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Original Research Article

The association between obese patient's behavioural practices and severity of obesity among obese patient attending clinic at Eku Baptist Government Hospital, Delta State, Nigeria

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ABSTRACT

Background: Over the last two decades, the rate of obesity has rapidly increased across the developing world and behavioral practices (dietary habits, alcohol intake, smoking, physical inactivity) play important role in its development and management. Reducing the negative health impact of obesity requires an understanding of the connection between behavioral patterns and the severity of obesity. This study therefore sought to assess the relationship between obese patient's behavioural practices and severity of obesity.
Methods: This was a hospital based, cross-sectional descriptive study carried out at the general out-patient department of Eku Baptist government hospital, between May 2015 and July 2015. The chi-square test was used to test for the degree of association between categorical variables and the level of significant was set at $p<0.05$.
Results: A total of 265 obese individuals who met the inclusion criteria were selected for this study, with females accounting for 205 (77.4%) and males 60 (22.6%) of respondents, giving a male:female ratio of 1:3.3. Most respondents-206 (77.7%) belonged to class 1 obesity, 45 (17.0%) belonged to class 2 while class 3 obesity accounted for 5.3% of the study population. This study showed that the relationship between severity of obesity, excessive alcohol consumption, and poor dietary habit were statistically significant while for physical inactivity and cigarette smoking were statistically not significant.
Conclusions: By identifying the specific behavioural practices that contribute to the severity of obesity, healthcare providers and policymakers can design targeted programs to promote healthy behaviours and reduce the burden of obesity.

Keywords: Obesity, Behavioural practices, Risk factors, Severity, Eku

INTRODUCTION

Obesity, which among adults is defined as body mass index (BMI) of 30 or greater, is a condition in which there is excessive accumulation of body fat.[1] It is a chronic health condition in which the excessive accumulation of body fats may have negative effects on an individual's health by bringing about increase incidence of different health issues (such as diabetes mellitus, cardiovascular diseases, non-alcoholic fatty liver disease, and an increased risk of disability) that may

eventually reduce the life expectancy of the person.[1] Behavioural practices, such as poor dietary habits, harmful alcohol intake, smoking cigarette and physical inactivity play an important role in development and management of obesity. However, the specific ways in which these behavioural practices contribute to the severity of obesity are not well understood.[2]

Over the last two decades, the rates of obesity have rapidly increased across the developing world.[3] Researchers have estimated that numbers reached 641 million obese adults in 2014 compared to only 105 million in 1975, thus showing an alarming increase.[3] The causes and effects of obesity are multifaceted and complex. It may either be genetic in origin or from negative environmental factors, especially behavioural/lifestyle factors (such as poor dietary habits, reduced physical activities, sedentary lifestyle etc.,). In terms of effects, obesity is associated with the growing prevalence of several cardiovascular conditions, from hypertension and coronary heart disease (CHD) to atrial fibrillation (AF) and even total heart failure. However, in addition to the above, it affects nearly every organ system, from the endocrine system, central nervous system, and to the gastrointestinal (GI) system.[4]

Aim and objectives

Studies relating to obesity risk behavior and severity of obesity in our environment are few, therefore this study sought to assess the relationship between obese patient's behavioural practices and severity of obesity. To achieve this aim the study will: determine the severity of obesity among respondents; investigate and determine the prevalence of harmful behaviours practices among obese patients; measure the association between obese patient's behavioural practices and severity of obesity; determine the comorbidities of obesity present among respondents through history taking and clinical examination; assess the respondent's knowledge of measures for control of obesity.

METHODS

Study design/duration

This was a cross-sectional descriptive hospital based study carried out over a 3-months period, between May 2015 and July 2015.

Study setting

This study was carried out at the general outpatient unit of Eku Baptist government hospital, Eku, Delta State. Eku Baptist government hospital is a public health institution with a bed capacity of 126 beds, offering both in-patient and out-patient services in obstetrics and gynaecology, paediatric, family medicine, internal medicine, surgery, radiology and emergency services. The center is involved in residency training in family medicine and research in the field of medicine.

Study population

Healthy adult males and females who are over 30 years of age.

Inclusion criteria

Consenting adults over 30 years with BMI over 30 kg/m^2.

Exclusion criteria

Pregnant women, those with ascites and significant oedema, and those with physical deformities affecting the spine and could not stand for weight and height measurement, non-consenting patients, and those who were critically ill.

Sample size calculation

The minimum sample size was calculated using the Cochrane formula for descriptive study.[5]

$n = \frac{z^2 pq}{d^2}$ A standard normal deviation (z) of 1.96 at 95% confidence interval (Cl) and desired precision level (d) of 5%, proportion (p) of obese patients in a previous study done in Nigeria was 22.2%.[6] This gave a sample size of 265 including 10% attrition.

Sampling strategies

A total of about 1800 obese patients were seen within 12 months in 2013 at the general outpatient department of the hospital (information retrieved from the medical records department of the hospital). This goes down to an average of 450 obese patients in three months (expected population). A systematic sampling method was used to achieve the sampling size of 265. To get the sampling interval, the sampling size was divided by the expected population. This gave a K value of approximately 2 (sampling interval). The first patient was selected via a simple random sampling (balloting) method between the numbers 1 and 2. The first number selected for this was 1 and that meant that the subsequent patients with numbers 3, 5, 7, n+2, n+2 +2…..were selected for the study. An average of about 60-80 patients were seen daily at the GOPD, and of these 8-10 of them were obese. Averages of 4-5 of these patients were recruited daily until the sample size was realized.

Data collection

This was done through an interviewer administered questionnaire that was adopted from the WHO STEPS questionnaire (WHO STEPS Manual, 2015).[7] The questionnaire at the end contained sections for social risk factors (socio-demography), behavioural/lifestyle

measures, awareness of been obese, knowledge of lifestyle modifications, history of obesity comorbidities, anthropometric measurements and biochemical measurements of participants.

Data analysis

Physical activity: This was classified into three categories, 1) those that are minimally active or sufficiently active, 2) those that are moderately active and 3) those that are 'HEPA active' (health enhancing physical activity) or highly active.[8,]

Summated scores were used to arrive at the dietary habit for each respondent based on frequency of consumption of vegetables/fruits per day/week. With a total possible range of score of 0 to 30 points, a score of 21-30 indicated good eating habit, 11-20 indicated moderate eating habit, while those with score of 0-10 indicated poor eating habit.[9]

The respondents were categorised into non-smoker (never smoked), former smoker (ex-smoker) and current smoker based on life time smoking habit.[10]

For the purpose of this study one drink was equivalent to one large glass or a bottle of beer (500 ml, 5% ABV=3 units) or one shot of spirits (25 ml, 40% ABV=1unit) or one large glass of red wine (250 ml, 13% ABV=3 units). ABV is alcohol by volume. The respondents who consumed alcohol in excess of the recommended levels of one drink per day for women and two drinks per day for men were considered heavy drinkers while those who consume within the recommended value were considered light drinkers.[11]

For knowledge of lifestyle modification those who scored 3 points were graded as high level, 2 points as moderate level, 1 point as low level, 0 point as no knowledge.

The BMI was calculated using the formula: weight divided by the square of height. The respondent classified as obese class I (30.0-34.9 kg/m^2), obese class II (35.0-39.9 kg/m^2) and obese class III (40.0 kg/m^2 and above).[1]

The waist/hip ratio was calculated and the respondents were categorized into normal for male less than 0.9 cm and females less than 0.85 and central obesity for male equal to or greater than 0.90 cm and for female equal to or greater than 0.85.[12]

Respondents with systolic pressures less than 140 mmHg were regarded as normal while those equal or above 140 mmHg were regarded as high and those with diastolic pressure less than 90 mmHg regarded as normal while those equal or above 90 mmHg were regarded as high.[13]

For diagnosis of diabetes mellitus, values equal to or less than 126 mg/dl were regarded as normal while above 126mg/dL were regarded as high.[14]

The respondents were classified according to the 2001 national cholesterol education (NCEP) guidedline.[16] Values equal to or less than 200 mg/dL were regarded normal while those above 200mg/dL were regarded as high.[15]

The results generated were entered into a computer statistical program SPSS (statistical package for social sciences) version 16. The initial analysis was generation of means and frequency tables and by cross tabulations to explore statistical association between variables. The chi-square test was used to test for the degree of association between categorical variables. The level of significant was set at $p<0.05$.

Ethical consideration

Approval for the research was sought from the research and ethics committee of the Eku Baptist hospital (Appendix 3). Informed consent was obtained from each participant and confidentiality was maintained at each stage in accordance with clinical principle for the guidance of physicians in medical research as stipulated in the Helsinki declaration of 1964 as reviewed in the sixth edition of 2008.[16]

RESULTS

A total of 265 obese individuals who met the inclusion criteria for the study were studied and the data collected from them were analyzed and the findings are as presented below.

Table 1 and 2 shows the demographic characteristics of the respondents. The respondents comprised of 205 (77.4%) females and 60 (22.6%) males, giving a male:female ratio of 1:3.3. Most of the respondents were aged between 51-60 years, and the fewest were those aged ≤40 years. The mean age of the respondents was 52.3±8.9 years (mean age for the male and female was 49.3±7.3 and 53.4±9.2 respectively).

Table 3 shows the distribution of the patients by severity of obesity and gender. Most of them-206 (77.7%) belonged to class 1 obesity, were predominantly females-162 (79.0%) than males-44 (73.3%). Forty-five (17.0%) belonged to class 2 obesity and there was higher proportion of males-13 (21.7%) compared females-32 (15.6%). Class 3 obesity accounted for 5.3% of the study population and was fairly equally distributed between the gender. The overall mean BMI of the respondents was 34.10±2.78 kg/m^2, while for the male and female was 34.27±2.65 kg/m^2 and 34.06±2.83 kg/m^2 respectively.

Most obese patients were inactive-152 (57.4%) with slightly higher proportion of females-118 (57.6%) being inactive than the males-34 (56.7%). On the other hand-89 (33.6%) and 24 (9.1%) were sufficiently active and highly active respectively. Most of the respondents-172 (64.9%) consumed alcohol, compared to 93 (35.1%) who

did not consume alcohol. However, most of those who consumed alcohol were light drinkers-107 (40.4%). Alcohol consumption was lower among the females-129 (62.9%) than the males-43 (71.7%), and also there were more heavy drinkers among the male patients-31 (51.7%) than the females-34 (16.6%). Overall prevalence of smoking among the respondents was 29.8%, and for males -65.0% and females-19.3%. Males were also more likely to have smoked-7 (14.6%) in the past or currently smoking-20 (41.7%), compared to the females-14 (7.3%) and 12 (6.3%) respectively. Dietary habit of most of the patients was moderate-216 (81.5%) and there was not much difference between the males-50 (83.3%) and females-166 (81.0%) (Table 4).

Table 5 shows the relationship between behavioural factors and severity of obesity. Use of alcohol and dietary habit were found to be significantly associated with severity of obesity. Heavy drinkers were found to have more severe forms of obesity compared to non or light drinkers-χ^2=20.62, p<0.001. Also, obese patients with poor dietary habit were also found to be more likely to have Class 3 obesity than those with moderate dietary habit- χ^2=8.29, p=0.02. Even though less active obese patients and those with history of smoking (previous and current) were found to have more severe forms of obesity, these associations were not statistically significant.

Presence of co-morbid conditions was assessed using both previous history of known co-morbidity and screening as shown in Table 6. Commonest co-morbidities identified among the patients were-hypertension-94 (35.5%), sleep apnea-54 (20.4%), hypercholesterolemia-48 (18.1%), osteoarthritis-39 (14.7%) and diabetes-35 (13.2%). Hypertension and sleep apnea were commoner among the male patients while hypercholesterolemia and arthritis were commoner among the female patients.

Furthermore, significant proportion of newly diagnosed cases was found among those with hypertension-57 (60.6%), hypercholesterolemia-28 (58.3%) and diabetes-16 (45.7%). New cases of diagnosed diabetes among the females accounted for 88.9% of cases, while newly diagnosed hypercholesterolemia among the males accounted for 77.8% of cases (Figure 1).

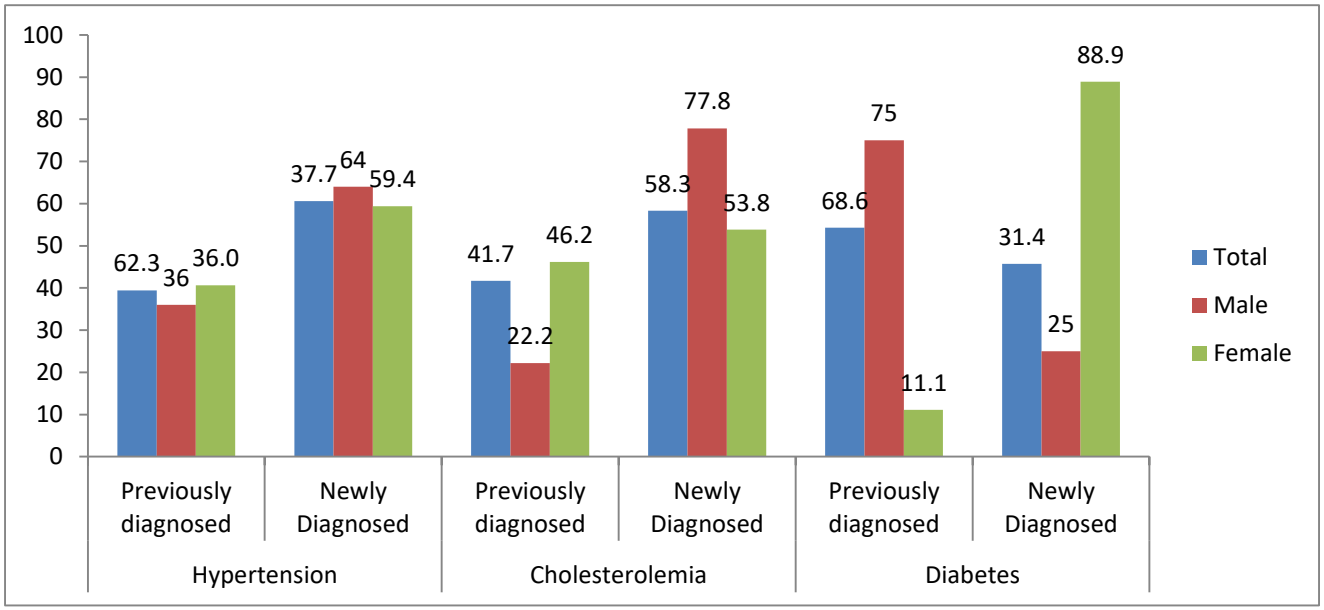

Figure 1: Comparison of previously diagnosed and newly diagnosed comorbidities of obesity.

Table 7 shows knowledge of measures for controlling obesity among those who were aware of obesity. Most of them-158 (96.9%) were aware of measures to control obesity, and there was no significant gender difference. Most common known control measure was dietary control (80.8%), followed by exercise (67.7%) and the least was behaviour modification-23.0%. On their scored knowledge of obesity control measures, most of them 123 (46.4%) have no knowledge of obesity control measures, 58 (21.9%) had poor knowledge, while 52 (19.6%) and 32 (12.1%) had moderate and high knowledge of obesity control measures respectively. Male obese patients had higher knowledge of obesity control measures than the female obese patients.

Table 1: Socio-demographic characteristics of the respondents (n=265).

Characteristics	N	Percentage (%)
Gender		
Male	60	22.6
Female	205	77.4

Continued.

Characteristics	N	Percentage (%)
Age (in years)		
≤40	27	10.2
41-50	70	26.4
51-60	130	49.1
≥61	38	14.3
Mean±SD	52.3±8.9	
Educational status		
None	30	11.3
Primary	41	15.5
Secondary	152	57.4
Tertiary	42	15.8
Marital status		
Single	23	8.7
Married	174	65.7
Widowed	41	15.5
Separated	20	7.5
Divorced	7	2.6
Religion		
Christianity	247	93.2
Islam	4	1.5
Traditional	9	3.4
Others	5	1.9
Occupation		
Professionals	29	10.9
High skilled	20	7.5
Skilled	97	36.6
Partlly skilled	49	18.5
Unskilled	70	26.4
Ethnic group		
Urhobo	106	40.0
Isoko	74	27.9
Ibo	36	13.6
Itsekiri	33	12.5
Yoruba	3	1.1
Izon	13	4.9

Table 2: Socio-demographic characteristics of the respondents by gender.

Characteristic	Total, n=265 (%)	Male, n=60 (%)	Female, n=205 (%)
Age (in years)			
≤40	27 (10.2)	5 (8.3)	22 (10.7)
41-50	70 (26.4)	26 (43.3)	44 (21.5)
51-60	130 (49.1)	27 (45.0)	103 (50.2)
≥61	38 (14.3)	2 (3.3)	36 (17.6)
Mean±SD	52.3±8.9	49.3±7.3	53.4±9.2
Marital status			
Single	23 (8.7)	13 (21.7)	10 (4.9)
Married	174 (65.7)	33 (55.0)	141 (68.8)
Divorced	7 (2.6)	2 (3.3)	5 (2.4)
Seperated	20 (7.5)	9 (15.0)	11 (5.4)
Widowed	41 (15.5)	3 (5.0)	38 (18.5)
Religion			
Christianity	247 (93.2)	55 (91.7)	192 (93.7)
Islam	4 (1.5)	2 (3.3)	2 (1.0)
Traditional	9 (3.4)	1 (1.7)	8 (3.9)
Others	5 (1.9)	2 (3.3)	3 (1.5)

Table 3: Distribution of the obese patients by severity of obesity and gender.

Class	Total, n=265 (%)	Male, n=60 (%)	Female, n=205 (%)
Class 1	206 (77.7)	44 (73.3)	162 (79.0)
Class 2	45 (17.0)	13 (21.7)	32 (15.6)
Class 3	14 (5.3)	3 (5.0)	11 (5.4)
Mean±SD	34.10±2.78	34.27±2.65	34.06±2.83
WHR (Mean±SD)	0.85±0.19	0.84±0.10	0.86±0.22

Table 4: Behavioural practices of the respondents by gender.

Behavioural practice	Total, n=265 (%)	Male, n=60 (%)	Female, n=205 (%)
Level of activity			
Inactive	152 (57.4)	34 (56.7)	118 (57.6)
Sufficiently active	89 (33.6)	21 (35.0)	68 (33.2)
Highly active	24 (9.1)	5 (8.3)	19 (9.3)
Alcohol consumption			
Non drinkers	93 (35.1)	17 (28.3)	76 (37.1)
Light drinkers	107 (40.4)	12 (20.0)	95 (46.3)
Heavy drinkers	65 (24.5)	31 (51.7)	34 (16.6)
Smoking status			
No smoker	186 (70.2)	21 (35.0)	165 (80.5)
Ex-smoker	47 (17.7)	19 (31.7)	28 (13.7)
Current smoker	32 (12.1)	20 (33.3)	12 (5.8)
Dietary habit			
Poor	49 (18.5)	10 (16.7)	39 (19.0)
Moderate	216 (81.5)	50 (83.3)	166 (81.0)

Table 5: Relationship between obese patients' behavioural practices and severity of obesity.

Behaviour	Class 1, n=206 (%)	Class 2, n=45 (%)	Class 3, n=14 (%)	χ^2	P value
Level of activity					
Inactive	112 (73.7)	30 (19.7)	10 (6.6)		
Sufficiently active	71 (79.8)	14 (15.7)	4 (4.5)	3.48	0.17
Highly active	23 (95.8)	1 (4.2)	0 (0.0)	df=2	
Drinking status					
Non drinkers	68 (73.1)	19 (20.4)	6 (6.5)		
Light drinkers	97 (90.7)	9 (8.4)	1 (0.9)	20.62	<0.001
Heavy drinkers	41 (63.1)	17 (26.1)	7 (10.8)		
Smoking status					
No smoker	148 (79.6)	31 (16.7)	7 (3.8)		
Ex-smoker	36 (76.6)	7 (14.9)	4 (8.5)	3.76	0.44
Current smoker	22 (68.8)	7 (21.9)	3 (9.4)		
Dietary habit					
Poor	39 (79.6)	4(8.2)	6 (12.2)	8.29	0.02
Moderate	167 (77.3)	41 (19.0)	8 (3.7)		

Table 6: Distribution of comorbidities associated with obesity among the respondents.

Comorbidity	Total, n=265 (%)	Male, n=60 (%)	Female, n=205 (%)
Hypertension	94 (35.5)	25 (41.7)	69 (33.7)
Sleep apnea	54 (20.4)	14 (23.3)	40 (19.5)
Hypercholestrolemia	48 (18.1)	9 (15.0)	39 (19.0)
Osteoarthritis	39 (14.7)	6 (10.0)	33 (16.1)
Diabetes	35 (13.2)	8 (13.3)	27 (13.2)
Coronary heart disease	7 (2.6)	3 (5.0)	4 (2.0)
Stroke	6 (2.3)	2 (3.3)	4 (2.0)
Gout	2 (0.8)	1 (1.7)	1 (0.5)

Table 7: Respondents knowledge of measures for the control of obesity.

Variables	Total, n=163 (%)	Male, n=42 (%)	Female, n=121 (%)
Knowledge of obesity control measures			
Yes	158 (96.9)	41 (97.6)	117 (96.7)
No	5 (3.1)	1 (2.4)	4 (3.3)
Type of obesity control measure known			
Dietary control	126 (80.8)	29 (72.5)	97 (83.6)
Exercise	107 (67.7)	33 (80.5)	74 (63.2)
Behaviour modification	35 (23.0)	13 (33.3)	22 (19.5)
Level of knowledge of obesity control measure			
No knowledge	123 (46.4)	22 (36.7)	101 (49.3)
Poor knowledge	58 (21.9))	17 (28.3)	41 (20.0)
Moderate knowledge	52 (19.6)	8 (13.3)	44 (21.5)
High knowledge	32 (12.1)	13 (21.7)	19 (9.3)

DISCUSSION

People are involved with lots of behaviours which expose them to the risk of developing obesity without them knowing and many continue with these behaviours even when they are obese. Due to the above reason this study was conducted to find out the obesity risk behavior inherent in obese patients (that has been fueling their obese stature) and how it relates to the levels of their obesity. This study had a total of 265 obese respondents comprising of 205 (77.4%) females and 60 (22.6%) males, giving a male:female ratio of 1:3.3. The mean age of the respondents was 52.3±8.9 years.

Grades of obesity

Class 1 obesity, as was seen in this study have been shown to be the commonest grade of obesity in Nigeria and worldwide even amongst obese population. The high prevalence observed in this study may be because at this level, obesity is desirable and acceptable both culturally and socially in our environment. This is so because obesity at the level of class 1 is not seen as a pathological condition rather it's seen as a sign of wealth and healthy living.

Prevalence of obesity risk behaviours

Alcohol consumption: About 64.9% of the respondents consumed alcohol which was similar to results obtained from southeast Nigeria, 66.7% and Southwest Nigeria 69.1% but was higher than 38% obtained from a 2019 global survey done by WHO 34.3%, and 25% by Adeloye, and Ajayi respectively.[17-21] Overall, these results showed an increasing trend of alcohol consumption nationwide and this may be attributable to the changing lifestyle observed across the nation (increasing number of social clubs, night clubs, and bars in the country).

Tobacco smoking: The prevalence of 29.8% reported in this study among obese respondents was higher than 10.2% observed in a similar study done in Saudi Arabia, and 5.6% reported by global adult tobacco survey report for Nigeria.[22,23] The prevalence of 12.1% of current smokers among obese respondents in this present study was also higher than 6.9% obtained in the study done in Saudi Arabia.[22] The prevalence of current smokers in this study was highest among class 3 obese respondent (21%) and lowest among class 1obese respondents (10%). The high prevalence observed in this current study indicates that more public enlightening programs/campaign on the health dangers of cigarette smoking should be done in the study area and its environs.

Physical inactivity: Adeloye et al in their study reported that the pooled crude prevalence of physical inactivity in Nigeria was 52.0% which was similar to the result (57.4%) reported in our study, but lower than the result (78%) obtained by Oyeyemi et al.[20,24] However, the result in this study was higher than 22.1% reported by WHO for African region.[25] The high prevalence rate reported in this study may be because our participants were mainly obese which may be a discouraging factor for them to engage in physical activity. However, the respondents in class 3 were most physically inactive (71.4%) compared to class 1 who were least physically inactive (54.4%).

Poor dietary habits: Respondents with poor dietary habit had a prevalence of 18.5% however, the class 3 group had the poorest of dietary habits (42.9%) followed by class 1 with a prevalence of 18.9%. With this result it goes to show that poor dietary habit was poorest among the most severe obese group and this finding was statistically significant with a p=0.02.

Obesity risk behaviours and gender

This study showed that 24.5% of the respondents were heavy drinkers and the male respondents (51.7%) were heavy drinkers than the female respondents (16.6%). This result was similar to the result observed by Chukwuonye et al which showed that 30.5% of their participants were heavy drinkers and that more men consumed alcohol than women.[26] The preponderance of male alcohol users seems

to be universal with male consumption of alcohol been linked to masculinity and high sexual performance.

Current cigarette smoking in this study was more prevalent in males (65.0%) than females (19.3%) and this was consistent with existing studies that found that tobacco smoking was significantly higher among males when compared to females. However, this higher prevalence observed among males may predispose to the risk of passive smoking which may endanger the health of innocent citizens, especially wives and children of smokers.

In terms of dietary habit this study did not observe any difference between the males-50 (83.3%) and females-166 (81.0%) respondents. This may be because both males and female respondents culturally share the same dietary habits.

Physical inactivity in this study was observed to have no gender predilection between males (56.7%) and females (57.6%). This result was similar to that reported by Oyeyemi et al (female=76%, males=79%) but was different from many other studies which reported that females were more physically inactive than males.[20,27] The observation in this study may be because Eku town being a semi-urban area have their men less involved in manual labour.

Relationship between obesity risk behaviours and grades of obesity

The relationship between alcohol consumption and severity of obesity in this study was statistically significant, with a higher percentage of heavy drinkers found within the severely obese than been found within the mildly obese and moderately obese. Previous studies done around the world had shown variable results, with heavy drinkers being more at risk of developing obesity compared to light drinking having a negative association with adiposity.[28,29,30]

This study showed that the relationship between dietary habit and grades of obesity was statistically significant. It is therefore not surprising that in this study even amongst obese patient those with poor dietary habits clustered more in class 3 than those having moderate dietary habits. The reason may be that a typical Nigerian traditional food pattern was found to be associated with a higher risk of both general and abdominal obesity, but a more diverse traditional food pattern was associated with a reduced risk of general obesity.[31]

Those with history of smoking (previous and current) were found to have more severe forms of obesity, however, this association was statistically not significant. The reason for this may be because most smokers in trying to avoid indoor smoking (due to stigmatization) engage mostly in outdoor smoking at clubs, bars etc., where they are exposed to unhealthy diet and excessive alcohol consumption, all of which contributes to unhealthy weight increase.

Even though less active obese patients were found to have more severe forms of obesity in this study, the association between severity of obesity and physical activity was not statistically significant. Physical inactivity, when combined especially with unhealthy dietary habits, predispose to obesity but this present study was able to further show that even amongst obese individuals (6 out of 14 (71.4%) class 3 obese respondents were physically inactive), physical inactivity predisposes to more severe forms of obesity.

Obesity and comorbidities

The commonest comorbidities observed among respondents in this study was hypertension (35.3%), followed by sleep apnoea (20.4%), hypercholesterolaemia (18.1%), osteoarthritis (14.7%) and diabetes mellitus (13.2%).

The prevalence of hypertension (35.3%) among obese respondents in this study was lower than the prevalence obtained by Okoye et al in Enugu (65.8%) but higher than the prevalence observed in Umuahia (16.3%), Ilorin (27.1%), and Udo in Edo state (20.2%).[32-35] Obesity and hypertension are strongly associated epidemiologically, particularly central obesity.[36,37] However, obesity and hypertension may be linked via several other mechanisms.[32] These mechanisms include enhanced insulin resistance, elevated leptin synthesis, impaired renal pressure natriuresis, and sympathetic nervous system dysregulation.[32]

The prevalence of diabetes mellitus observed in this study was higher than the result obtained from Umuahia (3.9%) and Ilorin (1.5%), but was lower than the result obtained from Abeokuta (14.8%).[33,34,36] This finding was in keeping with the report that the prevalence of diabetes mellitus depended on the population group under study, in this case obese patients, with rural and urban variations, and has reported increase over the past two decades in both developed and developing countries.[33] This increase was presumed to be due to change in diet style, aging population, physical inactivity and increasing prevalence of obesity.[33]

The prevalence of hypercholesterlaemia reported in this study was far lower than 73.9% among obese patients reported by Ahaneku et al but was similar to observation made by Agomuoh et al which reported a prevalence of 19.0%.[37,38] Dyslipidemia, which was linked to obesity in a group of illnesses and/or risk factors that result in dysmetabolic syndrome, has become a significant medical issue in both industrialized and developing nations.[39]

The prevalence of sleep apnoea reported in this study was similar to that observed by Adebusoye et al among elderly patient in UCH Ibadan which showed that one

third (33%) of the elderly patients reported snoring with one quarter (25%) of the respondents also being habitual snorers.[42] The higher proportion of males having sleep apnoea compared to females observed in this study was also similar to the study done by Adegbusoye et al in UCH Ibadan.[40]

This study also showed the importance of adding laboratory screening for comorbidities of obesity to history of comorbidities because with laboratory screening as much as 57 (60.6% from 35.3%), 28 (58.3% from 18.1%), and 16 (45.7% from 13.2%) new cases of hypertension, hypercholesterolaemia and diabetes mellitus respectively were diagnosed. This was similar to the study done by Okoye et al in which out of the documented 65.8% hypertensive respondents diagnosed, 55.6% were newly diagnosed.[33] These findings go to show the importance of screening for comorbidities in all obese patients.

Awareness of obesity and knowledge of lifestyle modification

Majority of the participants (61.5%) in this study were aware of their obese condition and their commonest source of information was from health workers (54.6%). This result was higher than what was obtained in the study done by Iloh et al in Umuahia, where only 16.3% of the respondents were aware of their obese condition and 36.6% got their information from health workers.[34] The reason for this difference in results may be due to the high level of interaction between the community members and health workers because of the long existence of the Eku Baptist Hospital in our environment. However, the healthcare provider should do more in the area of behavioural modification because if the general patients are more aware of their obese condition, the health consequences of obesity as well as modifiable predisposing factors of obesity, then it may be easier to educate them on lifestyle modifications such as healthy diet, physical activity and more especially behavioural modification.

Implication of the study

The results of this study will add to the knowledge of connection between behavioral patterns and the severity of obesity. It will also guide in the creation of focused interventions and public health plans that will encourage healthy lifestyle choices and lessen the prevalence of obesity.

Limitations

This study had limitations. First, the cross-sectional design of the study limited the ability to provide causal inference. Secondly, the fact that the study was hospital-based may also have affected the results of the study since it may not be true representation of the entire population.

CONCLUSION

In conclusion, this study showed that; In term of severity of obesity, class 1 obesity had the highest prevalence; Obesity risk behaviours were found to be commoner in males than in females for cigarette smoking and excessive alcohol intake, more in females than males for physical inactivity and no significant gender difference for poor dietary habits; Respondents with severe forms of obesity (class 3) had worst obesity risk behaviours compared with respondents with the other forms of obesity. Finally, the relationship between dietary habit, alcohol consumption and severity of obesity in this study were statistically significant while between physical activity, cigarette smoking and severity of obesity were statistically not significant.

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