

Original article:

A Cross-Sectional Study of Prevalence of Prehypertension in Medical Students at a Tertiary Care Teaching Centre

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ABSTRACT:

Background and Objectives: The purpose of present study was to identify the prevalence of hypertension and prehypertension and find out any relationship of their blood pressure status with BMI. Our study population consisted of medical students who were from similar socioeconomic status, dietary habits & lifestyle. Early identification of prehypertension in this subgroup plays an important role in screening for metabolic syndrome and identifies modifiable factors required for proposing prevention strategies for prevention of cardiovascular accidents.

Material and Methods: A cross sectional study was conducted among medical students of Saraswathi Institute of Medical Sciences, Anwarpur, Hapur, Uttar Pradesh, India. A total of 120 students were included in the study those who volunteered for participation in the study. A predesigned and pretested questionnaire was filled by the students after the purpose of study was explained to them.

Results: Out of total 120 subjects participated in the study 41 were male and 79 were female. Age range of the subjects was 17-25 years with a mean age of 19.26 years. Out of total 120 subjects 46(38.3%) were prehypertensives, 07 (5.8%) had stage I hypertension and 03 (2.5%) had stage II hypertension.

Out of total 120 subjects 25 (20.8%) subjects had BMI < 18.5, 61 (50.8%) had BMI between 18.5-23.9, 26 (21.7%) had BMI between 24-26.9 and 8 (6.7%) had BMI \geq 27. The association of hypertension with obesity is significant (P value <0.05)

Conclusion: From present study, we can conclude that we have an alarming number of prehypertensive subgroup in the study population which needs to be identified and informed of the future complications. Identification of subjects with pre-hypertension at an earlier age and using high risk strategy of prevention of hypertension among them is important in the prevention of hypertension in study population to prevent the emerging pandemic of hypertension.

Keywords: BMI, Hypertension, Obesity, Overweight, Prehypertension

INTRODUCTION

Hypertension (HT) is an important public health problem worldwide and is the most widely recognized modifiable risk factor for cardiovascular disease (CVD), cerebrovascular disease (stroke) and end-stage renal disease.¹

In past, most researchers described hypertension to be a disease of older adults and elderly, there is a paucity of data on hypertension in teenagers and young adults. Recently, data from the National Study of adolescent Health (Add Health) indicates that hypertension may be more common among

young adults than previously thought.^{2,3} Physicians across the globe have found higher prevalence of metabolic syndrome than previously expected. There is an urgent need to estimate the risks among the health care professionals.

Based on the current evidence, the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)⁴ recommended a new classification for blood pressure in which normal blood pressure is defined as systolic blood pressure < 120 mmHg and diastolic blood pressure of <80 mmHg, while persons with systolic blood pressure of 120 to 139 mmHg and/or diastolic blood pressure of 80 to 89 mmHg are classified as having prehypertension. This new classification places a large number of persons previously considered as normal in this higher risk category and emphasizes the need for monitoring and possible intervention in persons with blood pressures between the range of normal and hypertensive. Since the publication of JNC 7 a number of studies have reported associations between prehypertension and other risk factors for cardiovascular disease. These include obesity, high total cholesterol, diabetes mellitus and elevated C-reactive protein etc.⁵⁻⁷

With India emerging as an economically developed nation, the need of the hour is to focus research and data collection on different population groups. Studies targeting prehypertension in various population groups would provide an estimate of the future magnitude of the problem and assist in developing strategies for control of hypertension and CVD.⁸

Clinical trials have shown that weight loss with a dietary intervention can lower BP levels.^{9,10}

Furthermore, since prehypertension was introduced

as a new category by the Seventh Joint National Committee on the Prevention, Detection, Evaluation and Treatment of Hypertension (JNC-7) in 2003,⁵ little research has been conducted to find out associations of BMI with prehypertension in the literature. The purpose of present study was to identify the prevalence of hypertension and prehypertension and find out any relationship of their blood pressure status with BMI. Our study population consisted of medical students who were from similar socioeconomic status, dietary habits & lifestyle. Early identification of prehypertension in this subgroup plays an important role in screening for metabolic syndrome and identifies modifiable factors required for proposing prevention strategies for prevention of cardiovascular accidents.

MATERIAL AND METHODS

A cross sectional study was conducted among medical students of Saraswathi Institute of Medical Sciences, Anwarpur, Hapur, Uttar Pradesh, India. A total of 120 students were included in the study those who volunteered for participation in the study. A predesigned and pretested questionnaire was filled by the students after the purpose of study was explained to them. Blood pressure was measured from the right arm of the seated participant after five minutes rest and was recorded to the nearest 2 mmHg using 1st and 5th Korotkoff sounds. Three blood pressure measurements were taken and the mean of the last two measurements was used in the analysis. Anthropometric measurements including weight, height were obtained using standardized techniques.

Prehypertension was defined according to JNC 7 criteria as having either a systolic blood pressure of 120 to 139 mmHg and/or diastolic blood pressure of 80 to 89 mmHg in persons who were not on

treatment for hypertension. Hypertension was also defined according to JNC 7 criteria as having an untreated systolic blood pressure (BP) of greater than or equal to 140 mmHg or diastolic BP greater than or equal to 90 mmHg or being on medication for hypertension. Normal blood pressure was defined as having both a systolic BP of < 120

mmHg and a diastolic BP of < 80 mmHg in the absence of antihypertensive medication.⁴

Body mass index (BMI) was calculated as weight in kilograms divided by the square of the height in metres. Overweight was defined as a BMI greater than or equal to 25 (kg/m²), while obesity was defined as BMI greater than or equal 30 (kg/m²).¹¹

Table 1: Distribution of the subjects according to the JNC 7 classification

Hypertension	Males n (%)	Females n (%)	Total n (%)
Normal	18(15.0)	46(38.3)	64(53.3)
Pre HTN	19(15.8)	27(22.5)	46(38.3)
Stage I	2(1.6)	5(4.2)	07(5.8)
Stage II	2(1.6)	1(0.8)	03(2.5)
Total	41(34.2)	79(65.8)	120(100)

Table 2: Distribution of the subjects according to the BMI

BMI	Males n (%)	Females n (%)	Total n (%)
<18.5	5(4.2)	20(16.7)	25(20.8)
18.5 - 23.9	25(20.8)	36(30.0)	61(50.8)
24 - 26.9	8(6.7)	18(15.0)	26(21.7)
≥27	3(2.5)	5(4.2)	8(6.7)
Total	41(34.2)	79(65.8)	120(100)

RESULTS

Out of total 120 subjects participated in the study 41 were male and 79 were female. Age range of the subjects was 17-25 years with a mean age of 19.26 years. Out of total 120 subjects 46(38.3%) were prehypertensives, 07 (5.8%) had stage I hypertension and 03 (2.5%) had stage II hypertension. (Table 1)

Out of total 120 subjects 25 (20.8%) subjects had BMI < 18.5, 61 (50.8%) had BMI between 18.5-23.9, 26 (21.7%) had BMI between 24-26.9 and 8 (6.7%) had BMI ≥27. The association of hypertension with obesity is significant (P value

<0.05) (Table 2)

DISCUSSION

Proportion of prehypertension and hypertension in medical college students were 38.3% and 8.3% respectively in present study. These results were similar to few studies done in past..^{2,12,13} In present study the prevalence of hypertension in males and females were 3.3% in males and 5.0% in females. Prevalence of prehypertension in males and females were 15.8% and 22.5%. Findings were similar to J. Jain et al.² in Central India whereas in other studies prevalence of both prehypertension and hypertension was found more in males than

females.^{2,14,15}

From our analysis of nearly 38.3% of our students fell in the prehypertensive range which is more than the general population. Shobha S Shetty and Avinash Nayak found much higher values of prehypertension in medical students (55%).¹³ We hypothesize that the medical students undergo similar or more stress during their training period with little physical activity, altered food habits and recreational social habits like smoking & alcohol might have accentuated our finding. All the students in our study group belonged to the same socioeconomic strata & consumed the same kind of food.¹³

The public health implication of this increased burden of at-risk people in our population requires serious consideration. It has been estimated that a 5 mmHg reduction in systolic blood pressure in the population will produce a 14% reduction in the risk of stroke and a 9% reduction in the risk of coronary heart disease.¹⁶ The present study stresses the need to target this subgroup of prehypertensives more aggressively to prevent the epidemic of hypertension and its sequelae like coronary artery disease and chronic kidney disease. It has been shown that overweight status and increasing age are potential risks for future development of hypertension thus obesity management and lifestyle modifications are potential factors in the prevention of hypertension⁸ and we stress the need to inculcate this in the early training period among the medical students to keep the health care fraternity in better shape.¹³

Presently pharmacological therapy has not been recommended to treat prehypertension except for those with other comorbid risk factors.¹⁷

Overall, the high prevalence of prehypertension in the younger age groups suggest that although the

absolute risk of CVD attributable to prehypertension may be low, the population attribute a blerisk may be relatively high and therefore will have important public health implications. The public health implication of this increased burden of at-risk people in our population is worthy of serious evaluation. If we apply a population approach to disease prevention we could therefore expect that a small reduction in mean population blood pressure will result in relatively large reductions in overall CVD risk. This can be achieved through either lifestyle or pharmacological intervention.

CONCLUSION

From present study, we can conclude that we have an alarming number of prehypertensive subgroup in the study population which needs to be identified and informed of the future complications. Identification of subjects with pre-hypertension at an earlier age and using high risk strategy of prevention of hypertension among them is important in the prevention of hypertension in study population to prevent the emerging pandemic of hypertension.

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