High Blood Pressure among Undergraduate Students of a Medical College in Raipur, C.G: A Cross-Sectional Study

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Abstract:

Introduction: Hypertension is a major cause of premature death worldwide. Medical students are very susceptible to hypertension at an early age.

Objectives: To estimate the prevalence and determinants of hypertension among medical students.

Materials and Methods: It was a cross-sectional study done among 599 medical students during March –May 2023 at Raipur Institute of Medical Sciences, Raipur, C.G. Statistical analysis was done using Chi-square test and multiple logistic regression.

Results: Prevalence of hypertension among medical students was 11.69%. Age, presence of family history of hypertension, obesity, physical inactivity, smoking, alcohol consumption were significantly associated with hypertension (p < 0.05).

Conclusions: A high prevalence of hypertension was found among medical students. Smoking, Alcohol consumption, BMI and physical inactivity are the modifiable risk factors associated with hypertension which can be addressed to reduce the prevalence of hypertension in this study group.

Keywords: High BP, Hypertension, Medical students, Physical activity.

Introduction

Hypertension is a major cause of premature death worldwide. An estimated 1.28 billion adults aged 30–79 years have hypertension. Globally, prevalence of hypertension among adult aged 30-79 years is around 33%, most (two-thirds) living in low- and middle-income countries (1). Currently, it is estimated that 28.1% of all deaths in India were due to CVD and, high systolic blood pressure (SBP) was the single largest contributor (8.5%) to disability-adjusted life years DALYs [2]. An estimated 46% of adults with hypertension are unaware that they have the condition. Less than half of adults (42%) with hypertension are diagnosed and treated (1) .One of the global targets for noncommunicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 2030 (3). As per a multicentric survey done by ICMR, 28.5 per cent of adults in India were hypertensive. Among them, 27.9 per cent were aware of their hypertensive status, 14.5 per cent were under treatment and 12.6 per cent had their blood pressure under control (4).

India recently strengthened its resolve to address hypertension at the population level by launching the population-based screening for hypertension (along with diabetes and the three common cancers) and strengthening primary and secondary health facilities(5).

The younger age groups are at increased risk of developing these diseases because of excessive exposure to faulty food habits, academic stress, gadget use, and lack of physical activity. Medical education is stressful throughout the course of training because of the amount of study required, social isolation, pressure of examinations and peers, and discrepancies between expectations and reality, which could all contribute to psychological stress [6]. Studies have pointed to a shift in the age of onset of hypertension toward the younger age groups [7, 8]. Objectives: The objective of the study was to estimate the prevalence and determinants of hypertension among medical students.

Materials & Methods

This was a cross-sectional study done on undergraduate medical students during March–May 2023 at Raipur Institute of Medical Sciences, Raipur, C.G. The study was approves by the

Institutional Ethical Committee. The single population proportion formula was used to determine sample size, assuming a 95% of confidence level, 5% margin of error, and 18.5% prevalence of high BP (9). Finally, a contingency of 10% was used to account for nonresponse during data collection. Therefore, the final sample size was estimated to be 255 students . After obtaining the written informed consent from the participants, data regarding socio-demographic factors and risk factors were collected using predesigned semi structured questionnaire. Anthropometric measurements were taken and BP was measured for all the participants. Measurement of weight and height was done using standardized, calibrated weighing machine and stadiometer respectively. Body mass index (BMI) was categorized based on cut-off points for BMI categories in Asian populations as follows: less than 18.5, 18.5 to 23, 23 to 27.5, and more than or equal to 27.5 for underweight, normal weight, overweight and obese respectively.(10,11,12)

The blood pressure was measured when the participants were relax, sitting in a chair for more than five minutes. It was instructed that the participant did not consume caffeine or did exercise or smoking for at least 30 min before BP measurement. Two readings were obtained from each participant separated by at least two minutes and an average was taken to obtain the final measurement. This was then categorised in accordance with Eighth Joint National Committee (JNC 8) and reported [Normal < 120/80 mmHg; Prehypertensive 120-139/80-89 mmHg; Stage 1 HTN 140-159/90-99 mmHg; Stage 2 HTN > 160/> 100 mmHg] . (13)

Data analysis: Data were entered into Microsoft Excel and analyzed with SPSS version 21.0. Data were summarized as frequencies and percentages. The unadjusted odds ratio with the 95.0% confidence interval was computed for binary variables. Association between demographic variables, anthropometric variables, and BP was analyzed by the chi-square test. P-value <0.05 was considered as significant.

Results

The study included 599 students of a medical college in Raipur studying in 1st professional year , 2nd professional year , Final Part 1 and Final Part 2 MBBS . The age range of the participant was 19 to 24 years (Mean 20.6, SD 2.2) of which 46.0% were males.

Prevalence of hypertension

The prevalence of hypertension among medical students was 11.69 % (stage I and stage II hypertension). The results also showed that 20.7 % were prehypertensive (Table 1).

Table 1: Distribution of the participants according to classification of hypertension

Blood pressure category	N = 599		p value
	Number (n)	Percent (%)	
Normal	405	67.6	0.000
Prehypertensive	124	20.7	
Stage 1 HTN	61	10.2	
Stage 2 HTN	9	1.49	

Blood pressure was categorized as Normal, < 120/80 mmHg; Prehypertensive, 120-139/80-89 mmHg; Stage 1 HTN, 140-159/90-99 mmHg; Stage 2 HTN≥ 160/≥ 100 mmHg

Association of different variables with hypertension*: Table 2 showed that presence of family history of hypertension, obesity, physical inactivity, smoking, alcohol consumption were significantly associated with hypertension (p < 0.05). However, the age, gender and year of study were not significantly associated with hypertension (p>.05).

Table 2: Association of demographic and anthropometric variables with blood pressure among participants

Variables		Normal n(%)	Pre HTN + HTN1 + HTN2 n(%)	p value
Obesity	Underweight	31 (51.7%)	29 (48.3%)	0.004
	Normal	298 (70.8%)	123 (29.2%)	
	Overweight	55 (59.8%)	37 (40.2%)	
	Obese	21(80.8%)	5 (19.2%)	
Physical activity	Daily	104 (70.3%)	44 (29.7%)	0.041
	3 – 4 times	78 (78.0%)	22 (22.0%)	
	1 – 2 times	64 (65.3%)	34 (34.7%)	
	Never	159 (62.8%)	94 (37.2%)	
Age	18-21	195 (70.7%)	81 (29.3%)	0.142
	21-24	210 (65.0%)	113 (35.0%)	

Gender	male	130 (62.5%)	78 (37.5%)	0.051
	female	275 (70.3%)	116(29.7%)	
Professional Year	1st Year	63 (42.0%)	87 (58.0%)	0.063
	2nd Year	136 (90.7%)	14 (9.3%)	
	MBBS Part 1	109 (72.7%)	41 (27.3%)	
	MBBS Part 2	97 (65.1%)	52 (34.9%)	
Family history	Yes	101 (56.7%)	77 (43.3%)	0.000
	No	304 (72.2%)	117 (27.8%)	
Smoking	Yes	32 (49.2%)	33 (50.8%)	0.001
	No	373 (69.9%)	161 (30.1%)	
Alcohol consumption	Yes	12 (44.4%)	15 (55.6%)	0.008
	No	393 (68.7%)	179 (31.3%)	

Discussion

The main objectives of this study were to assess the prevalence of hypertension and identify their determinants in the medical students. In the present study, the prevalence of hypertension (stage 1 and stage 2 hypertension) was 11.69 %. The prevalence of prehypertension (20.7%) was also high in our study. In other studies, the reported prevalence of hypertension was 8.1% (Cenji et al) (14), 18.5%.(Midha et al.)(15) , 17.6% (Chakraborty et al) (16) . These findings indicate that hypertension is a major threat in medical students that needs serious consideration. This is like only the tip of the iceberg where many cases remain undetected.

The study evaluated the link between hypertension and various demographic and anthropometric variables, which included previously established determinants of hypertension such as sex, age, BMI, alcohol and tobacco use and physical inactivity. Many of our results are consistent with findings from previous studies. There was no statistically significant sex difference noted in the study, which is in contrast to the findings of study done by Chenji et al with the prevalence of BP greater than 140/90 mm Hg among males (11.8%) being more than that among females (5.2%), and also study findings from Mangalore, [14,17]. This finding in our study could be due to smaller sample size.

The present study reveals that level of physical activity and BMI were significantly associated with hypertension. In the study from Varanasi also, the odds of hypertension in subjects with obesity (OR=3.57) was significanlty higher than in normal subjects.(18) The combination of insulin resistance, increased sympathetic activity, and increased leptin levels could be the mechanism behind this association between physical inactivity, high BMI with hypertension. . The present study also revealed that there was a significant association between hypertension and family history of hypertension. Shanthirani et al and Gupta R et al also observed a similar association.(19,20)

Limitation

A single BP recording was taken because of time constraints as students had to go for their classes and clinical postings. However, a second reading was taken on the same day for students who had high BP readings, and a repeat measurement was done on the subsequent day. If BP was found to be consistently high, the students were referred to the Medicine Department at the medical college hospital. The findings of the study could not be generalized because data was collected from students from a single medical college.

Conclusion

The present study reveals a high prevalence of hypertension (11.69 %) among medical students. The non-modifiable risk factors of hypertension among medical graduates found significant in our study are gender and family history of hypertension, whereas the significant modifiable risk factors are BMI and physical activity. This study findings stresses on need of regular screening for Blood Pressure and various risk factors responsible for it.

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