Full Length Research Paper

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

Adediran Olufemi Sola[1], Okpara Ihunanya Chinyere[1]*, Adeniyi Olasupo Stephen[2], Jimoh Ahmed Kayode[3]

[1]Department of Internal Medicine, P. M. B. 102119, Benue State University Makurdi, Nigeria.
[2]Department of Physiology, P. M. B. 102119, Benue State University Makurdi, Nigeria
[3]Department of Chemical Pathology, Federal Medical Centre, Ido-Ekiti, Nigeria

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 world wide 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

Abbreviations

BMI, Body Mass Index; MONICA, Multinational MONItoring of trends and determinants in CArdiovascular diseases; SPSS, Statistical Packages for Social Sciences; WC, Waist Circumference; WHO, World Health Organization.

*Corresponding author E-mail: iokparajubilee@yahoo.com; Phone: 08037067040

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: weight in kilograms / height^2 in meters (Quetelet, 1994).

The WHO classification of obesity defines a body mass index of 30.00kg/m^2 or more as obese while a range of 25.00 to 29.99kg/m^2 is considered as overweight (World Health Organisation Technical report service 894, 2000). Obesity can also be assessed using the waist circumference (WC). This is referred to as central or abdominal obesity. WC greater than 88cm in women and greater than 102cm in men are used as measures of central obesity while that measured by BMI is refered to as generalized obesity (World Health Organisation Technical report service 894, 2000).

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[13] divided by the square of the height in meters.The WC was measured at the level of the Iliac crests[16] 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/m^2 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

Variable	Urban n =113 Mean (SD)	Rural n = 116 Mean (SD)	t-test	p-value
Age	43.24(13.76)	41.91(15.08)	0.70	0.485
Weight	69.43(13.61)	58.98(8.29)	7.04	<0.001*
Height	1.59(0.08)	1.61(0.07)	-1.70	0.090
BMI	27.35(4.96)	22.72(2.50)	8.95	<0.001*
WC	90.06(13.83)	80.49(7.26)	6.58	<0.001*

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

Table 2. Characteristics of the study population by gender

Variable	Male n = 113 Mean(SD)	Female n= 116 Mean(SD)	t-test	p-value
Age	43.04(14.54)	42.09(14.46)	0.50	0.620
Weight	63.95(9.05)	64.32(14.93)	-0.22	0.825
Height	1.63(0.06)	1.57(0.07)	6.11	<0.001*
BMI	24.07(3.17)	25.91(5.43)	-3.11	0.002*
WC	83.75(11.34)	86.64(12.44)	-1.84	0.068

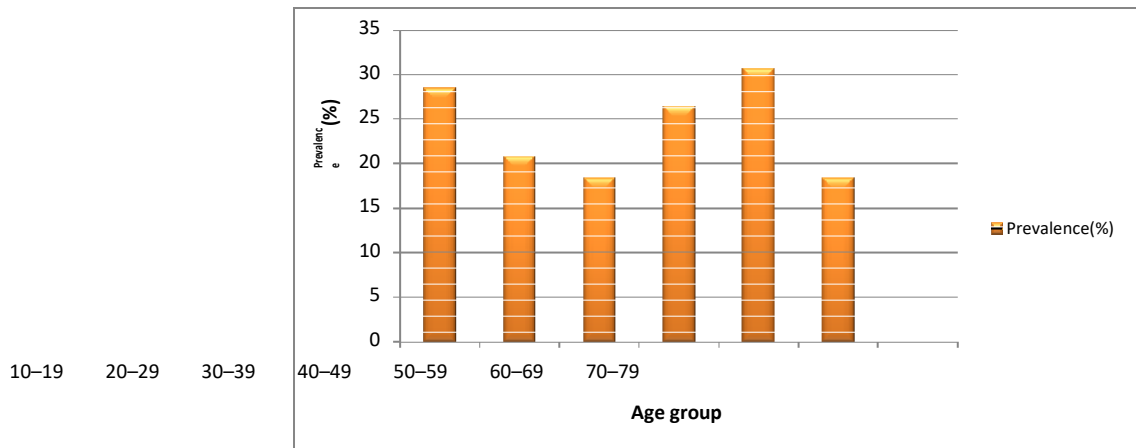*= statistically significant, BMI = Body mass index
WC = Waist circumference

Figure 1. Prevalence of Obesity by Age group

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 ($\chi2$ = 15.24, p <0.001). Obesity prevalence was higher in females than males with rates of 36.2% versus 8.0% ($\chi2$ = 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%).

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 marital status ($\chi 2 = 0.26$, p = 0.069, 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 lipophylic 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

Mokdad AH, Bowman BA Ford ES, et al (2001). The continuing epidemic of obesity and diabetes in the United States. JAMA. 286:1195 – 1200.

International Association for the Study of Obesity (IASO) Annual Review 2003 -2004 London : IASO 2004.

National Center for Chronic Prevention and Health Promotion. Defining overweight and obesity. Available at www.cdc.gov/nccdphp/dnpa/obesity identifying .htm. Accessed July 28th 2006.

Flegal KM, Carroll MD, Kuckzmarski RJ et al(1998). Overweight and obesity in the United States : prevalence and trends 1960 – 1994. Int J Obesity and Related Metab Diseases. 22: 39 – 47.

Lawoyin TO, Asuzu MC, Karfman J, et al (2002). Prevalence of cardiovascular risk factors in an African urban inner city community. West Afr. J. Med. 21 (3): 208 -211.

Johnson TO (1970). Prevalence of overweight and obesity among adult subjects of an urban African population. Br. J. of preventive and Social Med. 24: 105 – 109.

Copper R, Rotimi C, Ataman G et al (1997). The prevalence of hypertension in seven populations of West African origin. Am. J. pub. Health. 87: 160 – 168.

Akpa MR, Agomuoh DI, Alasia DD (2006). Serum Lipid pattern of healthy adult Nigerians in Port Harcourt. Niger. J. Med. 15 (2):137 – 140.

Kadiri S, Salako BL (2004). Cardiovascular Risk Factors in Middle aged Nigerians. East Afr. J. Med. Sci. 33 (4): 381 – 384.

Fadupin GT, Joseph EU, Keshinro OO (2004). Prevalence of obesity among Type 2 Diabetic patients in Nigeria. A case study of patients in Ibadan, Oyo state Nigeria. Afr. J. Med. Sci. 33 (4): 381 – 384.

Amodu PH, Mba IO, Lawson L (2005). Prevalence of Obesity and dyslipidemia in hypertensives in Abuja Nigeria. Scan. J. Clin. Lab. Inv. 240: 14 – 17.

Wikipedia, the free encyclopedia (http://enwikipedia.org/wiki/obesity)

Quetelet AD (1994). Physique De L'Homme, quoted by pengelly CDR. Body mass index and abdominal girth in the diagnosis of obesity. Proc. R Col . Physicians, Edinburg. 24:174 – 180.

World Health Organisation Technical report service 894: Obesity: preventing and manging the global epidemic. Geneva: World Health Organization 2000.

Mollentze WF, Morre AJ, Stey AF et al (1995). Coronary Heart disease risk factors and urban orange free state population. South Afr. Med. J. 85 (2): 90 – 96.

Aronne LJ (2002). Classification of Obesity and Assessment of Obesity – related Health risks: Obesity Research.10 (suppl 2): 1055 – 1155.

Borne LT, Lambert EV, Steyne K (2002). Where does the black population of South Africa stand on the nutrition transition? Public Health Nutrition. 5(IA): 157 – 162.

Popkin BM (1994).The nutrition transition in low income countries: an emerging crisis. Nutr. Rev. 52(9): 285 – 295.

Segal DG, Sanchez JC (2001). Childhood obesity in the year 2001. The Endocrinol.11(4): 296 – 306.

Lim TO, Ding LM, Zaki M, et al (2000). Distribution of Body weight, Height and Body mass index in a National sample of Malaysian Adults. Med. J. Malaysia. 55:108 – 128.

Yusuf S, Hawken S, Ounpuu S, et al (2004). Inter heart study investigators. Effect of potentially modifiable risk factors associated with myocardial infection in 52 countries (the inter heart study): case-control study. Lancet 364: 937 – 952.

Dagenais GR, YiQ, Man JF, et al (2005). Prognostic impact of body weight and abdominal obesity in women and men with cardiovascular disease. Am. heart J. 149: 54 – 60.

Parkes KR (2003). Demographic and life style predictors of body mass index among offshore oil industry workers: cross-sectional and longitudinal findings. Occupational Med. 53(3): 213 – 221.

Jeffery RW, Rick AM (2002). Cross sectional and Longitudinal Associations between body mass index and marriage – related factors. Obesity Res. 10(8): 809 – 815.