PREVALENCE AND PATTERN OF OBESITY AMONG PATIENTS WITH ESSENTIAL HYPERTENSION IN JOS, NORTH CENTRAL NIGERIA.

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ABSTRACT.

Background: Overweight, Obesity and hypertension are components of a defined cluster of risk factors for the development of non-communicable diseases which were thought previously to be a problem of developed countries, but have now become increasingly common in the developing world. Major non-communicable diseases associated with this cluster include; cardiovascular diseases, cerebrovascular disease, type 2 diabetes mellitus (DM), atherogenic dyslipidaemia and certain types of cancer.

Aim

: The objective of the study was to determine the prevalence and pattern of obesity among patients with essential hypertension in Jos, North Central Nigeria.

Method: It was a cross-sectional descriptive study. Three hundred and forty (340) adults with essential hypertension were recruited consecutively into the study. A structured questionnaire was used to obtain relevant socio-demographic history; anthropometric variables were measured from each study participant. Overweight and obesity were defined by using international classification adopted by World Health Organization (WHO).

Results: Females comprised 67.9% of the study population. The prevalence of overweight and obesity in the study subjects was found to be 33.5% and 42.6% respectively. The proportion of obese females(49.8%) was significantly higher than obese males(27.5%) p <0.000. Most of the study subjects (79.1%) had abnormal waist Circumference(WC). The proportion of females with abnormal WC (95%) was significantly higher than males(55.0%), p=0.000. Two hundred and forty-three (71.5%) study subjects had abnormal Waist to Hip Ratio (WHR); more males (71.6%) had abnormal WHR compared to females (71.4%), p=0.980.

Conclusion: The prevalence of overweight and obesity (both generalized and central) was found to be high among hypertensives in Jos. The relative frequency of all forms of obesity aside WHR was higher in females. Hypertensives should be screened early for obesity and managed appropriately to avert attendant morbidity and mortality.

Keywords: Prevalence and pattern, Obesity, Overweight, Essential Hypertension.

INTRODUCTION.

Overweight and Obesity are seen as abnormal and excessive fat accumulation that impair health. They are viewed as a global epidemic by the World Health Organization (WHO).[1] In 2015, the Global Burden of Diseases (GBD) Study offered a discouraging reminder that the global obesity epidemic was worsening in most parts of the world and that its implication regarding both physical and economic health remained omnious[2]. In the study, researchers assembled data from 195 countries to evaluate trends in overweight and obesity and related mortality and morbidity; findings from the study showed that the prevalence of obesity has more than doubled since1980 and is now 5% in children and 12% in adults- findings that mirror similar trends in type 2 diabetes.

The National Cholesterol Education Program Adult Treatment Panel (NCEP ATP) III recognizes obesity, physical inactivity and atherogenic diet as major risk factors for cardiovascular diseases[3]. Obesity is a component of the metabolic syndrome which represents a cluster of risk factors for cardiovascular diseases. Other components of the cluster include glucose intolerance/type 2 diabetes, elevated triglycerides, low levels of High Density Lipoprotein cholesterol(HDL-c) and elevated blood pressure. Obesity is thought to be the main factor in its development by various international bodies such as the World Health Organization (WHO), American Diabetes Association and International Diabetes Federation.

The risk of diabetes is particularly increased by obesity especially the android (central) obesity; 80-95% of increases in diabetes can be attributable to obesity and overweight[4,5]. Obesity is also associated with increased risk of other co-morbid conditions like cardiovascular diseases (hypertension, heart failure, arrhythmias, ischaemic heart disease, obesity related cardiomyopathy, stroke and sudden death), certain cancers, sleep apnoea and sleep disordered breathing[6-8]. Cardiovascular diseases produce the greatest morbidity and mortality among co-morbidities associated with obesity; the greater the obesity the higher the morbidity and mortality[9].

The burden of hypertension and other Non-communicable diseases (NCDs) is rapidly increasing and the African continent may be the most affected region in the world[10] .The United Nations and other major public health stakeholders have declared NCDs a major cause for global concern[10,11]. It is estimated that hypertension affects about 1billion people all over the world and is the main risk factor for many other cardiovascular diseases [10,11,12,13]. This study aimed to determine the prevalence and pattern of obesity among hypertensives in Jos, North-Central Nigeria. Findings from the study will be used to raise awareness on the enormity of the

problem and emphasize the need to screen all hypertensives for obesity. This is with the view to initiate life style measures among hypertensives that will help to prevent them developing associated cardiovascular disease and its attendant morbidity and mortality.

MATERIALS AND METHODS

This was a cross sectional descriptive study carried out at the Medical Out-Patient Department (MOPD) and the General Out-Patient Department (GOPD) of the Jos University Teaching Hospital (JUTH) in the North Central Part of Nigeria.

Jos University Teaching Hospital renders Primary, secondary and Tertiary health care services to more than nine states and Federal Capital Territory(FCT) of Nigeria.

Three hundred and fifty patients diagnosed to have primary hypertension aged 30-70 years attending the MOPD and GOPD were recruited consecutively into the study, which was carried out over a period of 6 months. The study procedure was explained to all subjects and informed written consent was obtained from each study subject.

Relevant Socio-demographic data (age, gender, occupation) was obtained from each study subject. The anthropometric variables were measured; overweight and obesity were defined by using the international classification of overweight and obesity according to the Body Mass Index (BMI)

adopted from WHO[14]. Weight was measured in Kilograms with a stadiometer, with subjects standing, arms hanging naturally by the sides and foot wear off. Height measured using a stadiometer in meters at the crown of the head without any foot wear or head gear and patient looking straight ahead. Using the classification, [14] BMI was categorized as follows;

- Underweight = $<18.5 Kg/m^2$.
- Normal = $18.5- 24.9 Kg/m^2$.
- Overweight = $25- 29.9 Kg/m^2$.
- Class I obesity = $30- 34.9 Kg/m^2$.
- Class II obesity = $35- 39.9 Kg/m^2$.
- Class III obesity (commonly called severe or morbid obesity) = $40 Kg/m^2$.

Waist Circumference (WC) and Hip Circumference (HC) were also measured according to the WHO protocol[15].

WC values of 80cm for females and 94cm for males were regarded as abdominal or central obesity[16].

BLOOD PRESSURE.

Study subjects were instructed not to take caffeine and avoid smoking one hour before BP measurement. Blood pressure was taken with patient sitting quietly after five minutes of rest using a mercury sphygmomanometer in a sitting position with arm resting on a table at the level of the heart. Blood pressure was measured on both arms with

average of both measurements being recorded. Hypertension was defined in the study as systolic BP of 140mmHg and /or Diastolic BP of 90mmHg or use of antihypertensive drugs.

Ethical approval for the study was obtained from the Ethics and research review committee of Jos University Teaching Hospital.

DATA ANALYSIS.

Data was analysed using Epi-info version3.5.1 CDC Atlanta Georgia. Mean and standard deviation was used to describe continuous variables, while proportion was used for categorical variables. The student t-test was used to compare group means and chi-square test for comparison of proportion and test of significance between categorical variables. A p value of <0.05 was considered as statistically significant.

RESULTS.

Three hundred and Forty consecutive patients diagnosed with hypertension were enrolled into the study. A total of 109(32.1%) male and 231(67.9%) female subjects participated in the study with a male to female ratio of 1:2.1. The mean age (SD) of study subjects was $53.61\pm(9.83)$ years with a range of 30-70 years. The mean (SD) age of male subjects was $54.65\pm(9.68)$ years and $53.17\pm(9.76)$ years for females. However this difference was not statistically significant. (t=1. 741, p=0.187).

Table 4.1 Study population by age and Gender

Age group (years)	Number (%)		
	males(109)	females(231)	Total(340)
31-40	12(29.3)	29(70.3)	41(100)
41-50	25 (27.8)	65 (72.2)	90(100)
51-60	42(32.3)	88(67.7)	130(100)
61-70	30(38)	49(62)	79(100)
Total	109(32.1)	231(67.9)	340 (100)

X^2=1.741, p=0.187

Table 4.2: Characteristics of study population.

		Number (%)		
Characteristics value	Males(n=109)	Females(n=231)	total (n=340)	P-
Marital status				
Married	70(28.0)	180(72.0)	250(100)	
Unmarried	39(43.3)	51(56.7)	90(100)	0.007
Educational level				
None	7(13.2)	46(86.8)	53(100)	
Primary	50(28.4)	126(71.6)	176(100)	
Secondary	10(35.7)	18(64.3)	28(100)	
Tertiary	42(50.6)	41(49.4)	83(100)	0.0000
Residence				
Urban	99(32.1)	209(67.9)	308(100)	
Rural	10(31.3)	22(68.7)	32(100)	0.918

Unmarried – single, divorced, widow/widower

The mean (SD) BMI of all subjects was 29.33(6.03) Kg/m^2. The mean (SD) BMI for male and female subjects was 27.30(5.53) Kg/m^2 and 30.03Kg/m^2 respectively (t=4.370, p=0.000) with females having significantly higher BMI. Seventy-six (22.4%) study subjects had normal BMI, while 114(33.5%) were overweight and 145(42.6%) were obese (I.e. BMI 30Kg/m^2). The proportion of obese females (49.8%) was significantly higher than that of obese males (27.5%) X^2=15.003, p=0.000

Table 4.3: BMI categories of respondents

	Sex [Number (%)]		
BMI Category	Males(n=109)	Females(n=231)	Total(n=340)
<18.5	1(20.0)	4(80.0)	5(100)
18.5-24.9	38(50.0)	38(50.0)	76(100)
25-29.9	40(35.1)	74(64.9)	114(100)
30	30(20.7)	115(79.3)	145(100)
Total n(%)	109 (32.4)	231(67.6)	340(100)

X^2=17.873, p=0.00

The mean (SD) waist circumference of males and females was 95.2(12.5) cm and 96.7(12.30) cm respectively (t=1.0395, p=0.2993) being insignificantly higher among female subjects. Two hundred and sixty nine (79.1%) had abnormal WC (i.e 80cm in female subjects and 94cm in male subjects) and 71(20.9%) had normal WC. The proportion of females with abnormal WC (90.5%) was insignificantly higher than that of male subjects (55.0%). X^2=2.26, P=0.133.

The mean (SD) WHR in males and females were 0.95(0.07) and 0.89(0.08) respectively, t=5.388, p=0.000. Two hundred and forty three subjects (71.5%) had abnormal WHR (i.e. WHR 0.85 and 0.90 in females and males respectively). The proportion of male subjects with abnormal WHR (71.6%) was insignificantly higher than that of females (71.4%), X^2=0.000, p=0.980.

Table 4.4: Prevalence of different pattern of obesity among respondents.

Component	total (n=340)	males(n=109)	Females (n=231)	X^2	P-value
Number (%)					
BMI Levels in Kg/m2					
Abnormal(30)	145 (42.6)	30(27.5)	115(49.8)	15.003	0.000
Normal(<30)	195(57.4)	79(72.5)	116(50.2)		
WC(cm)					
Abnormal(94 in males and 80 in females)	269(79.1)	60(55.0)	209(90.5)	54.14	0.000
Normal(<94 in males and <80 in females)	7l(20.9)	49(45.0)	22(9.5)		
Waist to Hip ratio levels					
Abnormal(0.85 in females and 0.9 in males)	243(71.5)	78(71.6)	165(71.4)	0.000	0.9801
Normal(<0.85 in females and <0.90)	97(28.50)	31(28.4)	66(28.6)		

DISCUSSION.

Obesity is regarded as a major public health concern and a major cardiovascular risk factor[6]. The presence of obesity and hypertension in the same individual is associated with greater cardiovascular risk well above that associated with either risk factor (i.e. obesity or hypertension).

One hundred and fourteen (38.8%) of this study participants were found to be overweight, while 145(42.6%) were obese using BMI as measure of determining obesity. The proportion of obese females (49.8%) was significantly higher than that of obese males (27.5%).

The frequency of overweight and obesity in this study is higher than that of previous studies by Orgah et al[17] and Akintunde et al[18] from Abeokuta and Ife respectively in south western Nigeria. This might be attributed to the differences in sample size and differences in the socio-economic status of study subjects used in the studies. The other reason may be due to the fact their studies are slightly older than the current study; as urbanization and adaptation of western life style has been increasing steadily over the years.

The findings from this study is however comparable to that of the National Health and Nutrition Examination survey (NHANES) in which 61% and 30% of the USA population were found to be overweight and obese respectively[19]. This is largely due to the adaptation of western life style which has greatly increased in our society over the years.

Even though BMI is used commonly used as a measure of overall adiposity and classify risk level to various chronic disease, increasing evidence suggest that central (Abdominal) fat distribution pattern as indicated by waist circumference and waist to hip ratio might be a better measure of risk assessment for obesity related diseases[20]. Measurement of WC in this study found abnormal WC in most (90.5%) of the female compared to 55% in the male subjects. While for WHR measurement, 71.4% of female subjects had abnormal WHR which is slightly lower than that of the males at 71.6%.

Review from literature showed that the female gender tends to have a higher prevalence of obesity compared to the male gender [13, 21, 22]. This trend was also confirmed by our study; as all the parameters for assessing obesity aside the WHR were found to be relatively more prevalent in the female gender. This difference was further corroborated from studies from South Africa, Ghana and Tunisia [23, 24, 25]. In developing countries like ours; this could be due to cultural influences, where female obesity is seen as a sign of wealth and beauty in Africa. Similarly, the influence of behavioral and psychosocial factors has been demonstrated to explain the importance of obesity in females[26].

The finding of high prevalence of overweight and

obesity among patients with essential hypertension is similar to findings from previous studies in Nigeria. [27,28,29].

CONCLUSION.

The study found a high prevalence of overweight, obesity, and measures of central obesity in patients with essential hypertension. Most measures of assessing obesity aside the waist to hip ratio were found to be commoner in females.

We advocate for routine screening of all hypertensives to detect the presence of obesity and to institute life style measures early in order to prevent or reduce associated attendant morbidity and mortality.

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