

Central Obesity and Stress- Predisposing Factors to Hypertension among Health Workers in Jos University Teaching Hospital, Plateau State, Nigeria



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Abstract

Central obesity poses more threat to human health than general obesity and stress increases its presentation. This study assessed prevalence of central obesity and stress, and their association with hypertension. Two hundred and eighty-three health workers in Jos Teaching Hospital, Plateau State, Nigeria were randomly selected. Socio-demographic characteristics and lifestyles (physical activity, alcohol intake, smoking and stress) were evaluated by semi-structured and International Stress Management Association Questionnaire. Central obesity was determined by waist circumference. Crude overweight, obesity and blood pressure were assessed by Body Mass Index, Body fat percentage and digital sphygmomanometer respectively. Hypertension was defined as BP =140/90mmHg. Descriptive and inferential statistics were performed and significance was set at $p < 0.05$. Study participants were 32% males and 68% females. Mean age was 37 ± 9.5 years. Clinical and non-clinical workers were 37.5% and 62.5% respectively. Majority did not drink alcohol (78.1%) neither smoke cigarette (97.5%) but 55.1% did not engage in physical fitness. Central obesity, Crude overweight/obesity, at risk waist-hip ratio, excess body fat, prehypertension, hypertension were 47.3%, 49.5%, 43.1%, 61.1%, 20.1% and 30.1% respectively. Large proportion (60.9%) experienced moderate to high stress. Significant association was observed between Body Mass Index (BMI) and stress ($p=0.011$), Body fat and stress ($p=0.025$), systolic pressure and BMI ($p=0.000$), and diastolic pressure and BMI ($p=0.000$). Central obesity and stress are prevalent among health workers especially females. This predisposes them to hypertension and other metabolic disorders. Policy on appropriate workload and recreational activities for wellbeing of health workers should be promoted by Health Policy makers in Nigeria.

Keywords: Central obesity; Stress; Hypertension; Health workers

Abbreviations: WC: Waist Circumference; BMI: Body Mass Index; WHR: Waist-Hip Ratio; ISMA: International Stress Management Association; SPSS: Social Package for Social Sciences; BP: Blood Pressure

Introduction

Obesity is increasing worldwide at alarming rate. Currently, 13% of adults globally and 8.1-22.2% Nigerian adults are obese [1,2]. Central obesity also known as visceral or abdominal obesity poses more threat to human health than general obesity. Irrespective of other fat deposits in the body, central obesity is found to contribute 20% global metabolic syndrome which includes systemic inflammation, hyperlipidaemia, insulin resistance and cardiovascular disease, even among individuals

with normal weight [3]. Stress predisposes to obesity through hormonal response especially excess cortisol production leading to deposit of white adipose cells and increased appetite which make many stressed individuals to engage in consumption of foods high in calorie, fat and sugars as coping strategy [3,4]. Demand and shift nature of work of healthcare providers affect their sleep quality, influence their dietary habit and recreational activities [5,6]. Stress alongside influences eating pattern and

capable of contributing to excessive body weight gain and high blood pressure [6]. This study assessed prevalence of central obesity and stress, and their association with hypertension among health workers in Jos University Teaching Hospital, Jos, Plateau State, Nigeria.

Materials and Methods

Study location and design

A cross-sectional study was conducted in Jos University Teaching Hospital, Plateau State, Nigeria. It accommodates more than 60 percent of the doctors in the entire North central region, and offers various services such as research, teaching, consultation and clinical services. Its health service providers are over 1000 and about 500 non-clinical staff strength.

Sample size calculation

Sample size was calculated using statistical formula by Araoye, 2008 and a prevalence of hypertension of 23.3% among employees of a tertiary hospital in Yenagoa, Bayelsa state, Nigeria [7]. The minimum sample size calculated was 275.

Study population and sampling methodology

Two hundred and eighty-three (283) health workers who gave informed consent were randomly selected to participate in the study. Pregnant women and sick staff were excluded. Ethical approval for the study was obtained from the Ethic committee of Jos University Teaching Hospital, Jos. The study participants also gave verbal consent to participate in the study after they have been informed about objectives of the study.

Data collection

A semi-structured, self-administered questionnaire was developed to assess socio-demographic characteristics, medical history and lifestyles (alcohol intake, smoking and physical activity) of the respondents. Weight (kg), height (m), Waist

Circumference (WC) in cm, hip waist circumference in cm and body fat (%) were measured by portable bathroom weighing scale (HANSON model), stadiometer, non-stretchable measuring tape and by BIA device (Omron BF-212) respectively. Body Mass Index (BMI) and Waist-Hip Ratio (WHR) were calculated. International Stress Management Association (ISMA) questionnaire consisting twenty (20) questions was used to evaluate stress levels of the respondents. Blood pressure (BP) was measured on the right arm by digital sphygmomanometer while respondents were on seat after at least 5mins of rest. Overall obesity was defined as BMI $\geq 30\text{kg/m}^2$. Central obesity was defined as WC $>88\text{cm}$ for women and $>102\text{cm}$ for men; WHR ≥ 0.90 for men and ≥ 0.85 [8]. Excess body fat was defined as percentage body fat $\geq 32.0\%$ (females) and $\geq 21.7\%$ (males) [9-11]. Hypertension was defined as BP $\geq 140/90\text{mmHg}$ [12]. Respondents who scored 4 points or less were regarded to have low stress level. Those who scored 5 - 13 points were regarded as having moderate stress level while 14 points and above define high stress level. Data obtained were analyzed by Social Package for Social Sciences (SPSS) version 20.0. Data were described by mean, standard deviation, frequency and percentage. Chi-square was employed to determine associations. Level of significance was $p < 0.05$.

Results

Socio-demographic characteristics of participants

The study participants were 32% males and 68% females. Their mean age was 36.8 ± 9.63 years. More than half (64.3%) of them were within age of 30-49 years. Large proportions (67.5%) were married. Medical practitioners (medical doctors, Nurses, Dieticians, Physiotherapists, Pharmacists, Medical lab scientists, Dental Technologists) were 33.6%. Non-medical workers (administrative officers, security guards, cooks, cleaners, laundry workers) and interns were 65.0% and 1.4% respectively (Table 1).

Table 1: Socio-demographic characteristics, lifestyle & medical history of participants.

Variables	Male 91 (32.2%)	Female 192 (67.8%)	Total 283 (100%)
Age (Years)			
Mean (SD)			37(9.63)
20-29	20(28.2)	51(71.8)	71(25.1)
30-39	48(44.0)	61(56.0)	109(38.5)
40-49	21(28.8)	52(71.2)	73(25.8)
≥ 50	2(6.7)	28(93.3)	30(10.6)
Marital Status			
Single	29(40.8)	42(59.2)	71(25.1)
Married	47(24.6)	144(75.4)	191(67.5)
Divorced	15(88.2)	2(11.8)	17(6.0)
Widowed	0(0.0)	4(100.0)	04(1.4)

Occupation			
Medical Doctors	8(66.7)	4(33.3)	12(4.2)
Nurses	2(13.3)	13(86.7)	15(5.3)
Dieticians	7(26.9)	19(73.1)	26(9.2)
Physiotherapists	4(44.4)	5(55.6)	9(3.2)
Pharmacists	11(84.6)	2(15.4)	13(4.6)
Medical lab scientists	8(44.4)	10(55.6)	18(6.4)
Dental Technologists	0(0.0)	2(100.0)	2(0.7)
Interns	0(0.0)	4(100.0)	4(1.4)
Non-clinical	51(27.7)	133(72.3)	184(65.0)
Alcohol Intake			
Yes	13(21.3)	48(78.7)	61(21.6)
No	78(355.1)	144(64.9)	222(78.4)
Cigarette Smoking			
Yes	3(42.9)	4(57.1)	7(2.5)
No	88(31.9)	188(68.1)	276(97.5)
Type of Physical Exercise			
Low intensity	36(31.9)	77(68.1)	113(29.9)
High intensity	4(28.6)	10(71.4)	14(4.9)
None	51(32.7.6)	105(67.3)	156(55.1)
Participants' Parents with chronic disease			
Father/Grandfather	21(25.0)	63(75.0)	84(29.7)
Mother/grandmother	22(29.3)	53(70.7)	75(26.5)
None of the two	48(63.2)	76(36.8)	124(43.8)
Participants' Current Diseased Conditions			
None	85(32.6)	176(67.4)	261(92.2)
Arthritis	1(33.3)	2(66.7)	3(1.1)
Ear impairment	0(0.0)	1(100.0)	1(0.4)
Migraine	0(0.0)	1(100.0)	1(0.4)
Postnatal hypertension	2(28.6)	5(71.4)	7(2.4)
Ulcer	0(0.0)	3(100.0)	3(1.1)
HBP/Rhinosinusitis	1(100.0)	0(0.0)	1(0.4)
Diabetes	0(0.0)	4(100.0)	4(1.4)
HIV	2(100.0)	0(0.0)	2(0.6)

Nutritional status, lifestyle and medical history of participants

Figure 1 presents the nutritional status of the participants. Based on Body Mass Index (BMI) classification, participants having underweight were 3.5%. Those with normal weight were 47.0%. Overweight, obesity, central obesity and excess body fat accounted for 37.5%, 12.0%, 47.3% and 61.1% respectively. Only

21.6% participants took alcohol and few (2.5%) smoked cigarette regularly. Only 4.9% participants engaged in high intense physical exercise, 29.9% having low intense physical exercise every week but more than half (55.1%) did not engage in physical fitness. About 7.5% participants were highly stressed. More than half (62.5%) has moderate stress, and 30.0% had low stress (Figure 2). Large proportion (92.2%) of participants claimed not to be

suffering from any chronic disease. Prevalence of prehypertension and hypertension was 20.1% and 30.1% respectively (Figure 3). Participants who had parents suffering from chronic diseases were 56.2% and only (7.8%) of the participants reported they were suffering from diseased conditions (Table 1).

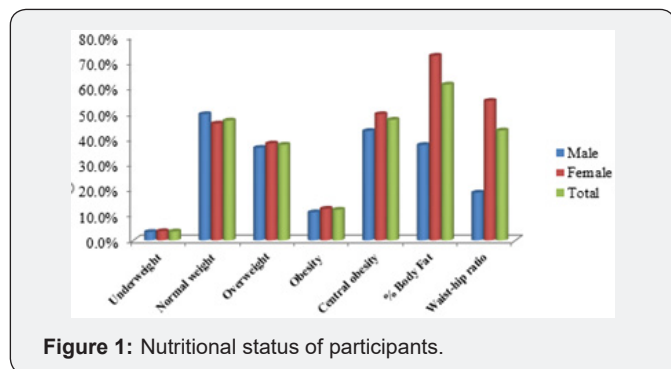


Figure 1: Nutritional status of participants.

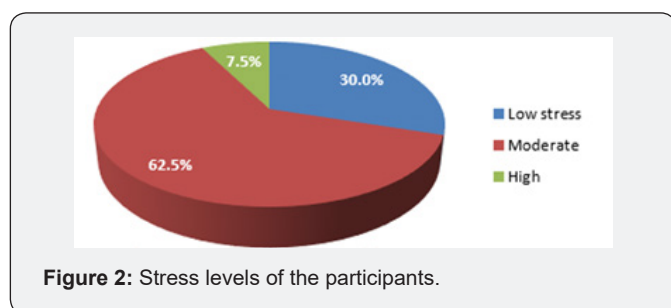


Figure 2: Stress levels of the participants.

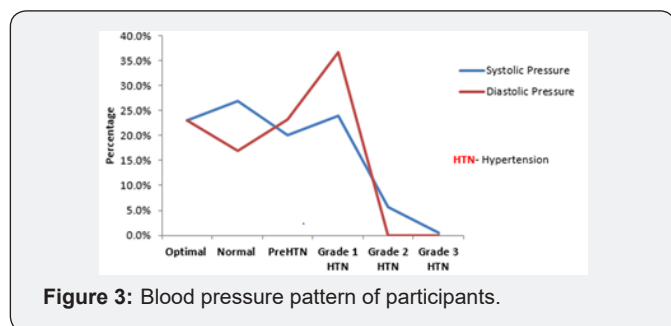


Figure 3: Blood pressure pattern of participants.

Association of obesity and stress to hypertension among Participants

Table 2: Association between variables.

Variables	χ^2	P value
BMI & Stress	18.98	0.004
BMI & systolic pressure	63.152	0
BMI & diastolic pressure	42.771	0
WC & Systolic pressure	14.031	0.015
Stress & diastolic BP	15.182	0.019

A significant association was observed between Body Mass Index (BMI) and stress ($\chi^2 = 18.980$, $p=0.011$), systolic pressure and BMI ($\chi^2 = 63.152$, $p=0.000$), diastolic pressure and BMI ($\chi^2 = 42.771$; $p=0.000$), central obesity and systolic pressure (χ^2

$= 14.031$, $p=0.015$), stress and diastolic pressure ($\chi^2 = 15.182$, $p=0.019$) (Table 2).

Discussion

Prevalence of overall obesity (12.0%) and central obesity (47.3%) in this study is lower than 27.3% obesity and 49.7% central obesity reported by Iwuala et al, [13] in Lagos, Nigeria, and 27.9% obesity observed in Kenya by Ondicho et al, [14] among health workers. Obesity is capable of causing low employee’s productivity, absenteeism and lack of efficiency [15,16]. Prevalence of obesity and overweight among the health workers in Jos Teaching Hospital is attributed to low physical activity and prevalence of work-related stress which previous studies have reported as risk factors of obesity [17,18]. Previous studies have established that Nigerian health workers are overweight and obese [19-21]. This study confirmed that Nigerian health workers are not only having excess weight but are experiencing central obesity which poses more threat to healthy living than general body obesity. Central obesity predisposes individual to metabolic syndromes which include systemic inflammation, hyperlipidaemia, insulin resistance and cardiovascular disease [22,23] and can occur among people with normal weight [3]. Though many of the health workers in this study claimed not to have any chronic disease, but the findings show that some of them are unknowingly suffering from prehypertension and hypertension which are results of central obesity and stress. This buttresses the fact that hypertension is a silent killer which shows no symptom until there is manifestation of cardiovascular disorders [24]. Prevalence of hypertension among the health workers in this study is similar to what Owolabi et al, [25] reported among the health workforce in Baptist Medical Hospital, Ogbomosho. But, hypertension in this study is lower than 36.6% which Ojomu et al, [19] reported among health workers in the same study location six years earlier. This indicates that hypertension is still prevailing among Nigerian health workers.

This study observed positive association between central obesity and high blood pressure. This corroborates previous studies conducted in Nigeria and abroad where hypertension and other metabolic disorders have been observed more among obese and overweight individuals than people with normal weight [26-28]. Elevated waist circumference, waist-hip ratio and excess body fat predispose to metabolic disorders which include as hypertension and diabetes [8,9]. This study observed association between stress and Body Mass Index. This support previous five years longitudinal study conducted by Harding et al, [29] among Australian adults in which stress is associated to weight gain. Stress is known to contribute to development of abdominal obesity through the activation of hypothalamic-pituitary-adrenal (HPA) axis which elevates circulating glucocorticoids especially cortisol resulting to high blood pressure, increased heart rate, circulating catecholamines, deposit of white adipose cells and increased

appetite in which many affected people resulted to excess intake of caloric foods [3,4,30-32]. Buss [6] also reported that stress contributed to obesity development by influencing eating pattern of nurses in United States. Health work is characterized with shift and having high patient to care provider ratio in the health institutions increase rate of exposure of health workers to more stress as being observed in this study. World Health Organization [33] has previously raised alarm on the low density of health providers in Nigeria to deliver health services for large population (1.95 per 1,000). Thus, this is leading to high workload on the available health workers who are currently suffering from work-related stress and some metabolic syndrome unconsciously [34-36].

In conclusion, this study establishes that central obesity and stress are prevalent and associated to each other and are both predisposing factors to hypertension observed among health workers in Jos University Teaching Hospital, Plateau State, Nigeria. Health sector needs to be given serious attention by the government and stakeholders in order to ensure quality health service delivery. Health policy which addresses workload commiserating human capacity in health institutions need to be made. Health workers must also deliberately be involved in recreational activities and personal routine medical check-up.

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