



## Study of Association of Anthropometric Parameters of Obesity and Blood Pressure in Hypertensive Subjects in A Tertiary Care Hospital

### KEYWORDS

SBP - Systolic Blood Pressure, DBP - Diastolic Blood Pressure, BMI - Body Mass Index, WG - Waist Girth, WHR - Waist-Hip Ratio. WHtR- Waist Height Ratio.

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### ABSTRACT Background:

Cardiovascular diseases have now become the first and second leading causes responsible for one-third of all deaths (1). The relationship of obesity and high blood pressure with cardiovascular system is well documented for young, middle aged and older men (2). Most of the individuals aged 35 years or more have Systolic Blood pressure (SBP) and Diastolic Blood pressure (DBP) above optimal limits (<120/<80) mmHg. This cross sectional study measures the effect of various anthropometric parameters and blood pressure in hypertensive male and female subjects.

**Materials and Method:** Study subjects of both sexes were grouped into two groups. Group A (n=50) included hypertensive male patients aged 40 years and above. Group B (n=50) included Hypertensive female patients of age group 40 years and above. The data was entered in a predesigned and pretested Proforma. Three Blood Pressure readings were taken with a standard Mercury Sphygmomanometer. Average of these readings was considered as the blood pressure of the person (3, 4).

### Results:

The data was analysed using statistical SPSS software. The Mean SBP of Group A i.e. males was 155 mmHg and that of Group B i.e. females was 148 mm Hg. Although the mean value of SBP in males was slightly higher in males compared to females as shown by the 'p' value (>0.10) but it was not statistically significant. The DBP in Group 'A' males had a Mean value of 96 mm Hg and females a mean value of DBP 98 mm Hg. The p value is not significant. The mean values of weight in males although was higher in males 69 Kilograms as compared to females 53 Kilograms and the p value (0.001) was significant. There was no significant difference in values on comparing the BMI, WHpR (Waist Hip Ratio) and WHtR (Waist Height Ratio), the 'p' value in both the groups was statistically not significant.

**Conclusion:** In conclusion it was observed that Waist Girth and Waist hip Ratio (WHpR) in males and BMI in females are important risk factors of SBP in Hypertensive subjects. Increased Waist Girth (WG), BMI, WHpR are associated with increased DBP but varies with age and gender.

### Introduction:

In India it is estimated that there were approximately 46.9 million patients with cardiovascular disease in India during the year 2010 (3). Overweight, central obesity, high blood pressure, dyslipidaemia, diabetes and low cardio-respiratory fitness are among the biological factors contributing principally to increased risk. Several epidemiological studies from different populations have reported significant association between different anthropometric indicators and blood pressure levels. (5,6,7). Some anthropometric measures or indexes, such as body mass index (BMI), and other measures of body fatness have been used in most of these studies to analyze the association between adiposity and cardiovascular risk factors (8,9, 10). Most of these studies have shown linear relationships between anthropometric measures and the risk of cardiovascular disease (11,12). These associations between body fatness using different indexes have been consistently observed, but remain poorly understood.

### Material and Methods:

About 100 individuals were included in the study, which were divided into two groups A and B. The group 'A' hypertensive males (n=50) and Group 'B' hypertensive females (n=50) constituted the study population. This study was conducted in the Medicine OPD of Hind hospital, Barabanki, Lucknow. All known hypertensives subjects

aged 40 years and below 50 years were selected randomly from the General Medicine OPD, Hind hospital. However following patients were excluded from the study (Pregnant females, patients with diseases such as: Cancer, Tuberculosis, Hyperthyroidism, Hypothyroidism, Cushing's syndrome, Secondary hypertension).

### Methodology:

The study was conducted after necessary permission from Hospital Ethics Committee of Hind hospital. A prior informed consent was also obtained from each subject for participation in the study. After about 10 min of quiet sitting, three readings of blood pressure (BP) were taken at intervals of 3-5 minutes using an electronic BP monitor (Omron Healthcare Inc.). The heart rate (HR) readings were also obtained from the electronic BP monitor. The Body Mass Index (BMI) or Quetelet's Index was calculated as weight (in kilograms) divided by (height in meters)<sup>2</sup>.

### Statistical Analysis:

SPSS software. The parameters between male and female subjects were compared using Chi square test.

### RESULTS

Table 1: Shows the mean values of parameters and standard deviation recorded in both the Hypertensive Males and Females. The mean values of weight in males although

was higher in males 68 as compared to females. The resulting 'p' value was 0.001 and was statistically significant.

Variables	Group A	Group A
	Males (N=50)	Females (N=50)
	Mean $\pm$ SD	Mean $\pm$ SD
SBP	156 $\pm$ 14.2	146 $\pm$ 12.8
DBP	98 $\pm$ 5.2	94 $\pm$ 5.8
MAP	112 $\pm$ 6.8	110 $\pm$ 7.2
Weight	66 $\pm$ 4.2	52 $\pm$ 7.4
BMI	24 $\pm$ 1.2	25 $\pm$ 4.4
WHR	0.9 $\pm$ 0.12	0.8 $\pm$ 0.1

Table 2: Shows the correlation between SBI' and other parameters in Males and females. There was a positive correlation between Systolic Blood Pressure and age ( $r = 0.28$ ) for Males and ( $r = 0.016$ ) for females although it is Not Significant in both. Strongest correlation was shown by Waist Girth and WHpR in males of this group and BMI in females of this group with SBP.

Variables	Systolic Blood pressure (SBP)	
	Hypertensive males (Group A)	Hypertensive females (Group B)
Age	0.28	0.016
Weight	0.06	0.06
Waist girth	0.80	0.82
BMI	0.14	0.72
WHR	0.86	0.60

**Table 3: Shows the correlation between Diastolic Blood Pressure (DBP) and other parameters.**

Parameter	Diastolic Blood pressure (DBP)	
	Hypertensive Males(Group A) (n=50)	Hypertensive Females(Group B) (n=50)
Age	0.14	0.48
Weight	0.12	0.32
Waist girth	0.48	0.22
BMI	0.26	0.40
WHR	0.36	0.32

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