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Prevalence of hypertension and obesity among non-academic staff in a Nigerian University

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Abstract

Background: The aim of achieving a healthy society has motivated and led many researchers to understand the prevalence of diseases to create awareness and assess interventions' effectiveness.
Objective: This study determines the prevalence of hypertension and obesity among the non-academic staff of the Federal University of Agriculture, Abeokuta.
Methods: The study design was descriptive and cross-sectional. 300 Non-academic staff of the institution were randomly selected and data were obtained on their sociodemographic and socioeconomic characteristics, predisposing risk factors of hypertension, anthropometry, and blood pressure measurements using a structured self-administered questionnaire and standard procedures. Data were analyzed and presented using descriptive and inferential statistics. Statistical significance was established at $p<0.05$.
Results: The mean age was 42±8.0years**,** there were more female respondents (56.0%) than male respondents (44.0%) and 76.0% of the respondents were married. Results further revealed a high prevalence of overweight and obesity (52%), pre-hypertension and hypertension (40%), and risk of abdominal obesity (84%).
Conclusion: Non-academic staff are an essential component of the workforce and workplace intervention is essential to reduce the work nature risk factor of Obesity and Hypertension to prolong lives, and boost productivity and economic growth.

Keywords: prevalence, hypertension, obesity, university

Introduction

According to World Health Organization (WHO), the global burden of hypertension and other non-communicable diseases (NCDs) is rapidly increasing and the African continent seems to be the most affected region in the world. World Health Organization reported that Africa has the highest prevalence of hypertension (27%) and the number of adults with hypertension increased from 594 million in 1975 to 1.13 billion in 2015, with the highest prevalence in low- and middle-income countries (LMICs).[1,2] The prevalence of hypertension in Nigeria forms a significant part of the total burden in Africa because of the large population of the country currently estimated to be over 170 million.[3] High blood pressure, commonly referred to as a silent killer is a risk factor for stroke, ischemic heart disease, heart failure, and chronic kidney diseases.[4] The World Health Organization (WHO) defines hypertension as systolic blood pressure (SBP) ≥140mmHg and/or diastolic blood pressure (DBP) ≥90mmHg.[2]

On the other hand, overweight and obesity are the leading cause of preventable illness and death in the world today including Nigeria,[5] and poses a

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significant risk leading to chronic health conditions, thus increasing the overall disease burden.[6] Overweight and obesity are the fifth largest risk for global deaths, and one-third of the world's adult population is either overweight or obese.[7,8] Overweight and obesity are increasing worldwide at an alarming rate. According to WHO, about 2 billion adults (36%) are overweight, and 650 million (13%) are considered to be affected by obesity in 2016. Obesity is diagnosed as body mass index (BMI) ≥30.0 kg/m2 and overweight as a BMI range of 25kg/m2 to 29.9kg/m2.[8-11]

Several studies have reported links between overweight, obesity, and hypertension.[12-14] According to Saydah et al.,[12] 35.7% of obese individuals had hypertension in the National Health and Nutrition Examination Survey (NHANES) 1999–2010. There is an increase in the frequency of hypertension with a BMI elevated from the lower limit to the upper limit of normal.[14] Williams et al.,[13] opined that a healthy BMI and waist circumference values reduce blood pressure and cardiovascular risk. There are different mechanisms by which increased weight leads to increased blood pressure, hence, controlling and preventing weight gain and obesity may prevent the development of related co-morbidities including hypertension.[14]

Obesity and overweight pose numerous psychological, social and economic threats.[15] Anoshirike et al.,[5] reported increased risk of temporary work loss such as sick leave and reduced productivity while at work as risk factors of overweight and obesity. In addition to the social and psychological burden of obesity, obesity could result in chronic health conditions such as hypertension, type 2 diabetes mellitus, cardiovascular diseases, cancer, gallstones, and respiratory system problems.[6,16] Agha and Agha[17] also opined that excessive fat accumulation in the body may impair health conditions leading to significant long-term health consequences including the development of diabetes, coronary heart disease, and osteoarthritis as well as increased risk of certain cancers.

Omer[10] in an in-depth review identified the contributing factors of overweight and obesity to include; energy imbalance, reduced physical activity, low socioeconomic status, etc. Anoshirike et al.,[5] also reported that being overweight can be caused by unhealthy eating patterns, such as high consumption of sugar-sweetened soft drinks, snacks, and sweets, low consumption of fruit and vegetable, and habit of skipping breakfast. Hruby and Hu[18] opined that the surge in the prevalence of obesity in low- and middle-income countries (LMIC) has generally been a result of rapid industrialization and the adaptation of sedentary lifestyles as they improve economically.

Problem statement and justification

There are major disparities in the burden of hypertension among low-, middle- and high-income countries and even racially.[19] The WHO African Region has the highest prevalence of hypertension (27%). This increase is mainly due to a rise in hypertension risk factors in those populations including overweight and obesity.[2]

The upsurge of overweight and obesity among the adult workforce has become a global public health concern, and is accompanied by a higher risk of type II diabetes, coronary heart disease, and stroke which leads to substantial healthcare costs, reduced work productivity, and losses due to inability to work.[5,20,21] Among University staff in Nigeria, there is a continued increase in the prevalence of obesity, which may be attributed to the nature of their work, yet poor knowledge of the condition is reported among non-academic employees or workers in a Nigerian university setting.[22,23] In suggesting evidence-based context for government and other health policy planners on strategies to reduce this burden in low-resource settings like Nigeria, it is important to have detailed up-to-date information on the prevalence of hypertension to match this with available resources. This study will, hence, provide information on the prevalence of hypertension and obesity among the non-academic staff of the Federal University of Agriculture, Abeokuta.

Materials and methods

Study area and location

The study was carried out in Abeokuta, which is the state capital of Ogun state in southwest Nigeria. It is situated on the east bank of the Ogun River, near a group of rocky outcrops in a wooded savanna.[24] The study location was within the Federal University of Agriculture, Abeokuta (FUNAAB), a unique and leading institution, and also one of the three specialized Universities of Agriculture in Nigeria. It was established on January 1, 1988, with the triple mandate of teaching, research, and extension guiding its educational and community-based operations.[25]

Study design

This study is cross-sectional and descriptive in design.

Study population

The study was carried out among the non-academic staff of the Federal University of Agriculture, Abeokuta.

Sample size determination

The total number of non-academic staff at the Federal University of Agriculture, Abeokuta was known (1,833). The sample size was calculated using Andrew Fisher's formula, and the estimated sample size was 272 which was increased to 300 for possible dropout.[26] Therefore, 300 respondents were recruited for the study.

Sampling technique and procedure

The total number of non-academic staff of the Federal University of Agriculture, Abeokuta was determined which was 1,833. A simple random sampling was used to select 300 respondents from various departments and units of the institution.

Inclusion and exclusion criteria

Full-time non-academic workers who are healthy and free of obvious disabilities were included whereas pregnant women were excluded from the study.

Data collection

Data on socio-demographic and socio-economic including age, gender, ethnicity, gender, education level, and marital status were obtained using a semi-structured self-administered questionnaire. Anthropometry data such as body weight, height, waist circumference, and hip circumference were measured using standard procedures by trained anthropometrists.[27-28]

Anthropometric measurements were taken twice, and average values were used for data analysis. The Body Mass Index (BMI) was estimated as weight in kilograms divided by height square in m^2 and classified using the WHO standard.[29] Blood pressure measurement comprising of both systolic and diastolic readings was obtained after a minimum of 5 minutes of quiet sitting/rest using a calibrated digital sphygmomanometer with respondents in a sitting position, the feet flat on the floor and the arm placed at the same level as the heart, measurements were taken twice, the average was recorded and classified using a standard procedure.[2,11,30]

Physical activity was assessed using self-reported data on physical activity during an entire week, and classified into high, low, and moderate activity levels.[11,31] Predisposing risk factors of obesity and hypertension were assessed from the list of risk factors of hypertension described by Abdullahi and Jegede.[32]

Data analysis

All statistical analysis with descriptive statistics was carried out using statistical package software (SPSS version 20). Data were summarized using frequency, percentage, mean and standard deviation. The Chi-square test was used to test for a statistically significant association between the dependent and independent variables at $p < 0.05$.

Informed consent

The study involved data collection using structured questionnaire and anthropometry assessment, hence, permission to conduct the study was obtained from the Department of Nutrition and Dietetics, the Federal University of Agriculture, Abeokuta. Respondent's consents were sought before data collection and respondent's information was kept confidential and used strictly for research purpose.

Results

Socio-demographic and socio-economic characteristics of the respondents

Table 1 below described the socio-demographic and socio-economic background of the respondents. The mean age was 42±8.0years and more than half (58.0%) of the respondents were aged 41-60 years. The gender distribution shows that there were more female respondents (56.0%) than male respondents (44.0%). More than three-quarters (80%) of the respondents were Christian and 76.0% of the respondents were married. Only 20% of the respondents earned more than #100, 000 monthly whereas the majority (88.0%) of the respondents had tertiary education. More than half (58.0%) of the respondent's parents were self-employed.

Anthropometric characteristics of the respondent

The anthropometric characteristics of the respondents are depicted in **Table 2** below. The assessment revealed that 48.0% of the respondents were of normal weight while 52% were overweight and obese. The result further revealed that a large percentage (84.0%) of the respondents were at risk of abdominal obesity, while only 16.0% showed no risk of abdominal obesity.

Medical history and risk factors of obesity and hypertension among respondents

Table 3 below described the medical history and predisposing risk factors of obesity and hypertension among the respondents. The result showed that a vast majority (84.0%, 86.0%) of the respondents had no previous medical history of diabetes and hyperlipidemia respectively whereas 42.0% and 40.0% had a medical history of obesity and hypertension respectively. Less than half (20.0%) of the respondents drank alcohol and 4.0% smoked. More than half (64.0%) of the respondents reported that they engage in one or more physical activities regularly.

Blood pressure measurement of the respondent

Figure 1 below described the blood pressure measurement of the respondents. The majority (60.0%) of the respondent had normal blood pressure, while 38.0% and 2.0% were in the pre-hypertension stage and stage 1 hypertension respectively.

Physical activity level of respondents

Figure 2 below described the physical activity level of the respondents. The majority (66%) of the respondent had moderate physical activity, while 24.3% and 9.7% had low and high activities level respectively.

Relationship between physical activity level and anthropometric measurements of the respondents

Table 4 below showed the relationship between physical activity level and anthropometric measurements of the respondents. The result revealed that there is a significant difference between the physical activity level and Body mass index of the respondents at p=0.001, whereas physical activity level and respondents' blood pressure measurements were not statistically significant (i.e. p>0.05).

Table 1. Socio-demographic and socioeconomic characteristics of respondents (n=300)

Variable	Frequency	Percentage
Age of the Respondents		
20-30years	66	22.0
31-40years	60	20.0
41-50 years	84	28.0
51-60years	90	30.0
Mean Age of the Respondents		**42±8.0years**
Gender of the Respondents		
Male	132	44.0
Female	168	56.0
Marital Status		
Single	60	20.0
Married	228	76.0
Divorced	12	4.0
Religion of the respondent		
Islam	54	18.0
Christianity	240	80.0
Others	6	2.0
Ethnicity of the respondent		
Yoruba	270	90.0
Igbo	12	4.0
Others	18	6.0
Monthly income of respondents		
<#50,000	108	36.0
#50000-100000	132	44.0
#100001-200000	48	16.0
>#200,000	12	4.0
Educational qualification		
SSCE	36	12.0
NCE	72	24.0
OND	66	22.0
BSc. and above	126	42.0
Occupation of parents		
Civil servant	102	34.0
Self-employed	174	58.0
Others	24	8.0

Table 2. Anthropometric characteristics of the respondent (n=300)

Variable	Frequency	Percentage
BMI		
Normal weight	144	48.0
Overweight	96	32.0
Obese	60	20.0
WHR		
No Risk of Abdominal Obesity	48	16.0
At risk of Abdominal Obesity	252	84.0

BMI- Body mass index
WHR- Waist-Hip ratio

Table 3. Medical history and predisposing risk factors of obesity among respondents (n=300)

Variable	Frequency	Percentage
Do you have a previous medical history of diabetes		
Yes	48	16.0
No	252	84.0
Do you have a previous medical history of obesity		
Yes	126	42.0
No	174	58.0
Do you have a previous history of hyperlipidemia		
Yes	42	14.0
No	258	86.0
Do you have a previous medical history of hypertension		
Yes	120	40
No	180	60
Do you drink alcohol		
Yes	60	20.0
No	240	80.0
Do you smoke		
Yes	12	4.0
No	288	96.0
Do you regularly engage in one or more physical activities		
Yes	108	36.0
No	192	64.0

Table 4. Relationship between physical activity level and anthropometric measurement

Variable	R	R^2	P-value
PAL*Weight	-0.1	0.1	0.11
PAL*BMI	0.2	0.4	**0.001***
PAL*WHR	-0.1	0.1	0.075
PAL*DIASTOLIC	0.5	0.25	0.357
PAL*SYSTOLIC	-0.8	0.16	0.896

PAL- Physical Activity Level
BMI- Body Mass Index
WHR- Waist-Hip Ratio

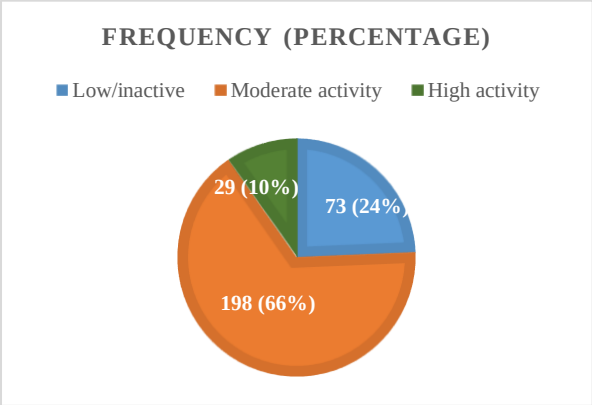

Figure 1. Blood pressure measurement of the respondents

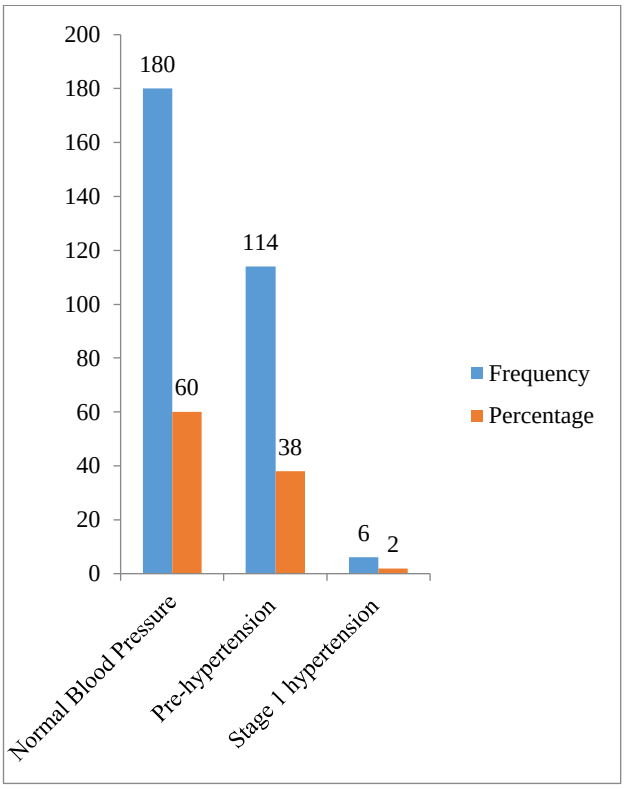

Figure 2. Physical activity level of respondents

Discussion

The increased burden of hypertension and non-communicable diseases among low-income and lower-middle-income countries with the highest prevalence in Africa is a global phenomenon, and has made their prevention an essential component of a global public health initiative.[9,33] Despite the reported prevalence of hypertension in Africa, earlier research reported that poor and undesirable health-seeking behaviors are still prevalent among Nigerians.[34] Adekoya and Sodeinde[35] also stated that Nigerians have inadequate awareness and knowledge of blood pressure, and there is increased practice of risky behavior that predisposes individuals to obesity and hypertension. Hence, this study provides information on the prevalence of hypertension and obesity among the non-academic staff of the Federal University of Agriculture, Abeokuta.

The mean age of respondents in this study agreed with Adedoyin et al.,[30] in a study conducted in Obafemi Awolowo University, Ile Ife, Osun State where the mean age of Non-Academic Staff was 45.6±10.9years. This suggests that the majority of non-academic staff in Nigerian Universities are in the middle adulthood stage. According to the Statista Research Department report of 2018/2019, there are more male non-academic personnel in Nigerian Universities; this study however contradicts the report as there were more female respondents than male respondents.[36] This increased participation of women in the workforce can improve women's empowerment. The majority of the respondents in this study were married. This implies that there are more married workers among non-academic staff. This can improve family income and the nutritional status of households. The result agreed with the study of Abdullahi and Jegede[32] in a study conducted among university staff in Oyo State where majorities (86.0%) of the respondents were married.

Adekoya and Sodeinde[35] in a literature review identified obesity as the major contributory factor of hypertension. The risk of hypertension is substantially increased by being overweight and obese.[14] In a study conducted in Osun State, a

strong significant relationship was established between body mass index, waist circumference, and blood pressure.[30] This study found a high prevalence of overweight and obesity, a high risk of abdominal obesity, and a high prevalence of pre-hypertension and hypertension among the respondents. This could result from a sedentary lifestyle and poor dietary practices among non-academic staff in Nigerian Universities. This high prevalence can pose a threat to health, productivity, and economic development. Dun et al.,[11] in a study conducted in an urbanized community in China reported a high prevalence (40.4%) of overweight and obesity among the respondents establishing that there is a high burden of hypertension, obesity, and overweight in urban areas which can be linked to physical inactivity. A similar study in Osun State reported the prevalence of hypertension among university staff as 34.9%.[30]

The predisposing risk factors of hypertension have been linked with lifestyle choices including physical inactivity, alcohol consumption, smoking, poor diet, obesity, etc.[1,34] However, Adekoya and Sodeinde[35] opined that having a family history of hypertension and obesity are essential risk factors for the condition. This study result showed 42.0% and 40.0% had a medical history of obesity and hypertension respectively. This could be a risk factor for the prevalence of pre-hypertension and hypertension of 40% recorded in this study.

Physical activity is one of the important lifestyle modifications commonly recommended in the prevention and management of hypertension.[33] Williams et al.,[13] also supported that addressing physical activity has proven benefits for blood pressure reduction. The World Health Organization guideline for physical activity and sedentary behavior emphasizes on reduction in sitting time and recommends a weekly physical activity level of moderate intensity for 150 minutes or vigorous intensity for 75 minutes which is essential for achieving optimum health.[37] Despite this recommendation, 24% of the respondents in this study had a sedentary lifestyle. This sedentary lifestyle can be attributed to the nature of their work which has been reported to be a risk factor for Obesity and Hypertension.[30] The physical activity level was estimated using a self-reported information from the respondents, prior knowledge of high or moderate activity level by the respondents might influence the results. This limitation should be considered in the interpretation of this study result.

Conclusion and recommendation

This study has revealed that the prevalence of obesity, pre-hypertension, and hypertension among non-academic staff is high. A work-based intervention including screening, seminars, and health and lifestyle promotion measures should be encouraged to reduce the burden of obesity and hypertension among non-academic staff in Nigerian Universities.

Declaration of Interest

The authors declare that there is no conflict of interest.

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