Texila International Journal of Public Health
Volume 7, Issue 4, Dec 2019

Prevalence and Determinants of Overweight, Obesity, Prehypertension, and Hypertension in the Banking Industry in Nigeria: An Analysis of a Nationwide Dataset

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Abstract

Banking occupations are typically white-collar jobs with long hours of sitting, high workload, little time for breaks, and indulgence in highly processed foods. This lifestyle predisposes bank employees to overweight, obesity, and hypertension, the leading risk factors for cardiovascular disease, the number cause of death globally.

This study was a cross-sectional survey of bank employees across Nigeria conducted in 2018. A census sample consisting of 3013 bankers, who participated in a healthy lifestyle program was processed and analyzed using SPSS. The study explored the prevalence and determinants of overweight, obesity, prehypertension, and hypertension in the banking industry. A questionnaire, interview schedule, and anthropometric and blood pressure tools were used in collecting the primary data.

The age of the participants ranged from 19 to 59 years, 62% were youth (19-39), 38% middle-aged (40-59), 81% men, and 19% women. Senior staff constituted 52.2%, junior 45.4%, and executive 2.4%. The mean age was 38.8 ± 9.0 years, weight 78.75 ± 14.74kg, height 1.71 ± 0.08m, BMI 26.99 ± 4.89kg/m^2, waist circumference 79.13 ± 26.72m, hip circumference 87.24 ± 28.57cm, waist-hip-ratio 0.91 ± 0.07, systolic blood pressure 129 ± 18mmHg, and diastolic blood pressure 80 ± 12mmHg.

The prevalence of healthy weight was 35.6%, underweight 1.5%, overweight 39.3%, obesity 23.6%, abnormal waist to hip ratio (WHR) 61%, normotension 32.5%, prehypertension 33.9%, and hypertension 27.6%. Overweight was associated with age and location; obesity with age, sex, office status, and location; prehypertension with age and location; and hypertension with age, sex, location, and obesity.

Keyword: *Prevalence, Overweight, Obesity, Prehypertension, Hypertension, Banking Industry, Nigeria.*

Introduction

The global trend of increasing non-communicable diseases is particularly affecting developing countries (Lackland and Weber, 2015). Cardiovascular disease, the most common cause of death worldwide, has become a significant public health problem in the banking sector. Overweight, obesity, and hypertension are emerging risk factors of chronic non-communicable diseases across the world (Doku et al., 2019; Khalid et al., 2019; Mc Namara et al., 2019). The prevalence of overweight, obesity, and hypertension is reported to be higher among employees of white-collar job than in the general population (Gupta and Garg, 2019; Muluvhu et al., 2019; Ofori and Obosi, 2019; Zhang et al., 2019).

Besides genetic predisposition, lifestyle plays a vital role in the etiology of cardiovascular diseases (Roth et al., 2015). A sedentary lifestyle and unhealthy eating are associated with overweight, obesity, and hypertension (Li et al., 2019). Sedentary lifestyle, stress, and eating junk foods are rampant in the banking sector (Doku et al., 2019), hence the need for this study.

Obesity is an excessive body weight caused by accumulation of fat (Kazak et al., 2017). It is caused by the interaction of genetic factors with environmental factors such as unhealthy foods and reduced physical activity (Albuquerque et al., 2017). A sedentary lifestyle is the leading cause of obesity (Li et al., 2019).

DOI: 10.21522/TIJPH.2013.07.04.Art006
ISSN: 2520-3134

Hypertension is a sustained increase in blood pressure above 140/90 mmHg irrespective of age and sex. Blood pressure increases with age (Rao et al., 2019). Hypertension can be considered mild (140/90 - 149/99), moderate (150/100 - 59/109), or severe (160/110 or higher) (Naidu et al., 2019). It can also be classified into stage 1 or prehypertension (120/80 - 139/89), stage 2 hypertension (140/90 - 159/99), stage 3 hypertension (160/100 - 179/109), or stage 4 hypertension (180/110 - higher) (Azar and Sarkis, 2019). Hypertension is also categorized into systolic or diastolic hypertension (Ahmed et al., 2019).

Based on aetiology, hypertension is divided into primary (idiopathic) and secondary hypertension (Dong et al., 2019). In primary hypertension, the cause is unknown, but it is associated with family history, high salt intake, obesity, stress, and sedentary lifestyle (Yilmaz et al., 2019). In secondary hypertension, the underlying aetiology is known, and includes kidney diseases, endocrine disorders, pregnancy-induced, drugs, raised intracranial pressure, and vascular abnormalities (Chrysaidou et al., 2019).

Methods

This study was conducted at 37 banks across the 36 states of Nigeria and the capital city Abuja in 2018. It was a cross-sectional survey of bank employees participating in a healthy lifestyle program. The sampling technique was a census sampling with 3013 participants. The aim of the survey was to determine the prevalence and determinants of overweight, obesity, and hypertension in the banking industry.

The primary data was collected by trained medical personnel using measuring tape, weighing scale, standiometer, calculator, and electronic sphygmomanometers. Interviews were also conducted using an interview schedule. The secondary dataset was processed and analyzed using SPSS (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Names, emails, and telephone numbers were deleted for ethical reasons. Personal data was limited to age, sex, and office status (a measure of personal and family income) while biometrics included weight, height, BMI, waist circumference (WC), hip circumference (HC), waist-hip-ratio (WHR), and systolic blood pressure (BP) and diastolic BP.

Age was grouped into four 10 years intervals: 18-29; 30-39; 40-49; and 50-59. Qualitative data was coded into numeric values and analyzed. BMI, WHR, and BP were also transformed and grouped as ordinal variables based on the WHO criteria. The ordinal variables included age groups, office status, BMI groups, WHR groups, and BP groups. The office status included junior, senior, and executive. The BMI groups were underweight (< 18.5kg/m^2), healthy weight (18.5-24.9kg/m^2), overweight (25 -29.9kg/m^2), and obesity (> 30kg/m^2). The WHR groups were normal (< 0.85 in women and < 0.9 in men) and abnormal (> 0.85 in women and > 0.9 in men). The BP was grouped into normal (< 120/80mmHg), prehypertension (120/80 -139/89mmhg), and hypertension (>140/90mmHg).

The independent or predictor variables were age, age group, sex, office status, weight, height, BMI, BMI groups, WC, HC, WHR, and WHR groups while the dependent variables were systolic and diastolic BP, overweight, obesity, prehypertension and hypertension. The analysis involved univariate statistics, cross-tabulation and X^2 test, and correlation. A confidence level (CL) of 95% and a level of significance of 0.05 were used for the analysis. At p-value < 0.05, the observed association was reported as statistically significant.

The limitations of the study included the exclusion of pregnant women, deletion of participants with missing values, inclusion of those with normalized BP on antihypertensives as normal, and inclusion of isolated systolic and isolated diastolic hypertension as well as white-coat hypertension as hypertensive cases.

Results

The age of the participants ranged from 19 years to 59 years with a mean of 38.8 ± 9.0years, median 37years, and mode 32years. Youths (19 - 39years) constituted 62% of the participants while the remaining 38% were middle-aged (40 – 59years). Women formed 19% of the sample while men constituted 81%. Most of the participants were in the senior staff cadre (52.2%), followed by junior staff (45.4%), and the remaining 2.4% were in the executive rank.

The weight of the participants ranged from 44 to 165kg, height from 1.4 to 2.1m, BMI from 14 to 53 kg/m^2, WC from 24 to 142cm, HC from 28 to 152cm, WHR from 0.56 to 1.43, systolic BP from 79 to 214mmHg, and diastolic BP from 50 to 150mmHg. The mean weight, height, BMI, WC, HC, WHR, systolic BP, and Diastolic BP of the participants were 78.75 ± 14.74kg, 1.71 ± 0.08m, 26.99 ± 4.89kg/m^2, 79.13 ± 26.72cm, 87.24 ± 28.57cm, 0.91 ± 0.07, 129 ± 18mmHg, and 80 ± 12mmHg respectively (Table 1).

The prevalence of underweight was 1.5%, overweight 39.3%, obesity 23.6%, healthy weight 35.6%, prehypertension 33.9%, and hypertension 27.6% (Figures 1, 2, and 3). Out of the 710 obese participants, 519 (73%) had obesity type 1, 147 (21%) had obesity type 2, and 44 (6%) had obesity type 3 or morbid obesity (Figure 4). Abnormal WHR was 61% which closely tallied with overweight and obesity combined (62.9%). Only 31% of the participants had normal WHR (Figure 1). Hypertension was present in 831 participants (27.6%), prehypertension in 1203 participants (33.9%), and the remaining 979 (32.5%) had normal BP (Figure 2). The distribution of the outcome variables according to location is shown in Table 2.

Overweight was significantly associated with age (X^2 (3) = 18.12, p < .001) and location (X^2 (36) = 58.42, p = .01) of the participants. The effect size of the associations was small with CV of .078 (p < .001) and .139 (p .01) respectively. The prevalence of overweight relatively increased with age (Table 3), and age group of less than 30 years had the lowest prevalence (29.7%) while the age group of 40-50 years had the highest prevalence (42.4%) when compared with the overall prevalence of 39.3% (Tables 3 and 4).

Age, sex, office status, and location were significantly associated with obesity (Table 5). The effect size of the relationships was higher with sex (Phi 0.188, p < .001) and age (CV = 0.181, p < .001). Sex was the strongest predictor of obesity (X^2 (1) = 106.95, p < .001) with women twice more likely to be obese than men (OR .49, 95% CI .43-.56). The female prevalence of obesity was 40% as against 19.7% in men and 26.7%, the overall prevalence (Table 5).

Age (X^2 (3) = 98.19, p < .001) showed significant differences across the four age groups as indicated by progressive Standardized Residuals (SRs) (-4.2 at < 30 years to 6.2 at 50-59 years) suggesting a positive correlation between age and obesity (Table 5). Similarly, the prevalence of obesity increased with elevation in staff cadre (junior staff 17.3%, senior staff 28.4%, and executive 37.5%).

The significant determinants of abnormal WHR were similar to those of obesity. Age, sex, and rank were all significantly associated with abnormal WHR (Table 6). Abnormal WHR increased with age and rank (cadre) elevation while women had a slightly more odds of developing abnormal WHR than men (OR .91, 95% CI .85-.97). The association between age and abnormal WHR was moderate but the strongest among all the relevant categorical variables (CV .258, p < .001).

Prehypertension was associated with sex (X^2 (1) = 10.56, p .001) and location (X^2 (36) = 77.61, p < .001) as shown in Table 8. Men had higher odds of developing prehypertension than women (OR 1.2, 95% CI 1.1-1.4). The prevalence of prehypertension in men was 41.3% and 34% in women (Table 7). The effect size of both associations was small (Phi .06 (p .001) and CV .160 (p < .001) for sex and location respectively. Prehypertension prevalence was highest in Kogi (52.4%) and least in Kebbi (12%).

Age, sex, and location were the significantly associated with hypertension (X^2 (3) = 151.32, p < .001, X^2 (1) = 6.25, p .012, and X^2 (36) = 134.55, p < .001 respectively). The effect size was moderate for age (CV .224, p < .001) and Location (CV .211, p < .001) and small for sex (Phi .05, p .012). The prevalence of hypertension was least in < 30 years age-group (14.6%), 21.7% in 30-39years old, 35.5% in 40-49years old, and highest in 50-59years old (44.2%). The odds of men having hypertension was 1.2 more than that of women (OR 1.2, 95% CI 1.0-1.4). Asaba had the highest prevalence of 58.9% while Awka had the least prevalence of 12.5% (Table 8).

Pearson correlation (Table 9) demonstrated a significant small positive correlation between age and obesity (as measured by WHR r = .318 and BMI r = .245), systolic BP (r = .298), and diastolic BP (r = .231). There was also a positive correlation between age and weight (r = .206), WC (r = .174), and HC (r = .105). Weight correlated better with BMI (r = .854) than with WC (r = .399), HC (r = .332), and WHR (r = .326). Similarly, weight correlated better with systolic BP (r = .256) than with diastolic BP (r = .213). Height

DOI: 10.21522/TIJPH.2013.07.04.Art006
ISSN: 2520-3134

positively correlated with weight (r = .347) and BMI (r = .172), but to a much lesser extent with WHR (r =.089). BMI correlated with systolic BP (r = .191) and diastolic BP (r = .180) better than WHR (r = .187 and .135), WC (r = .082 and .089), and HC (r = .040, p = .029 and .060, p = .001).

Discussion

In this study, the prevalences of overweight (39.3%) and obesity (23.6%) are higher than the national prevalence of overweight (20-35%) and obesity (8-22%) in Nigeria (Chukwuonye et al. 2013). Similarly, the prevalence of combined overweight and obesity (62.9%) is higher than that reported by Sekoni et al. (2013) of 40.4% amongst commercial bank employees in Lagos, Nigeria, and that reported by Addo et al. (2015) 55.6% among financial institution workers in Accra Metropolis, Ghana.

These high prevalences of overweight and obesity among bank employees in this study can be explained by the sedentary nature of banking work, long hours of work, indulgence on junk foods, and late dinners. Gupta and Garg (2019) demonstrated that 'the more working hours in a day, the greater the chances of becoming obese or overweight'. Additionally, the higher income of bank employees than average civil servants in Nigeria and the wrong notion of obesity as a sign of high standard of living in Nigeria could have predisposed bank employees to unhealthy eating for weight gain.

Interestingly, the overall prevalence of hypertension in this study (27.6%) tallies with the national prevalence of hypertension in Nigeria (28%) as reported by (Adeloye et al., 2015). However, Salaudeen et al. (2014) reported a higher prevalence of 34.4% among commercial bankers in Ilorin, Nigeria. This high prevalence of hypertension among commercial bank employees in Ilorin (34.4%) corresponds to the prevalence of hypertension among bank employees in Ilorin in this study - 35.1% (Table 12). This finding lends credence to the accuracy, validity and reliability of this study. Additionally, it implies that the findings of this study can be confidently generalizable to the banking industry in Nigeria and perhaps to the general population in Nigeria. Therefore, it can be deduced that studies on census data can also be generalizable just like cases of probability sampling technique (Gass et al., 2019; Firth et al., 2019; Salje et al., 2019; Sauver et al., 2012).

Globally, according to literature reviewed, the prevalence of hypertension among bank employees ranges from 19.2% in Ethopia (Fikadu and Lemma, 2016) to 39.3% in India (Ismail et al., 2013). These varying prevalences suggest the role of possible compounding effect of extraneous factors as well as environmental, cultural, and behavioral factors (Mahmoodabad et al., 2019; Travassos et al., 2019).

The prevalence of prehypertension among bank employees in this study was 33.9%. This prevalence is higher than a prevalence of 15.4% in adults living in rural areas of Niger Delta region, south-south Nigeria reported by Nwafor et al. (2015), but lower than a prevalence of 37.8% among apparently healthy adults in Umuahia, south-east Nigeria reported by Okwuonu et al. (2015). However, the prevalence of prehypertension in this study (33.9%) approximates the prevalence of 34.5% among bank employees in Surat city, West Indian state of Gujarat (Momin et al., 2012). In contrast, Brahmankar and Prabhu (2017) found a higher prevalence of 41.8% among bank employees in Western Maharashtra, India.

The high prevalence of prehypertension in the banking industry may predict a higher incidence of hypertension in the future since prehypertension is a risk factor for future hypertension (Doumas et al., 2019). However, this finding provides an opportunity for planning, implementation, monitoring, and evaluation of public health interventions in the areas of health education, physical exercise, and dietary measures in preventing future hypertension and consequent cardiovascular morbidity and mortality (Berks et al., 2019; Ryan et al., 2019).

In this study, overweight was associated with age and location of the participants. The prevalence of overweight increased with age and Owerri, Imo state, southeast Nigeria, had the highest prevalence of overweight (54%) while Jos, Plateau state, north-central Nigeria, had the lowest (25%). Sex was not associated with overweight contrary to Yang and Colditz's study in the US where overweight was found be commoner in male than female (Yang and Colditz, (2015). However, Addo et al. (2015) and Hirani et al. (2017) showed that overweight was associated with female sex, increasing age, reduced physical

inactivity, consumption of alcohol, higher office status, and high income. Local studies in Owerri, Imo state, Nigeria showed a prevalence of 28% among undergraduates (Emerole et al., 2014) and 41.5% among diabetic adults aged 19 - 64 years (Anoshirike et al., 2019); the higher prevalence in Owerri (54%) may be connected with sedentary lifestyle, long working hours, high income, and unhealthy eating among bank employees.

In the study, obesity was associated with increasing age and office status, female sex, and location. The prevalence of obesity increased with advancing age and elevation in staff cadre, females had twice the prevalence of males (40.0% in female, 19.7% in males), Jos had the highest prevalence (42.9%) while Yola had the least (7.1%). These findings are consistent with previous studies: obesity is twice more common in women than in men (Erem, 2015; Sekoni et al., 2013; WHO, 2019) and obesity increases with age, income, and office status (Addo et al., 2015; Erem, 2015; Hirani et al., 2017). The significant determinants of abnormal WHR were similar to those of obesity. Abnormal WHR increased with age and rank, and it is more common in females (66%) than in males (59.8%).

Prehypertension was associated with sex, location, and overweight. Men had a higher prevalence (41.3%) than women (34%); and Kogi had the highest prevalence (52.4%) while Kebbi had the least (12%). The male preponderance of prehypertension was also found in other studies in Umuahia, southeast Nigeria and Siberia, Russia (Okwuonu et al., 2015; Ruf et al. 2019). However, a study in Bangladesh (Al Kibria et al., 2019) revealed a comparable prevalence in both sexes (27.2% in males [95% CI: 25.6–28.8] and 27.6% in females [95% CI: 26.0–29.2]).

The association between overweight and prehypertension is supported by Laurent and Cunha (2019) when they demonstrated that prehypertension was associated with overweight, obesity, prediabetes, and diabetes mellitus. However, in this study, there was no statistically significant association between prehypertension and obesity (X^2 (1) = .201, p .654).

In this study, hypertension was associated with male sex, increasing age, location, and obesity. The prevalence of hypertension was lowest in those < 30 years (14.6%) and highest in those in the 50-59-year-old (44.2%) age group. Men had had a higher prevalence of hypertension (28.6%) than women (23.4%). Asaba had the highest prevalence (58.9%) while Awka had the least prevalence (12.5%). The prevalence of hypertension among obese participants was 32.5% and 20.2% among non-obese. The preponderance of hypertension in males was supported by other studies. In Nigeria, Adeloye et al. (2015) found a prevalence of 29.5% in men and 25% in women.

The positive relationship between hypertension and age has been well established. This association applies to the banking sector as well. Ismail et al. (2013), in India, identified the risk factors of hypertension among bank employees as increasing age, overweight and obesity. However, in this study, overweight was not significantly associated with hypertension. Adeloye et al. (2015) demonstrated a higher prevalence of hypertension in urban areas (30.6%) than in rural areas (26.4%) of Nigeria. This finding agrees with this study since all the branches that participated are located in state capitals, which are highly populated urban areas.

Conclusion

The objectives of this study of determining the prevalence of overweight, obesity, prehypertension, and hypertension, and the factors associated with these outcomes have been met to a large extent. The study clearly demonstrated the higher prevalence of overweight and obesity in the banking sector when compared to the general population in Nigeria. It also supported the associations of overweight, obesity, and hypertension with advancing age and the association between obesity and hypertension.

This study should be replicated in the general population in Nigeria using a probability sampling technique. This approach would provide an opportunity of making a valid comparison based with evidence from research. Future studies should also explore the prevalence of overweight, obesity, and hypertension among bank employees in rural areas of Nigeria.

DOI: 10.21522/TIJPH.2013.07.04.Art006
ISSN: 2520-3134

The high prevalence of prehypertension should inform public health interventions in the banking sector to prevent future occurrence of hypertension. These interventions should aim at inculcating healthy eating habit, regular physical exercise, and reducing workplace stress.

Giving the high prevalence of overweight and hypertension in the banking industry and the relatively low level of utilization of the gymnasia across Nigeria, it is recommended that social and behavioral experts be integrated into the healthy lifestyle interventions to ensure a multidisciplinary approach so that socially and culturally acceptable protocols can be integrated to encourage regular exercise at the gym and a healthy eating habit.

Other banks in Nigeria and Africa should establish workplace gyms and health promotion programs. This strategy will go a long way in discouraging sedentary lifestyle and curb the menace of overweight, obesity, hypertension, and even diabetes mellitus and the consequent cardiovascular diseases.

Health education, lifestyle modification, healthy eating, and regular physical activity are required to mitigate the high prevalence of overweight, obesity prehypertension, and hypertension in the banking industry. Establishing workplace gymnasia at bank premises will go a long way in improving staff wellbeing and reducing cardiovascular diseases.

Figures and tables

Table 1. Statistics of anthropometric and vital sign parameters

Descriptive Statistics of Anthropometric and Vital Sign Parameters (n=3013)						
Parameter	Minimum	Maximum	Mode	Median	Mean	Std. Deviation
Weight (kg)	44	165	72	77.2	78.75	14.74
Height (m)	1.40	2.10	1.70	1.71	1.71	.08
BMI	14.04	52.80	27	26.50	26.99	4.89
WC	24	142	92	88	79.13	26.72
HC	28	152	100	98	87.24	28.57
WHR	.56	1.43	.90	.90	.91	.07
Systolic BP	79	214	120	126	129	18
Diastolic BP	50	151	80	79	80	12

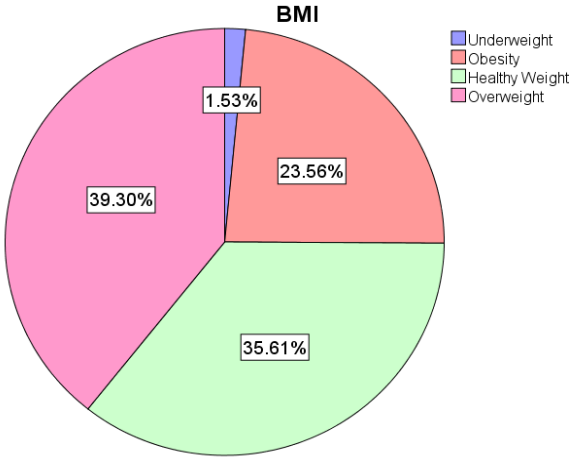

Figure 1. Piechart showing BMI distribution

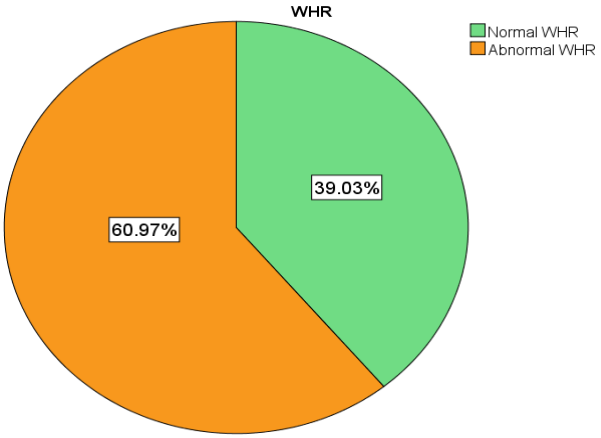

Figure 2. Piechart showing WHR distribution

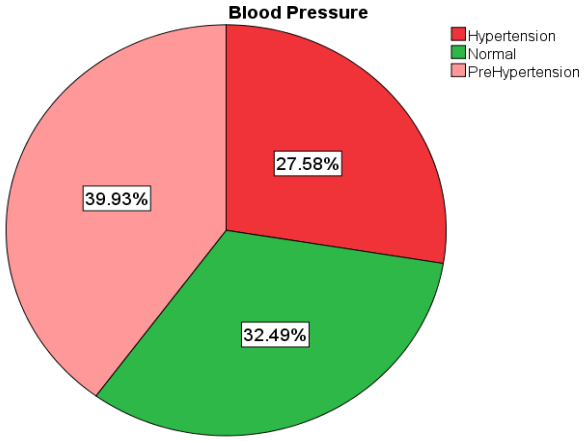

Figure 3. Piechart showing BP distribution

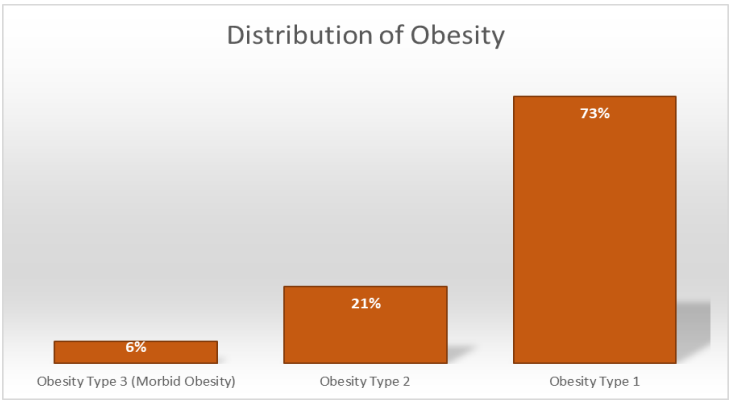

Figure 4. Subclassification of obesity among the participants

DOI: 10.21522/TIJPH.2013.07.04.Art006
ISSN: 2520-3134

Table 2. Prevalence of outcome variables according to state (location)

State (Location)	Prevalence				
	Overweight	Obesity	Abnormal WHR	Prehypertension	Hypertension
Abia (Umuahia)	38.9%	25.0%	94.4%	45.8%	19.4%
Adamawa (Yola)	40.5%	7.1%	57.1%	45.2%	25.0%
Akwa Ibom (Uyo)	36.1%	42.6%	65.6%	52.5%	36.1%
Anambra (Awka)	54.2%	29.2%	60.4%	33.3%	12.5%
Bauchi (Bauchi)	31.8%	20.0%	50.9%	37.3%	24.5%
Bayelsa (Yenagoa)	34.9%	30.2%	69.8%	34.9%	27.9%
Benue (Makurdi)	34.7%	21.4%	80.6%	19.4%	32.7%
Borno (Maiduguri)	33.7%	15.8%	65.3%	48.5%	20.8%
Cross River (Calabar)	37.5%	33.9%	48.2%	41.1%	35.7%
Delta (Asaba)	45.2%	27.4%	63.0%	27.4%	58.9%
Ebonyi (Abakaliki)	39.5%	31.6%	65.8%	50%	28.9%
Edo (Benin)	45.3%	23.3%	53.5%	39.5%	39.5%
Ekiti (Ado Ekiti)	34.2%	21.1%	68.4%	34.2%	28.9%
Enugu (Enugu)	44.4%	20.4%	72.2%	50%	13.9%
Gombe (Gombe)	38.5%	15.4%	52.3%	44.6%	33.8%
Imo (Owerri)	54.9%	28.0%	69.5%	40.2%	41.5%
Jigawa (Dutse)	23.8%	21.4%	47.6%	31%	45.2%
Kaduna (Kaduna)	36.9%	24.3%	54.4%	36.9%	21.4%
Kano (Kano)	40.0%	13.0%	61.7%	40%	20.0%
Katsina (Katsina)	32.2%	21.8%	57.5%	40.2%	32.2%
Kebbi (Birnin Kebbi)	50.0%	16.0%	68.0%	12%	26.0%
Kogi (Lokoja)	52.4%	20.6%	58.7%	52.4%	27%
Kwara (Ilorin)	38.1%	17.5%	51.5%	41.2%	35.1%
Lagos (Lagos)	37.2%	26.4%	56.2%	44.6%	23.1%
Nasarawa (Lafia)	33.9%	22.0%	49.2%	45.8%	8.5%
Niger (Minna	31.5%	21.7%	44.6%	34.8%	41.3%
Ogun (Abeokuta)	31.4%	29.1%	55.8%	36.0%	31.4%
Ondo (Akure)	37.5%	19.3%	63.6%	28.4%	23.9%
Osun (Oshogbo)	32.3%	27.7%	47.7%	44.6%	36.9%
Oyo (Ibadan)	41.8%	24.6%	64.9%	45.5%	17.9%
Plateau (Jos)	25.0%	42.9%	75.0%	42.9%	17.9%
Rivers (Port Harcourt)	41.7%	29.2%	50.0%	43.8%	21.9%
Sokoto (Sokoto)	35.5%	9.7%	51.6%	46.8%	17.7%
Taraba (Jalingo)	47.9%	27.1%	45.8%	39.6%	29.2%
Yobe (Damaturu)	28.6%	25.7%	71.4%	51.4%	37.1%
Zamfara (Gusau)	39.2%	13.7%	35.3%	37.3%	33.3%
Federal Capital (Abuja)	46.7%	30.0%	72.3%	38.0%	25.7%
Overall	39.3%	23.6%	61.0%	39.9%	27.6%

Table 3. Prevalence of outcome variables based on age

Age Group (years)	Prevalence				
	Overweight	Obesity	Abnormal WHR	Prehypertension	Hypertension
< 30	29.7 %	13.1%	41.3%	38.2%	14.6%
30 – 39	40.3%	19.5%	54.9%	41.5%	21.7%
40 – 49	42.4%	28.7%	70.8%	39.6%	35.5%
50 - 59	40%	36.7%	80.9%	37.3%	44.2%

Table 4. Significant determinants of overweight

Outcome	Predictor	SR	Major Contributors	Group Prevalence	Total Prevalence
Overweight	Age group	1.2 -3	40-49 < 30	42.4% 29.7%	39.3%
	Location	2.3 2.0 -1.7	Owerri Abuja Jos	54.9% 46.7% 25%	

Table 5. Significant determinants of obesity

Dependent Variable	Significant Predictor	SR	Location	% Within Predictor	% Total
Obesity	Age group	6.3 2.6 -3.3 -4.3	50-59 40-49 30-39 < 30	36.7 28.7 19.5 13.1	23.6
	Sex	8.1 -4	Female Male	40 19.7	
	Rank	2.4 3.9 -4.8	Executive Senior Junior	37.5 28.4 17.3	
	Location	3.0 3.1 2.3 -2.3 -3.1	Jos Uyo Abuja Kano Yola	42.9 42.6 30 13 7.1	

Table 6. Significant predictors of Abnormal WHR

Dependent Variable	Significant Predictor	SR	Location	% Within Predictor	% Total
Abnormal WHR	Age group	5.9 3.1 -3 -5	50-59 40-49 30-39 < 30	81 71 55 41.3	61
	Sex	1.6 -.8	Female Male	66 59.8	
	Rank	2.4 1.6 -2.3	Executive Senior Junior	83.3 64.2 56.1	
	Location	3.6 2.5 2.5	Umuahia Makurdi Abuja	94.4 80.6 72.3	

DOI: 10.21522/TIJPH.2013.07.04.Art006
ISSN: 2520-3134

		-2.3	Gusau	35.3	

Table 1. Significant determinants of Prehypertension

Dependent Variable	Significant Predictor	SR	Location	% Within Predictor	% Total
Prehypertension	Sex	1.1 -2.3	Male Female	41.3 34	39.9
	Location (State)	1.7 -3.2	Enugu Makurdi	50 19.4	
	Overweight	1.2	Prehypertension Normal	41.5 37.8	

Table 8. Significant determinants of Hypertension

Dependent Variable	Significant Predictor	SR	Location	% Within Predictor	% Total
Hypertension	Age group	7.3 3.7 -4.3 -4.9	50-59 40-49 30-39 < 30	44.2 35.5 21.7 14.6	27.6
	Sex	-1.9 0.9	Female Male	23.4 28.6	
	Location	5.1 2.5 2.4 2.2 2.1 -2.0	Asaba Minna Owerri Dutse Benin Awka	58.9 41.3 41.5 45.2 39.5 12.5	

Table 9. Correlations between the various continuous variables

Pearson Correlations										
Variable		Age	Weight	Height	BMI	WC	HC	WHR	Systolic BP	Diastolic BP
Age	r	1	.206	-.057	.245	.174	.105	.318	.298	.231
	p		.000	.002	.000	.000	.000	.000	.000	.000
Weight	r	.206	1	.347	.854	.399	.332	.326	.256	.213
	p	.000		.000	.000	.000	.000	.000	.000	.000
Height	r	-.057	.347	1	.172	.046	.023	.089	.136	.081
	p	.002	.000		.000	.012	.217	.000	.000	.000
BMI	r	.245	.854	-.172	1	.393	.337	.289	.191	.180
	p	.000	.000	.000		.000	.000	.000	.000	.000
WC	r	.174	.399	.046	.393	1	.971	.243	.082	.089
	p	.000	.000	.012	.000		.000	.000	.000	.000
HC	r	.105	.332	.023	.337	.971	1	.016	.040	.060
	p	.000	.000	.217	.000	.000		.380	.029	.001
WHR	r	.318	.326	.089	.289	.243	.016	1	.187	.135
	p	.000	.000	.000	.000	.000	.380		.000	.000
Systolic BP	r	.298	.256	.136	.191	.082	.040	.187	1	.756
	p	.000	.000	.000	.000	.000	.029	.000		.000
Diastolic BP	r	.231	.213	.081	.180	.089	.060	.135	.756	1
	p	.000	.000	.000	.000	.000	.001	.000	.000	

Acknowledgement

I wish to express my gratitude to the management of the bank for giving me the permission and support to conduct this study.

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