

ASSOCIATION OF PRE HYPERTENSION WITH BMI AND WAIST HIP RATIO AMONG THE RESIDENT DOCTORS

Dr. Atma Prakash Nayak¹, Anil K. Wanjari², Gopal Prasad³, Sunil kumar⁴

¹Senior Resident, MBBS, MD, Department of General Medicine, Jawaharlal Nehru Medical College, Sawangi, Meghe, Wardha, Maharashtra 442005.

²Professor, MBBS, MD, Department of General Medicine, Jawaharlal Nehru Medical College, Sawangi, Meghe, Wardha, Maharashtra 442005.

³Associate Professor, MBBS, MD (Pediatrics), DM (Nephrology), Department of Nephrology, Patna Medical College and hospital, Patna University Campus, Patna, Bihar 800004.

⁴Professor and Head, MBBS, MD, Department of General Medicine, Jawaharlal Nehru Medical College, Sawangi, Meghe, Wardha, Maharashtra 442005.

Corresponding Author: Dr. Atma Prakash Nayak

Senior Resident, MBBS, MD, Department of General Medicine, Jawaharlal Nehru Medical College, Sawangi, Meghe, Wardha, Maharashtra 442005.

Email: atmaprakash.nayak@gmail.com

ABSTRACT

Introduction: Hypertension is the most common cardiovascular disease and a public health issue. The Seventh Report of the Joint National Committee (JNC 7) defined pre-hypertension as blood pressure over optimum levels (SBP 120-139 mm Hg or DBP 80-89 mm Hg). Indian community-based study found about a third of the population had pre-HTN. Young adults are increasingly developing pre-hypertension and hypertension. In a multi-center research of 11 Indian cities, 40.2% of men and 30.1% of women had prehypertension. A research study in Orissa found 67% of medical students had prehypertension.

Aims: To Study the prevalence of pre-hypertension and association of BMI and waist hip ratio with pre-hypertension in this specific Population.

Materials and Methods: It was a Cross sectional study .this study was conducted from June2017 to June 2020 in the department of Medicine at Jawaharlal Nehru Medical College, Wardha. 155 patients were included in this study.

Results: Prevalence of prehypertension was observed in overweight population (50%) followed by obese population (26.7%) and Normal BMI (8.1%) with statistically significant difference. Waist hip ratio indicating obese was observed in 30.3% of study population and mean weight, BMI, waist circumference, Hip circumference, Waist/Hip ratio, SBP and DBP was significantly higher in study population with prehypertension.

Conclusion: Our study concludes that the prevalence of prehypertension is significantly higher than expected in this specific population. There was no statistically significant difference in prevalence of prehypertension across different age groups. There was a significant difference in prevalence of prehypertension among males and females with prevalence of prehypertension being higher in males. The prevalence of prehypertension was significantly higher in subjects with obese and overweight

BMI and subjects with obese Waist hip ratio. This study reiterates the importance of risk factors in the causation of prehypertension, *let alone* hypertension.

Keywords: Hypertension, BMI, Waist Hip Ratio and Hypertension

Introduction

Hypertension is the commonest cardiovascular disorder and a major public health problem. The Seventh Report of the Joint National Committee (JNC 7) defined pre-hypertension as persons with blood pressure (BP) above optimal levels [systolic BP (SBP) of 120-139 mm Hg or diastolic BP (DBP) of 80-89 mm Hg]. Community-based studies in India have demonstrated close to a third of the studied population with pre-HTN.[1]The incidence of pre-hypertension and hypertension among young adults is increasing day by the day.[2]In a multi-center study across 11 cities in India, the prevalence of prehypertension was found to be 40.2% among males and 30.1% in females.[3]The prevalence of prehypertension among medical students in a study conducted in Orissa was 67%. [3]

Similar study in Karnataka have brought to light the prevalence of prehypertension among medical students. [4]

Stress is a major risk factor postulated in the development of hypertension. The current changes in life style, personal habits and work environment have been attributed to the increasing incidence of hypertension among young adults. [5]

Residency training is a high performance, high pressure job. There can be no denying the fact that residents work under a lot of stress and therefore are subject to higher chances of developing hypertension and its complications. [6]

The higher the Blood pressure, higher the risk of both stroke and coronary events. The increased incidence of complications of hypertension in young resident doctors would lead to increased morbidity and mortality resulting in loss of precious man-hours; and put a strain on the government exchequer. In addition, Physicians are expected to diagnose and treat patients. It is however presumed that they would be aware of the risks of hypertension and would be taking care of their own health.[7]

MATERIALS AND METHODS

STUDY DESIGN: Cross sectional study

SETTING: The study was carried out at Acharya Vinoba Bhave Hospital, Sawangi (Meghe), a 1200 bedded multispecialty tertiary Centre situated in Wardha, Maharashtra

INCLUSION CRITERIA:

- Resident doctors working at Acharya Vinoba Bhave Hospital, Sawangi (Meghe), Wardha.

EXCLUSION CRITERIA:

- Subjects already diagnosed with hypertension and on cardio active medications.
- Subjects not willing to give consent.

RESULTS

Table 1. Distribution of subject according to Age, Prehypertension and Waist hip ratio

		Subjects(n=155)	Percent
Age group	25 to 27 years	118	76.1
	28 to 30 years	37	23.9
	Total	155	100.0
Prehypertension	Yes	86	55.5
	No	69	44.5
	Total	155	100.0
Waist hip ratio	Non obese	108	69.7
	Obese	47	30.3
	Total	155	100.0

Table 2. Correlation of BMI and Prehypertension.

			BMI kg/m2			Total
			Normal BMI	Overweight	Obese	
Prevalence of prehypertension	Yes	subjects	7	43	36	86
		%	8.1%	50.0%	41.9%	100.0%
	No	subjects	58	10	1	69
		%	84.1%	14.5%	1.4%	100.0%
Total		subjects	65	53	37	155
		%	41.9%	34.2%	23.9%	100.0%

Table .3 Prevalence of prehypertension vs other parameters amongst study population

	Prevalence of prehypertension				P value
	Yes		No		
	Mean	SD	Mean	SD	
Age in years	26.75	1.5	26.39	1.3	0.124
Height cm	166.14	4.0	166.53	4.3	0.566
weight kg	70.34	7.5	60.81	5.0	0.0001
BMI	25.41	2.4	21.88	1.5	0.0001
Waist Circumference	82.62	3.8	76.56	3.8	0.0001
Hip Circumference	98.14	3.3	101.66	4.1	0.0001

e					
Waist/Hip ratio	.8412	.04	.74	.03	0.0001
SBP	129.18	3.4	116.77	3.2	0.0001
DBP	81.26	6.0	71.33	3.9	0.0001

Age

As seen in the above table, most of the study population belongs to the age group of 25 to 27 years (76.1%) followed by 28 to 30 years (23.9%). As seen in the above table, Prevalence of prehypertension was 55.5% in the study population

BMI and Prehypertension

As seen in the above table, prevalence of prehypertension was observed most commonly in overweight population (50%) followed by obese population (26.7%) and Normal BMI (8.1%) with statistically significant difference.

As seen in the above table, Waist hip ratio indicating obese was observed in 30.3% of study population.

Other parameters

As seen in the above table, mean weight in kg, BMI, waist circumference, Hip circumference, Waist/Hip ratio, SBP and DBP was significantly higher in study population with prehypertension

DISCUSSION

The Joint National Commission 7 (JNC 7) on Prevention, Detection, Evaluation and Treatment of High Blood Pressure, released in May 2003, caused a flutter, when it introduced a new term /stage in the spectrum of hypertension, by introducing the concept of “prehypertension” which referred to those persons with a systolic blood pressure of 120-139 or diastolic BP of 80-89.¹

Age

In the present study, most of the study population belongs to the age group of 25 to 27 years (76.1%) followed by 28 to 30 years (23.9%). Prevalence of prehypertension was observed most commonly in 25 to 27 years of age (75.6%) followed by 28 to 30 years (24.4%) with no statistically significant difference

Prevalence of prehypertension

In the present study, prevalence of prehypertension was in 55.5% of study population. These findings were in agreement with the study conducted by Setty SS *et al.*, in which they reported a point prevalence of prehypertension of 55.4%.⁸ A study of 100 medical

students in by Kulkarni MM *et al.*, showed a prevalence of prehypertension in 64%⁹ while two studies of 100 boys + girls and 150 girls in a medical college by Kotpalliwar MK *et al.*, and Chaudhry K *et al.*, showed a prevalence of prehypertension in 52% and 58% respectively.¹⁰

Waist hip ratio

In the present study, Waist hip ratio indicating obese was observed in 30.3% of study population. Prevalence of prehypertension was observed most commonly in obese Waist Hip Ratio population (54.7%) followed by nonobese population (45.3%) with statistically significant difference. This findings was in agreement with the study conducted by Ellora Devi in which there was more prevalence of pre hypertension in obese adolescents as compared to non-obese (14.3% :3.9%)& when compared it was statistically significant($p < 0.001$).The association between elevated BP & BMI observed by us has been supported by Mohan B *et al* & NK Anand. ¹¹

Other parameters

In the present study, mean weight in kg, BMI, waist circumference, Hip circumference, Waist/Hip ratio, SBP and DBP was significantly higher in study population with prehypertension. In the study by **Ravi Venkatachalam Chitrapu *et al.***, the mean weight, body mass index and waist circumference, were all significantly higher among the prehypertensive group compared to the normotensive subjects. The mean weight was 61.7 kg in the former which was more than 4 kg heavier than the latter with a mean of 57 kg. Similarly, the mean waist circumferences in the two groups were about 80.2 cm and 77.2 cm respectively, while the mean BMI was a point higher that is 22.5 and 21.2, respectively. However, the proportion of students in different categories of BMI (underweight, normal, overweight, obese) was similar among normotensives and prehypertensives. ¹²

Until recently hypertension was considered to be one of the important public health problems in the developed and industrialized countries.

Waist hip ratio In the present study, Waist hip ratio indicating obese was observed in 30.3% of study population. Prevalence of prehypertension was observed most commonly in obese Waist Hip Ratio population (54.7%) followed by nonobese population (45.3%) with statistically significant difference. This findings was in agreement with the study conducted by Ellora Devi in which there was more prevalence of pre hypertension in obese adolescents as compared to non-obese (14.3% :3.9%)& when compared it was statistically significant($p < 0.001$).

(98) The association between elevated BP & BMI observed by us has been supported by Mohan B *et al* & NK Anand. ¹¹

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.

CONCLUSION

Our study concludes that the prevalence of prehypertension is significantly higher than expected in this specific population. There was no statistically significant difference in prevalence of prehypertension across different age groups. There was a significant difference in prevalence of prehypertension among males and females with prevalence of prehypertension being higher in males. The prevalence of prehypertension was significantly higher in subjects with obese and overweight BMI and subjects with obese Waist hip ratio.

Thus, this study reiterates the importance of risk factors in the causation of prehypertension, *let alone* hypertension.

Thus, it is emphasised that prehypertension and risk factors should be vigorously sought in the general population and necessary interventions be implemented. This will go a long way in saving manhours and health care expenditure and improve the productivity of nation.

REFERENCES

1. Yadav S, Boddula R, Genitta G, Bhatia V, Bansal B, Kongara S, Julka S, Kumar A, Singh HK, Ramesh V, Bhatia E. Prevalence & risk factors of pre- hypertension & hypertension in an affluent north Indian population. *Indian Journal of Medical Research*. 2008 Dec 1;128(6):712-21
2. Pletcher MJ, Bibbins-Domingo K, Lewis CE, Wei GS, Sidney S, Carr JJ, *et al*. Prehypertension during adulthood and coronary calcium later in life. *Ann Intern Med*. 2008;149:147–9
3. Gupta R, Deedwania PC, Achari V, Bhansali A, Gupta BK, Gupta A, *et al* Normotension, prehypertension, and hypertension in urban middle-class subjects in India: prevalence, awareness, treatment, and control. *Am J Hypertens*. 2013;26(1):83-94.
4. Patnaik A, Choudhury KC. Assessment of risk factors associated with hypertension among undergraduate medical students in a medical college in Odisha. *Adv Biomed Res*. 2015;4:38.
5. Kulkarni MM, Hemagiri K, Malavika, Patil RS. Prehypertension and associated factors among medical students of SSIMS & RC, Davangere--a cross-sectional study. *J Indian Med Assoc*. 2011;109(10):733-6
6. Lindquist TL, Beilin LJ, Knuiman MW. Influence of lifestyle, coping, and job stress on blood pressure in men and women. *Hypertension*. 1997;29(1 Pt 1):1-7
7. Colford JM Jr, McPhee SJ. The ravelled sleeve of care. Managing the stresses of residency training. *JAMA*. 1989;261(6):889-93.
8. Shetty SS, Naik A. Prevalence of Prehypertension amongst medical students in Coastal Karnataka. *J Evol Med Dent Sci* 2012;1:975-80
9. Kulkarni MM, Hemagiri K, Malavika, Patil RS. Prehypertension and associated factors among medical students of SSIMS and RC, Davangere — A cross-sectional study. *J Indian Med Assoc* 2011;109:733-4.
10. Chaudhry K, Diwan SK, Mahajan SN. Prehypertension in young females, where do they stand? *Indian Heart J* 2012;64:280-3
11. Mohan B, Kumar N, Aslam N, Rangbulla A, Kumbkarni S, Sood NK, *et al*. Prevalence of sustained hypertension and obesity in urban and rural school going children in Ludhiana. *Indian Heart J* 2004; 56: 310-314
12. Chitrapu RV, Thakkallapalli ZM. Prehypertension among Medical Students and its Association with Cardiovascular Risk Factors. *J NTR Univ Health Sci* 2015;4:8-12.