ORIGINAL ARTICLE

SOCIO-DEMOGRAPHIC INDICES OF HEALTH WORKERS IN A TERTIARY HEALTH INSTITUTION IN NIGERIA

O.E. Enang[1], H.O. Okpa[1], E.M. Bisong[2], O.A. Fasanmade[3], A.E. Ohwovoriole[3]

[1]*Department of Internal Medicine, University of Calabar/University of Calabar Teaching Hospital Calabar,*
[2]*Department of Family Medicine, University of Calabar/University of Calabar Teaching Hospital Calabar,*
[3]*Department of Internal Medicine, University of Lagos/Lagos University Teaching Hospital Lagos.*

ABSTRACT

Objective: To determine the prevalence and pattern of obesity among health workers in LUTH, Lagos. Nigeria

Research Methods and Procedures: A cross-sectional survey was conducted in sample of 200 Nigerian adults in LUTH, Lagos. Body weight, height, waist circumference and blood pressure were measured using standard methods. Overweight and obesity were defined according to the World Health Organization classification. Central obesity was defined according to guidelines of the International Diabetes Federation.

Results: The mean age of respondents was 33.6 ± 11.2 years. A total of 106 (53.0%) respondents were females while 94 (47.0%) of the respondents were males. The mean BMI and waist circumference were 23.1 kg/m^2 and 77.2 cm, respectively, for men and 23.5 kg/m^2 and 79.6 cm, respectively, for women. The overall prevalence of obesity was 9.0 % and the prevalence was higher in females (15.7%) than in males (4.4%) and the difference was statistically significant ($P<0.05$). The overall prevalence of overweight and obesity was 38.1%. The prevalence of central obesity was 4.6% in men and 20% in women. Subjects who took much salt in their meals were three times more likely to be obese (Odds Ratio =3.479, P=0.001) and those with hypertension were four times more likely to be obese (Odds Ratio =4.308, P=0.001). Lifestyle factors were the most important risk factors to explain the differences in overweight and central obesity between males and females.

Conclusion: This study concluded that the prevalence of obesity is on the increase and lifestyle risk factors are contributory. Lifestyle may be the main reason for differences in the prevalence of overweight and obesity among health workers.

INTRODUCTION

Chronic diseases including obesity accounts for a large proportion of the global burden of disease and it is the main cause of death in almost every country. According to a report by the World Health Organization (WHO), 39% of adults aged 18 years and over are overweight in 2014 and 13% were obese[1]. Being overweight is associated with a higher risk of disease, particularly if body fat is concentrated around the abdomen. The estimates of attributable mortality and burden due to being overweight and obese have been made using a measure of high body mass index (BMI) calculated as weight (kg) divided by height squared (m²). BMI was chosen as a simple measurement of body weight in relation to height because it is in principle easier to measure at the population level than body fat. Analysis of the relationship between BMI and mortality and morbidity suggests that the theoretical optimum mean population BMI is around 21 kg/ m².[1,2]

Obesity is a complex, multifactorial disease that develops from the interaction between genotype and the environment. Our understanding of how and why obesity occurs is incomplete; however, it involves the integration of social, behavioural, cultural, physiological, metabolic, and genetic factors[2]. The risk factors for obesity are excess energy intake, sedentary lifestyle, genetic factors, excess body weight which are risk factors also for diabetes and hypertension [1,2,3]

It is not only people from rich societies who develop obesity: recent decades have seen substantial lifestyle changes among indigenous populations and their interaction with genetic susceptibility has led to an epidemic of obesity and obesity associated disease. Prevention and management of obesity are a major challenge especially in developing countries, where obesity often coexists with malnutrition and underweight [1,3]

Evidence for the emerging epidemic of obesity has been gathered from population surveys using measures of body mass index (BMI) and others such as waist circumference. International and national guidelines, such as those adopted by WHO[3] and the National Institutes of Health define categories of overweight and obesity[4].

The WHO criteria for overweight (BMI 25.0 -29.9kg/m^2) and obesity (BMI > 30.0kg/m^2), using the direct method of age standardisation is applicable for populations of all countries[3]. Few countries have reported data on waist circumference or waist-hip ratio. Data on abdominal fat distribution are even

Correspondence: **Dr Ofem Enang**, Department of Internal Medicine, University of Calabar. PMB 1115, Calabar. ofemenang@yahoo.com Tel: 08033189568

scarcer, which is probably due to the fact that the equipment for these measurements is expensive and except for ultrasound scanning-impractical for field studies. Globally, obesity data have therefore been mostly reported based on simple measurements, the most commonly used of which is BMI[3]

The WHO publication shows that global obesity is on the increase in all continents; the prevalence of obesity is highest in the Pacific islands followed by North America (United States and Canada) and the Middle East; sub-Saharan Africa has the lowest prevalence of obesity; developing countries with diverse ethnic population, for example Mauritius and Brazil, seem to have the highest increase in obesity regardless of baseline obesity[3]. The prevalence of obesity and secular trends in epidemiology, are different for different countries and so is the increase in prevalence. The prevalence of obesity among males and females aged 15years and above in Brazil was 8.7% and 14.6% respectively in 2005, 36.5% and 41.8% respectively for the United States while the prevalence of obesity in Nigeria was 2.0% and 6.0% respectively[3] Abdominal obesity signifies excess adipose tissue located in the abdomen, and is believed to contribute disproportionately to ill health.

The adverse health consequences associated with abdominal obesity, as well as obesity in general are vast and include cardiovascular diseases, stroke, type 2 diabetes mellitus, hypertension, osteoarthritis, and sleep apnoea, as well as cancers of the breast, endometrium, prostate, and colon[5]. Some studies in Nigeria have found prevalence rates of obesity of 11.2% in males and 22.0% in females[6]; while another done among civil servants have found overall prevalence rates for overweight and obesity of 29.6%[7]. A study of an urban population sample done in Lagos reported obesity rates of 8.3% for males and 35.7% for females' respectively[8], while the prevalence of overweight and obesity in Jos was 21.4% (19.4%) in males and 23.5% in females giving a male to female ratio of 1:1.3 [9].

The Body mass index is commonly used to determined desirable body weight. Invented by a Belgian Polymath, Adolphe Quetelet, between 1830 and 1850, BMI is a measure of weight in relation to height and is calculated as weight (kg) divided by height (m^2) squared [10] A study done in Port Harcourt showed that the mean BMI was 25.79/ kg/m^2. Females had significantly higher BMI than males while the WHR was significantly higher in males than females. About 50.2% of the subjects had BMI of/25 kg/ m2 while 42.6% had WHR of/0.90 [11].

METHODS

The study was carried out within the Lagos University Teaching Hospital (LUTH) community. The Lagos University Teaching Hospital is located in Idi-Araba. The hospital has a 761 bed-capacity, over 40 Specialists clinics, Out-patient services, 24 hours Accident and Emergency services and In-patient care services. The hospital has an assemblage of highly skilled and dedicated professional staff. The staff strength is about 3,000, and this includes about 776 doctors and about 600 nurses amongst various other health professionals such as pharmacists, physiotherapists, and laboratory scientists. The hospital has 23 clinical services departments and 19 non clinical services departments.

The study was a descriptive cross sectional observational survey. The inclusion criteria was all health workers in LUTH with valid staff identity card, Males and females above 18 years. Subjects who are willing to participate after informed consent. While, the exclusion criteria was males and females below 18 years, Non LUTH staff, Non possession of a valid LUTH staff identity card, unwillingness to participate after informed consent, Pregnancy.

The subjects were selected from among the clinical and non-clinical staff of LUTH using the multistage sampling method. The first stage sampling was by simple random selection from a list of the 42 clinical and non-clinical departments comprising 23 clinical departments and 19 non clinical departments. In the second stage, the staff from the 23 clinical departments were divided into Doctors, Nurses, Pharmacists, Laboratory Scientists and Physiotherapists while those in the non-clinical departments were divided into Ward Assistants, Laundry staff, Environmental staff, Administration staff and Mortuary staff. In the third stage, Doctors, Nurses and laboratory scientists were randomly selected from the clinical departments, while ward assistants, laundry staff and administrative staff were randomly selected from the non-clinical departments. Doctors from Internal Medicine, Obstetrics and Gynaecology, and Surgery were further randomly selected. The nurses were randomly selected from Wards E5, Surgery out- patient and Accident and Emergency. The Laboratory scientists were randomly selected from Microbiology, Chemical Pathology and Haematology. From the non-clinical departments, staffs were randomly selected from among ward assistants, laundry and administration. By using proportional allocation, doctors who made up about sixty percent of the clinical departments were allocated 120 questionnaires, nurses 70, laboratory scientists 15. The ward assistants were allocated 10 questionnaires, laundry staff 10, and administrative staff 15. Doctors from Internal Medicine were allocated 38 questionnaires, obstetrics and gynaecology 42, and surgery 40. Nurses from Ward E5 were allocated 24 questionnaires, Accident and Emergency 30, surgery out-patient 16. The laboratory scientists were allocated 15 questionnaires. The ward assistants, laundry staff and administrative staff were allocated 10, 10 and 15 questionnaires respectively. In the fourth stage, all those staff who met the inclusion criteria were administered questionnaire.

Ten research assistants made up of both medical doctors and medical students, who understand English and Yoruba were used to assist in data collection. These research assistants were trained for one week on how to administer the questionnaire and obtain measurements. The questionnaires were interviewer administered.

Verbal permission and cooperation for the study was obtained from the subjects before administering questionnaire and obtaining measurements. The research procedure was based on modification of WHO STEPS instrument[12]. Data was analyzed using SPSS version 17.0 (Chicago, IL). Student's t-test was used for comparison of group means. Chi square test was used for comparison of proportion between two groups. Association of risk factors with obesity was tested independently, controlled for age, by multiple logistic regressions. Results were presented as frequencies and percentages. The level of significance was taken as $p < 0.05$.

RESULTS

General description of participants

The socio- demographic characteristics of health workers in LUTH is shown in Table 1. The mean age of the subjects was 33.6 ± 11.2 years. The age range was between 18 and 59 years. A large proportion of the workers (44%) were aged between 20 to 30 years. Male subjects were 94 (47%) and the females were 106 (53%) giving a sex ratio of 1: 1.12. more than half of the subjects 120 (60%) were single, while 36% were married. The Yoruba ethnic group made up 76% of the subjects while the Ibos made up 18% .Christians made up 129 (64.5%) while those of the Islamic faith were 26 (13%).

Socio-demographic variable	Frequency	Percent
Age (year)		
≤ 20	12	6.0
21 – 30	88	44.0
31 – 40	49	24.5
41 – 50	29	14.5
>50	22	11.0
Total	**200**	**100**
Mean age	33.6 ± 11.2	
Sex		
Male	94	47.0
Female	106	53.0
Total	**200**	**100**
Marital status		
Single	120	60.0
Married	72	36.0
Separated/Divorced	8	4.0
Total	**200**	**100**
Ethnicity		
Yoruba	152	76.0
Igbo	36	18.0
Others	12	6.0
Total	**200**	**100**
Religion		
Christianity	129	64.5
Islam	26	13.0
None	45	22.5
Total	**200**	**100**

Table 2 shows the socio- economic characteristics of health workers in LUTH. About three quarters 143 (71.5%) of the subjects had university education and only 15 (7.5%) had secondary education. About half of the respondents 95 (47.5%) were doctors a third 63 (31.5%) were nurses. The others health workers made up 42 (21%)

Socio-demographic variable	Frequency	Percent
Education		
Secondary	15	7.5
Post secondary	42	21.0
University	143	71.5
Total	**200**	**100**
Occupation		
Doctor	95	47.5
Nurse	63	31.5
Laboratory scientist	12	6.0
Others	30	15.0
Total	**200**	**100**

Table 3 shows the history of smoking and alcohol consumption among health workers in LUTH. Of the 200 respondents, more than three quarters 168 (84.0%) did not smoke cigarettes while only 32 (16%) were smokers. Of the 32 smokers, the mean number of cigarettes per day was 2.6 ± 0.8 and 18.8% of them smoked more than 4 sticks per day. More than half of the smokers 20 (62.5%) smoked for less than 6 months, while 6 (18.8%) smoked for more than 1 year. More than three quarters of the respondents 152 (76.0%) do not take alcohol while 48 (24.0%) took alcohol. Of the 48 that took alcohol, 38 (79.2%) took beers, while the 20.8% took other types of alcohol. The mean number of bottles of alcohol taken per day was 2.2 ± 1.0 while the mean duration of alcohol intake per year was 6.8 ± 3.1

variable	Frequency	Percent
Smoking status		
Smoke	32	16.0
Do not smoke	168	84.0
Total	**200**	**100**
Number of cigarette sticks/day	n=32	
2	20	62.5
3	6	18.8
4	6	18.8
Total	**32**	**100**
Mean number of cigarettes	2.6 ± 0.8	
Duration of smoking (month)	n=32	
<6	20	62.5
6 – 12	6	18.8
>12	6	18.8
Total	**32**	**100**
Mean duration of alcohol intake		
Alcohol intake		
Take alcohol	48	24.0
Do not take alcohol	152	76.0
Total	**200**	**100**
Type of alcohol	n=48	
Beer	38	79.2
Wine	5	10.4
Palm wine	5	10.4
Total	**48**	**100**
Number of bottles/day	n=48	
1	9	18.8
2	29	60.4
>2	10	20.8
Total	**48**	**100**
Mean number of bottles/day	2.2 ± 1.0	
Duration of alcohol intake (year)	n=48	
1 – 5	17	35.4
6 – 10	31	64.6
Total	**48**	[illegible]
Mean duration of alcohol intake	6.8 ± 3.1	

Table 4 shows the dietary history and involvement in exercises among health workers in LUTH. Most of the respondents 149 (74.5%) take much salt in their diet, while 51 (25.5%) take little salt in their diet. Those who use vegetable oil for cooking made up 174 (87.0%) of the respondents, while those who use other types of oil for cooking made up 13.0% of the respondents. More than three quarters of the respondents 144 (72.0%) did not take part in exercises, while only 56 or 28% of respondents were involved in the exercises.

variable	Frequency	Percent
Salt intake		
Much	149	74.5
Little	51	25.5
Total	**200**	**100**
Type of cooking oil		
Vegetable oil	174	87.0
Palm oil	25	12.5
Butter	1	0.5
Involvement in exercise		
Yes	56	28.0
No	144	72.0
Total	**200**	**100**

Table 5 shows the anthropometric indices of health workers in LUTH. There were 58 (29.0%) of the respondents who were overweight and 18 (9.0%) were obese. Of the 94 male respondents, 17 (18.1%) had a waist to hip ratio greater than 0.90cm while of the 106 female respondents, 14 (13.2%) had a waist to hip ratio greater than 0.85cm.

variable	Frequency	Percent
Body Mass Index (kg/m^2)		
18.5 – 24.9	124	62.0
25.0 – 29.9	58	29.0
$\geqslant$ 30	18	9.0
Total	**200**	**100**
Waist-hip-ratio$_{Male}$	n=94	
<0.9	77	81.9
$\geqslant$0.9	17	18.1
Total	**94**	**100**
Mean waist-hip-ratio$_{Male}$	0.81 ± 0.10	
Waist-hip-ratio$_{Female}$	n=94	
<0.85	92	86.8
$\geqslant$0.85	14	13.2
Total	**106**	**100**
Mean waist-hip-ratio$_{Female}$	0.76 ± 0.08	

variable	Frequency	Percent
Systolic BP (mmHg)		
<120	92	46.0
120 -139	106	53.0
⩾140	2	1.0
Total	**200**	**100**
Mean systolic BP	114.8 ± 9.0	
Diastolic BP(mmHg)		
<80	112	56
80 - 89	71	35.5
⩾90	17	8.5
Total	**200**	**100**
Mean diastolic BP	74.4 ± 8.3	

Table 7 shows the associations between socio demographic variables and body mass index. There was a association between body mass index and age of respondents (P = 0.0002) and this was statistically significant. Similarly, there was significantly significant association between body mass index and sex (P = 0.03), body mass index and marital status (P = 0.003), body mass index and ethnicity (P = 0.001), body mass index and occupation (P = 0.004), body mass index and religion (P = 0.001). However, there was no statistically significant association between body mass index and education (P=0.83)

Socio-demographic variable	Body Mass Index (kg/m²) (%) 18.5-24.9	25.0–29.9	⩾30	Total	X^2	df	
Age (year)							
⩽ 20	7 (58.3)	5 (41.7)	0 (0)	12	30.68	8	0.0002
21 – 30	64 (72.7)	17 (19.3)	7 (8.0)	88			
31 – 40	28 (57.1)	13 (26.5)	8 (16.3)	49			
41 - 50	19 (65.5)	7 (24.1)	3 (10.3)	29			
> 50	6 (27.3)	16 (72.7)	0 (0)	22			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Sex							
Male	57 (60.6)	33 (35.1)	4 (4.3)	94	6.77	2	0.03
Female	67 (63.2)	25 (23.6)	14 (13.2)	106			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Marital status							
Single	87 (72.5)	25 (20.8)	8 (6.7)	120	16.01	4	0.003
Married	32 (44.4)	30 (41.7)	10 (13.9)	72			
Divorced/Widowed	5 (62.5)	3 (37.5)	0 (0)	8			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Ethnicity							
Yoruba	103 (67.8)	37 (24.3)	12 (7.9)	152	18.74	4	0.001
Igbo	12 (33.3)	20 (55.6)	4 (11.1)	36			
Others	9 (75.0)	1 (8.3)	2 (16.7)	12			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Religion							
Christianity	87 (67.4)	26 (20.2)	16 (12.4)	129	17.78	4	0.001
Islam	16 (61.5)	10 (38.5)	0 (0)	26	17.78	4	0.001
None	21 (46.7)	22 (48.9)	2 (4.4)	100			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Education							
Secondary	9 (60.0)	4 (26.7)	2 (13.3)	15	1.48	4	0.83
Post secondary	28 (66.7)	12 (28.6)	2 (4.8)	42			
University	87 (60.8)	42 (29.4)	14 (9.8)	143			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Occupation							
Doctor	66 (69.5)	28 (29.5)	1 (1.1)	95	18.89	6	0.004
Nurse	33 (52.4)	18 (28.6)	12 (19.0)	63			
Laboratory scientist	8 (66.7)	4 (33.3)	0 (0)	12			
Others	17 (56.7)	8 (26.7)	5 (16.7)	30			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			

Table 8 shows the association between lifestyle and body mass index. There is a statistically significant association between smoking and body mass index (P = 0.001), alcohol consumption and body mass index (P = 0.01), non-consumption of alcohol and body mass index (P =0.002) salt intake and body mass index (P=0.0001), Participation in exercise has a statistically significant association with body mass index (P= 0.02).

Table 9 shows the association between obesity and predictor variables. There is a statistically significant association between obesity, blood pressure and salt intake while there is no statistically significant association between obesity and alcohol consumption.

Life styles	Body Mass Index (kg/m^2) (%)				X^2	df	p
	18.5-24.9	25.0–29.9	⩾30	Total			
Smoking status							
Smoke	12 (37.5)	18 (56.3)	2 (6.3)	32	13.76	2	0.001
Do not smoke	112 (66.7)	40 (32.8)	16 (9.5)	168			0.001*
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Alcohol intake							
Take alcohol	23 (47.9)	22 (45.8)	3 (16.7)	48	8.72	2	0.01
Do not take alcohol	101 (66.4)	36 (23.7)	15 (9.9)	152			0.02*
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Salt intake							
Much salt	104 (69.8)	37 (24.8)	8 (5.4)	149	17.79	2	0.0001 0.0002*
Little salt	20 (39.2)	21 (41.2)	10 (19.6)	51			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			
Involvement in exercise							
Yes	36 (64.3)	20 (35.7)	0 (0)	56	8.28	2	0.02
No	88 (61.1)	38 (26.4)	18 (12.5)	144			
Total	**124 (62.0)**	**58 (29.0)**	**18 (9.0)**	**200**			

Variables	Obesity status		X^2	P-value
	Yes	No		
Blood pressure classification			7.656	0.022**
Normal	18(21.9)	64(78.1)		
Pre-hypertensive	40(40.0)	60(60.0)		
Stage 1 hypertensive	8(44.4)	10(55.6)		
Total	66(33.0)	134(66.0)		
Alcohol consumption			2.850	0.109
Yes	25(52.1)	23(47.9)		
No	101(66.4)	51(33.6)		
Total	126(63.0)	74(37.0)		
Salt intake			10.308	0.002**
Yes	9(8.1)	102(91.9)		
No	55(61.8)	34(38.2)		
Total	64(32.0)	136(68.0)		

The factors identified to be significantly ass[illegible] status (salt intake and blood pressure classification) in univariate analysis were harvested and subjected [illegible] analysis. The results of the multiple logistic regression analysis for obesity status are shown in table 9. The depe[illegible] table 9 is obesity status of the subjects, a Yes-or No outcome. Subjects who take more salt in adequate proport[illegible] ore likely (OR = 3.497, p = 0.001) to be predisposed to obesity. Also patients who are hypertensive are 4 times m[illegible].308, p= 0.001) to be predisposed to obesity.

Variables	Coefficients β	Std. Error	Wald-statistic	df	P-value	Exp (β)
Salt intake						
Yes	1.252	0.391	10.225	1	0.001	3.497
Blood pressure						
Hypertensive	1.460	0.600	13.456	2	0.001	4.308
Constant	-0.823	0.590	1.948	1	0.163	0.439

DISCUSSION

The mean age of the respondents in this study was 33.6 ± 11.2 years was less than the 41.2 years recorded in a study among civil servants in Zaria, Nigeria [8] and 47.7 years in South-west Nigeria [13].The difference may be due to the fact that most of the respondents in this study were from among particular group of people as opposed to the general population in the other study. In this study, the age group 21 to 49 years accounted for 83% of the study population compared to 53.3% in a study in a screening survey conducted in South-west Nigeria [13].

The prevalence of obesity among health workers in LUTH was 9.0 % and the prevalence was higher in females (15.7%) than in males (4.4%). This difference was statistically significant (P<0.05).). The prevalence of overweight and obesity was 19.4% in males and 23.5% in females in Jos[9] while the prevalence of obesity was 11.2% in males and 22.0% in females in a suburban community in Northern Nigeria[6]. The overall prevalence of overweight and obesity among health workers in LUTH was 38.1%, which is similar to the 36.1% found in another study in Northern Nigeria[6]. The prevalence of overweight and obesity in males was 38.8% and 37.4% in females in this study, and these findings are higher than that in other studies done in Nigeria in 1995 and 2006 [14, 15]. The trend is an increase in the prevalence of overweight and obesity.There was a positive correlation between BMI and BP in the overall sample.

In Africa, some of the highest prevalence rates of obesity were reported in Seychelles (14.6% in males and 33.8% in females)[16]. In this study, the prevalence of overweight and obesity was highest within the 31 to 40 age group (42.8%, P=0.0002) and were both higher in females (15.7%, P=0.028%) which is consistent with findings reported in other studies in Nigeria [7, 13]. Analysis of the data revealed a complex relationship between all the forms of overweight and obesity and religion (Christians 32.6%, P=0.001), marital status (married 55.6%, P=0.003) and occupation (Doctors 30.6%, P= 0.04, nurses 47.6% P=0.04) that were examined. It can be assumed that people tend to put on weight after marriage and setting up a family. More than half of the respondents 106 (53.0%) had systolic Pre- hypertension while those with diastolic Pre-hypertension was 71(35.5%). More than half of those who smoked 18 (56.3%) were obese while only about a third 40 (32.8%) of those who do not smoke were overweight. Of those who smoke, about 62.6% were either overweight or obese, while only 43.3% of those who do not smoke were either overweight or obese. There was an association between alcohol consumption and obesity as 25 (62.5%) of those who take alcohol were either obese or overweight, while 51 (33.6%) of those who do not take alcohol were either overweight or obese. Although, the relationship between alcohol consumption and obesity can be positive or negative, it is more often related to the number of drinks the individuals consumed on the days they drank .The pattern of obesity is reflected in the fat distribution among males and females using the waist hip ratio and waist circumference as indicators. The proportion of men with a high waist hip ratio (>0.90) was 19.3% compared to 16.7% in females (>0.85). There was a statistically significant difference (P<0.05) in the proportion of males with a high waist circumference (>94cm) 4.6% compared to (>80cm) 20.0% in females. Females were more centrally obese than males. The implication is that there are more females than males with a higher tendency to cardiovascular events. This is similar to findings in other studies done in Nigeria [13,14].

There was a positive correlation between BP and BMI, which was statistically significant. Interestingly, the BP patterns between females and males in Africa exhibit a heterogeneous pattern. On the one hand, some studies from Southern Africa, [15-17] Morocco [18] and Egypt [19] have recorded higher BP in females than in males, which is the opposite of what is obtained in this study. This observation has been referred to as reversed gender dichotomy. On the other hand, studies in other countries, notably Nigeria,[20] Democratic Republic of Congo [21] and Ghana,[22] have shown higher BPs in males than in females as is the case in this study. In Caucasians and Afro-Americans, studies of BPs generally reported higher levels in males than in females[23, 24]. It appears this heterogeneity may be a reflection of different socioeconomic stressors and related factors rather than of pure physiological origin[25, 26]. One explanation cited for reversed gender dichotomy was higher indices of obesity and elevated level of insulin resistance in the females [26]. A number of factors have been implicated in the development of this form of hypertension, notably adoption of Western-type lifestyles, especially diet, and increased psychosocial stress.

CONCLUSION

There is a high prevalence of obesity and in particular abdominal obesity among health workers in LUTH, Lagos especially among females. The determination of the Body Mass Index is sufficient to assess for prevalence of obesity. Using waist circumference alone however, allows us to identify high risk patients from within the overweight and obese workers with central obesity and therefore those at higher risk for cardiovascular events

REFERENCES

1. World Health Organisation; Obesity and Overweight fact sheets. www.who.int/Publications/obesity and overweight fact sheets. Accessed on 2016/11/15.
2. National Research Council. Committee on Diet and Health. Implications for reducing chronic disease risk.Washington, DC: National Academy Press; 1989
3. WHO Global InfoBase team. The SuRF Report 2. Surveillance of chronic disease Risk Factors: Country-level data and comparable estimates. Geneva, World Health Organization, 2005.
4. National Institutes of Health, National Heart, Lung, and Blood Institute. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults—The Evidence Report. Obes Res 1998;6(Suppl 2):51S–209S
5. National Heart, Lung and Blood Institute Obesity Education Initiative: Identification, evaluation and treatment of Overweight and Obesity in Adults. 4084, October, 2000.
6. Bakari AG, Onyemelukwe GC, Sani BG, Aliyu IS, Hassan SS, Aliyu TM. **Obesity, overweight and under weight in suburban northern Nigeria.** Int J Diabetes & Metabolism (2007) 15: 67-68
7. Toryila JE, Mohammed A, Adelaye AB, Achie LN, Tende JA. Prevalence of overweight and obesity among civil servants in Zaria, Nigeria. International Journal of Pure and Applied Sciences 3(2): 60-65, 2009
8. Johnson TO. Comparative study of screening methods for diabetes mellitus in the elderly Nigerian subject, The West African Medical Journal 20 (1971) 243-/246.
9. Puepet FH, Zoakah AI, Chuhwak EK. **Prevalence Of Overweight And Obesity Among Urban Nigeria Adults In Jos. Highland Journal of Medical Research. Volume 1: 1 (2002) 13-16.**
10. Klein, S Wadden, T Sugar man, H. J. AGA technical review on obesity. Gastroenterology 2002; 123:882-932.
11. Nyenwe EA, Odia OJ, Ihekwaba AE, Ojule A, Babatunde S. Type 2 diabetes in adult Nigerians: A study of its prevalence and risk factors in Port Harcourt, Nigeria. Diabetes Res Clin Pract. 2003 Dec; 62(3): 177-85.
12. http://www.who.int/chp/steps/STEPS_Instruments. Accessed on 2016-11-15
13. Alebiosu CO, Ogunsemi OO, Odunsan O et al. Screening for diabetes in a semi-urban Nigerian community. Nigerian Endocrine Practice 2008; 2: 35-41
14. Abubakari AR, Lauder W, Agyemang C, Jones M, Kirk A, Bhopal RS. Prevalence and time trends in obesity among adult West African populations: a meta-analysis. Obesity Reviews (2008) 9: 297-311.
15. Seedat YK, Seedat MA, Hackland DB. Prevalence of hypertension in the urban and rural Zulu. J Epidemiol Commun Health 1982; 36(4): 256–261.
16. Martorell R, Khan KL, Hughes M, Grummer-Strawn LM. Obesity in women from developing countries. Eur J Clin Nutr 2000;54:247–52
17. Mufunda J, Scott LJ, Chifamba J, Matenga J, Sparks B, Cooper RS et al. Correlates of blood pressure in an urban Zimbabwean population and comparison to other populations of African region. J Hum Hypertension 2000; 14: 65–73.
18. Tazi MA. Prevalence of the main cardiovascular risk factors in Morocco. Results of a National Survey, 2000. J Hypertens 2003; 21: 897–903.
19. Ibrahim MM, Rizk H, Appel LJ, el Arousy W, Helmy S, Sharaf Y et al. Hypertension prevalence, awareness, treatment, and control in Egypt. Results from the Egyptian National Hypertension Program (NHP). NHP Investigative team. Hypertension 1995; 26: 886–890.
20. Kaufman JS, Owoaje EE, James SA, Rotimi CN, Cooper RS. Determinants of hypertension in West Africa: contribution of anthropometric and dietary factors to urban–rural and socio-economic gradients. Am J Epidemiol 1996; 143(12): 1203–1218.
21. M'Buyamba-Kabangu JR, Fagard R, Staessen J, Lijnen P, Amery A. Correlates of blood pressure in rural and urban Zaire. J Hypertens 1987; 5(3): 371–375
22. Luke A, Durazo-Arvizu R, Rotimi C, Prewett TE, Forrester T, Wilks R et al. Relation between body mass index and body fat in black population samples from Nigeria, Jamaica and the United State. Am J Epidemiol 1997; 145: 620–628.
23. Whelton PK, Muntner P. Prevalence, awareness, treatment and control of hypertension in North Africa and Asia. J Hum Hypertens 2004; 18: 545–551.
24. Simmons D, Barbour G, Congelton J, Levy J, Meacher P, Saul H et al. Blood pressure and salt intake in Malawi: an urban rural study. J Epidemiol Community Health 1986; 40(2): 188–192.
25. Strogatz DS, Cruft JB, James SA, Keenan NL, Browning SR, Garrett JM et al. Social support, stress and blood pressure in black adults. Epidemiology 1997; 8: 482–497.
26. Mufunda J, Sigola LB, Chifamba J, Vengesa PM. Hyperinsulinemia: possible cause of high blood pressure in unemployed urban black women. High Blood Pressure 1995; 4: 137–140.