Obesity prevalence and its associated factors in an urban and rural area of Abuja Nigeria

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There is a global rise in the prevalence of obesity in both developed and developing countries reaching epidemic levels. It has therefore become an important health issue globally. This study aims at determining the prevalence of obesity in an urban and rural area in the Federal Capital Territory (FCT) Abuja – Nigeria. In a cross sectional community based study, and by a stratified random sampling method, 229 subjects were selected. A pretested structured questionnaire was administered to obtain sociodemographic characteristics. Anthropometric data were measured by standard methods. The body mass index (BMI) was calculated and in conjunction with waist WC were used as measures of obesity. The overall prevalence of obesity was 22.3%. Prevalence rates were higher in the urban area than rural area (40.7% versus 4.3%, $\chi^2 = 43.81, p < 0.001$). Obesity was more prevalent in women than men (36.2% versus 8.0%, $\chi^2 = 26.37, p < 0.001$) and was significantly associated with little or no education (OR= 3.100, p = 0.001). The prevalence of obesity in the urban area was much higher than in the rural area. This was mainly due to nutritional transition and lack of education.

Keywords: Obesity, prevalence, urban, rural.

INTRODUCTION

Obesity and overweight affect approximately 1.70 billion people worldwide and over 135 million people in Europe (Mokdad et al., 2001). Globally it is estimated that about 300 million people are obese (International Association for the Study of Obesity (IASO) Annual Review 2003 - 2004 London : IASO 2004) and in the United States of America, obesity affects over 60 million people giving a prevalence rate of 34% (National Center for Chronic Prevention and Health Promotion, 2006). It is also estimated that 325, 000 people in the united states die annually from obesity related health complications and 4.3% to 5.7% of direct health costs is related to obesity (Flegal et al., 1998). It is for these reasons that obesity has become a major health issue for public discourse in most developed western countries.

In developing countries, comprehensive data on the
prevalence of obesity is scanty and it is thought to be a
disease of the affluent society only. In Nigeria early data
in the middle and later part of the last century suggested
a low prevalence (Lawoyin et al., 2002; Johnson, 1970).
However recent reports from various studies indicate an
increasing prevalence (Copper et al., 1997; Akpa et al.,
2006). In a population based study in Nigeria, obesity
was present in 21% of males and 28% of females (Kadiri
and Salako, 2004), while in a group of type 2 diabetics
83% were obese or overweight (Fadupin et al., 2004).
Another study on hypertensive patients showed
prevalence rates of 71.6% in females and 50.5% in males
(Amodu et al., 2005). Hence obesity tends to be
associated with non communicable diseases.

Obesity is defined as a condition in which the natural
energy reserve, stored in the fatty tissues of humans and
other mammals is increased to a point where it is
associated with adverse health conditions or increased
mortality (Wikipedia, the free encyclopedia). It is
assessed clinically using the body mass index (BMI) or
quetelet index which is calculated based on the formula:

\[ \text{BMI} = \frac{\text{weight in kilograms}}{\text{height in meters}^2} \]

As noted above obesity is associated with the
development of a host of non communicable diseases
such as hypertension, insulin resistance, type 2 diabetes
mellitus, hypercholesterolemia and coronary heart
disease (Mollentze et al., 1995). When these conditions
occur in conjunction with obesity they worsen outcome by
increasing the morbidity and mortality associated with the
condition hence the need for urgent intervention.

This study aims at determining the prevalence of
obesity in an urban and rural population of Nigerians
thereby ascertaining how lifestyle changes affect the
development of this disease. It is hoped that this would
contribute to educating the public at large and inform
policy measures required for the necessary intervention
to quell the rising trend and prevalence of obesity.

MATERIALS AND METHODS

A total of 229 participants were recruited for this cross
sectional community based study by a stratified random
sampling method. Stratification was by age, gender and
location. 113 were recruited from the urban area called
Garki village in Abuja – Abuja Municipal Area Council of
Nigeria, while 116 came from a rural area called Kuseki
in Kuje area council. Kuseki is about four hours drive
from the urban area and lacks safe water supply and
electricity being a typical rural setting. Both areas are
within the federal capital territory region (FCT) in Nigeria.
The study was carried out between May 2009 and June
2010.

Ethical approval was obtained from the department of
Medicine, Abuja municipal area council and the ethical
committee of the Benue State University Makurdi.
Informed consent in written form or by a thumb print was
obtained from the participants after due explanation
before they were used for the study. A structured
questionnaire including age, gender, marital status,
occupation, level of education and location was
administered to the participants or completed on their
behalf. Anthropometric data which included weight,
height and WC were obtained. The weight was measured
to the nearest 0.5kg using a weighing scale with the
participants wearing light clothing and removing their foot
wears. Height was measured to the nearest 0.5cm using a
stadiometer. The BMI was calculated as weight in
kilograms divided by the square of the height in
meters. The WC was measured at the level of the iliac
crests using a flexible tape and passing along the
umbilical level of the unclothed abdomen.

Based on the WHO criteria for obesity, participants
whose BMI were up to 30kg/m² and above were regarded
as obese while those with BMI ≥25.00 and ≤29.99 were
regarded as overweight. Participants with WC >88cm for
women and > 102cm for men were regarded as having
central obesity.

The Statistical Package for Social Sciences (SPSS)
version 20 statistical soft ware was used for data
analysis. For continuous variables, mean values and
standard deviations were calculated and the means
compared using the independent samples t test. Pearson
chi square was used to test locality and gender
differences in prevalence rates and the association
between BMI and sociodemographic factors. Values of p
< 0.05 were considered statistically significant.

RESULTS

Sociodemographic characteristics of the population

There were 229 participants in the study with an age
range of 18 – 78 years. 113 males and 116 females. In
terms of locality, 113 were from the urban location and
116 were from the rural area. The mean age of the urban
group was 43.24 ± 13.76 years while the rural
participants had a mean age of 41.91 ± 15.08 years.
There was no statistical difference in the mean age or
height of the two groups. However the mean weight, BMI
and WC were significantly higher in the urban group than
rural group (p <0.001). Males were significantly taller than
Table 1. Characteristics of the study population by locality

<table>
<thead>
<tr>
<th>Variable</th>
<th>Urban Mean (SD)</th>
<th>Rural Mean (SD)</th>
<th>t-test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>43.24(13.76)</td>
<td>41.91(15.08)</td>
<td>0.70</td>
<td>0.485</td>
</tr>
<tr>
<td>Weight</td>
<td>69.43(13.61)</td>
<td>58.98(8.29)</td>
<td>7.04</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Height</td>
<td>1.59(0.08)</td>
<td>1.61(0.07)</td>
<td>-1.70</td>
<td>0.090</td>
</tr>
<tr>
<td>BMI</td>
<td>27.35(4.96)</td>
<td>22.72(2.50)</td>
<td>8.95</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>WC</td>
<td>90.06(13.83)</td>
<td>80.49(7.26)</td>
<td>6.58</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

* = statistically significant, BMI = Body mass index
WC = Waist circumference

Table 2. Characteristics of the study population by gender

<table>
<thead>
<tr>
<th>Variable</th>
<th>Male Mean(SD)</th>
<th>Female Mean(SD)</th>
<th>t-test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>43.04(14.54)</td>
<td>42.09(14.46)</td>
<td>0.50</td>
<td>0.620</td>
</tr>
<tr>
<td>Weight</td>
<td>63.95(9.05)</td>
<td>64.32(14.93)</td>
<td>-0.22</td>
<td>0.825</td>
</tr>
<tr>
<td>Height</td>
<td>1.63(0.06)</td>
<td>1.57(0.07)</td>
<td>6.11</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>BMI</td>
<td>24.07(3.17)</td>
<td>25.91(5.43)</td>
<td>-3.11</td>
<td>0.002*</td>
</tr>
<tr>
<td>WC</td>
<td>83.75(11.34)</td>
<td>86.64(12.44)</td>
<td>-1.84</td>
<td>0.068</td>
</tr>
</tbody>
</table>

* = statistically significant, BMI = Body mass index
WC = Waist circumference

females (p< 0.001) while females had significantly higher BMI than males (p = 0.002). These are shown in tables 1 and 2.

About half of the population had no education or just primary education (58.1%) while a large percentage of them (79.0%) were married.

Prevalence of obesity

The overall prevalence of obesity was 22.3% while that of overweight was 32.3%. The overall prevalence of central obesity was 20.1%. Obesity was more prevalent in the urban area than in the rural area with rates of 40.7% versus 4.3% respectively (χ² = 15.24, p <0.001). Obesity prevalence was higher in females than males with rates of 36.2% versus 8.0% (χ² = 26.37, p <0.001). As shown in figure 1 the prevalence peaked in the 50 – 60 years age group. It was also more prevalent amongst participants with little or no education than in the educated ones (38.6% versus 16.9%).

Figure 1. Prevalence of Obesity by Age group
Association with sociodemographic factors

Pearson Chi-Square showed that obesity was not significantly associated with age ($\chi^2 = 0.53, p = 0.469$, OR = 0.79). It was not associated with marital status ($\chi^2 = 0.26, p = 0.669$, OR = 0.82). However, it was significantly associated with little or no education ($\chi^2 = 11.68, p = 0.001$, OR = 3.10).

DISCUSSION

The prevalence of obesity is increasing rapidly in both developed and developing nations. It has reached epidemic proportions globally and the evidence suggests that the situation is likely to get worse.

In the present study, obesity was significantly more prevalent in the urban area than rural area with rates of 40.7% versus 4.3% ($p < 0.001$). The higher prevalence of obesity in the urban area compared to rural area is attributable to rapid and unplanned urbanization in developing countries, change from local dietary pattern to western style diet which is driven by the proliferation of fast food outlets in major cities in developing nations. Exposure to and consumption of high fat and refined food high in calorie and a reduced energy expenditure in form of physical inactivity have been implicated (Borne et al., 2002). Preference for watching of television and playing of television games instead of outdoor recreational activities as these urban areas are undergoing economic and nutritional transition (Popkin, 1994) is also implicated.

Females in the study were found to be significantly more obese than males with prevalence rates of 36.2% versus 8.0% ($p < 0.001$). Similar finding was noted in the WHO MONICA project where women had significantly higher prevalence rates of obesity than men (World Health Organisation Technical report service 894, 2000). This may be due to hormonal factors and also because women have more frequent opportunities to consume food and are more likely to have greater volumes of food available because they traditionally prepare meals for their families (Segal and Sanchez, 2001).

The prevalence of obesity peaked in the 50 – 59 age group though obesity was not significantly associated with age. Decrease in height as a person ages has been quoted as one of the reasons BMI increases with age (Lim et al., 2000). Obesity develops when calorie intake exceeds calorie expenditure due to excessive consumption, sedentary life style or inadequate physical activity and these features tend to occur with age. The peak in the 50-59 age group was noted for both generalized and central obesity. Central obesity is considered to be more dangerous than generalized obesity because the adipose tissues in the abdomen are more lipophytic and tend to generate more free fatty acids when metabolized. The increased free fatty acids result in generation of oxidant stress molecules, depression of Nitric Oxide (NO) production and impairment of endothelial relaxation function, insulin resistance and hyperinsulinaemia which all promote atherogenesis and atherosclerosis. It is worthy to note that central obesity is not just a risk factor for cardiovascular disease worldwide but for all cause mortality in both men and women (Yusuf et al., 2004; Dagenais et al., 2005).

Participants with little or no formal education had the highest prevalence of obesity compared with those with formal education (38.6% versus 16.9%) and this was statistically significant ($p = 0.001$). This finding is similar to the study done by parkes (2003) (Parkes, 2003), which found that respondents with no schooling and no formal education had significantly higher BMI than those with qualifications (Parkes, 2003).

Our study also showed that a larger proportion of singles were obese than married (25.0% versus 21.5%) but this difference was not statistically significant. This is probably because a large proportion of the sample population (79.0%) were married. The finding is different from that of Jeffery (2002) (Jeffery and Rick, 2002) which showed that marriage was associated with a significant 2 year weight gain and divorce was associated with a significant 2 year weight loss. The effects of marriage and divorce on weight may be due to the influence of marriage on inducement to eat (eg shared meals) or on motivation for weight loss.

CONCLUSION

The results of this study showed that obesity is significantly more prevalent in the urban area than rural area and within these settings, women have significantly higher prevalence than men. Amongst sociodemographic factors such as age, educational level and marital status, little or no education was significantly associated with obesity.

The findings of this study can provide baseline data for monitoring the effectiveness of national programmes for the prevention and control of obesity.

REFERENCES


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