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A study on prevalence of Hypertension and its related risk factors among undergraduate medical students in Kolkata.

Amitabha Chattopadhyay[1] ,Pranita Taraphdar [2], Badal KumarSahu [3], Sanghamitra Maulik[4],Ritu Ghosh[5],Abhik Sinha [6], Mallika Biswas[7]

[1](Assistant Professor, Department of Community Medicine, R.G.Kar Medical College ,West Bengal, India)
[2](Associate Professor, Department of Community Medicine, NRS Medical College ,West Bengal, India)
[3](Demonstrator, Department of Community Medicine, NRS Medical College ,West Bengal, India)
[4]((Demonstrator, Department of Community Medicine, NRS Medical College ,West Bengal, India)
[5,6] (Assistant Professor, Department of Community Medicine, R.G.Kar Medical College ,West Bengal, India)
[7](Associate Professor, Department ofBiochemistry, NRS Medical College ,West Bengal, India)

Abstract :
Background: *Hypertension is a major contributor to the global disease burden. It poses an important public health challenge. Even as most studies assess the prevalence of hypertension and its risk factors in older adults and the elderly, there is a paucity of such data among teenagers and young adults. Knowledge of the predisposing risk factors is vital in the modification of lifestyle behaviors conducive to optimal cardiovascular health.* ***Methodology:*** *This was a cross sectional study carried out among the undergraduate medical students a Government Medical College in Kolkata. Total sample size for analysis was 850. Students were interviewed using a predesigned and pretested semi structured questionnaire and blood pressure, BMI and WHR was measured.* ***Results:*** *In this study13.88% of the students were hypertensives, while 19.18% were prehypertensives. Significant association ($p \leq 0.05$) was found with age, place of stay, gender, year of study, BMI, WHR, family history of hypertension, excess salt consumption, junk food intake and physical activity.* ***Conclusion:*** *Hypertension being a silent killer remains asymptomatic until complications like coronary artery disease, stroke, and renal failure develop. Undergraduate medical students are the future health care professionals of any society. So, it is crucial to devise sound prevention and control programs among this cohort of population, to improve their knowledge, attitudes and lifestyle practices early in life, to control hypertension and prevent its subsequent morbidities.*

Keyword*: Hypertension, risk factors, undergraduate medical students*

I. Introduction

Hypertension is a major contributor to the global disease burden. It poses an important public health challenge to both economically developing and developed countries, including India. Hypertension is responsible for 57% of stroke deaths and 24% of coronary heart disease deaths in India.[1] It is estimated that cardiovascular disease will be the major cause of death and disability in India by 2020.Hypertension is emerging as a major health problem in the recent years and the prevalence of hypertension is gradually increasing in urban communities.[2]

Hypertension confers the highest attributable risk to deaths from cardiovascular disease [3]and epidemiological data provide convincing evidence that the risk of cardiovascular disease related to blood pressure is graded and continuous.[4] This risk is evident even in childhood; with elevated blood pressure predicting hypertension in adulthood,[5] and adverse effects of elevated blood pressure in childhood on vascular structure and function, specifically left ventricular hypertrophy, are already apparent in youth.[6-8] Reduction of blood pressure reduces this risk in people with and without hypertension and is a desired goal in children and adults.[9,10]

Even as most studies assess the prevalence of hypertension and its risk factors in older adults and the elderly, there is a paucity of such data among teenagers and young adults, as they are considered to be at a lower risk of developing the disease. With a growing problem of hypertension worldwide, there is a concern that hypertension in young adults may also be on the rise and that cases are not detected because of inadequate screening in this age group.[11]

The epidemiology of demographic transition states that a long-term shift occurs in mortality and disease patterns, whereby infectious diseases are gradually displaced by degenerative and man-made diseases as the chief form of morbidity and death.[12] Furthermore, evidence shows that India is a country in transition where people have adopted western living patterns; risk factors such as sedentary lifestyle; obesity, stress, unhealthy diets; and smoking have all been demonstrated in young adults.

Knowledge of the predisposing risk factors is vital in the modification of lifestyle behaviors conducive to optimal cardiovascular health.[13,14] Measuring and appropriately disseminating knowledge of the modifiable risk factors at an early age is an essential preventive educational approach. Strategies to achieve even a modest lowering of the levels of blood pressure in the population of children and young adults are therefore important public health goals. An attempt is made in the present study to assess the prevalence of hypertension and its related risk factors among undergraduate medical students in Kolkata.

II. Materials and Methods

This was a cross sectional study carried out among the undergraduate medical students of N.R.S Medical College, which is a Government Medical College in Kolkata, West Bengal. The study was conducted over a period of 1 months (April 2014 to May 2014). Out of the total 878 undergraduate students distributed over 4 batches (2nd year to 4th year), 19 students could not be tracked and 9 students refused to participate. The total sample size for analysis was therefore 850. The purpose of the study was explained to the students; informed verbal consent was taken and they were interviewed using a predesigned and pretested semi structured questionnaire to record basic socioeconomic and demographic information. Hypertension was defined as per JNC 7 guidelines (Normal: Systolic and diastolic < 120/80,Prehypertensives: systolic 120-139 or diastolic 80-89 mm of Hg,Stage-1 hypertensives: systolic 140-159 or diastolic 90-99 mm of Hg,Stage-2 hypertensives: systolic 160 or diastolic 100 mm of Hg) [15] and was measured using the auscultatory method with a standardized calibrated mercury column type sphygmomanometer and an appropriate sized cuff encircling at least 80% of the arm in the seated posture, with feet on the floor and arm supported at heart level; two separate measurements were done and the average of the two measurements was recorded. In some cases, where high blood pressure was recorded for the first time, the researchers checked the blood pressure more than twice and took the average of the two close readings. Students already taking antihypertensives drugs were also included in hypertensive categories. Standing height and weight were measured. Body weight was measured (to the nearest 0.5 kg) with the subject standing motionless on the weighing scale, feet about 15 cm apart, and weight equally distributed on each leg. Subjects were instructed to wear minimum outerwear (as culturally appropriate) and no footwear while their weight was being measured. Height was measured (to the nearest 0.5 cm) with a portable stadiometer, with the subject in an erect position against a vertical surface, and with the head positioned so that the top of the external auditory meatus was level with the inferior margin of the bony orbit. The body mass index (BMI) which is expressed in kg/m^2 was used to define obesity and overweight according to recommendations as given by World Health Organization. A person was considered to be obese if body mass index $\geq 30\ kg/m^2$ and overweight when BMI $\geq 25\ kg/m^2$. Waist circumference was measured at the midpoint between the inferior margin of the last rib and the top of the iliac crest. Hip circumference was measured at the largest posterior extension of the buttocks. Waist and hip circumferences were measured to the nearest 0.1 cm. The waist-to hip ratio was calculated using the formula, WHR = waist circumference (cm) /hip circumference (cm).Waist-hip ratio > 1 for males and >0.85 for females was defined as truncal obesity.[16-18] Individuals with either a parent or a sibling (brother or sister) having hypertension were considered to have a positive family history. Statistical analysis was done by using Microsoft Excel 8.0 and EPI INFO3.4.3 software. The chi-square test was used to analyze the differences, considering a as statistically significant.

III. Results

Table 1 presents the socio demographic profile of the selected students. About 60% of the students were less than 20 years of age, and majority of the students resided in hostel. Almost two third of the subjects were male and majority were Hindu by religion. Non vegetarians predominated in the study population and 48% of the students had excess weight. Family history of hypertension was present in 28.35% of the participants. About 50% of the students had minimal physical activity and majority consumed excess salt(> 5 gm/day). Addiction to any form of tobacco(chewable & non chewable)/alcohol/both was present in 12.1 % of the subjects while more than 85% of the students consumed junk foods. About 33% of the students had truncal obesity.

Table-2& Figure 1 presents the blood pressure status of the undergraduate medical students. Out of the 850 students 13.88% of the students were hypertensives, while 19.18% were prehypertensives.

Table-3 presents the association between blood pressure status of the undergraduate medical students and various risk factors. Significant association ($p \leq 0.05$) was found with age, place of stay, gender, year of study, BMI, WHR, family history of hypertension, excess salt consumption, junk food intake and physical activity. However significant association was not found in relation to religion, addiction and food habits in this study.

Figure 2 & 3 shows the distribution of the blood pressure status of the students in respect to BMI &WHR.29.9% of the obese subjects were hypertensive, while 13.5% of the overweight individuals had high blood pressure. Almost one-third (29.1%) of the students having truncal obesity had hypertension while it was only 6.2% in case of individuals with normal waist hip ratio.

IV. Discussion

Until recently hypertension was considered to be one of the important public health problems in the developed and industrialized countries only. In the developing countries, its impact was not fully felt due to presence of rampant communicable diseases. However with control of communicable disease and increased life expectancy with life style changes, hypertension is becoming one of the emerging problems with its implications for concomitant increase in risk of cardiovascular and renal disease. Prompt diagnosis of hypertension is crucial due to potentially detrimental complications which the untreated condition can pose. Since it remains asymptomatic until late in its course, even newly diagnosed patients are at the brink of developing subtle cardiovascular and end organ damage. But these complications can be avoided with prompt diagnosis and appropriate management.

In this study, out of the 850 students 13.88% of the students were hypertensives, while 19.18% were prehypertensives. Significant association ($p \leq 0.05$) was found with age, place of stay, gender, year of study, BMI, WHR, family history of hypertension, excess salt consumption, junk food intake and physical activity. Similar study among university students at Gondar, Ethiopia had a prevalence of hypertension of 7.7%. Higher rates of hypertension were observed among male, overweight, and participants who had sleep duration of ≤5 hours.[19] Prevalence of pre hypertension stage was 51.8%, while the prevalence of stage I and stage II hypertension was 6.1% and 0.9% respectively in a study among young adult medical students at J N Medical College, Belgaum in 2009.[20]

A significant number of individuals were identified to be in the prehypertension category, stressing the need to initiate screening strategies at an earlier age and promote opportunistic screening for hypertension during routine health care visits, so that major health gains can be made through the implementation of primary prevention strategies.Certain limitations of our approach need to be acknowledged. The use of a single visit to ascertain hypertension status can result in an overestimation of its prevalence.

V. Conclusion

The present era has shown an upsurge in the incidence of hypertension among the young population. Hypertension being a silent killer remains asymptomatic until complications like coronary artery disease, stroke, and renal failure develop. This necessitates the need for appropriate diagnosis followed by treatment along with compliance of the patient. Undergraduate medical students assume an imperative role in any health care system, since they are the future health care professionals of any society. So, it is crucial to devise sound prevention and control programs among this cohort of population, to improve their knowledge, attitudes and lifestyle practices early in life, to control hypertension and prevent its subsequent morbidities.

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Figure 1: Pie diagram showing the blood pressure status of the undergraduate medical students (n= 850)

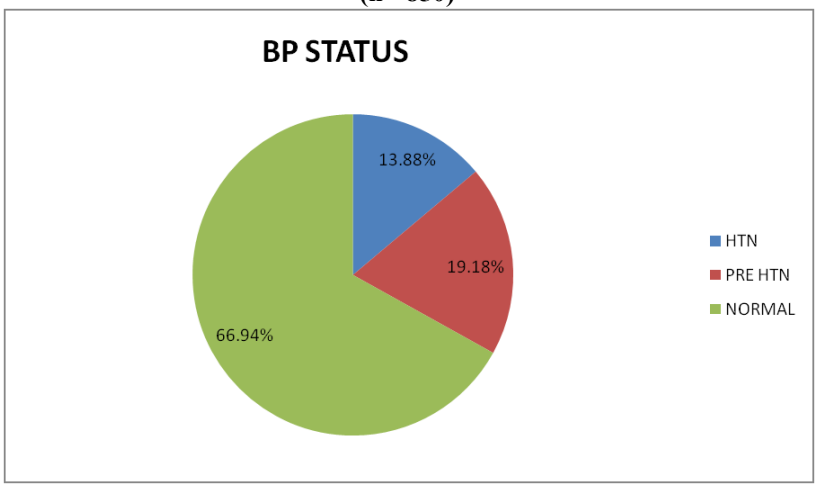

Figure 2: Bar diagram showing the blood pressure status of the undergraduate medical students in respect to BMI

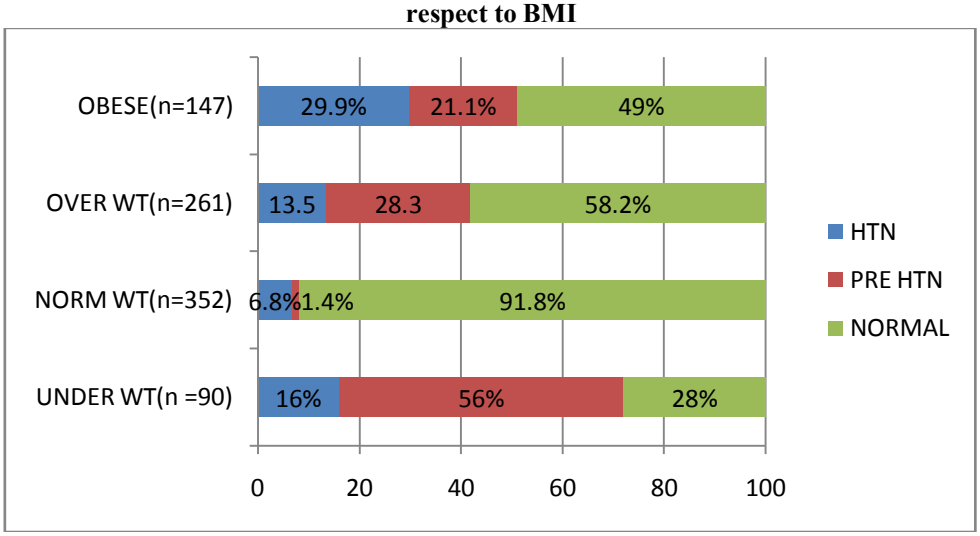

Figure 3: Bar diagram showing the blood pressure status of the undergraduate medical students in respect to Waist Hip Ratio

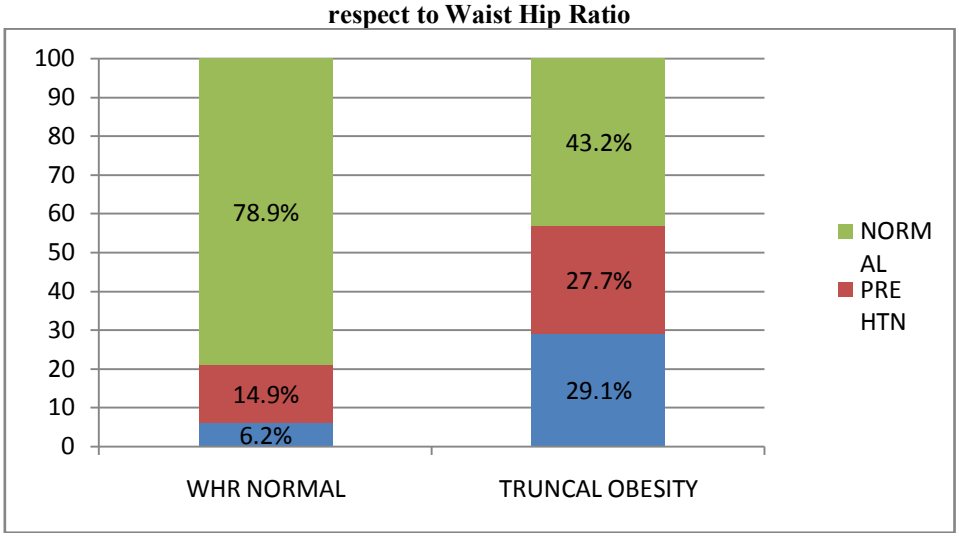

Table-1 : Socio demographic profile of medical students(n=850)

Socio demographic characteristics	No.	percentage
Age		
<19 yrs	172	29.5%
19-20 yrs	184	28.6%
20-21 yrs	251	21.6%
>21 yrs	243	20.2%
Place of stay		
Hostel	531	62.5%
Home	250	29.4%
Others	69	8.1 %
Gender		
Male	552	64.9%
Female	298	35.1%
Year of study		
2 nd year	240	28.2%
3 rd year	235	27.6%
4 th year	233	27.4%
5 th year	142	16.7%
Religion		
Hindu	661	77.8%
Muslim	130	15.3 %
Others	59	6.9%
Body mass index		
underweight	90	10.59%
normal	352	41.41%
overweight	261	30.71%
obese	147	17.29%
Food habits		
Non veg	752	88.47%
Veg	98	11.53%
Excess salt consumption †		
Yes	558	65.65%
No	292	34.35%
Family h/o of hypertension		
Yes	241	28.35%
No	609	71.65%
Addiction #		
Yes	103	12.12%
No	747	87.88%
Physical activity		
Nil	427	50.24%

1-2 day/wk	242	28.47%
3-4 day/wk	120	14.12%
5 day or more/wk	61	7.18%
Waist hip ratio		
Normal	565	66.47%
Above normal	285	33.53%
Junk food intake		
Never	109	12.82%
Occasional	516	73.53%
Often	225	26.47%

any form of tobacco/alcohol/both
†salt consumption >5 gm/daily

Table-2: The distribution of the medical students according to blood pressure status (n= 850)

Blood pressure status	No.	%
Hypertensives	118	13.88%
Prehypertensives	163	19.18%
Normal	569	66.94%

Table-3:Associaton betwen blood pressure status of medical students and various risk factors. (n= 850)

Risk factors	Hypertensives(%)	Prehypertensives(%)	normal (%)	p value
Age				
<19 yrs	3(1.74)	55(31.98)	114(66.28)	**≤ 0.05**
19-20 yrs	18(9.78)	42(22.83)	124(67.39)	
20-21 yrs	40(15.94)	29 (11.55)	182(72.51)	
>21 yrs	57(23.46)	37 (15.23)	149(61.32)	
Place of stay				
Hostel	75(14.12)	115(21.66)	341(64.22)	**≤ 0.05**
Home	34(13.6)	29(11.60)	187(74.8)	
Others	9(13.04)	19(27.54)	41(59.42)	
Gender				
Male	91(16.49)	123(22.28)	338(61.23)	**≤ 0.05**
Female	27(9.06)	40(13.42)	231(77.52)	
Year of study				
2 nd year	14(5.83)	64(26.67)	162(67.5)	**≤ 0.05**
3 rd year	9(3.83)	56(23.83)	170(72.34)	
4 th year	38(16.31)	6(2.58)	189(81.12)	
5 th year	57(40.14)	37(26.06)	48(33.8)	
Religion				
Hindu	98(14.83)	126(19.06)	437(66.11)	≥0.05
Muslim	14(10.77)	28(21.54)	88(67.69)	
Others	6(10.17)	9 (15.25)	44(74.58)	
Body mass index				
underweight	16(16.0)	56(56.0)	28(28.0)	**≤ 0.05**
normal	24(6.8)	5(1.4)	323(91.8)	
overweight	34(13.5)	71(28.3)	146(58.2)	
obese	44(29.9)	31(21.1)	72(49.0)	
Food habits				
Non veg	106(14.1)	152(20.2)	494(65.7)	≥0.05
Veg	12(12.2)	11(11.2)	75(76.5)	
Excess salt consumption				
Yes	105(18.8)	107(19.2)	346(62.0)	**≤ 0.05**
No	13(4.5)	56(19.2)	223(76.4)	
Family h/o of hypertension				

Yes	72(29.9)	114(47.3)	55(22.8)	**≤ 0.05**
No	46(7.6)	49(8.0)	514(84.4)	
Addiction				
Yes	11(11.7)	11(11.7)	72(76.6)	≥0.05
No	107(14.2)	152(20.1)	497(65.7)	
Physical activity				
Nil	67(15.4)	141(32.3)	228(52.3)	**≤ 0.05**
1-2 day/wk	31(12.5)	8(3.2)	209(84.3)	
3-4 day/wk	14(11.0)	11(8.7)	102(80.3)	
5 day or more/wk	6(15.4)	3(7.7)	30(76..9)	
Waist hip ratio				
Normal	35(6.2)	84(14.9)	446(78.9)	**≤ 0.05**
Above normal	83(29.1)	79(27.7)	143(43.2)	
Junk food intake				
Never	17(15.6)	37(33.9)	55(50.5)	**≤ 0.05**
Occasional	34 (6.6)	36(7.0)	446(86.4)	
Often	67(29.8)	90(40.0)	68(30.2)	