PREVALENCE OF HIGH BLOOD PRESSURE AMONG YOUNG ADULTS IN ILE-IFE, NIGERIA

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ABSTRACT: High blood pressure is a major public health concerns globally. This study determined the mean blood pressure, prevalence of high blood pressure, gender difference in blood pressure and relationship between blood pressure and body mass index (BMI) among Nigerian young adults. A cross sectional study was conducted among the students of Obafemi Awolowo University, Ile-Ife, Nigeria. Seven hundred and two (702) students (412males and 290females) with age range between 18-40years participated in the study. Weight, height and blood pressure (BP) were measured using standard methods. BMI and blood pressure were classified using WHO and JNC VII classifications respectively. Data was analysed using SPSS version 17.0 software. The student t-test was used to determine the significant difference. A p value < 0.05 was taken as statistically significant. The mean systolic blood pressure, diastolic blood pressure and BMI were 119.24 ± 11.89mmHg, 71.79 ± 9.15mmHg and 21.89kg/m2 respectively. The prevalence of high blood pressure, overweight and obesity were 8.4%, 14.8% and 1.3% respectively. The prevalence of high blood pressure among males and females were 5.3% and 3.1% respectively with significant sex difference ($\chi2 = 43.56$, p value < 0.001). In conclusion, the prevalence of high blood pressure was higher in male than female young adult. Periodic blood pressure screening for young adult population in our environment will play a significant role in early detection and management of hypertensive heart diseases.
Keywords: Prevalence, High Blood Pressure, Young Adults.

BACKGROUND

Hypertension represents the single greatest preventable cause of death in humans and is one of the most important modifiable risk factors for cardiovascular diseases. Analysis of the global burden of hypertension revealed that over 25% of the world's adult population had hypertension in 2000 and the proportion is expected to increase to 29% by 2025(1, 2). Raised blood pressure is estimated to cause 7.5 million (12.8% of all causes of death) deaths per year. Hypertension (HTN) doubles the risk of cardiovascular diseases such as coronary heart diseases (CHD), congestive heart failure (CHF), stroke, renal failure, and peripheral arterial diseases(3-5). Prevalence of hypertension varies among nations and sub-populations within a nation though generally lower among high-income populations. In Nigerian Africa, hypertension is the most common non-communicable and cardiovascular disease and this places a significant burden on the families and nation's limited health facilities and constitutes the most important cause of morbidity and mortality from cardiovascular diseases in Nigerian families (6-8).

Obesity has been particularly recognized as a major independent risk factor for cardiovascular diseases (9). This is because increased body fat is accompanied by profound changes in the physiological and metabolic functions of the body, which are directly dependent on the degree of excess weight and on its distribution around the body (10). The concept of the metabolically obese normal weight individual is based on the observation that these same characteristics may be found in normal weight individuals with disorders often associated with obesity (11-14). Most of the studies conducted in this environment on high blood pressure are either on general population of

adults but not on young adults (15-17). Therefore, the aim of our study was to determine the prevalence of hypertension and its relationship with obesity indices among young adults in Ile-Ife, Southwest, Nigeria.

METHODS

Study population: The participants were students of Obafemi Awolowo University, Ile-Ife, Nigeria. Seven hundred and two (702) students (412males and 290females) within the age range of 18 to 40years participated in the study. None of the female participants was pregnant. They were all informed about the research and consents were obtained before participating. Ethical clearance was obtained from the Ethics and Research Committee of the Obafemi Awolowo University, Ile-Ife, Nigeria.

Sphygmomanometry: Blood pressure (BP) measurement was done by an indirect method using a validated digital sphygmomanometer (Lumiscope) of appropriate cuff size attached to the arm. The BP measurements were taken in a sitting position after five minutes of rest. Those with elevated blood pressure after first assessment had repeated BP assessment on more than two occasions at different days to confirm sustained elevation of their blood pressure levels. High blood pressure was diagnosed based on systolic blood pressure (SBP) $\geq$ 140 and/ or diastolic blood pressure (DBP) $\geq$ 90mmHg. The blood pressure was classified using the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC VII).

Anthropometry: Weight measuring scales were checked and adjusted at zero level between each measurement and height was measured using standard protocol. BMI was calculated from weight and height using Quetelet index formula; [weight (kg)/height (m)2] (12).The BMI was classified according to World Health Organization (WHO) standard.

Statistical Analysis: Results were presented as mean $\pm$ standard deviation (SD). The student t-test was used to determine the significant difference between two groups. Data was analysed using SPSS version 17 software.

RESULTS

Seven hundred and two (702) students were used for the study, 58.7% (412) were males. The age ranges between 18 to 40years.The mean age was 23.55$\pm$4.48years. The mean of weight (kg), height (m), BMI (kg/m2) and body surface area (m2) were 61.42$\pm$9.73, 1.68$\pm$0.08, 21.89$\pm$3.07 and 1.69$\pm$0.15 respectively. The lower and upper limits of BMI were 16.1kg/m2 and 37.1kg/m2 respectively. BMI was classified based on WHO criteria. Underweight was identified as BMI < 18.5 kg/m2, normal as 18.5-24.9kg/m2, overweight as BMI 25.0-29.9 kg/m2 and obese as BMI $\geq$ 30.0 kg/m2 (13). The prevalence of underweight, normal weight, overweight and obesity were 10.0%, 73.9%, 14.8% and 1.3% respectively. Higher prevalence of abnormal BMI (overweight and obesity respectively) occurred among women (20.0% and 1.4%) compared with men (11.2% and 1.2%) in this study (χ2:36.22, p-value < 0.001).

Prevalence of high blood pressure: The mean systolic blood pressure $\pm$ SD and diastolic blood pressure $\pm$ SD are 119.2 $\pm$ 11.9mmHg and 71.8 $\pm$ 9.2mmHg respectively. More than half of the participants (50.4%) had normal blood pressure levels while 45.2% had blood pressure level at pre-hypertension range (Table 1).Overall, the prevalence of high blood pressure was 4.4%.There was a gender difference in blood pressure class distribution. The prevalence of high blood pressure among male and female young adults were 5.3% and 3.1% respectively (Figure 1). There was significant relationship between WHO BMI and JNC VII blood pressure classifications (Table 2).

DISCUSSION

From this study, the prevalence of high blood pressure was 4.4% using $\geq$140mmHg SBP and/or $\geq$ 90mmHg DBP as cut-off point. This implies that one in twenty three young adults had high blood pressure. This is lower than 29% prevalence from the United States, 14.1% from Vietnam and 23.9% from Jordan in which the studies were carried out among adult population generally (17-19). The relatively low prevalence of high blood pressure in this present study was due to the fact that the population was young (18-40years). As many studies agreed, there was a positive association between age and hypertension (18-21) in which the risk of hypertension increases with age. This is mainly due to arterial stiffness as one gets older.

According to Figure1, significant sex differences was established in blood pressure distribution with high prevalence of high blood pressure found among males than females (χ2: 43.555 , p-value < 0.001). Similar reports from Zimbabwe and Morocco also showed high prevalence of hypertension among males than in females

(24-25). This was in contrast with a study done among general adult population in Northwest Ethiopia which reported higher prevalence of hypertension in women than in men. This was referred to as reversed gender dichotomy. One explanation given for reversed gender dichotomy was higher indices of obesity, elevated level of insulin resistance in the women and stress level at later age (26).

The prevalence of overweight and obesity from this study were 14.8% and 1.3% respectively, with significantly higher prevalence among women compared with men (20.0% and 1.4% against 11.2% and 1.2%).When compared with reports from other studies in Northern Nigeria, the prevalence of obesity in this study was lower than 15.9% reported by Gezawa et al., 2014(23), 13.1% reported by Bakari et al., 2007(27) and the 21% reported by Wahab et al., 2011 (28) among adult population. The lower prevalence of abnormal BMI in this present study may be due to the fact that the focus was on young adult age group. In this study,1.85% and 0.14% of the overweight and obese participants respectively had high blood pressure.The was a signifant positive relationship between abnormal BMI(overweight and obesity) and high blood pressure. This finding was similar to earlier reports by Adebayo et al., 2013 on positive correlation between measures of anthropometry and blood pressure (29).

CONCLUSION

The prevalence of high blood pressure was higher in male than female young adult. Periodic blood pressure screening for young adult population in our environment will play a significant role in early detection and management of hypertensive heart diseases.

Table 1. Blood pressure distribution among participants according to JNC VII

BP classification	SBP (mmHg)	DBP (mmHg)	Frequency	Percentage (%)
Normal	<120	<80	354	50.4
PreHTN	120-139	Or 80-89	317	45.2
Stage 1 HTN	140-159	Or 90-99	26	3.7
Stage 2 HTN	$\geq$160	Or $\geq$ 100	5	0.7

SBP- systolic blood pressure, DBP- diastolic blood pressure, HTN- hypertension, N=702

Table 2. Relationship between WHO BMI and JNC VII blood pressure classifications

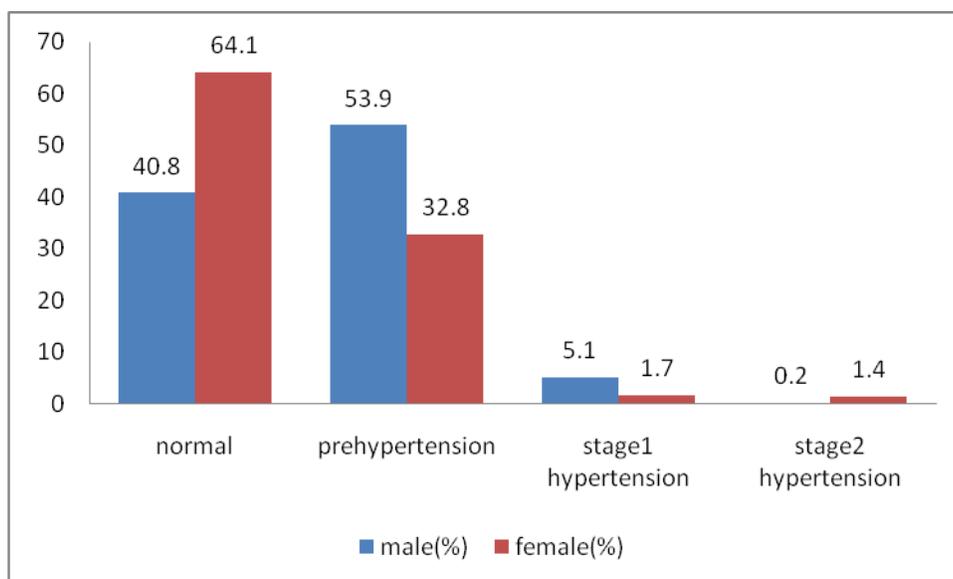| Blood pressure Classification	BMI Classes			
	underweight	Normal weight	overweight	obese
Normal blood pressure	50	260	39	5
Pre-hypertension	19	243	52	3
Stage 1 hypertension	1	13	11	1
Stage 2 hypertension	0	3	2	0

(χ2 = 36.22, p-value <0.001), N=702

Figure 1: Sex differences in classification of blood pressure using JNC VII.

Significant sex difference in blood pressure of young adults (χ2:43.56 , p-value < 0.001), proportionally more females had normal blood pressure than males while more males had pre-hypertension and stage 1 hypertension than females.

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