JHER Vol. 28 No. 1, September 2021, pp. 223 -236

Metabolic Syndrome Issues among Bank Staff in Nsukka Local Government Area, Enugu State, Nigeria

[1]Okafor, A.M.; [2]Kalu-Uka, A.G; [2]Egumgbe, U.D.; [1]Otu, N.F.
[1]Department of Nutrition and Dietetics;
[2]Department of Home Science and Management
University of Nigeria, Nsukka.

Abstract

The general purpose of the study was to investigate the prevalence of metabolic syndrome among bank staff in Nsukka LGA of Enugu State. Specifically, it determined the subjects' socio-demographic attributes, anthropometric indices lipid profile, blood pressure, fasting blood glucose prevalence of metabolic syndrome, nutrient intake, and physical activity level. Questionnaire was used to obtain information on socio-economic data, cigarette and alcoholic beverage consumption of subjects. Anthropometric (weight, height, waist and hip circumferences), blood pressure and blood sugar measurements were taken with appropriate instruments. Twenty percent of the sample size was used as sub-sample for biochemical studies (lipid profile and fasting blood glucose), food record and physical activity level studies. Data were analyzed using Pearson's correlation and Chi-square to determine relationship existing among variables at $p < 0.05$. Major findings revealed that the following among the subjects: borderline triglyceride (20.0%), hypoglycaemia (14.0%) and impaired fasting blood glucose (4.0%). A few of the respondents had raised systolic (12.0%) and diastolic (8.0%) blood pressure. Prevalence of metabolic syndrome was 70%. It was recommended that further research be carried out to determine the causative factors for the effective intervention metabolic syndrome issue. Also strategies must be taken to protect bankers and other sedentary workers from metabolic syndrome and its attendant effects.

Key words: Prevalence, Metabolic, Syndrome, Blood, Pressure, Lipid, Profile.

Introduction

Metabolic syndrome (MetS) has been described as a cluster of cardiovascular diseases risk factors of metabolic origin (Alberti, Zimmet & Shaw, 2005). It is a global health problem currently occupying the front burner in clinical and public health practice (Tokin, 2004). MetS is a cluster of biochemical and anthropometric abnormality that has high predictive ability for the development of atherosclerotic cardiovascular diseases (Alberti, Zimmet & Shaw, 2006). The components include central obesity, dyslipidemia (reduced high density

lipoprotein cholesterol and elevated triglycerides), raised blood pressure and hyperglycemia (Alberti, Zimmet & Shaw 2005).

It is a global time bomb, with a quarter of the world's adult estimated to have the condition (Awosan *et al*., 2013). The prevalence of metabolic syndrome is increasing in developing countries as a result of genetic interactions with metabolic and environmental factors (Silva, Prata & Curha 2011). People with MetS are twice as likely to die from, and thrice as likely to have heart attack or stroke compared to people without it (Awosan *et al*., 2013). It has been estimated that up to 80 percent of 200 million people with type 2 diabetes mellitus globally will die of cardiovascular diseases, thus putting MetS and diabetes mellitus ahead of HIV/AIDS in terms of morbidity and mortality (International Diabetic Federation [IDF], 2013).

Reports from studies show high prevalence of metabolic syndrome globally mirroring the rising prevalence of its components, sequel to urbanization, industrialization and changes in life style (Hu, 2011). According to Ogbu and Chukwukelu (2012), the prevalence of metabolic syndrome is about 23.4 percent in Nigeria. The increase in sedentary lifestyle as a health risk behaviour has since been noticed as a contributory factor to chronic diseases such as hypertension, obesity, diabetes and lipid disorders (Pate, O'neill & Lobelo, 2008). Physical inactivity, sedentary nature of jobs and unhealthy dietary habits place bank staff at greater risk of developing MetS and its complications (Ayogu, Nwajuaku & Udenta 2019).

Busy schedule of bank staff who work 10-12 hours for five or sometimes six days in a week could be the reason why this occupational group may be at risk of MetS. This coupled with physical inactivity, unhealthy dietary habits and intake are believed to be among the underlying cause of the syndrome among bank staff. Bank workers, because of their busy work schedule skip meals. Again, due to their regular income, they tend to patronize food vendors whose foods and snacks are usually high in fats which are consumed with energy-dense carbonated sweetened beverages. This makes bank workers consume more calorie than they really need. Unhealthy diet and low physical activity levels have been described as common causes of metabolic syndrome (Churilla & Fitzhugh, 2012).

Bankers may further be exposed to physical inactivity and obesity as opportunities to walk to and from their work places and engage in other physical activities may be absent (Ayogu, Nwajuaku & Udenta, 2019). Information concerning the prevalence and components of MetS among bank staff is sparse. This study therefore sought to assess the prevalence of metabolic syndrome among staff of banks in Nsukka Local Government Area of Enugu State.

Objectives of the study

The major objective of the study was to assess the prevalence of metabolic

syndrome among bank staff in Nsukka urban Local Government Area, Enugu State, Nigeria. Specifically, the study determined the following indices of the subjects:

1. anthropometric indices;
2. lipid profile;
3. blood pressure;
4. fasting blood glucose;
5. prevalence of metabolic syndrome;
6. nutrient intake;
7. physical activity level;

Methodology

***Design of the study*:** This study employed a cross-sectional survey design. Cross- sectional surveys are studies aimed at determining the prevalence of a particular attribute in a defined population at a particular time. Cross-sectional survey designs are used for population-based surveys to make inferences at a point in time about a defined population. Thus, this population –based study among bank staff in Nsukka Urban was designed to determine metabolic syndrome prevalence.

***Area of study*:** The study was carried out in the urban area of Nsukka. Enugu State, Nigeria. Nsukka is surrounded by hills both within and outside its vicinity (Ezeh, 2004) and lies within the coordinates of $6^0$51′24′′N and$7^0$23′45′′E. There are 14 commercial banks in Nsukka urban that provide financial and related services for Nsukka residents. These services are provided to clients by people employed or hired by banks. Services provided include but are not limited to assisting with services such as managing client's bank account, authorizing and counselling clients and banking products and services.

***Population for the study*:** The study population consisted of all (510) bank employees in the 14 commercial banks in Nsukka LGA aged between 19-53 years of both genders. They have SSCE as the minimum educational qualification and earned between ₦5,500 to > ₦71,000.

***Sample for the study*:** Random sampling by balloting without replacement was used to select subjects for the study based on the staff population of each bank. A tota; sample of 215 workers were selected.

***Instruments for data collection*:** The instruments used for data collection include questionnaire, weighing scale, microtoise height meter, flexible non-stretchable tape, digital sphygmomanometer, glucometer, randox kit, (GPAQ) Global Physical Activity Questionnaire analysis framework and kitchen scales.

A structured questionnaire was constructed. The questionnaire was validated by lectures in the department of Home Science, Nutrition and Dietetics. The questionnaire was used to obtain information on the respondent's demographic and socio-economic characteristics, alcohol consumption and cigarette smoking habits.

***Data collection*:** A total of 250 copies of questionnaires were distributed to subjects by hand. All the 250 were retrieved back. Other measurements were taken from 50 subjects as follows:

***Anthropometric measurement*:** Anthropometric measurements of weight, height, waist circumference and hip circumference were taken from 50 subjects.

***Weight measurement*:** Weight measurements were taken with Chris bathroom scale calibrated in kilogram with 120 Kg capacity. The subjects were weighed with minimum clothing on. The subjects stood erect on the platform of the scale with arms at the sides, head, knee and back kept erect. Readings were taken and recorded to the nearest 0.1kg.

***Height measurement*:** Subject's heights were measured with a microtoise height metre calibrated in centimetres. The subjects were asked to stand erect bare-footed on the foot board of the microtoise metre with their heels together and parallel to each other and pointing forward with arm hanging freely at the side of the body. The headpiece was lowered, crushing the hair and making contact with the top of the head. The reading was taken to the nearest 0.1cm.

Body mass index (BMI), which is an index of weight for height is commonly used to classify overweight and obesity among adults (WHO, 2012), was calculated for each subject. It is defined as the weight in kilograms divided by the square of height in meters (kg/m^2).

$$BMI = \frac{\text{Weight (kg)}}{\text{Height2 (m2)}}$$

BMI values of the subjects were compared with WHO (2002) BMI classification.

***Waist circumference*:** Subject's waist circumference was measured with a flexible non- stretchable measuring tape. The measuring tape was placed on the smallest area below the rib cage and at the level of the navel round the waist with the subject standing erect, abdominal muscles relaxed, arms at the side and feet together. The tape was held firmly without indenting the soft tissues and readings taken to the nearest 0.1 cm at the end of normal expiration. Waist circumference of > 94cm in men or > 80cm in women were classified as central obesity (International Diabetes Federation [IDF], 2006).

***Hip circumference*:** Hip circumference was measured with a flexible, non-stretchable measuring tape. The measuring tape was placed at the point of greatest circumference round the hip region with the subject standing erect, arms at the sides and feet together. The tape was tightened to make close contact with the body without indenting the soft tissue. Readings were taken to the nearest 0.1 cm. *Waist-hip ratio* was calculated using the formula below:

$$WHR = \frac{\text{Waist circumference (cm)}}{\text{Hip circumference (cm)}}$$

According to IDF (2006) definition, WHR of > 0.9 in men and > 0.85cm in women is classified as central obesity.

***Blood pressure measurement*:** The measurement of blood pressure (BP) was done using a digital sphygmomanometer after a five minutes rest on the right arm of 50 subjects. The subjects were seated with

their right arm placed on the table and palm facing upwards. The cuff was snugly wrapped and fastened securely around the arm. The start button was pressed and this enabled automatic inflation of the cuff after which the systolic and diastolic blood pressure reading was displayed in mmHg. Blood pressure measurement was done three consecutive times on each subject at a 15 minutes interval. Blood pressure measurement of the subjects was classified using the method described by WHO (1999).

***Fasting blood glucose measurement*:** It was measured after 8-12 hour post-absorptive fast using Accu-chek glucometer with 600mg/dl measuring range by 50 subjects. Test strips were inserted into the glucometer to turn the glucometer on. Cotton wool soaked in methylated spirit was used to clean and sterilize the subjects' thumb. Lancet was used to prick the subject's finger tip. A small drop of the subjects' blood was applied on the middle of the orange coloured, square application area of the test strip after a dropping sign was displayed on the glucometer. The glucometer measured and displayed the level of glucose in the subject's blood. This was recorded in mg/dl. Fasting blood glucose level of the subjects was classified using the method described by WHO (2006).

***Lipid profile determination*:** It was done using Randox kit. Fasting blood (10-12hours post-absorptive fast) was obtained from a vein in front of the elbow of 50 subjects by a Laboratory Scientist. The site was sterilised with cotton wool soaked in methylated spirit. The Laboratory Scientist wrapped an elastic band around the arm to allow blood fill the vein. Five millilitre of blood was collected using a 5ml syringe. Mild pressure was applied at the point where the blood was drawn with a cotton ball. The blood sample was taken to the laboratory for lipid profile determination using Randox kit. Lipid profile of the subjects was classified using IDF (2006) standard.

Metabolic syndrome was classified using the International Diabetes Federation (IDF,2006) definition which states that diagnosis of metabolic syndrome is made by the presence of abdominal or central obesity (waist circumference > 94cm in men or > 85 cm in women) plus any two of the following: (a) raised triglycerides: triglycerides > 1.7mmol/l or specific treatment for lipid abnormality; (b) reduced high density lipoprotein (HDL) cholesterol: < 1.03mmol/l in men or 1.29 mmol/l in women or specific treatment for lipid abnormality; (c) raised blood pressure (BP): systolic BP >130mmHg or diastolic BP >85mmHg or treatment of previously diagnosed hypertension; and (d) raised fasting blood glucose: fasting blood glucose > 6.1mmol/l or 100mg/dl previously diagnosed type 2 diabetes.

***Food record*:** The subjects were asked to keep a 3-day record of the foods eaten and their quantities. Kitchen scales were made available to the subjects. Their nutrient intake was estimated and compared with

WHO/FAO (1999) recommended nutrient intake standards for adults.

***Physical activity*:** Energy expenditure measured in metabolic equivalent (MET) was estimated using duration, intensity and frequency of physical activities performed within three days. MET was calculated by multiplying the time spent on each activity by the MET values of each level of activity. The values were computed by the sum of the entire low moderate to vigorous intensity physical activities performed at work, transportation and recreation. Total MET/minutes/days of the subjects were classified into low, moderate and high physical activity levels as defined by GPAQ analysis framework (WHO, 2009).

***Data analysis*:** Data obtained was analysed using descriptive statistics including means, frequencies and percentages. Inferential statistics was done using Pearson's correlation and Chi-square to determine relationship existing among variables at $p < 0.05$.

Results

Socio-demographic profile of respondents

Data on the socio-demographic profile and lifestyle behaviours of the subjects, show that a good number (42.8%) of the subjects were between 26-32years whereas 6.0% were between the ages of 47-53 years. Majority (60.4%) of the subjects were females while 39.6% were males. Majority (53.6%) of the subjects were single while (46.0%) were married and 0.4% separated. The highest proportion (74.8%) of the subjects had BSc/HND while only 2.0% had OND. Majority (69.2%) of the subjects earned more than ₦71,000 while 6% earned between ₦5,500 – 20,500 monthly. Some (14.0%) of the subjects smoke cigarettes and 33.6% sprinkle salt on cooked food before eating.

Table 1: Anthropometric indices of the subjects by sex

Anthropometric indices	Male Frequency (%)	Female Frequency (%)	Total Frequency (%)
BMI			
Underweight	0 (0.0)	0(0.0)	0(0.0)
Normal	60(60.6)	100(66.2)	160(64.0)
Overweight	32(32.3)	43(28.5)	75(30.0)
Obese (class 1)	7(7.1)	8(5.3)	15(6.0)
Total	**99(100.0)**	**151(100.0)**	**250(100.0)**
	χ^2=0.903	p= 0.637	
WC			
Normal	62(62.6)	83(54.9)	145(58.0)
Abdominal overweight	31(31.3)	64(42.4)	95(38.0)
Abdominal obesity	6(6.1)	4(2.7)	10(4.0)
Total	**99(100.0)**	**151(100.0)**	**250(100.0)**
	χ^2=4.273	p= 0.118	

WHR			
Low	90(90.9)	125(82.8)	215(86.0)
Normal	9(9.1)	26(17.2)	35(14.0)
Very high	0(0.0)	0(0.0)	0
Total	**99(100.0)**	**151(100.0)**	**250(100.0)**
	χ^2=3.28	p= 0.07	

BMI: Body mass index, WC: Waist circumference, WHR: Waist hip ratio

Table 1 shows the anthropometric indices of the subjects by sex. Overweight and obesity was seen in 30.0% and 6.0% of the subjects respectively. Abdominal overweight (38.0%) and abdominal obesity (4.0%) existed among the subjects. Majority (86.0) of the subjects showed a low waist hip ratio while (14.0%) of the subjects were normal.

Table 2: Biochemical parameters and blood pressure of the subjects

Variables	Male N(%)	Female N(%)	Total N(%)
Total C			
Normal	36 (94.7)	11(91.7)	47 (94.0)
Borderline high	2 (5.3)	1 (8.3)	3 (6.0)
High	0(0.0)	0(0.0)	0(0.0)
Total	**38 (100.0)**	**12 (100.0)**	**50(100.0)**
	χ^2=0.152	p= 0.696	
HDL-C			
Low	6 (15.8)	5 (41.7)	11 (22.0)
Normal	26 (68.4)	4 (33.3)	30 (60.0)
Borderline	6 (15.8)	3 (25.0)	9 (18.0)
Total	**38 (100.0)**	**12 (100.0)**	**50 (100.0)**
	χ^2= 5.07	p= 0.079	
LDL- C			
Better	26 (65.7)	8 (66.7)	34 (68.0)
Normal	8 (23.7)	2 (16.7)	10 (20.0)
Borderline	3 (7.9)	1 (8.3)	4 (8.0)
High	1 (2.6)	1 (8.3)	2 (4.0)
Total	**38 (100.0)**	**12 (100.0)**	**50 (100.0)**
	χ^2=0.835	p= 0.841	
TG			
Normal	30 (78.9)	11 (91.7)	41 (80.0)
Borderline	8 (21.1)	1 (8.3)	9 (20.0)
Table 2 Contd			
Total	**38 (100.0**	**12 (100.0)**	**50 (100.0)**
	χ^2=1.000	p= 0.317	
FBS			
Hypoglycaemia	6 (15.8)	1 (8.3)	7 (14.0)
Normal	30 (78.9)	11 (91.7)	41 (82.0)
Impaired fasting blood glucose	2 (5.3)	0 (0.0)	2 (4.0)
Total	**38 (100.0)**	**12 (100.0)**	**50 (100.0)**

	χ^2=1.174	p= 0.556	
Systolic BP			
Optimal	45 (45.5)	55 (36.4)	100 (40.0)
Normal	40 (40.4)	70 (46.5)	110 (44.0)
High normal	1 (9.1)	9 (6.0)	10 (4.0)
Hypertension	13 (13.1)	17 (11.3)	30 (12.0)
Total	**99 (100.0)**	**151 (100.0)**	**250 (100.0)**
	χ^2=5.539	p= 0.136	
Diastolic BP			
Optimal	43 (43.4)	67 (44.4)	110 (44.0)
Normal	38 (38.4)	37 (24.5)	75 (30.0)
High normal	16 (16.2)	29 (19.3)	45 (18.0)
Hypertension	2 (2.0)	18 (11.9)	20 (8.0)
Total	**99 (100)**	**151 (100.0)**	**250 (100.0)**
	χ^2=11.486	p= 0.009	

Total-C= Total cholesterol, HDL-C= High density lipoprotein cholesterol, LDL-C= low density lipoprotein cholesterol, TG= Triglycerides, FBS= Fasting blood sugar, BP= Blood pressure

Table 2 shows the biochemical parameters and blood pressure of the subjects. Borderline high total cholesterol (6.0%), low HDL-C (22.0%), high LDL-C (4.0%), borderline triglyceride (20.0%), hypoglycaemia (14.0%) and impaired fasting blood glucose (4.0%) were seen among the subjects. Some of the subjects had systolic (12.0%) and diastolic (8.0%) blood pressure. Diastolic blood pressure of the male and female subjects differed significantly ($p < 0.05$).

Table 3: Nutrient intake of the subjects

Nutrients	**Males**			**Females**		
	Mean intake	**RNI**	**%RNI**	**Mean intake**	**RNI**	**%RNI**
Energy (Kcal)	2787.0	2895	96.3	2086.6	2200	94.8
Protein (g)	76.0	47	161.7	70.6	50	141.2
Fat (g)	65.3	49	133.3	50.2	45	111.6
Carbohydrate (g)	314.7	130	242.0	137.0	125	109.6
Vitamin A (µg)	260.4	600	43.4	238.1	500	47.6
Vitamin B_6 (mg)	0.9	2	45.0	1.5	1.6	93.8
Folic acid (µg)	80.8	200	40.4	94.7	180	52.6
Vitamin C (mg)	15.1	30	50.3	18.2	30	60.7
Calcium (mg)	315.1	450	70.0	213.7	800	26.7
Iron (mg)	9.1	15.0	60.7	9.4	29	32.4
Magnesium (mg)	205.5	350	58.7	183.3	280	65.5
Phosphorus (mg)	723.5	800	90.4	647.1	800	80.9

RNI = Recommended Nutrient Intake; Energy value: FAO (1990b) Protein: WHO (1995), Micronutrients: FAO (1988, 1982)

Table 4 shows the nutrient intake of the subjects. Mean caloric intake of male and female subjects were 2787.0 kcal and 2086.6kcal, respectively. Mean protein, fats and carbohydrate intake of the males and females were above 100.0% RNI whereas micronutrient intakes were below 100.0 RNI.

Table 4: Metabolic syndrome prevalence, physical activity level and alcoholic beverage consumption of the subjects

Variables	Female F(%)	Male F(%)	Total F(%)
Metabolic syndrome			
Present	10 (83.3)	25 (65.8)	35 (70.0)
Absent	2 (16.7)	13 (34.2)	15 (30.0)
Total	**12 (100.0)**	**38 (100.0)**	**50 (100.0)**
Physical Activity Level			
Low	8 (66.7)	14 (47.0)	22 (44.0)
Moderate	4 (33.3)	12 (31.5)	16 (32.0)
High	0	12 (31.5)	12 (24.0)
Total	**12 (100.0)**	**38 (100.0)**	**50 (100.0)**
Weekly alcoholic beverage consumption			
Normal	12 (16.7)	4 (20.0)	16 (17.4)
Above normal	60 (83.3)	16 (80.0)	76 (82.6)
Total	**72 (100.0)**	**20 (100.0)**	**92 (100.0)**

Normal: Males=≤14units/week, female ≤ 7units/week; Above normal: Males > 14units/week, Females > 7units/week

Table 4 shows the metabolic syndrome prevalence, physical activity level and alcoholic beverage consumption of the subjects. Metabolic syndrome was present in 83.3% female and 65.8% male subjects. Overall prevalence of metabolic syndrome was 70.0%. Subjects had high (24.0%), moderate (32.0%) and low (44.0%) physical activity levels. Majority of the alcoholic beverage consumers consumed above normal quantity of alcohol weekly (82.6%) and this is seen among 83.3% male and 80.0% female alcoholic beverage consumers.

Discussion of findings

Prevalence of metabolic syndrome recorded in this study was more than 12.1% reported by Adaja and Idemudia, (2018) among health workers in a tertiary hospital in South-South, Nigeria, 32.5% reported among health workers in Turkey (Ozcelik, Uzunlulu, Kizilgul, Oguz, Antika (2013) and 17.5% reported in Sokoto, Northern Nigeria among civil servants (Awosan *et. al* (2013). The higher prevalence of MetS reported among females in this study were similar to the findings of Marbry, Reeves, Eakin and Owen (2010) who reported a higher prevalence of MetS among

females (32.1%) than males (20.7%) among gulfers in Gulf Cooperative Council countries. Some reasons for the high prevalence of metabolic syndrome among female bank workers might be as a result of their busy schedule, increased physical inactivity, challenges in balancing personal and professional life. Increased working hours has been found to be associated with metabolic syndrome, hypertension, elevated waist circumference and hyperglycemia (Guo, *et al*. 2015).

Higher prevalence of abdominal obesity among female bank staff compared to the males in the study supports the gender difference in metabolic risk factors that have been reported by Olawuyi and Adeoye (2018) among civil servants in Ibadan (females 68.3% and males 10.2%). The prevalence of obesity recorded in this study was lower than that obtained among adults in Aba (16.5%) (Ngwogu, Ekpo, Akpuaka & Ngwogu 2013), but was comparable to 6.8% reported among civil servants in Ebonyi State, Nigeria (Ugwuja, Ogbonna, Nwibo and Onimawo, 2013). A higher rate (25.8%) was however, observed among a group of bankers in Ibadan (Leshin & Fadupin, 2013). The occurrence of abdominal overweight and obesity is partly attributable to the sedentary nature of bank work as a result of physical inactivity, which is usually associated with prolonged hours of sitting, minimal energy expenditure, snacking on energy-dense foods with sugar-sweetened beverages. Prolonged hours of sitting have been associated with increased risk of raised blood sugar, cardiovascular diseases, and cancers (Biswas, *et al*. 2015).

Prevalence of reduced high density lipoprotein cholesterol in this study was lower than the 23% prevalence reported in a study among working adults in Ethiopia (Tran, *et al*. 2011) but higher than the 0% prevalence reported by Ayogu, Nwajuaku and Udenta (2019) among rural Nigerian workers. Fezau, Balkau, Kengne, Sobnqwi and Mbanya (2007) reported zero prevalence of elevated triglycerides among adults subjects drawn from rural and urban communities in Cameroon. Prevalence of low high density lipoprotein and borderline triglyceride reported in this study could be attributed to excessive alcohol intake, physical inactivity, poor diet and obesity.

Systolic and diastolic blood pressure prevalence observed in this study was lower than the 14% (systolic blood pressure) and 12% (diastolic blood pressure) reported among civil servants in Idemili South Local Government Area, Southeast Nigeria (Ayogu, Nwajuaku & Udenta 2019) and 17.7% prevalence reported among bank employees in Benin City, Nigeria (Ofili & Omuemu 2005). Prevalence of raised systolic and diastolic blood pressure observed in this study implies a tendency to hypertension among the bank staff. Factors associated with raised blood pressure are harmful use of alcohol, excessive intake of salt and being overweight or obese. Hypertension, the major risk

factor for cardiovascular diseases such as coronary heart disease, cerebrovascular disease, peripheral vascular disease, has become a global concern (WHO, 2013).

Prevalence of impaired fasting blood glucose among the subjects was lower than 8% reported by Tesfaye, Shikur, Shimels and Firdu (2016) among federal policemen commission residing in Addis Ababa, Ethiopia and 7.0% reported by Ramakrishnan et al. (2013) among policemen in India. This might be accounted for by different criteria used for diagnoses of impaired fasting glucose level, other socioeconomic as well as behavioral characteristics such as excessive consumption of alcohol and unhealthy dietary habits.

Micronutrients intake of the subjects were grossly inadequate similar to the report of Edun and Odunga (2015) among bankers in Lagos state. This shows that the diets of bankers majorly consist of starchy staples which are micronutrient-poor and energy-dense; and fruits and vegetables which are micronutrient-dense are hardly consumed. Ene-Obong, Enugu and Uwaegbute. (2001) reported low intakes of vitamin B_6, vitamin C, calcium and magnesium among female working adults in Enugu State, Nigeria. Inadequate caloric intake was reported for male (75.1%) and female (85.0%) bankers in Lagos State by Edun and Odunga (2015) similar to the findings of this study. Inadequate micronutrient intake will have far-reaching nutritional implications such the development of chronic metabolic disorders.

The Low physical activity reported in this study was lower than 79.0% reported in a study conducted among healthcare professionals in South-West, Nigeria (Iwuala, *et al*. 2015). Physical inactivity is now a public health concern among the working class. WHO recommends that adults should engage in at least 150 minutes of moderate- intensity aerobic physical activity or at least 75 minutes of vigorous-intensity aerobic physical activity during the week (WHO, 2015). Less than half of the subjects met this recommendation.

Low prevalence of cigarette smoking was similar to the 6% reported among the working class in Kaduna State, Nigeria (Oladimeji, Fawole, Nguku & Nsubuga (2012). A plausible reason for the low prevalence of smoking among the bankers in this study could be as a result of their busy schedule and meeting with deadlines and targets which may not give than enough time to engage in such unhealthy lifestyle behaviour.

Conclusion

Metabolic syndrome was highly prevalent among bankers which can be associated with an increased risk of developing cardiovascular diseases; therefore further research is required to determine the causative factors and effective intervention strategies that must be taken to protect bankers and other sedentary workers from metabolic syndrome and its attendant effect.

Recommendations

1) There is need for further research to assess the level of awareness, treatment and control of the components of metabolic syndrome, as well as its economic and social consequences on the individual.
2) Periodic screening of bank workers for metabolic syndrome components (elevated blood pressure, abnormal cholesterol levels, increased blood sugar and abdominal obesity) is imminent as this would lead to early detection and treatment of these conditions so as to delay the onset of metabolic syndrome and its complications.
3) Bank managers considering the long working hours should create refectories within the bank building where adequate diets will be prepared for the staff there by reducing their consumption of junk foods.

References

Adaja, T. M. & Idemudia, J. O. (2018). Metabolic Syndrome among Healthcare Workers in a Tertiary Hospital in South-South, Nigeria. *Asian Journal of Medicine and Health* 12(3); 1-9.

Alberti, K. G., Zimmet, P. Z. & Shaw, J. (2005). The metabolic syndrome- a new world
definition. *Lancet*, 366(9491); 1059-1062.

Alberti, K. G., Zimmet, P. Z. & Shaw, J. (2006). The metabolic syndrome- a new world definition. A consensus statement from the International Diabetes Federation. *Diabetes Medical*, 23: 469-80.

American Society for Metabolic & Bariatric Surgery (2017). Type 2 Raised blood sugar and obesity: twin epidemics Accessed from https://asmbs.org/resources/weight-and-type-2-Diabetes-after-bariatricsurgery-fact-sheet.

Awosan, K. J., Ibrahim, M. T. O., Arisegi, S. A., Ejimadu, S. P., Erhiano, E. E. & Aderahman, A.T. (2013). Prevalence of metabolic syndrome and its components among civil servants in a metropolician city in Northern Nigeria. *Global Advanced Research Journal of Medicine and Medical Science*. 2: 238-246.

Ayogu, R. N. B., Nwajuaku, C. & and Udenta, E. A. (2019). Components and Risk Factors of Metabolic Syndrome among Rural Nigerian Workers. *Nigerian Medical Journal.* 60(2); 53–61.

Biswas, A., Oh, P. I., Faulkner, G. E., Bajaj, R. R., Silver, M. A. & Mitchell, M. S. (2015). Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: A systematic review and meta-analysis. *Ann Intern Med*. 162(2); 123–132.

Churilla, J. R. & Fitzhugh, E. C. (2012). Total physical activity volume, physical activity intensity, and metabolic syndrome: 1999-2004 national health and nutrition examination survey. *Metab Syndr Relat Disorder;*10: 70–6.

Edun, B. T. & Odunuga, B. A. (2015). Food Habits and Nutrient Intake of Bankers in Lagos State. *Journal of Nursing and Health Science.* 4(2); 1-3.

Ene-Obong, H.N., Enugu G.L. & Uwaegbute A.C. (2001): Determinants of Health and Nutritional Status of Rural Nigerian Women. *Journal of*

Health Population Nutrition 19 (4); 320-330.

Fezue, L., Balkau, B., Kengne, A. P., Sobngwi, E. & Mbanya, J. C. (2007).Metabolic syndrome in a sub-Saharan African setting: central obesity may be the key determinant. *Arteriosclerosis, Thrombosis and Vascular Biology*, 30(7); 1282-92.

Guo, Y., Rong, Y., Huang, X., Lai, H., Luo, X. and Zhang, Z, (2015). Shift work and the relationship with metabolic syndrome in chinese aged workers. *PLoS One*. 2015; 10(3);1–12.

Hu, F. B. (2011). Globalization of diabetes: The role of diet, lifestyle, and genes. *Diabetes Care*. 34:1249–57.

International Diabetes Federation IDF (2006). The IDF consensus worldwide definition of metabolic syndrome; 2006. Available:http://www.idf.org/metabolic syndrome.

International Diabetics Federation IDF (2013). IDF world-wide definition of the metabolic syndrome. International Diabetes Federation. *Retrived May 17th, from https://www.idf.org/metabolic syndrome.*

Iwuala, S. O., Ayankogbe, O. O., Olatona, F. A., Olamoyegun, M. A., Okpara, I. U, Sabir A. A, et al. (2015). Obesity among health service providers in Nigeria: Danger to long term health worker retention? *Pan Afr Med Journal*. 22:1–8.

Leshin, O. O. & Fadupin, G. T. (2013). Risk factors of the cardiovascular diseases among bankers in Ibadan, Oyo State. Nigeria. *Nigerian Journal of Nutrition Science*, 34(2); 10-106.

Mabry, R. M., Reeves, M. M., Eakin, E. G. & Owen, N. (2010). Gender differences in the prevalence of metabolic syndrome in Gulf cooperative Council Countries: a systematic review. *Diabetes Medical*, 27(5); 593-597.

Ngwogu, K. O., Ekpo, B. O., Akpuaka, F. C. & Ngwogu, A. C. (2013). Lipid profile of apparently healthy adults in Aba metropolis. *International Journal of Basic, Applied and Innovative Research* 2(4) 85-91.

Ofili, A. N. & Omuemu, V.O.(2005). Knowledge and prevalence of risk factors for hypertension among workers in the banking industry in Benin-city, Edo state, Nigeria. *Trop J Health Sci*.; 12:26–30.

Oladimeji, A., Fawole, O. I, Nguku, P. & Nsubuga, P. (2012) Prevalence and factors associated with hypertension and obesity among civil servants in Kaduna State. *Pan Africa Medical Journal*, 18; 26–31

Olawuyi, A. T. & Adeoye, I. A. (2018). The prevalence and associated factors of noncommunicable disease risk factors among civil servants in Ibadan, Nigeria. *PLoS ONE* 13(9)

Ogbu, I. S. I. & Chukwukelu, E. E. (2012). Prevalence of metabolic Syndrome using weight and weight indices in an apparently healthy Nigerian population. *Int J Med Biomed Res.*1(2);141–6.

Ozcelik, M., Uzunlulu, M., Kizilgul, M., Oguz, A. & Antika T. (2013). The awareness of abdominal obesity and metabolic syndrome in health care workers. *J Endocrinol Metab*.; 3(3);57–61.

Pate, R. R., O'neill, J. R. & Lobelo, F (2008). The evolving definition of ''sedentary.'' *Exerc. Sport Sci. Rev*; 36(4);173-78.

Ramakrishnan, J., Majgi, S. M., Premarajan, K. C., Lakshminarayanan, S., Thangaraj, S. & Chinnakali, P. (2013). High Prevalence of cardiovascular risk factors among policemen in

Puducherry, South India. *J Cardiovasc Dis Res*. ;4:112–5.

Rippe, J. M. & Angelopoulos, T. J.(2016). Relationship between added sugars

consumption and chronic disease risk factors: Current understanding. Nutrients. 8:pii: E697. [*PMC free article] [PubMed] [Google Scholar]*

Silva, K. F., Prata, A. & Curha, D.F. (2011). Frequency of metabolic syndrome and the food intake patterns in adults living in rural area of Brazil. *Rev Soc Bras Med Trop*. 44(4) 425-429.

Tran, A., Gelaye, B., Girma, B., Lemma, S., Berhane, Y., Bekele T, et al. (2011). Prevalence of metabolic syndrome among working adults in Ethiopia. Int J Hypertens. 2011;2011:193719. [*PMC free article] [PubMed] [Google Scholar]*

Tokin, A. (2004). The metabolic syndrome: a growing problem. *European Heart Journal Supplement,* 6, A32-A34.

Tesfaye, T., Shikur, B., Shimels, T. & Firdu, N. (2016). Prevalence and factors associated with diabetes mellitus and impaired fasting glucose level among members of federal police commission residing in Addis Ababa, Ethiopia. *BMC Endocrine Disorders* (2016) 16:68.

Ugwuja, E. I., Ogbonna, N. C., Nwibo, A. N. & Onimawo, I. A. (2013). Overweight and obesity, lipid profile and atherogenic indices among civil servants in Abakaliki, South Eastern Nigeria. *Annals Medical Health Science Research*, 3, 13-21.

WHO (2000). The most commonly used definition, established by the World Health Organization (WHO) in 1997 and published in 2000, p.9. Retrieved February 8, 2015,from*https://en.wikipedia.org/wiki/wikipedia.wikiproject_Medicine/Translation_taskforce/RTT/Simple_Obesity.*

WHO Expert, Consultation (2004). Appropriate body-mass index for Asian population and its implications for policy and intervention strategies. *Lancet*, 363 (9403).

WHO (2013). A global brief on hypertension: silent killer, global public health crises. WorldHealthDay2013. Available: http://apps.who.int/iris/bitstream/10665/79059/1

WHO (2015). Global recommendations on physical activity for health. Geneva: World Health Organization.