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RESEARCH ARTICLE

BLOOD PRESSURE AND ANTHROPOMETRIC PARAMETERS CORRELATION AMONG HEALTHY ADULTS

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ABSTRACT

Hypertension is a risk factor for cardiovascular diseases and obesity is becoming a health problem in many developed and developing countries. Obesity is a global epidemic and is on the rise. This study was carried out "to assess and correlate the blood pressure and anthropometric parameters among the healthy adults. Total subjects were 100, in which 50 males and 50 females were taken. The descriptive research design and purposive sampling technique was used. Self structured tool was formulated by extensive review of literature and validation of experts. The data was collected by using self report (interview), observation and bio- physiological method. Findings of the present study revealed that there is significant positive correlation of weight(r=0.562, p=0.00), BMI(r=0.311, p=0.002), HC (r=0.255, p=0.010) WC(r=0.454, p=0.00), WHR (r=0.449, p=0.00) with MAP respectively. There is significant positive correlation of weight (r=0.558, p=0.00), BMI(r=0.241, p=0.016), HC (r=0.200, p=0.00) WC(r=0.389, p=0.00), WHR(r=0.407, p=0.00) with average SBP and significant positive correlation of weight(r=0.536, p=0.00), BMI(r=0.368, p=0.00), HC (r=0.287, p=0.004) WC(r=0.469, p=0.00), WHR(r=0.424, p=0.00) with average DBP. The present study indicates statistically no significant correlation between height and average DBP (r=0.182, p=0.07), WHtR and average SBP (r=0.134, p=0.184). It was concluded that with the increase in anthropometric parameters there is increase in both systolic and diastolic blood pressure.

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INTRODUCTION

Vital signs are important component of patient care. One of the major vital sign to maintain is blood pressure. Blood pressure is important because, higher the blood pressure is, higher is the risk for health problems in future. Blood pressure increases with age. Risk of high blood pressure begins to climb when man hits the age 46 years, although it can occur in younger men and women. Hypertension is a chronic disease having high prevalence worldwide. According to World Health Organization 2012, worldwide one in three suffers from hypertension and in India 30% of people suffer from hypertension, in 2008 the prevalence of hypertension in Indian's was 32.5% (33.2% in men and 31.5% in women. Obesity, being associated with decrease insulin sensitivity, diabetes, hypertension, dyslipidemia, hypertriglyceridemia, unfavourable cholesterol levels had lead to adverse metabolic changes which are risk factors for coronary artery diseases, stroke, type 2 diabetes mellitus and certain forms of cancer. Anthropometric parameters are a set of non invasive quantitative techniques of determining an individual's body fat composition by measuring, recording, and analysing the specific dimensions of the body. Anthropometry and nutrition are interrelated and include genetic and environmental characteristics, sociocultural conditions, lifestyle, functional status, and health. Anthropometric evaluation is an essential part of nutritional assessment to determinate conditions, such as malnutrition, overweight and obesity and redistribution of adipose tissue. A number of studies have proved that mortality increases with obesity. BMI more than 30 kg per meter square becomes a predictor of coronary artery diseases and moreover associated with chronic diseases including hyperlipidemia, hyperinsulinemia and hypertension. The waist hip ratio is used for the evaluation of body fat distribution. Waist circumference is more strongly associated with central fat distribution. Another anthropometric index, waist to height ratio is shown to be better correlated with metabolic risk factors. It is essential to determine anthropometric parameters which are more associated with the changes of the blood pressure so, therefore this study is undertaken to correlate the anthropometric parameters with blood pressure.

MATERIALS AND METHODS

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A quantitative research approach and a descriptive (correlational) design has been used to assess correlation of blood pressure and anthropometric parameters among healthy adults in general OPDs of tertiary care hospital of district Ludhiana, Punjab.100 healthy adults of age group 18-55 years were selected by purposive sampling technique. The tool for data collection was a structured interview and anthropometric measurements and it had following sections-

Part-A: Socio demographic sheet.
Part-B: Clinical profile sheet
Part-C: Bio physiological profile.

C(1) Blood pressure monitoring sheet
C(2) Anthropometric parameters measurement sheet

RESULTS

Out of 100 nearly half i.e. 47% of the subjects belong to age group 18-30 years, 50% subjects were male and another 50% were female. 57% of the subjects were living in rural area. 73% of the subjects were married. Majority 66% of subjects belonged to Sikh religion followed by Hindus i.e. 34%. Mostly, 42% healthy adults were graduate and above and only 8% were illiterate. As per socioeconomic status, 60% of subjects were non working and among working 40% were farmers followed by businessmen i.e, 27.5%. Majority i.e.66% of subjects were living in nuclear family and 43% had joint families. In personal habits, 49% subjects were vegetarian, 55% had moderate lifestyle pattern and majority i.e98%, 90% and 90% had no history of smoking, alcohol consumption and history of drug abuse respectively. As per clinical profile, most of the subjects, i.e.73% were having no significant past medical history, 27%were having past medical history among which typhoid was found in most of the cases. Most of the subjects, i.e.70%were having no surgical history, 30% of the subjects were having past surgical history among which LSCS was mostly found.27% of the subjects had undergone for 1-5 surgeries. Most of the subjects, i.e.23% had the duration of 1-10 years. This Table depicts mean distribution of subjects as per the blood pressure profile. It shows that highest average SBP mean is 110.34±15.58 followed by MAP i.e,85.40±11.06 and least mean is72.34±9.77seen in average DBP in males. In females, highest average SBP is 128.94±13.09 followed by MAP i.e.95.38±10.22 and least mean is 78.60±9.72 seen in average DBP. In total subjects, the highest average SBP mean is 119.64±17.09 followed by MAP i.e. 90.39±11.72 and least mean is 75.47±10.19 seen in average DBP. So most of the subjects has more mean of average SBP changes. As per gender, mean of average SBP, average DBP and MAP were high among females as compared to males. Table 2 depicts the mean distribution of subjects as per anthropometric parameters. It shows that highest mean i.e.172.20±8.45is seen in height followed by HC i.e.98.78±7.16, WC i.e. 91.24±10.01weight i.e. 71.29±11.44, BMI i.e.25.44±4.04, WHR i.e.0.92±0.05. The least mean seen in WHtRi,e. 0.52±0.71 in males. In females, the highest mean i.e.158.34±6.02 is seen in height followed by HC i.e. 98.76±10.68, WC i.e.88.18±11.46, weight i.e.66.11±10.21, BMI i.e. 26.53±4.76, WHR i.e. 0.88±0.07. The least mean seen in WHtR i.e. 0.55±0.09.In total subjects, the highest mean i.e. is seen in height followed by HC i.e.98.77±9.05, WC i.e.

Table 1. Mean distribution of subjects as per Blood Pressure profile

N=100

BP Profile	Male Mean±SD (n_1=50)	Female Mean±SD (n_2=50)	Total Mean±SD (N=100)
Average SBP	110.34±15.58	128.94±13.09	119.64±17.09
Average DBP	72.34±9.77	78.60±9.72	75.47±10.19
MAP	85.40±11.06	95.38±10.22	90.39±11.72

Table 2. Mean distribution of subjects as per anthropometric parameters

N=100

Anthropometric Parameters	Male Mean±SD (n_1=50)	Female Mean±SD (n_2=50)	MD	Total Mean±SD (N=100)
Height	172.20±8.45	158.34±6.02	13.86	165.27±10.09
Weight	76.48±10.26	66.11±10.21	10.37	71.29±11.44
BMI	25.44±4.04	26.53±4.76	-1.09	25.98±4.42
WC	91.24±10.01	88.18±11.46	3.06	89.71±10.82
HC	98.78±7.16	98.76±10.68	0.02	98.77±9.05
WHtR	0.52±0.71	0.55±0.09	-0.03	0.54±0.08
WHR	0.92±0.05	0.88±0.07	0.04	0.89±0.07

Table 3. Correlation of blood pressure with anthropometric parameters

N=100

Anthropo-metric parameters	Total Mean±SD	MAP		Average SBP		Average DBP	
		r	p value	R	p value	r	p value
Height	165.27±10.08	0.268	0.007	0.338	0.001	0.182	0.070
Weight	71.295±11.43	0.562	0.000	0.558	0.000	0.536	0.000
BMI	25.98±4.41	0.311	0.002	0.241	0.016	0.368	0.000
WC	89.71±10.81	0.454	0.000	0.389	0.000	0.469	0.000
HC	98.77±9.04	0.255	0.010	0.200	0.000	0.287	0.004
WHtR	0.537±0.08	0.227	0.023	0.134	0.184	0.288	0.004
WHR	0.896±0.06	0.449	0.000	0.407	0.000	0.424	0.000

MAP= 90.39±11.721 significant at p <0.01
SBP=119.64±17.094 significant at p<0.05
DBP=75.47±10.194

WHR i.e. 0.89±0.07.

The least mean seen in WHtR i.e.0.54±0.08. As per gender, Height, Weight, WC, HC, WHR, were high among males where asBMI and WHtR were high among females. Table 3 depicts the correlation of blood pressure with anthropometric measurements. It shows that there is a correlation of mean of MAP and height i.e (r=0.268), weight (r= 0.562), BMI (r = 0.311), WC (r=0.454), WHR (r= 0.449), at 0.01 level of significance and HC (r= 0.255), WHtR (r= 0.227) at 0.05 level of significance. There was a significant correlation of mean average SBP with height (r=0.338), weight (r=0.558), WC (r=0.389), WHR(r=0.407) at 0.01 level of significance and BMI (r=0.241) at 0.05 level of significance. There is no significant correlation of mean average SBP with WHtR. The correlation of mean average DBP with weight (r= 0.563), BMI (r=0.368), WC (r= 0.469), HC (r= 0.287), WHtR (r= 0.288), WHR (r=0.424) at 0.01 level of significance. There is no significant correlation of mean average DBP with height.

DISCUSSION

The results of the study revealed that the highest average SBP mean is 119.64 followed by MAP mean i.e. 90.39 and least average DBP mean is 75.47.So most of the subject had more SBP changes. Findings of present study are supported by study of Deshmukh and Gupta (2016) in rural wardha on 3514 individuals in adults revealed that the mean SBP in males and females were 120.2±0.54 and 118.4±0.51mmHg and mean DBP were 77.7±0.38 and 76.3±0.61mmHg respectively. Present study also revealed that highest mean i.e. 165.27 is seen in height followed by HC i.e. 98.77, then WC i.e. 89.71 further weight i.e. 71.29 and then BMI i.e. 25.89 followed by WHR i.e. 0.896 and then WHtR i.e. 0.537. The prevalence of hypertension was 21.8% among males and 19.8% among females. Supported data seen in study of Deshmukh and Gupta (2016) i.e. BMI >23 and >25 was found to be 6.5% and 5.1% in males respectively and 5.4% and 5.2% in females respectively, 7.6% males and 8.7% females had higher WC, then 21.5% males and 30.5% females had higher WHR. According to the findings of the present study, it can be concluded that there is significant positive correlation of weight, BMI, WC, HC, WHR with MAP (mean arterial pressure), average SBP and average DBP. The present study indicates statistically no significant correlation between height and average DBP (r=0.182/p=0.07) and also WHtR and average SBP(r=0.134/p=0.184).

A similar study was conducted by Deshmukh and Gupta (2006) on 3514 individuals revealed that there is significant positive correlation of BMI, WHR, WC, WHtR with SBP and DBP**.**A similar study conducted by Saxena and Prakash (2014) on 1241rural adults revealed that WC was most strongly associated with hypertension and BMI, WHR was also found associated.

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