom scale and it was approximated to the nearest half kilogram (Kg).The scale was calibrated daily to ensure quality control. The International Physical Activity Questionnaire (IPAQ) was developed as an instrument for measuring of physical activity. The short IPAQ form "last 7 d recall" is recommended for national monitoring and the long form for research requiring more detailed assessment.[12] Perceived Stress Scale (PSS) is the most common assessment scale to assess the level of stress experienced by a person following various stressful events, like physical diseases and psychological disorders. There are three forms of the PSS, the initially developed scale had 14 items (PSS-14), later shorter versions with 10 (PSS-10) and 4 (PSS-4) items had been developed. The perceived stress scale has a recall period of one month. The scale is open access and does not require copyright permissions.[13]In the present study we used the PSS-4 version.

Statistical Analysis: The data was entered and analyzed by using Statistical Package for Social Sciences (SPSS) (version 21.0) software package. Descriptive statistics was used to define the study population. Categorical and ordinal variables were expressed as frequency/percentages. Continuous variables were expressed as mean and standard deviation. Body Mass Index (BMI) was then calculated in kg/m^2 by dividing weight (in Kg) by the square of the height (in meters).Based on the calculated body mass index, the participants were classified as being underweight when BMI was less than <18.5 kg/m^2, normal weight when BMI was between 18.5-24.9 kg/m^2, overweight and obese I & II when BMI was 25 to 29.99 and ≥ 30 kg/m^2, respectively.[14] After finishing the examination, all diagnosed cases of hypertension, diabetes and obesity among teachers were notified about the problem, given health education, and appropriate referral services were provided. The IPAQ scoring was used to classify the respondents into 3 categories namely inactive, minimally active, and Health Enhancing Physical Activity (HEPA).[15] Perceived stress score was calculated by reverse coding the scores of the 2nd and 3rd questions (Positive indicators), where 4=0,3=1,2=2,1=3 and 0=4.[16] Appropriate Tests of significance (Chi-square test) was applied to the study variables to establish the relation between the study variables. A p value of less than 0.05 was considered to be statistically significant.

Ethical issues: Ethical principles such as respect for the persons, beneficence and justice were adhered. Clearance from the Institutional Review Board [9/MMCH&RI/2015(A)] was obtained prior to beginning of the study. Informed consent was obtained from individual participants prior to start of the study. Newly diagnosed respondents, were notified of the condition and proper referral to the concerned specialist was provided. No information was withheld from the respondent.

RESULTS

Socio-demographic Characteristics of the respondents:

Our study showed that, the mean age of the respondents was 38.64 ± 9.33.Majority (61.8%) of the respondents were aged between 31-50 yrs. Among the total 198 participants, 61 (70.7%) were female and married (80.3%).Majority of the participants were Hindu (92.9 %) and belonged the upper (47.5%)and upper middle class (44.9%). Majority (93.4%) of the study participants were from outstation, requiring daily commute to the teaching institution.

The mean years of experience of the respondents was 11.79 ± 9.014. More than half of the respondents had an experience of 10 years or less (54.5%).In our study, the participants teaching various classes were of almost equally distributed between primary (33.3%), secondary (33.8%) and higher secondary (32.8%).

Cardio vascular risk factors:

Cardio vascular risk factors reported by the respondents were as follows, majority were Non-smoker (89.9%), Non- Alcoholic (86.9%), and had a mixed dietary pattern (73.2%). More than half the respondents reported to not having a Family history of Hypertension (64.1%), Diabetes mellitus (61.1%) and Coronary Heart Disease (82.3%). Majority of the respondents had no History of Hypertension (86.9%) and Diabetes mellitus (85.9%).(Table 1)

Anthropometric measurements, Body Mass Index, Physical Activity & Perceived Stress Scores of the respondents

As seen in table 2, the Mean height of the respondents was 158.06 ± 7.946 and Mean weight was 64.57 ± 12.378. Based on the calculated Body Mass Index, most of the respondents were classified (40.9%) and Over weight (35.4%). Majority of the respondents were found to be Physical Activity Inactive (63.1%), while the Perceived Stress Scores among respondents showed that more than half the respondents had Moderate stress (62.1%) while 28.3% of the respondents were found to have low stress.

Table 1.Cardio vascular risk factors among the respondents (n=198)

Variable	Frequency	Percentage
Smoking distribution		
Smoker	17	8.6
Non-smoker	178	89.9
Ex-smoker	3	1.5
Alcoholism distribution		
Alcoholic	18	9.1
Non- Alcoholic	172	86.9
Ex- Alcoholic	8	4
Dietary practices		
Vegetarian	53	26.8
Mixed	145	73.2
Family history of Hypertension		
Yes	71	35.9
No	127	64.1
Family history of Diabetes mellitus		
Yes	77	38.9
No	121	61.1
Family history of Coronary Heart Disease		
Yes	35	17.7
No	163	82.3
History of Hypertension		
Yes	26	13.1
No	172	86.9
History of Diabetes mellitus		
Yes	28	14.1
No	170	85.9
JNC 7 classification		
Normal Blood pressure	95	48
Pre-Hypertension	72	36.4
Stage I Hypertension	26	13.1
Stage II Hypertension	5	2.5

2 Anthropometric measurements, Body Mass Index, Physical Activity & Perceived Stress Scores of the respondents (n=198)

	Frequency (n=198)	Percent
Body Mass Index of respondents		
Under weight	10	5.1
Normal	81	40.9
Over weight	70	35.4
Obesity I	34	17.2
Obesity II	3	1.5
International Physical Activity Questionnaire Scores		
Inactive	125	63.1
Minimally active	45	22.7
Health enhancing physical activity	28	14.1
Perceived Stress Scores among respondents		
Low stress	56	28.3
Moderate stress	123	62.1
High perceived stress	19	9.6

Table 4 Correlation between various Risk factors and Stages of Hypertension

	Pre-Hypertension n=72 (χ^2, df, p value)	Stage I Hypertension n=26 (χ^2, df, p value)	Stage II Hypertension n=5 (χ^2, df, p value)
Age	**9.89, 3, 0.01***	**21.253, 3, 0.01***	**6.14, 3, 0.04***
Teaching class	**9.75, 2, 0.008***	0.53, 2, 0.82	0.20, 1, 0.65
Years of experience	**36.33, 3, 0.001***	5.077, 3, 0.16	0.20, 1, 0.65
Residence	**76.05, 1, 0.01***	**43.56, 1, 0.010***	-
Socioeconomic status	**30.58, 2, 0.001***	**19.84, 3, 0.001***	0.4, 2, 0.81
Tobacco use	**91.58, 2, 0.001***	**40.69, 2, 0.001***	-
Alcohol	**95.58, 2, 0.001***	**7.53, 1, 0.008***	1.80, 1, 0.18
Diet	**18.0, 1, 0.001***	3.84, 1, 0.05	0.20, 1, 0.65
BMI	**61.36, 4, 0.001***	**9.88, 3, 0.02***	**6.72, 2, 0.01***
IPAQ Scores	**39.93, 2, 0.001***	**31.58, 2, 0.001***	**15.07, 2, 0.001***
PSS Scores	**39.81, 2, 0.001***	**39.08, 2, 0.001***	**9.30, 2, 0.01***

As seen in Table 3, variables like Age, Classes taught by the teachers, years of experience, place of Residence, Socioeconomic status, Tobacco use, Alcohol consumption, Diet, Body mass index, International Physical Activity Quest Scores, Perceived Stress Scale Scores were correlated with stages of hypertension. Significant association was found with all variables in the development of pre-hypertension. Increasing Age, place of Residence indicating travel to workplace, Socioeconomic status, Tobacco use, Alcohol consumption, increased Body mass index, decreased physical activity, high levels of Stress were significantly associated with the development of Stage I hypertension. Stage II hypertension was found to be associated with Increasing Age, mixed diet, increased Body mass index, increased physical inactivity and increased psychological stress

DISCUSSION

Our results showed, The mean age of the respondents was 38.64 ± 9.33**.** More than half of the respondents were aged less than 50 years. Majority of the study participants were female, **Table** Hindus and married. Most of the study participants had to travel from outstation to reach their workplace. More than 80% of the respondents belonged to the upper and upper middle classes. Majority of the teachers had an experience of less than 30 years.

In this study we found that most of the respondents were non-smokers and non-alcoholics, more than 70% of the respondents consumed a mixed diet. the distribution of overweight, obesity I & obesity II were 35.4 %, 17.2% & 1.5 % respectively. Our results show that more than 60% of the respondents were physically inactive. The respondents with moderate and high perceived stress were 62.1% and 9.6% respectively. Our results showed the prevalence of pre hypertension to be 36.4% and the prevalence of hypertension to be 15.6%.

Socio-demographic Characteristics: In our study the mean age of the respondents was 38.64 ± 9.33 years**.** Similar results were reported by Ibrahim et al (36.52 ± 7.62)[17], Fikadu et al (36.03 ± 11.91)[18] and Girish et al (32.87 ±9.19 years).[19] Majority of the respondents were married (83.7%),which is also similar to our study (80%). However in our study most of the teachers were female as compared to their results which had more male respondents as compared to female respondents (1.5:1 ratio).[17] This could be attributed to the better literacy rates among the female population in Tamilnadu and the gender dynamics in the Indian sub-continent. Fikadu et al showed that majority of the respondents (54.1%) were in the middle income category,[18] In our study we found that More than 80% of the respondents belonged to the upper and upper middle classes.

Prevalence of hypertension: Studies from Jeddah[17] and Ethiopia[18] reported prevalence of hypertension among teachers to be 25.2% and 21% respectively. Studies from Tumkur[19] (28.57%) and Bangalore[20] (36%) also reported similar findings. Our study reported the prevalence of hypertension to be 15.6%. Our results were lower when compared to the fore mentioned studies, but found to be slightly higher than the Prevalence among secondary school teachers in Belghavi (13.25%).[20] The cause of these variations need to be explored further to plan a targeted interventional plan, This can be possible in a multi-centric study involving teachers from different parts of the country.

Prevalence of Prehypertension: Our results showed the prevalence of pre hypertension to be 36.4%, Among school teachers in Jeddah[17] and Bangalore [20] the prevalence of pre-hypertension was found to be 43.0%.and 30% respectively. All studies indicate that prehypertension is on the rise among teachers. This population if not properly monitored and screened on a regular period, would add to the increasing burden of hypertension and its associated complications on the community. This also mandates the planning and implementation of specified interventional programs to address the health needs of the teachers.

Risk factors of hypertension:

*Age & Gender:*Ibrahim et al reported that that male gender, increasing age, were significantly associated with the prevalence of hypertension, Similar findings were reported by other studies also,[17-18] . Our results are also in line with similar findings, were increasing age is significantly associated with the development of prehypertension and hypertension.

Place Of Residence Indicating Travel To Workplace

Our results showed that participants who travelled from outstation to reach the workplace were at a significant risk of developing hypertension, similar findings were reported by Manjula et al. They found that one of the major stress factors experienced by the teachers was due to travel.[21] The role of travel could be the distance travelled by the teachers, duration of travel and mode of transportation used etc. These factors need to be explored further by future studies.

*Tobacco Use & Alcohol Consumption:*Studies indicate a strong association between tobacco use and alcohol consumption to the development of hypertension,[17-21] Our study also presents the same findings, were Tobacco Use, and Alcohol Consumption were significantly associated with the development of prehypertension and stage I hypertension.

*Body mass index & Physical Activity***::**Studies have reported that increased body weight and increased body mass index significantly increased the odds of developing hypertension and pre-hypertension among school teachers.[17-21]

Our study also concurs with the other studies by showing the significant association between the variables. The increased BMI among the teachers can be attributed to the inactive lifestyle as seen by the IPAQ scores which shows that majority of the where either inactive (63.1%) or minimally active (22.7%). This could be due to the working hours, nature of work and time lost to travel. These issues can be addressed by organizing sporting events or physical activity session for teachers like yoga in the campus for the benefit of the teachers.

Psychological Stress: Psychological stress has been found to be a significant indicator for the development of hypertension. Our results showed that majority of the teachers experienced moderate level (62.1%) of psychological stress, while 9.6% experienced high levels of stress. Manjula et al reported that the stress factors experienced by the teachers included travel, inadequate salary, experience and discrimination at work.[21] In our study, we were not able to ascertain the cause of the psychological stress which remains to be a limitation of our study

Conclusion & Recommendations: Increasing age, place of residence (indicating travel to workplace),Socioeconomic status, Tobacco use, Alcohol consumption, Increased body mass index, Decreased physical activity, High levels of Stress were significantly associated with pre-hypertensive & hypertensive states. There is an urgent need for periodic monitoring and screening programs for hypertension among the teaching faculty, to address the growing burden of hypertension. Various programs like yoga meditation and recreational events have to be organized to ease the physical and mental stress encountered by the school teachers. Awareness about the various life style modification like smoking, tobacco usage, alcohol consumption, salt restriction and dietary practices should be imparted to the teachers as it would serve the dual purpose, that of self-awareness and spread of health awareness to the students by the teachers. Teachers can be used as a medium for spreading these messages to their family, the students and their colleagues. Physical activity in the form of games should be organized on a regular basis at the campus, to promote the development of a healthy lifestyle.

In the policy making levels, there is an urgent need to address the growing burden of hypertension. This can be achieved by increasing public awareness regarding healthy behaviors, early detection and prompt treatment of hypertension. A need based population strategy, which is cost-effective and feasible should be devised to address these issues.

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