Int J Diabetes & Metabolism (2005) 13: 28-29

Indices of obesity among type-2 diabetic Hausa-Fulani Nigerians

Adamu G Bakari and Geoffrey C Onyemelukwe

Department of Medicine, Ahmadu Bello University & Ahmadu Bello University Teaching Hospital, Zaria, Nigeria.

Abstract.

Background: Obesity has been identified as the most important modifiable risk factor in the aetiology of type-2 diabetes mellitus. In clinical practice, body mass index (BMI) is the commonest index used to define the presence and degree of obesity. Unfortunately, BMI does not define the presence or absence of central obesity which has been shown to be the most pathogenically important in the causation of metabolic disorders including type-2 diabetes. Waist-hip ratio (WHR) has been shown to be a sensitive and reliable index of intra-abdominal obesity as well as intra-abdominal to subcutaneous fat ratio. Study **Objective:** To define obesity rates using BMI and WHR among type-2 diabetic northern Nigerians. **Subjects and Methods:** Forty type-2 diabetic subjects and 36 healthy controls were studied. **Results:** Mean BMI among type-2 diabetic patients was 24.93$\pm$ 4.43 Kg M^{-2} versus 22.93 ± 4.02 Kg M^{-2} ($p<0.02$). Overweight occurred in 14(35%) of diabetic subjects versus 8 (22.0) of control subjects. Obesity on the other hand was observed in two (5.0%) of diabetic patients and none among control subjects. Type 2 diabetic patients had significantly much higher WHR compared to control subjects (1.03 ± 0.08 versus 0.92 ± 0.08 respectively, $p<0.001$). Central obesity was recorded in 38 (95%) type 2 diabetic patients compared to (%) of control subjects. **Conclusion:** Current cut-off points using BMI may suggest that obesity is not common among type-2 diabetic Northern Nigerians although central obesity is quite common. There may be a need to revisit the cut off points to define obesity in this population.

Key words: *BMI, Obesity, Nigerians, Type-2 diabetes, WHR*

Introduction

Obesity is the most important modifiable risk factor in the aetiology of type-2 diabetes mellitus[1]. Body mass index (BM I) is the commonest index used to define obesity in clinical practice. However, BMI does not define the presence or absence of central obesity which has been shown to be the most pathogenically important in the aetiology of metabolic disorders. Waist-hip ratio (WHR) has been shown to be a sensitive index of both the total amount of intra-abdominal fat as well as the ratio of intra-abdominal to subcutaneous fat ratio[2]. This study aims at defining obesity rates using both indices among type 2 diabetic Northern Nigerians.

Subjects and Methods

Subjects were Type 2 diabetic patients attending the diabetic clinic of Ahmadu Bello University Teaching hospital (ABUTH) Zaria, Nigeria, and who had 'good glycaemic control. This was defined as fasting blood sugar (FBS) of 4.4 to 6.7 mmol/L, and or a 2-h post prandial blood sugar of 4.4 to 8.9 mmol/L, and 'acceptable' glycaemic control (FBS of 6.7 to 7.8 mmol/L and or 2 PP of 8.9 to I 0.0 mmol/L) [3]; on at least three clinic visits while on dietary therapy alone, or dietary therapy in addition to oral hypoglyceamic agent(s).

Correspondence to: Dr. AG. Bakari , Department of Medicine, Ahmadu Bello University & ABU Teaching Hospital, Zaria Nigeria., E-mail: abgirei@yahoo.com.

Classification of patients as type 2 diabetics was, however, based on clinical grounds of non-dependence on insulin for survival. Thirty-six healthy, age-, sex and socio economic status-matched volunteers who had no personal or family history of diabetes mellitus or hypertension were recruited to serve as controls.

Information on age, sex and anthropometric measures were obtained from all patients and control subjects. Weights (in Kg) were taken with only undergarments on to the nearest 0.5 kg. Heights (in metres) were taken to the nearest 0.5 cm with subjects standing erect without shoes or headgear. Body Mass Index (BMI) was derived by dividing the weight by the square of the height. BMI of $\geq$25 to 29.99 Kg/M^2 was used to define overweight while a value $\geq$ 30 Kg/M^2 was used to define obesity.[4] Waist circumferences were measured at the level of the umbilicus with subjects in the supine position while hip circumferences were measured at the level of the anterior superior iliac spine with subjects in the standing position. Central obesity was defined as WHR $\geq$0.90 and $\geq$0.85 for females and males respectively. [4]

Results are presented as mean ± standard deviation. Unpaired student's t-test was used to determine the differences between continuous variables while chi-square test was used for categorical variables. The level of statistical significance in each case was taken as $P \leq 0.05$.

Results

A total of 40 type 2 diabetic patients and 36 control subjects participated in the study. Average age at time of study was 49.4 $\pm$ 9.7 years (range 36 to 70 years) for type 2 diabetic patients and 48.6 ± 9.8 years (range 36 to 69 years) for control subject (P>0.5). Similarly, the sex distribution for the two groups was also similar (P > 0.5). There were 28 (70 %) males and 12 (30%) females in the diabetic group.

Although type 2 diabetic patients had higher BMI than control subjects, the anthropometric differences between the two groups was more striking when the WHR's were compared. Mean BMI among type 2 diabetic patients was 24.93 $\pm$ 4.43 KgM^{-2} compared to 22.93 ± 4.02 KgM^{-2} among control subjects p<0.02). Overweight occurred in 14 (35%) of diabetic subjects and 8 (22.0%) of control subjects; while obesity (BMI $\geq$30.0 Kg M^2) was recorded in only two (5.0%) type 2 diabetic patients and none of the control subjects.

Mean WHR were respectively 1 .03 ± 0.08 and 0.92 ± 0.082 among diabetic and control subjects, (p< 0.001). Central obesity was recorded in 38 (95.0%) type 2 diabetic patients, (26 (92.9%) male and 12 (100.0%) female diabetic patients.

Discussion

This study has shown that whereas obesity as defined by BMI is rare, central obesity is quite common among Nigerian type 2 diabetic patients. This is crucial in the management of type-2 diabetic patients as central obesity is the form of obesity that is associated with cardiovascular morbidity and mortality.[4] This was first highlighted by Vague[5] in 1947 who subsequently re-echoed the same observations nine years later[6]. There is evidence to suggest that visceral adipose tissue is more active metabolically than peripheral adipose tissue and is therefore more deleterious than the latter. For example visceral fat is known to be characterized by increased production of interleukin-6 and tumor necrosis factor-α[7] factors known to be associated with complications of the metabolic syndrome.

Obesity occurred more commonly among female patients compared to their male counterparts. This is similar to the findings of Akintewe and Adetuyibi in Western Nigeria[8] and may be due to cultural practices that tend to limit physical exertion by females with resultant sedentary habits, obesity and its attendant complications.

Central obesity is quite common among type 2 diabetic patients; but current cut-off points to define obesity using BMI in this population would suggest that obesity is rare among type 2 diabetic patients. Therefore, in this population and similar populations in Africa and the Indian subcontinent, where BMI among type- 2 diabetic patients are generally lower than that observed in Caucasian populations[4], particular emphasis should be placed on the detection and management of central obesity.

There is also the need to revisit the cut-off points of BMI to define obesity in this community as current cut-off points do not seem appropriate. Community studies to define which BMI levels are at risk of complications associated with excessive weight increase are therefore needed in our environment.

References

1. World Health Organization. Definition, Diagnosis and classification of diabetes mellitus and its complications. Report of a WHO consultation, WHO; Geneva, 1999.
2. Ashwell M, Cole TJ, and Dixon AR. Obesity: new insights into the anthropometric classification of fat distribution shown by computed tomography. BMJ 1985; 290:1692-1694.
3. Williams G. Management of non-insulin dependent diabetes mellitus. Lancet 1994; 343: 95-100.
4. World Health Organization Expert committee: Physical status; the use and interpretation of anthropometry. Report of a WHO Expert Committee. Technical Report series 854, WHO, Geneva, 1995.
5. Vague J. La differentiation sexuelle: facteur determinant des formes de L' obesite. Press Med 1947; 55:339-340.
6. Vague J. The degree of masculine differentiation of obesities: a factor determining predisposition to diabetes, atherosclerosis, gout, and uric acid calculus disease. Am J Clin Nutr 1956; 4:20-34.
7. Sowers JR. Obesity and cardiovascular disease. Clin Chem 1998; 44:1821-1825.
8. Akintewe TA, Adetuyibi A. Obesity and hypertension in diabetic Nigerians. Trop Geog Med 1986; 38:146-149.