ORIGINAL ARTICLE

Prevalence and knowledge of hypertension among students of medical college of central Uttar Pradesh, India

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Abstract

Background: Hypertension is one of the biggest health challenges, which is continuously increasing among young adults, especially students. The aim of the present study was to find out the prevalence, associated factors and knowledge of hypertension among undergraduate students of a medical college of a rural area in central Uttar Pradesh, India. **Methodology**: A cross-sectional study was conducted in one of the medical college of central Uttar Pradesh, India. Data were collected on socio-demographic and behavioral factors, and anthropometric assessments were carried out using standard equipment and procedures. **Results**: The present research involved 147 undergraduate medical students with a mean age of 21.9±2.2 years. Knowledge about hypertension was poor, average and good among19.7% (n=29), 76.8% (n=113) and 3.4% (n=5) students, respectively. Mean systolic blood pressure (mean SBP) was 127.07 ± 10.109 mm of Hg with a range 110 to 154mm of Hg, and mean diastolic blood pressure (mean DBP) was 80.5 ± 6.587 mm Hg with a range 68 to 94 mm of Hg. **Conclusions**: Smoking, alcoholism, non-vegetarian diet, body weight over 60 kgs and waist-hip ratio over 0.9 were recognized as risk factors of hypertension. Hence it needs a powerful surveillance program to find the exact problem.

Keywords

Hypertension; Knowledge; Medical Students; Prevalence; Risk Factors.

Introduction

Hypertension is a growing public health problem and causes a significant burden on the health system in India. Medical students are very susceptible to hypertension (1). A significant amount of the studies has been diverted to the children and adolescent group due to the increasing prevalence of hypertension among them. (2). Fourth National Family Health Survey (2015-16) reported hypertension in13.8% men versus 8.8% women (overall11.3%) aged15–49 and 15–54 respectively (3). Epidemiologists have estimated that the number of premature deaths caused by hypertension will escalate to over 1.56 billion by the year 2025 (4). Fewer than one in five people have a controlled hypertension. One of the global targets for hypertension, is to reduce its prevalence by 25% by 2025 from baseline of 2010 (5). If blood pressure levels of individuals were followed up over the years from early childhood into adult life, then those individuals whose pressures were initially high in the distribution would probably continue in the same "track" as adults (6). The studies conducted till now are mostly among hypertension in college students who live in big cities. Pieces of evidence on the burden of hypertension and associated factors also lack among medical college students.

Aims & Objectives

1. To find out prevalence of hypertension among medical students
2. To determine risk factors associated with hypertension among medical students
3. To assess the knowledge regarding hypertension among medical students.

Material & Methods

The present Cross-Sectional study was conducted at a medical college of a rural area in central Uttar Pradesh, North India. All undergraduate students studying in the medical college formed the study population. The duration of the study was six months. Study participants were interviewed using a pre-designed, pre-tested, semi-structured questionnaire. Data were collected on social, demographic and behavioral factors. The anthropometric measurements were carried out using standard equipment and procedures. Waist circumference ≥ 90 cm for men, and ≥80cm for women cut off for defining abdominal obesity. Cut off value for hypertension was taken at 140/90 mm Hg (7, 8). Knowledge about hypertension of study participants was assessed using "self-made validated questionnaire". Sample size calculation: By considering the prevalence of 10.5% of hypertension (10) with an absolute error 5% at a 95% confidence interval, the sample size for the present study has been calculated using the formula

$$N=\frac{(Z_{1-\alpha/2})^{2} P\,(1-P)}{D^2}$$

Where-$Z_{1-\alpha/2}$ = a constant value at 95% confidence interval

P =Expected prevalence of hypertension

D = Absolute allowable error

N = Sample size

Substituting values into the formula

$$=\frac{1.96^2 X 10.5 X 89.5}{5^2} == 144.40$$

The sample size is thus rounded off to 148. Thirty-seven students were selected from all four batches. One student removed his name from the survey, so the final size of the sample was 147. We have excluded the study participants which given incomplete response. We continued to collect the data till sample size is reached. Face to face interview was conducted to collect the data, so there were no dropouts and non-response. (Figure 1)

Statistical analysis: Data were entered in Microsoft Excel and analyzed using IBM Corp. Released in 2016. IBM SPSS Statistics for Windows, Version 24.0, IBM Corp., Armonk, NY. Continuous data were summarized using mean, median, and standard deviation depending on the distribution of the data. Categorical data were summarized using percentages and proportions. A comparison was made between participants who had hypertension and those without hypertension. P-value <0.05 was considered statistically significant. The prevalence of hypertension was estimated and the association of various factors were assessed using the chi-square test and multivariate logistic regression.

Ethical clearance: Ethical clearance for the research was taken from the Ethics committee of the University. Written informed consent was obtained from each study participant before enrollment into the study. For a hypertensive individual, counseling was done, and referrals were made.

Results

The mean age of study participants was 21.9 ±2.2 years. The present study showed a high proportion of hypertension, which was found to be 17.6%. The proportion of males was 57.8% among study subjects. Knowledge about hypertension was poor, average and good among 291(9.7%), 113 (76.8%) and 5 (3.4%) students, respectively. [Table 1] Mean systolic blood pressure was127.07± 10.109 mm of Hg with a range 110 to 154 mm of Hg, and mean diastolic blood pressure was 80.5 ± 6.587 mm of Hg with a range 68 to 94 mm of Hg. Bivariate analysis showed that smokers have 4.853 times more chances of developing hypertension than non-smokers. The difference between the two groups was found statistically significant (p-value 0.001). Similarly, alcoholics have about three times more chances of developing hypertension than non-alcoholics p-value of these groups was 0.038, which is statistically significant. Vegetarians have 78.2% lesser chances of developing hypertension than non-vegetarians. The difference between these two groups was found statistically significant (p-value = 0.018). Similarly, people whose weight was less than 60 kg have 84.4% less chance of developing hypertension than people whose weight was over 60 kg [Table 2]. However, these were not found to be significant in multivariate analysis [Table 3]. Study subjects having a waist-hip ratio of less than 0.9 have 0.345 times more chance to develop hypertension. The difference between these two groups was found statistically significant (p-value = 0.020). In Bivariate analysis, the study participants having a waist less than 90 cm has 0.157 times more chance to develop hypertension (p-value = 0.002) [Table 2]. Multivariate analysis showed that study participants who have waist circumference less than 90 cms had 0.209 times fewer chances of developing hypertension. The difference between the two groups was found statistically significant (p-value 0.039) [Table 3].

Discussion

In the present study, the overall prevalence of hypertension was 17.26%. The proportion of hypertension was 27.5% in males and 7.5% in females. Midha T, et al. found that the prevalence of hypertension among medical students was 18.5%, which is almost similar to the present study (1).Chitrapu RV et al.(9) showed similar results to the current study as not all pre-hypertensives would be converted to future hypertensives. Srivastava A K et al.found in their study that the prevalence of hypertension was 10.5% (10).The difference could be attributed to an increase in study burden because of new technologies (online classes/post-graduate coaching classes, etc.) over the recent years in medical education. Kumar N, et al. found that out of 230 subjects that took part in the study, 82 were male, and 148 were female. Out of 230 subjects, it was found out that 91 (39.6%) were pre-hypertensive, 15 (6.5%) had stage-I hypertension, and 6 (2.6%) had stage II hypertension in comparison with the present study(11). Al-Mazef HT et al. found that normotensives made up 53.5%, pre-hypertensives formed 39.5%, and hypertensive students formed 7% proportion among the study group. The overall proportions of hypertension and pre-hypertension were higher among male students (85.7% and 64.4%) than female students (14.3% and 35.6%), respectively (12). Parsekar SS found that the prevalence of high BP and overweight/obesity 23.05% and 9.18%, respectively (13).Tadesse T conducted a study on 610 college students and found that the prevalence of hypertension was 7.7%. Higher rates of hypertension were observed among males [AOR: 3.12, 95% CI (1.16-8.36)] (14). Al Wabel AH did a study on130 medical student, and found the 14.6% of prevalence of hypertension (15). The findings come from a survey and examination of first- and second-year students showed that about 18% of medical students had stage 2 hypertension, while only eight percent proportion of the general population of same age group had stage 2 hypertension. The prevalence is approximately 2.4 times higher than expected (16).

In the current study, it was found that smoking, alcoholism, non-vegetarian diet, and weight over 60 kg have a significant association with hypertension. Midha T, et al. found that there is a significant association of hypertension with male gender (OR=0.328), family history of hypertension (OR=2.812), level of physical activity (OR=0.395), and BMI (OR=3.710) (1).Chitrapu RV et al. found that prevalence was similar in boys and girls and associated with a greater mean body-weight, body mass index, and waist circumference when compared to normotensive persons (9).Nyombi KV et al., surveyed 180 students and found that 107 (59%) were males with a mean age of 22 years, and 159 (88%) were in their pre-clinical years of medical education. Cardiovascular risk factors with the highest prevalence were increased alcohol intake (31.7%); raised SBP (14%); and excessive salt intake (13%). The study subjects with raised SBP, were older (OR = 1.18), overweight (OR = 1.08), and with a personal history of cardiovascular disease (OR = 4.68) (17).Patnaik A et al. found that the combined prevalence of pre-hypertension plus hypertension was 67%, which was much higher in this study compared to other studies (18).In the present study knowledge about hypertension was poor, average and good in 29 (19.7%), 113 (76.8%) and 5 (3.4%) students, respectively. Wizner B, et al. found that only 21.2% of students had good knowledge about the BP measurement technique, 70% to 90% of subjects knew hypertension diagnostic criteria, about 30% of subjects gave the correct values defined as "high-normal." About 37.1% of subjects were aware of complications concerning the heart, nervous system, renal system, eye, and peripheral blood vessels. Only eleven percent of the study subjects were aware about all drugs for hypertension, recommended by WHO guidelines (19).

Conclusion

The prevalence of hypertension among study subjects is higher than the general population of India (NFHS-4 Data of the year 2015-16), most of which are undiagnosed cases. Smoking, alcoholism, non-vegetarian diet, body-weight more than 60 kgs and waist-hip ratio more than 0.9 were found to be risk factors of hypertension. So, by controlling these factors, we can prevent hypertension. Management of high BP can be one of the most cost-effective public health interventions. Recognizing subjects with hypertension at an earlier age and employing a high risk policy of hypertension prevention among them is crucial in the prevention of hypertension in the community in order to avoid the emerging pandemic of hypertension. Our findings illustrate the importance of implementing innovative preventive and health promotion strategies aimed at younger age groups.

Recommendation

Vital hypertension surveillance programs addressing the social, environmental, and lifestyle correlates and initiatives which increase awareness of hypertension and its risk factors target younger age groups, particularly medical students. Further studies focused on risk factors of hypertension among medical students, and preventive measures are required.

Limitation of the study

This study was conducted on a specific population, e.g., Medical students, so the result cannot apply to the general population.

Relevance of the study

The prevalence of hypertension found in this study is **more than** National Family Health Survey-4, India. Hence it needs a powerful surveillance program to know that exact problem; consequently, we can control that situation by making appropriate decisions. Early detection of modifiable factors in medical students, influencing hypertension, helps in managing the future complication of the disease.

Authors Contribution

All authors contributed to concept, design, acquisition, analysis, interpretation of data, drafting of the manuscript, critical revision of the manuscript for important intellectual content, coordination, statistical analysis, administrative, technical, material support, and supervision.

References

1. Midha T, Nigam S, Martolia DS, Kaur S. Prevalence and determinants of hypertension in MBBS students of Govt. Medical College, Kannauj, Uttar Pradesh. Indian Journal of Forensic and Community Medicine. 2018Apr; 5(2):97-100.
2. Lurbe E, Agabiti-Rosei E, Cruickshank JK, Dominiczak A, Erdine S, et al., 2016 European Society of Hypertension guidelines for the

management of high blood pressure in children and adolescents. Journal of Hypertension. 2016 Oct 1;34 (10):1887-920.

3. Gupta R, Gaur K, Ram CV. Emerging trends in hypertension epidemiology in India Journal of Human Hypertension. 2019 Aug; 33(8):575-87.
4. Chockalingam A, Campbell NR, Fodor JG. Worldwide epidemic of hypertension. Canadian Journal of Cardiology. 2006 May 1;22(7):553
5. Hypertension. WHO.int. 2019. Available from: https://www.who.int/news-room/fact-sheets/detail/hypertension (Last accessed on 25.03.2021)
6. Park K.Park's Text Book of Preventive and Social Medicine. 25st ed. Jabalpur: Banarsidas Bhanot; 2019.p.404.
7. MO module for PBS for NCD Nrhmorissa.gov.in. 2017. Available from: http://www.nrhmorissa.gov.in/writereaddata/Upload/Documents/MO%20Module%20for%20PBS%20for%20NCds.pdf (Last accessed on 25.03.2021)
8. Module for Multi-Purpose Workers (MPW) - Female/male on prevention, screening and control of common non-communicable diseases: NHM. [Internet] Available from https://main.mohfw.gov.in/sites/default/files/Module%20for%20MultiPurpose%20Workers%20%20Prevention%2C%20Screening%20and%20Control%20of%20Common%20NCDS_2.pdf (Last accessed on 25.03.2021)
9. Chitrapu RV, Thakkallapalli ZM. Pre-hypertension among medical students and its association with cardiovascular risk factors. Journal of Dr. Nandamuri T Rama Rao University of Health Sciences. 2015 Jan 1;4(1):8.
10. Srivastava AK, Kandpal SD, Negi KS, Srivastava A. Prevalence and risk factor of hypertension among medical college students, HIMS, Dehradon. Indian J Prev Soc Med. 2012;1:43.
11. Kumar N, Kumar R, Sharma V. Prevalence of Prehypertension and Hypertension in Western UP Region at Tertiary Care Centre: Analysis from a Cross-Sectional Survey. Int J Med Res Prof 2020;13(2)261-65
12. Al-Majed HT, Sadek AA. Pre-hypertension and hypertension in college students in Kuwait: a neglected issue. Journal of Family & Community Medicine. 2012 May;19(2):105.
13. Parsekar SS, Singh MM, Venkatesh BT. High blood pressure and its association with obesity among preuniversity college students of Udupi taluk. International Journal of Medical Science and Public Health. 2015 Jul 1;4(7):1.
14. Tadesse T, Alemu H. Hypertension and associated factors among university students in Gondar, Ethiopia: A Cross-sectional study. Bio Med Central Public Health. 2014 Dec 1;14(1):937.
15. Al Wabel AH, Almufadhi MA, Alayed FM, Aloraini AY, Alobaysi HM, Alalwi RM. Assessment of hypertension and its associated risk factors among medical students in Qassim University. Saudi Journal of Kidney Diseases and Transplantation. 2018 Sep 1;29(5):1100.
16. Hypertension Rates High Among Medical Students. Medscape. 2019. Available from: https://www.medscape.com/viewarticle/917993 (Last accessed on 25.03.2021)
17. Nyombi KV, Kizito S, Mukunya D, Nabukalu A, Bukama M, Lunyera J, et al., High prevalence of hypertension and cardiovascular disease risk factors among medical students at Makerere University College of Health Sciences, Kampala, Uganda. Bio Med Center Research Notes. 2016 Dec;9(1):1-6.
18. Patnaik A, Choudhury KC. Assessment of risk factors associated with hypertension among undergraduate medical students in a medical college in Odisha. Advanced Biomedical Research. 2015;4.
19. Wizner B, Gryglewska B, Kocemba J, Grodzicki T. Knowledge of hypertension and blood pressure measurement procedure among students of last year of medical school in Cracow. Europe Pub Med Central. 2003;60(8):508-11.

Tables

TABLE 1 ASSOCIATION BETWEEN HYPERTENSION AND DIFFERENT SOCIO-DEMOGRAPHIC VARIABLES AMONG STUDY PARTICIPANTS

Variable	Sub-Group	Hypertensive Number (%)	Non-Hypertensive Number (%)	p-Value
Age Group	18 to 21 Years	14 (9.5%)	61 (41.5%)	
	22Years and Above	11 (7.5%)	61 (41.5%)	0.585
Gender	Male	20 (13.6%)	65 (44.2%)	
	Female	5 (3.4%)	57 (38.7%)	0.01
Religion	Hindu	16 (10.8%)	102 (69.4%)	
	Others	9 (6.1%)	20 (13.6%)	0.025
Type of family	Nuclear	17 (11.6%)	81 (55.1%)	
	Joint	8 (5.4%)	41 (27.9%)	0.877
Smoking	Present	11 (7.5%)	17 (11.6%)	
	Absent	14 (9.5%)	105 (71.4%)	0.001
Alcoholism	Present	7 (4.8%)	4 (2.7%)	
	Absent	18 (12.2%)	108 (73.5%)	0.031

TABLE 2 BIVARIATE ANALYSIS THE FOR THE RISK FACTORS OF HYPERTENSION AMONG STUDY PARTICIPANTS

Variables	Bivariate analysis		P value
	OR	**95 % CI**	
Age	1.273	0.535 – 1.273	0.585
Gender	0.285	0.101- 0.809	0.018
Religion	0.349	0.135-0.899	0.029
Category	0.923	0.390-2.184	0.855
Type of family	1.076	0.428-2.700	0.877
Total family members	1.398	0.565-3.460	0.468
Per capita income	0.877	0.182-4.227	0.871

Variables	Bivariate analysis		P value
Current smoker	4.853	1.893-12.440	0.001
Current alcoholic	3.000	1.065-8.449	0.038
Adequate physical activity	0.744	0.311-1.777	0.744
Practice yoga/ meditation	0.306	0.068-1.381	0.123
Diet	0.218	0.062-0.767	0.018
Fast food consumption	1.269	0.344-4.685	0.720
Blood relative suffering from hypertension	1.579	0.733-3.401	0.243
Blood relative suffering from Diabetes	1.147	0.561-2.346	0.707
Weight more than 60kgs	0.156	0.044-0.547	0.004
BMI≥23	0.434	0.181-1.037	0.060
Waist more than 90cms	0.157	0.049-0.499	0.002
Waist hip ratio more than 0.9	0.345	0.140-8.48	0.020

TABLE 3 MULTIVARIATE ANALYSIS THE FOR THE RISK FACTORS OF HYPERTENSION AMONG STUDY PARTICIPANTS

Variables	Multivariate Analysis		P value
	OR	95 % CI	
Gender	2.124	0.588- 7.674	0.250
Religion	0.332	0.099- 1.119	0.075
Current smoker	3.227	0.812-12.818	0.096
Current alcoholic	1.236	0.247-6.193	0.797
Diet	0.360	0.085-1.523	0.165
Weight less than 60 kg	0.340	0.084-1.376	0.130
Waist less than 90cms	0.209	0.048-0.922	0.039
Waist hip ratio more than 90 cms	0.867	0.284-2.647	0.802

Figures

FIGURE 1 STUDY FLOW CHART