

RESEARCH ARTICLE

Lifestyle Determinants of Hypertension among Female School Teachers

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Manuscript details:	ABSTRACT
<p>Received: 12.08.2017 Accepted: 15.12.2017 Published : 31.12.2017</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as: Sarah Jane Monica, Sheila John and Madhanagopal R (2017) Lifestyle Determinants of Hypertension among Female School Teachers; <i>International J. of Life Sciences</i>, 5 (4): 697-702.</p> <p>Copyright: © 2017 Author (s), This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>Hypertension is a major component of metabolic syndrome, coronary artery diseases and cerebrovascular diseases. Factors contributing to this rising trend in hypertension include urbanization along with changes in dietary habits and lack of physical activity. Working woman always bears a dual role responsibility one in family and the other at job. Teachers represent one of the most important, largest and productive sectors delivering cognitive knowledge to students. The objective of the present study was to determine the risk of hypertension among female school teachers and various lifestyle determinants contributing to it. The study was conducted in Chennai city on 200 female school teachers. Anthropometric indices such as height, body weight, body fat percent and waist circumference were measured. BMI was calculated and blood pressure was recorded. Statistical significance was accepted at ($p < 0.05$). The prevalence rate of pre-hypertension and hypertension was found to be 20% and 12% respectively. Age, waist circumference, body fat percent and personal history of diabetes was significantly associated with hypertension ($p < 0.05$). Health based strategies focusing on appropriate preventive measures for early diagnosis and treatment should be included for school teachers as it helps to improve their overall health.</p> <p>Keywords: Teachers, hypertension, risk factors, health strategies.</p>

INTRODUCTION

The world, today is currently witnessing an epidemiological transition, from communicable diseases to several chronic long term non-communicable diseases. Blood pressure refers to the force with which blood flows through the blood vessels and an increase in blood pressure is termed as hypertension. Hypertension is one of the non-communicable diseases that is a major cause of death. WHO reported global prevalence rate of hypertension to be

30%-45% (WHO, 2013). Nowadays, the incidence of hypertension is also increasing at an alarming rate in developing countries as the prevalence rate is two-fold times higher than developed countries (Cheung and Cheung, 2012; Ogah, 2013; WHO, 2013). It is considered to be an independent risk factor for cardiovascular mortality and morbidity as it doubles the risk of coronary heart disease including acute myocardial infarction, and triples the risk of congestive heart failure as well as stroke (WHO, 2014).

A working woman always bears a dual role responsibility one in family and the other at job. Teaching is a profession that requires long working hours and teachers represent one of the most important, largest and productive sectors as they deliver cognitive knowledge to students. The work of school teachers includes interaction with people whose safety and well-being they are responsible for, apart from their role of teaching (Singh and Singh, 2006). Added to this, nowadays teachers seem to be involved in other non-academic duties such as census enumeration and elections. Teachers regardless of what level they teach are always exposed to stress. Development of chronic illness such as hypertension, diabetes mellitus is also related to occupations that involves high level of stress and sedentary behavior (Mohan *et al.*, 2008).

To date, most of the programs available for teachers focus only on stress management, structural and organizational adjustments required to improve the learning environment for students thereby neglecting the teacher's physical health status (Kyriacou, 2001). Since hypertension is considered to be one of the strongest modifiable risk factors leading to cardiovascular diseases the aim of the present study was to determine risk of hypertension among female school teachers and various lifestyle determinants contributing to it. Prevention health based strategies for school teachers should be included as part of education and communication components and other programs as it helps to improve their overall health.

MATERIALS AND METHODS

Design of the study and study population

This study is a descriptive, cross-sectional one, which was conducted in Chennai city on female school teachers. The study protocol was approved by the

Institutional Ethics Committee and school principals before the commencement of the study. The sample size for the present study was 200 female school teachers. Schools were selected based on willingness to participate and enrollment with the goal of identifying population with and without hypertension among school teachers.

Written consent was obtained from the participating teachers and a questionnaire was used to elicit information on socio-demographic profile, physical activity pattern and personal history of non-communicable diseases prior to having the anthropometric measurements and blood pressure being measured by the investigator.

Anthropometric measurements

Weight and Height

Weight was measured using a portable digital weighing machine that was recorded to the nearest 0.1 kg. Height was measured to the nearest 0.1 cm using a wall mounted measuring tape which was fixed on the wall.

Body fat percent

Body fat percent refers to the amount of body fat mass in regard to the total body weight which is expressed in percentage. In the present study body fat percent was determined using body composition monitor (Omron Karada Scan – HBF-375). This machine estimates the body fat percent using the bioelectric impedance method. Classification of body fat percent was based on cut off given by Lohman (1986).

Waist circumference

Waist circumference was obtained by measuring the distance around the waist half inch above the umbilicus (belly button) using a non-stretchable plastic measuring tape and was recorded to the nearest 0.1 cm. Waist circumference greater than 80 cm indicates abdominal obesity (Misra *et al.*, 2006).

Body Mass Index

Body mass index (BMI) was calculated as weight in kilograms divided by height in meter square. BMI classification was based on recent WHO (2000) recommendation where BMI < 18.5 represents underweight, 18.5 to 22.9 for normal weight, 23 to 24.9 for overweight, >30 refers to obesity.

Blood pressure

Blood pressure was measured using digital electronic device (Rossmax model ®: MJ701) after the individual had rested for at least 5 minutes in a seated position with the arm rested on a table. Blood pressure was measured twice and the average was considered as the final reading. Classification of hypertension was determined according to Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. According to this classification, blood pressure was classified as normal if the systolic blood pressure was <120 mmHg and/or diastolic blood pressure was <80 mmHg, pre-hypertension if the systolic blood pressure was 120-139 mmHg and/or diastolic blood pressure was 80-89 mmHg, Stage 1 hypertension if the systolic blood pressure was 140-159 mmHg and/or diastolic blood pressure was 90-99 mmHg, and Stage 2 hypertension if the systolic blood pressure was ≥ 160 mmHg and/or diastolic blood pressure ≥ 100 mmHg (Chobanian *et al.*, 2003).

Statistical Analysis

Data obtained was entered in MS Excel 2010. Completeness and consistency of data were checked by running frequency on each variable. All analyses were performed using SPSS (version 15.0). Frequencies and percentages were used for descriptive statistics and Chi-square test was used to study the association between two categorical variables. Logistic regression analyses were carried out to see the influence of lifestyle determinants on hypertension. Odds ratio (OR) along with 95% confidence interval was also reported. Statistical significance was accepted at $p < 0.05$.

RESULTS AND DISCUSSION

The prevalence rate of hypertension among female school teachers is given in Fig 1. The blood pressure classification given by the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure was used to classify the blood pressure levels of the teachers in the present study. Blood pressure levels more than 140/90 mmHg was considered as hypertension and teachers whose systolic blood pressure level between the range 120-139 mmHg and diastolic blood pressure between the range 80-89 mmHg came under pre-hypertensive stage. Based on this classification about 24 (12%)

teachers were diagnosed with hypertension while 40(20%) had pre-hypertension.

Teachers who participated in the study had teaching experience of 5-15 years. It is clear that the age of the teachers who took part in the study ranged between 21-58 years. It is seen that 32 percent of teachers belonged to the age group 35-45 years while 22 percent of teachers were in the age group 45-55 years. It can be noted that the majority of the teachers (65%) had a waist circumference greater than the normal cut-off values. The normal waist circumference is <80cm for women and <90cm for men. Though majority (80%) of teachers had the habit of indulging in physical activity, the time spent towards physical activity was very less indeed. With regard to body mass index (BMI), it is clear that only 16 percent of the teachers had a normal BMI. It can also be inferred that 39 percent of the teachers came under grade I obesity while 21 percent came under grade II obesity category. Nearly 59% of the teachers had body fat percent more than 35%.

Socioeconomic status refers to a person's social status relative to other members in their society. Income level of the teachers was measured as the total annual income of all family members using the classification given by National Council of Applied Economics and research-(Shukla, 2010). A greater percentage of the teachers (87.5%) belonged to the middle class category with an annual family income of Rs.2, 00,000-10,000,000. Only 9 percent of the teachers reported personal history of diabetes. It is evident that apart from age being a risk factor for hypertension, lifestyle determinants such as increased waist circumference,

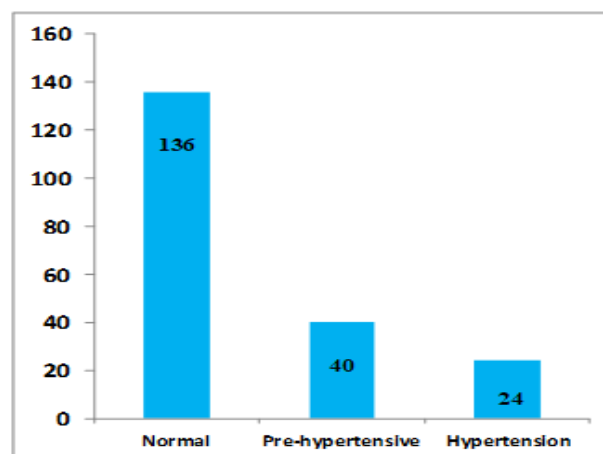


Fig.1 Prevalence rate of hypertension among teachers

Table 1 Lifestyle determinants associated with Hypertension

Risk factors		Hypertension		Chi-square value	p value
		Yes	No		
Age (years) Mean = 38.84±9.14	<25	0	16	15.714	0.00**
	25-35	4	56		
	35-45	6	66		
	45-55	12	32		
	>55	2	6		
Waist circumference (cm) Mean = 84.68± 10.92	<80	2	68	10.394	0.00**
	>80	22	108		
Physical activity	Yes	19	141	0.012	0.55 NS
	No	5	35		
BMI (kg/m ²) Mean = 26.98± 4.68	<18.5	0	7	4.217	0.52 NS
	18.5-22.9	2	30		
	23-24.9	2	28		
	25-29.9	12	66		
	30-34.9	6	36		
	>35	2	9		
Body fat percent (%) Mean= 35.27± 5.07	<20	0	2	9.726	0.02**
	20-29.9	0	27		
	30-34.5	3	50		
	>35	21	97		
Annual income	<Rs. 90,000	0	0	0.640	0.73 NS
	Rs. 90,000- 2,00,000	2	20		
	Rs. 2,00,000 -10,00,000	22	153		
	>Rs. 10,00,000	0	3		
Personal history of Diabetes	Yes	13	5	3.692	0.04**
	No	163	19		

**Significant at p<0.05

NS – Not significant

Table 2 Logistic regression analysis: risk factors contributing to hypertension

Determinants	Odds ratio (OR)	95% confidence interval	P value
Age	1.074	1.013 - 1.139	0.017**
Waist circumference	0.980	0.925 - 1.037	0.480NS
Body fat percent	1.166	1.006 - 1.351	0.041**
Personal history of Diabetes	2.321	0.669 - 8.050	0.185NS

**Significant at p<0.05

NS – Not significant

body fat percent and personal history of diabetes was also found to be significantly associated with hypertension (p<0.05) (Table 1).

Logistic regression analysis (Table 2) showed that age (odds ratio [OR]: 1.07; 95% confidence interval [CI]: 1.013 - 1.139) and body fat percent (odds ratio [OR]: 1.16; 95% confidence interval [CI]: 1.006 - 1.351)

significantly contributed to the risk of developing hypertension (p<0.05).

DISCUSSION

Hypertension which is a major risk factor for cardiovascular diseases still continues to affect about

one billion people worldwide. It has been estimated that raised blood pressure currently kills nine million people every year. Developing countries like India are seeing growing numbers of people who suffer from heart attacks and strokes due to undiagnosed and uncontrolled hypertension.

Strong relationship always exists between behavioral lifestyle factors such as unhealthy diets, physical inactivity, excessive weight gain and the risk of developing hypertension. On the other hand, lowering systolic blood pressure by 10 mmHg and diastolic blood pressure by 5 mmHg reduces the risk of stroke by 30-40% times and acute coronary events by 16% times (Perk *et al.*, 2012).

In the present study 12% of school teachers had hypertension and 20% had pre-hypertension thereby indicating hypertension as a significant health problem among teachers. Similarly Greiw *et al.* (2010) reported the prevalence rate of hypertension to be 15.1% among school teachers in Libya. Findings of the study indicates that age and other lifestyle determinants such as waist circumference, body fat percent and personal history of diabetes was significantly associated with hypertension ($p < 0.05$). The results of the study is on par with the study conducted among teachers by Erhun *et al.* (2005) who also reported significant increase in the risk of hypertension with age and BMI.

Body fat distribution is also an important risk factor for obesity-related diseases. Excess abdominal fat known as central or upper-body fat is associated with an increased risk of cardiovascular disease. Waist circumference is often used as a surrogate marker of abdominal fat mass and is associated with cardio metabolic disease risk (Pouliot *et al.*, 1994). The present study reports that 65% of the teachers had increased waist circumference (>80 cm) and 59% had high body fat percent that was significantly associated with hypertension ($p < 0.05$). This is due to the fact that Asian Indians have a peculiar body type known as Asian Indian phenotype that is characterized by abdominal obesity and accumulation of visceral fat. Increase in waist circumference contributes to obesity (Joshi, 2003).

The study showed that there was no association between physical activity and hypertension, but indulging in regular physical activity reduces the risk

of hypertension. Individuals are recommended to do physical activity for 30 minutes at least 4 -5 times a week. Regular physical activity is associated with convincing evidence of respective risk reductions of diabetes, hypertension and cardiovascular diseases (Sofi *et al.*, 2008; O'Donovan *et al.*, 2010).

Strong epidemiological evidence unequivocally supports a powerful association between diabetes and risk of hypertension. The results of the current study also indicates a positive association between diabetes and hypertension ($p < 0.05$). Although there was no association between BMI and hypertension, there are several studies that reports high prevalence of obesity among subjects with sedentary activity highlights them as a high-risk group for several chronic illnesses such as cardiovascular diseases and diabetes. Almeida *et al.* (2011) reported that physicians, higher educational professionals, general and administrative personnel and health care workers had a higher prevalence of diabetes. Factors such as increased waist circumference and sedentariness were found to be associated with it.

Many life style determinants leading to hypertension are modifiable and hence provide an opportunity for effective preventive measures and efforts. Hence specific preventive strategies should be planned for teachers as they constitute an important productive sector in the community. In addition these health based preventive strategies should be supervised by the education department of the city to ensure proper functioning.

CONCLUSION

The findings of the present study thereby indicate an urgent need for intensive health education for this group as teachers represent a large and growing segment of workplace in many countries. Therefore, establishing a screening system for early detection of hypertension becomes a prime necessity along with promoting life style intervention programs focusing on healthy diet and regular physical activity that helps in reducing the overall blood pressure related complications. Moreover these strategies are mostly cost-effective and feasible. Teachers can also be used as a medium for implementation of these strategies and schools can be utilized as a place for promoting health education to younger generation apart from it

being used as an epicenter for socialization and acquiring knowledge.

Conflicts of interest: The authors stated that no conflicts of interest.

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