Obesity and Its Associated Primary Co-Morbidities among Rural Mission Clinic Outpatients in Akwa Ibom State. Nigeria

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Abstract:
Introduction
Obesity is now seen in people of all ages and gender. Its associated co-morbidities have widespread effects on mortality risk.
The objective of this study was to describe the prevalence of obesity and its associated primary co-morbidities among rural mission clinic out patients in Akwa Ibom State, Nigeria,
Method:
This was a cross-sectional descriptive study conducted between February and July, 2019.
Consenting adults aged between 18 and 74 years were recruited consecutively, data were collected with a semi-structured, pre-tested and interviewer administered questionnaire. Respondents were measured for height, weight, waist and hip circumference. Body mass index (BMI) and waist hip ratio (WHR) were calculated. Obesity was defined as BMI ≥ 30.0 kg/m^2
Results:
A total of 3667 respondents were recruited over a 6-month period consisting of 2,076 [56.6%] females and 1591 [43.4%] males.
The mean age of the respondents was 39.6 ± 10.2 years. The prevalence obesity among respondents in this study was 38.7%. Obesity was present in 825 (22.5%) females compared to 591 (16.2) males giving a male to female ratio of 1:1.4.
Obesity was more prevalent among respondents aged between 35 and 54 years.
Dyslipidaemia was the dominant primary co-morbidity among obese respondents in this study.
Conclusion
Obesity and dyslipidaemia are common among adult out-patient attending rural mission hospital in Akwa Ibom State, Nigeria. There is therefore an urgent need to implement the three levels of obesity prevention as an immediate action priority. These include universal prevention of obesity,prevention of obesity in selected high risk groups and targeted prevention in affected individuals who are overweight to prevent further weight gain. This approach will hopefullycurtail the trend of obesity and its associated primary co-morbidities among rural hospital out-patients.
Keywords: *Obesity, primary co-morbidities, out-patients, rural mission hospital, Akwa Ibom State, Nigeria.*

I. Introduction

Obesity is a major public health problem and has assumed epidemic proportion globally [1]. In 2018, 1.4 billion adults aged 20 years and above were reported to be overweight and obese, of whom approximately 200 million men and 300 million women were estimated to be obese [2]

The World Health Organization stated that 1.9 billion of the world populations wereoverweight while 650 million were obese as at 2016 [3].

Although it had been projected that by 2030, there will be 2.16 billion overweight and 1.12 billion obese individuals globally, results from trend analysis suggest that 2 or more billion people worldwide are currently overweight or obese [4, 5].

According to the 2010 World Health Organization (WHO) survey data on Nigeria, the prevalence of overweight was reported to be between 26% and 37% in men and women respectively, while the prevalence of obesity was between 3% and 8.1% in men and women respectively [2].

The reported prevalence of overweight and obesity among public service workers in Ondo State, South-Western Nigeria was between 35% and 20% respectively [6]

In this study obesity was strongly associated with female gender, being married, physical inactivity hypertension as well as diabetes mellitus [6]. Several studies have been carried out on obesity among various population groups in Nigeria [7-11].Excessive body weight is an established risk factor for adverse health outcome and chronic diseases. [11].

Overweight or obesity is the leading cause of type 2 diabetes mellitus (T2DM), hypertension and osteoarthritis [11].Obesity is reported to decrease successful conception cycle as well as increase the risk of miscarriage [12]. Obesity may also be an important risk factor for allergic disease [13].The aetiology of obesity is poorly understood but genetic, environmental, socioeconomic and viral factors have been implicated [14, 15]

In spite of the availability of studies on obesity and its associated co-morbidities amongst different population groups in Nigeria [7, 10,], data on obesity and associated co-morbidities amongst rural Mission Clinic outpatients in Ekpene Obom, Etinan Local Government Area of Akwa Ibom State is scarce in the scientific literature. Thus screening for obesity among rural clinic outpatients with the aim of implementing the three levels of obesity prevention strategy among obese persons for weight reduction will be useful for early detection and prevention of associated co-morbidities.

Location of the Study

This study was carried out in the general outpatient clinic of Qua Iboe Church Leprosy hospital, Ekpene Obom, Etinan Local Government Area of Akwa Ibom State of Nigeria.

The hospital was established in 1932 by Qua Iboe Mission (QIM) as a leprosy settlement, over the years, however, it has developed into a full-fledged Hospital. The Hospital is currently administered under a tripartite arrangement between the Qua Iboe Church Nigeria (QICN), the Akwa Ibom State government (AKSG) and the leprosy mission (TLM).

There is also an existing memorandum of Understanding (MOU) between the Hospital and University of Uyo Teaching Hospital (UUTH) to allow residents in the department of Family Medicine of UUTH to undergo rural Health practice experience at the hospital in the course of their training

As a full-fledged Hospital, various services are provided for members of the public and these include outpatient clinic consultation, laboratory services, surgical services, radiology services, in-patient admissions, maternity and family planning services. Others include physiotherapy and prosthesis service as well eye clinic services.

The hospital also accepts medical students as well as students in specialties allied to medicine on experiential posting in leprology, tuberculosis and human immunodeficiency virus management.

SUBJECTS

This study was carried out among adult patients attending the general outpatient clinic (GOPC) of Qua Iboe Church Leprosy Hospital, Ekpene Obom, Etinan Local Government Area of Akwa Ibom State between February and July 2019.It was a hospital based cross-sectional descriptive study.

The general out-patient clinic operates from 8.00 am to 4.00 pm between Monday and Friday every week except public holidays

A total of 3667 consecutive adult patients aged 18 years and above were screened for obesity based on a body mass index (BMI) of $\geq 30.0 kg/m^2$ as well as associated primary co-morbidities [10]. These comprised 2076 females and 1591 males.

Standardized measurement of body weight and height were done with participants wearing only light clothing without shoes [10].

Body weight was measured in kilograms (kg) to the nearest 0.1kg and height was measured with a leveling board on an electronic scale to the nearest 0.1cm. BMI was then calculated by dividing the weight in kilogram by the square of the height in metres (BMI = kg/m^2) [1,3].

Inspite of the shortcomings of BMI which include the fact that it may misclassify a very muscular person as obese and may also overestimate fatness or underestimate fatness especially in the elderly, it is considered the most valid and practical way of determining obesity [1,3,15].

We applied World Health Organization (WHO) recommended criteria to define normal weight as BMI of $\leq$25.0kg/m^2, overweight as BMI of 25.0 -29.9 kg/m^2 and obesity as BMI of $\geq$ 30.0 kg/m^2) [15].

Waist circumference was measured midway between the interior margin of the last rib and the iliac crest in a horizontal plane with a non-stretchable measuring tape without compressing the soft tissue with the respondent standing erect and the feet 25-30cm apart to ensure weight was evenly distributed .

Hip circumference was measured around the pelvis at the point of maximum protrusion of the buttocks posteriorly and the pubic symphysis anteriorly [10].

Waist circumference of >102cm for males and >88cm for females were considered elevated while Hip circumference of >95cm for males and > 98cm for females were also considered elevated [10].

A semi-structured and pre-tested interviewer administered questionnaire was used to obtain information about socio-demographic characteristics of the participants such as age, marital status, highest level of education attained.

Level of income was classified as low, middle and high (in Nigerian Naira denomination 360=$1.00)

Occupation of participants was assessed based on international labour organization (ILO) National Occupation classification as unemployed, unskilled, skilled or professional [17]. An unemployed person is one without work for pay or profit, who is seeking employment and available to start work for pay or profit. Unskilled persons refer to occupations that typically do not require workers to have any kind of specialized training or skill. It typically involves the performance of simple and routine physical or manual task (Labourers, cleaners).

Skilled persons are those with relatively advanced literacy who possess knowledge and skills to perform tasks related to the field of work and have a high level of manual dexterity (clerical officers, drivers, artisans, machine operators) while professionals are those with high level of literacy with performance of tasks that require complex problem solving, decision-making and creativity. Professionals also possess excellent interpersonal communication skills [17].

Investigations were carried out for specific co-morbidities of obesity such as diabetes mellitus, hypertension, as well as dyslipidaemias.

Diabetes mellitus was diagnosed based on the 2011 revised criteria of the expert committee on the diagnosis and classification of diabetes mellitus which recommends the diagnosis of diabetes mellitus based on two fasting plasma glucose (FPG) levels of 126mg/dl (7.0mmol/L) or 2-hour post prandial glucose (2-hppg) reading of 200mg/dl (11.1mmol/L or higher) after a glucose load of 75g or glycosylated haemoglobin (HbA1c) of $\geq$ 6.4% [18].

Hypertension was diagnosed based on the Joint national Committee report on prevention, detection, evaluation and treatment of high blood pressure criteria which used an average blood pressure of $\geq$ 140/90mmHg after two readings [19].

Dyslipdaemia was diagnosed based on Adult treatment panel III (ATP III) model as elevated total serum cholesterol of$\geq$ 200mg/dl (5.2 mmol/L) elevated low density lipoprotein (LDL) cholesterol of $\geq$ 100mg/dl (2.6 mmol/L) decreased high density lipoprotein (HDL) cholesterol of $\leq$ 40mg/dl (1.0mmol/L) and elevated serum triglyceride concentration of$\geq$ 150mg/dl (1.70 mmol/L) [21].

DATA
Data obtained was collated and analyzed using statistical package for social sciences (SPSS) version 21.0 for windows. Categorical data were summarized using frequency and percentages while quantitative data were summarized using the appropriate measure of central tendency (mean and standard deviation)

Ethical Consideration
Ethical approval was obtained from Qua Iboe Church Leprosy Hospital Ethical Review Committee. Informed consent was obtained from the respondents. Voluntary nature of the study was explained to them including the fact that non-participation attracted no penalties. They were assured of absolute confidentiality of data obtained

II. Results

A total of 3667 adult patients were recruited into the study over a 6-month period. This consisted of 2076 female and 1591 males. The age range of the respondents was 18-74 years with a mean age of 39.6 (SD=10.2) years.

A total of 1418 (38.7%) respondents were obese based on a body mass index (BMI) of $\geq$ 30kg/m^2. This was made up of 825 (22.5%) females and 593 (16.2%) males.

Table 1 shows the anthropometric characteristics of the respondents. The mean BMI of the obese respondents was 29.8 + 4.9kg/m^2.

A total of 638 (30.7%) females were overweight compared to 428 (26.9%) males.

Three hundred and ninety eight (19.2%) female respondents had a BMI of 30.0-34.9kg/m^2 compared to 293 (18.4%) males, 313 (15.1%)female respondents had a BMI of 30.0 - 39.9 Kg/m^2 compared to 206 (12.9%) males . Morbidly obese female respondents were 114 (5.5%) compared to 94 (5.9%) males. The mean BMI of the obese respondents in this study was 31.8 (SD = 4.9) kg/m^2

Table 2 shows the demographic characteristics of the obese respondents.

Obesity was more prevalent between ages 35 and 54 years. Female respondents were more obese than male respondents in this study with a male to female ratio of 1:1.4. A total of 744 (52.5%) obese respondents were married while 276 (19.5%) were single.

A total of 592 (41.7%) obese respondents obtained secondary level of education, one hundred and ninety seven (13.9%) obese respondents were unemployed while 256 (18.1%) were professionals in their different fields of human endeavours.Eight hundred and eighty seven (62.6%) obese respondents lived in the rural area compared to 531 (37.4%) who lived in the urban area.Four hundred and eighty nine (34.5%) obese respondents were low income earners compared to 362 (25.5%) obese respondents who belonged to the high level income bracket.

Table 3 shows the prevalence of primary co-morbidities among the obese respondents.

Five hundred and seventy seven (40.7%) obese respondents had a fasting plasma glucose of $\geq$ 7.0mmol/L compared to 841 (59.3%) who were not diabetics.Four hundred and eighty (33.9%) obese respondents had a blood pressure of> 140/90 mmHg.

Dyslipdaemia was the dominant primary co-morbidity among obese respondents in this study. There was widespread derangement in the lipid profile pattern of the obese respondents. Nine hundred and ninety (69.8%) obese respondents had total cholesterol (TC) of > 5.2 mmol/L; 779 (54.9%) had low – density lipoprotein cholesterol of >2.6 mmol/L. Low level of high density lipoprotein was present in 573 (40.8%) obese respondents in this study. Hypertriglyceridaemia was present in 738 (52.0%) of the obese respondents in this study.

III. Discussion

Findings from this study show that obesity was common among respondents attending the Qua Iboe Church Leprosy Hospital , Ekpene Obom rural in Etinan Local Government Area of Akwa Ibom State of Nigeria.

The prevalence of obesity among respondents in this study was 38.7% made up of 22.5% females and 16.2% males. This was higher than the prevalence of 6.0% reported among adult outpatient attending a rural mission hospital in Imo State, South –East Nigeria as well as the prevalence of 16.3% reported among adult family medicine clinic outpatients in Rivers State, South-South Nigeria [21,22]. The observed differences might be due to the population studied as well as the study design. In spite of the above however, it is important to note that obesity epidemic is real and is prevalent among many population groups including rural clinic outpatients.

Females were more obese than males in this study (22.5% females versus 16.2% males). This is finding is similar to reports from previous studies [10, 21-24]. The reason for this trend might be due to the fact that females are less physically active compared to their male counterparts and also due to the fact being overweight or obese as female is thought to reflect the level of affluence of the spouse.

Obesity was more prevalent among respondents between 35 and 54 years of age. This finding is different from a study involving adult outpatients of a rural hospital in Imo State where obesity was more prevalent among respondents between 40 and 64 years of age [2]. In the said study, the mean age of respondents was 42.6 $\pm$ 11.3 years which was higher than 39.6 $\pm$ 10.2 years among respondents in the present study. Respondents in this study were therefore much younger. There is need for action among all stakeholders with respect to the obesity epidemic [25].

Dyslipidaemia was the dominant primary co-morbidity among respondents in this study. This was the trend across all parameters of the lipid profile. This observation is different from a previous report in which low level of high density lipoprotein cholesterol (HDL-C) was the only lipid abnormality among the respondents [26].

In another study, however, dyslipidaemia was reported to occur with increasing BMI levels in both sexes [27].These differences might be related to dietary transition that is taking place among different population groups globally.

The significance of these findings among obese respondents in this study is that the hospital is located in a rural community, majority of the obese respondents are rural residents whose major occupation is subsistent farming, this might mean that there is a significant change in their dietary patterns.Further study is hereby suggested.

Limitations: The cross-sectional nature of this study means that temporal relationship cannot be established.Moreover, since respondents in this study were hospital patients, the results obtained may not be applied to the general population.

IV. Conclusion and recommendations,

Findings from this study have shown that obesity and associated co-morbidities are common among different population groups irrespective of age, gender, occupation and place of dwelling

The finding of dyslipidaemia among obese rural community outpatients from an agrarian subsistent farming population as a dominant primary co-morbidity in this study necessitates the implementation of the three levels of obesity prevention strategy as an immediate action priority.

These include universal prevention (such as attention to feeding habits and types of food), prevention in selected high risk groups and targeted prevention in affected individuals who are overweight to prevent further weight gain in order to ensure a healthy rural population for productive national development.

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Table 1: Anthropometric characteristic of Respondents

Variables	Subjects	
	Female (F) (n=2076[%])	Male (M) (n=1591[%])
Body mass index (BMI) (kg/m^2)		
<18.5 (underweight)	164 [7.9]	249 [15.7]
18.5 – 24.9 (Normal)	449 [21.6]	321 [20.2]
25.0 – 29.9 (overweight)	638 [30.7]	428 [26.9]
30.0 – 34.9 (class 1 obesity)	398 [19.2]	293 [18.4]
35.0 – 39.9 (class II obesity)	313 [15.1]	206 [12.9]
$\geq$ 40.0 (morbid obesity)	114 [5.5]	94 [5.9]
Waist Circumference		
< 88cm (F)	1180 [56.8]	-
< 102cm (M)	-	883 [55.5]
> 88cm (F)	896 [43.2]	-
> 102cm (M)	-	708 [44.5]
Quartiles of waist-hip-ratio		
< 0.84	1086 [52.3]	733 [46.1]
0.85 – 0.89	576 [27.8]	512 [32.2]
> 0.90	414 [19.9]	346 [21.7]

Table 2: Demographic characteristics of the obese respondents

Variables	Frequency (n[%])
Age (in years)	
18 – 24	112 [7.9]
25 -34	132 [9.3]
35 – 44	496 [35.0]
45 -54	439 [31.0]
55 – 64	131 [9.2]
65 -74	108 [7.6]
Total	1418 [100.0]
Marital Status	
Single	276 [19.5]
Married	744 [52.5]
Widowed	270 [29.0]
Separated	128 [9.0]
Total	1418 [100.0]
Highest Level of Education attained	
Primary School	428 [30.2]
Secondary School	592 [41.7]
Post-Secondary	398 [28.1]
Total	1418 [100.0]
Occupation	
Unemployed	197 [13.9]
Unskilled	426 [30.0]
Skilled	539 [38.0]
Professional	256 [18.1]
Total	1418 [100.0]
Place of Residence	
Urban	531 [37.4]
Rural	887 [62.6]
Total	1418 [100.0]
Income	
Low Level	489 [34.5]
Middle Level	567 [40.0]
High Level	362 [25.5]
Total	1418 [100.0]

Table 3: Primary co-morbidities of the obese respondents

Variables	Frequency (n[%])
Fasting plasma glucose (FPG)	
< 7.0 mmol/L	841 [59.3]
> 7.0 mmol/L	577 [40.7]
Blood pressure pattern	
< 140/90 mmHg	938 [66.1]
$\geq$ 140/90 mmHg	480 [33.9]
Lipid profile	
Total cholesterol (TC)	
< 5.2 mmol/L	428 [30.2]
$\geq$ 5.2 mmol/L	990 [69.8]
Low density lipoprotein cholesterol (LDL-C)	
< 2.6 mmol/L	639 [45.1]
$\geq$ 2.6 mmol/L	779 [54.9]
High Density lipoprotein cholesterol (HDL-C)	
< 1.0 mmol/L	573 [40.4]
$\geq$ 1.0 mmol/L	845 [59.6]
Triglyceride (Tg)	
< 1.70mmol/L	680 [47.9]
$\geq$ 1.70 mmol/L	738 [52.1]