

## Original Research Article

# A comparative study of anthropometric measurements and hypertension among geriatric patients attending OPD

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## ABSTRACT

**Background:** Hypertension is silent killer, its chronic condition leads to coronary heart diseases, stroke and vascular complications. It is one of the most important treatable causes of mortality and morbidity in the elderly population, the prevalence of hypertension was 40 per cent in 2008, it is estimated that by the year 2025, the majority of the elderly people worldwide will reside in developing countries. Developing countries are thus likely to face an enormous burden of vulnerable elderly population who are predisposed to chronic non-communicable diseases.

**Methods:** Cross-sectional study carried out in geriatric clinic of government medical college, Miraj (1<sup>st</sup> Nov-31<sup>st</sup> Dec, 2015).

**Results:** The prevalence of hypertension among study participants was 41.46%. Prevalence of hypertension among male subjects was 56.60% where as it was 28.57% among female subjects. The body mass index was more than cut off point in hypertensive as compared to non-hypertensive in both males and females.

**Conclusions:** The overall prevalence of hypertension in study subjects is 41%. Increased BMI and waist circumference were found in hypertensive.

**Keywords:** Geriatric, Anthropometry, Hypertension, Cross-sectional

## INTRODUCTION

Ageing of Population is inevitable and irreversible demographic reality that is associated with welcome improvements in health and medical care, with longevity and declining fertility rates, the population of older persons (60 years and above) is growing faster than the general population.<sup>1</sup> Globally, the 60-plus population constitutes about 11.5 percent of the total population of 7 billion, around 2050 this proportion is projected to increase to about 22 percent when the elderly will outnumber children (below 15 years of age).<sup>2</sup> In developed countries, the proportion of the elderly will increase from 22.4 percent in 2012 to 31.9 percent in

2050.<sup>2</sup> The elderly population in India has been increasing at an increasing rate in recent years and the trend is likely to continue in the coming decades, the share of population over the age of 60 is projected to increase from 8 percent in 2015 to 19 percent in 2050, by the end of the century, the elderly will contribute nearly 34 percent of the total population in the country.<sup>3</sup> Evidence from the multicountry Global Burden of Disease project and other international epidemiologic research shows that health problems associated with aged populations affect a wide and expanding swath of world population, over the next 10 to 15 years people in every world region will suffer more death and disability from such non-communicable diseases as heart disease, cancer

and diabetes than from infection and parasitic diseases.<sup>4</sup> The effect of obesity on hypertension is modifiable risk factor, and present study was undertaken to compare the anthropometric measurements among hypertensive elderly individuals.

### Objective

- To determine the prevalence of hypertension in study population
- To compare the anthropometric measurements among hypertension and non-hypertension.

### METHODS

Cross-sectional study was carried out in patients who are attending the geriatric clinic of tertiary care hospital Miraj, for medical advice from November 2015 to December 2015. The data collected by using a pretested, semi structured questionnaire individuals in geriatric age group of 60 years and above. All study subjects were weighed in the clothes they had worn. The weighing machine was regularly standardized with a known weight. The adults were instructed about the procedure. The scale was readjusted to zero after weighing each adult. They were made to stand erect with both feet's together without any support, looking straight with vision fixed on a point on the opposite wall such that the plain of vision was perpendicular to their body and parallel to the ground. The measurements were recorded to the nearest of 0.5 kg. Measurements for height were plotted on the wall using a non-elastic measuring tape. Erect heights were obtained with the subjects standing barefoot on the flat surface, against the vertical wall with occiput, buttocks and heel touching the wall and arms hanging freely on the sides. Non-elastic plastic ruler was used to localize the upper limit of height measurements. Heights measurements were recorded to the nearest of 0.5 cm. WHO Asian classification was used for calculation of body mass index (BMI) and is expressed as weight (kg)

divided by height (m<sup>2</sup>).<sup>5,6</sup> Waist circumference measurements recorded in cm, midway between the lower rib margin and the iliac crest in standing position to the nearest 0.5 cm with the help of standard non-elastic measuring tape, cut-off points used for males:  $\geq 90$  cm. For females:  $\geq 80$  cm.<sup>7</sup> Hip circumference measurements in cm, at the widest girth of buttocks in standing position, wearing light cloths to the nearest 0.5 cm with the help of standard non-elastic measuring tape. Waist Hip Ratio (WHR) measurements expressed as Waist circumference divided by hip circumference, cut-off points used for males:  $\geq 0.90$ ; for females:  $\geq 0.80$ .<sup>7</sup> A person was considered to be hypertensive if he/she were already diagnosed case of hypertension and/or on treatment or with a current SBP of  $\geq 150$  mm Hg or DBP 90 mm Hg.<sup>8</sup> The data was tabulated after entering in Microsoft excel 2010 and analysed by using SPSS version 16.

### RESULTS

In Table 1, total numbers of cases were 246 in one month i.e. from November 2015–December 2015. In the present study the overall prevalence of hypertension among 246 study participants was 41.46%. Prevalence of hypertension among male subjects was 56.60% where as it was 28.57% among female subjects. In Table 2, it is seen that body mass index was more than cut off point in hypertensive as compared to non-hypertensive in both males and females. And the association between Hypertension and BMI was found to be statistically insignificant in both the genders i.e.  $p > 0.005$ . In Table 3, waist circumference was more in hypertensive 72.54% as compared to non-hypertensive 77.78% and the association between hypertension and waist circumference was found to be statistically insignificant in both the genders i.e.  $p > 0.005$ . Waist hip ratio was more than cut off in 89.24% of hypertensive and 89.58% of non-hypertensive (Table 4). And the association between hypertension and waist hip ratio was found to be statistically insignificant in both the genders i.e.  $p > 0.005$ .

**Table 1: Prevalence of hypertension in study individuals.**

Prevalence of HTN	Males (%)	Females (%)	Total (%)
Normal	20 (17.70)	58 (43.61)	78 (31.70)
Pre hypertensive	29 (25.66)	37 (27.82)	66 (26.83)
Hypertension	64 (56.60)	38 (28.57)	102 (41.47)
Total	113 (100.00)	133 (100.00)	246 (100.00)

**Table 2: Association of body mass index and hypertension in study individuals.**

BMI in kg/m <sup>2</sup>	Hypertensive (%)	Non hypertensive (%)	Total (%)	Chi-square/P value
Males	$\geq 23$	47 (46.07)	33 (22.91)	80 (32.53) $X^2=0.247, p=0.619$
	$< 23$	17 (16.7)	16 (11.11)	
Females	$\geq 23$	32 (31.36)	70 (48.61)	102 (41.45) $X^2=1.145, p=0.285$
	$< 23$	6 (5.87)	25 (17.37)	
Total	102 (100)	144 (100)	246 (100)	

**Table 3: Association of waist circumference and hypertension.**

Waist circumference in cm	Hypertensive (%)	Non hypertensive (%)	Total (%)	Chi-square/P value
<b>Males</b>	≥90	41 (40.19)	30 (20.84)	X <sup>2</sup> =0.013, p=0.910
	<90	23 (22.54)	19 (13.19)	
<b>Females</b>	≥80	33 (32.35)	82 (56.94)	X <sup>2</sup> =0.040, p=0.841
	<80	5 (4.92)	13 (9.03)	
<b>Total</b>		102 (100)	144 (100)	246 (100)

**Table 4: Association of waist hip ratio and hypertension in study individuals**

Waist-hip ratio in cm	Hypertensive (%)	Non hypertensive (%)	Total (%)	Chi-square/P value
<b>Males</b>	≥0.90	58 (56.86)	41 (28.47)	X <sup>2</sup> =0.678, p=0.410
	<0.90	6 (5.87)	8 (5.56)	
<b>Females</b>	≥0.80	33 (32.35)	88 (61.11)	X <sup>2</sup> =0.515, p=0.47
	<0.80	5 (4.92)	7 (4.86)	
<b>Total</b>		102 (100)	144 (100)	246 (100)

## DISCUSSION

In the present study the overall prevalence of hypertension was 41.46% (males- 56.60% and females- 28.57%). Above findings were similar to study conducted by Palanivel et al they observed overall prevalence of hypertension among study participants was 40.5% (95% CI: 33.747.4%).<sup>9</sup> In present study BMI was more than cut off point in hypertensive as compared to Non hypertensive in both males and females. Study conducted by Bays et al. found that increased BMI was associated with increased prevalence of hypertension and diabetes.<sup>10</sup> Another study conducted by Xiao et al observed BMI and waist circumference or waist-hip ratio had combined effect on the prevalence of hypertension.<sup>11</sup> Excessive energy intake and lack of physical activity might be the cause for obesity and increased intake of nutrients with sedentary lifestyle had resulted in weight gain. Present study found that waist circumference was more in hypertensive (72.54%) as compared to non-hypertensive (77.78%) and also WHR was more than cut off in 89.24% of hypertensive and 89.58% of non-hypertensive. Study conducted by Wang et al observed that BMI had stronger association with hypertension.<sup>12</sup> Another study conducted by Kumar et al showed a strong correlation between systolic blood pressures and BMI ( $p < 0.02$ ), the influence of sex on hypertension was statistically not significant for both systolic and diastolic blood pressure ( $p > 0.05$ ).<sup>13</sup> Our study observed that association between Hypertension and BMI, WC, WHR was found to be statistically insignificant in both the genders i.e.  $p > 0.005$ .

### Limitation of study

First, results cannot be generalised to general population as sample was small and drawn from one limited geographic area. Second, because of the cross-sectional design, this study had a limited hypothetical value. Third, the probability of missing data cannot be excluded as we studied only older adults.<sup>14</sup> Lastly, more studies are

needed in order to find out the relationships between anthropometric indices and metabolic variables by use of linear regression.

## CONCLUSION

The overall prevalence of hypertension in study subjects is 41%, increased BMI and waist circumference were found in hypertensive. Association between hypertension and BMI, WC, WHR was found to be statistically insignificant in both the genders. Additional salt intakes, alcohol consumption was found among hypertensive.

### Recommendations

Advise elderly adults to adopt DASH diet strategy, reducing physical inactivity and to create awareness regarding complications of hypertension and preventive steps to be taken regular checkup of blood pressure and screening for retinopathy, renal involvement and lipid profile and blood sugar.

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