Original Research Article

OBESITY AMONG ADULT OUTPATIENTS WITH TYPE 2 DIABETES MELLITUS ACCESSING CARE IN BOWEN UNIVERSITY TEACHING HOSPITAL (BUTH), OGBOMOSO

Abstract:

Background: Diabetes mellitus (DM) is an incurable chronic disease afflicting people of all races, sex, economic and social status, and of all ages. Obesity is a major contributor to the type 2 diabetes epidemic. Obesity in persons with diabetes is associated with poorer control of blood glucose levels, blood pressure, and cholesterol, placing patients at higher risk for both cardiovascular and microvascular disease.

Aim: To determine the prevalence of obesity and the associated risk factors among diabetic patients in Bowen University Teaching Hospital (BUTH), Ogbomoso.

Materials and Method: The study was a descriptive cross-sectional study. The data collection lasted 4 months between March and June 2018. A pretested questionnaire was used to collect data on socio-demographic characteristics and medical history of participants. We measured and recorded blood pressure, weight and height of each of the participants. The data collected were analyzed using SPSS for Windows version 20 statistical software package. The association between categorical variables were tested using Chi-square. Data presentation was done using tables, frequencies and percentages.

Result: Two hundred and seventy-five participants were recruited for this study. Their age ranges from 28 years to 85 years with the mean age of 59.07±11.82 years. Obesity was found in 29.8% of the study participants. Obesity was found to be associated with age group, sex, marital status, educational level, duration of diagnosis of diabetes and hypertension. The association was statistically significant.

Conclusion: The prevalence of obesity in type 2 diabetes was high in this study and was associated with age group, sex, marital status, educational level, duration of diagnosis of diabetes and level of blood pressure. There is a need to intensify effort to control obesity and achieve optimal blood pressure control among diabetic patients and prevent complications from ensuing.

Key words: Diabetes, Obesity, Body mass index, Hypertension

Introduction

Diabetes mellitus (DM) is an incurable chronic disease afflicting people of all races, sex, economic and social status, and of all ages[1]. Its prevalence has been increasing globally and the disease has become one of the major public health concerns[2]. The number of people with type 2 diabetes is increasing in every country and 80% of people with diabetes live in low and middle-income countries[3]. The International Diabetes Federation (IDF) estimates that over 5 million people suffer from the disease in Africa and the number is expected to increase to 15million by 2025[4].

Nigeria has the highest burden of diabetes in Africa, followed by South Africa with 2.6 million cases, Ethiopia 1.9 million, and Tanzania 1.7 million[5]. A recent systematic review and meta-analysis conducted by Adeloye and collegues in 2017 to estimate the prevalence of Type 2 DM (T2DM) in Nigeria reported that 5.8% of the population had diabetes mellitus, suggesting that the predictions of higher prevalence in low and middle-income countries in the future may be true[6].

Obesity is now regarded as a chronic, progressive disease with remissions and relapse and an important driver of the development of diabetes and many of its associated features. The deleterious effects of obesity and type 2 diabetes are seen in most, if not all, tissues in the body, with consequences resulting in significantly increased premature morbidity and mortality[7]. The World Health Organization (WHO) characterizes obesity as the disease in which the abundance of body fat has become so much that health might be at odds[8]. The aetiology of obesity is far more complex than simply an imbalance between energy intake and energy output. Metabolic, endocrine, and genetic factors; dietary habits; physical activity; race; age; sex; drug use; and socioeconomic status all play a role in the development of obesity[9]. It is a major contributor to the type 2 diabetes epidemic where nearly 88% of those with T2DM are considered overweight or obese[10].

Body mass index (BMI), is the most commonly used marker for body-weight assessment and is highly correlated with body fat[11], it defines obesity in clinical practice [2] Obesity is known to be the main risk factor for a number of non-communicable diseases like cardiovascular disease, type 2 diabetes, hypertension, coronary heart disease, or certain types of cancers. Of these diseases, type 2 diabetes is most strongly associated with obesity[12]. The prevalence of generalized obesity among patients with type 2 diabetes across Nigeria ranges from 5.0% in Zaria, in the Northwest to 40% in Lagos in the Southwestern part of the country[13]. Although more people in developing countries now die from obesity-associated diseases, including ischemic heart disease, diabetes mellitus and cancer, many people are still under the impression that overweight and obesity affects only the Western world and that lower resource countries continue to struggle with only underweight, malnutrition and infections[12].

An unhealthy diet consisting mainly of high-fat, energy-dense food contributes to the development of obesity and DM[14]. Obesity in persons with diabetes is associated with poorer control of blood glucose levels, blood pressure, and cholesterol, placing patients at higher risk for both cardiovascular and microvascular disease[15]. It has also become an enormous public health problem and a bigger health crisis than hunger and the leading cause of death and disabilities around the world with the burden expected to increase through time[16].

This study aims to determine the prevalence of obesity and its associated risk factors among diabetic patients in BUTH, Ogbomoso.

Material and Method: The study was a descriptive cross-sectional study. We recruited 275 patients with Type 2 diabetic accessing care at BUTH Ogbomoso. The data collection lasted 4 months between March and June 2018. Patients aged 18 years and above with diabetes mellitus who had been on treatment for at least 6 months and gave consent for the study were recruited while pregnant and cognitively impaired patients were excluded from the study. A pretested questionnaire was used to collect data on socio-demographic characteristics and medical history of participants.

We measured and recorded weight and height of each of the participants. This was used to calculate the body mass index expressed in kg/m^2. Participants with BMI <18.5 were classified as underweight, BMI of 18.5–24.9 as normal weight, while 25.0–29.9 and ≥30.0 were classified as overweight and obese respectively[17]**.**

Blood pressure measurement was used to classify participants into hypertensive or normotensive. Participants with blood pressure ≥ 140/90mmHg or with history of antihypertensive drug use were considered hypertensive while participants with blood pressure < 140/90mmHg were considered normotensive

The Standard Occupational Classification System designed by Office of Population Census and Surveys, London (OPCS 1991) and modified for Nigeria was used to classify participants into socioeconomic classes 1-3 as follows:

Class 1 = skilled worker e.g., professionals and managerial officers and retirees of this cadre

Class 2 = unskilled workers e.g., Artisans and traders

Class 3 = dependents e.g. retirees of class 2, those not on pension, house wives of class 2 cadre, students[18].

All participants provided verbal informed consent and the study was conducted in accordance with the Declaration of Helsinki. The ethics committee of Bowen University Teaching Hospital Ogbomoso approved the study.

The data collected were analyzed using SPSS for Windows version 20 statistical software package. Data presentation was done using tables, frequencies, percentages and prose.

The associations between sociodemographic factors, medical history and body mass index were tested using chi-square. P-value was set at 0.05 and P-value less than or equal to 0.05 was regarded as statistically significant.

Results

Table 1. Sociodemographic Characteristics of study participants

		Frequency	Percentage
Sex	Female	169	61.5
	Male	106	38.5
Age Group	≤30	4	1.5
	31-40	14	5.1
	41-50	58	21.1
	51-60	84	30.5
	>60	115	41.8
	Mean=59.07		
	SD=11.82		
Marital Status	Single	3	1.1
	Married	249	90.5
	Separated	4	1.5
	Widow	19	6.9
Religion	Christianity	208	75.6
	Islam	66	24.0
	Others	1	0.4
Level of Education	Uneducated	84	30.5
	Primary	81	29.5
	Secondary	50	18.2
	Tertiary	60	21.8
Social Class	1	69	25.1
	2	188	68.4
	3	18	6.5
Ethnicity	Yoruba	260	94.5
	Hausa	3	1.1
	Igbo	18	4.4
Location	Rural	77	28.0
	Urban	197	71.6
	Others	1	0.4

Two hundred and seventy-five participants were recruited for this study. Age group above 60 had the highest proportion (41.8%) of study participants. Majority (61.5%) of the study participants were female. Highest proportion (90.5%) of them were married. About three quarter (75.6%). were Christians. One third of the study participants were not educated and 68.4% of them belong to social class 2. Majority (94.5%) belong to Yoruba ethnic group. More than two third of the participants are Urban dwellers.

Table 2. Medical History of Study Participants

		Frequency	Percentage
Duration of Diabetes in years	<5	180	65.5
	6-10	47	17.1
	>10	48	17.4
Medication	Oral	169	61.5
	Insulin	11	4.0
	Both	95	34.5
Hypertension	Present	190	69.1
	Absent	85	30.9
BMI Category	Underweight	13	4.7
	Normal	70	25.5
	Overweight	110	40.5
	Obese	82	29.8

About two third (65.5%) of the participants had duration of diabetes less than 5years. Almost two third (61.5%) of the participants were on oral medication alone while more than two third (69.1%) had hypertension. Only 29.8% of the participants were obese.

Table 3.
Association between sociodemographic factors, medical history and body mass index

		Normal weight	**Overweight**	**Obese**	**Underweight**	**P-value**
Sex	Female	35(20.7%)	56(33.1%)	65(38.5%)	13(7.7%)	
	Male	35(33.0%)	54(50.9%)	17(16.0%)	0(0.0%)	0.000
	Total	70(25.5%)	110(40%)	82(29.8%)	13(4.7%)	
Age Group	<30	4(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	
	31-40	3(21.4%)	7(50.0%)	3(21.4%)	1(7.1%)	
	41-50	11(19.0%)	28(48.3%)	19(32.8%)	0(0.0%)	0.003
	51-60	21(25.0)	24(28.6%)	30(35.7%)	9(10.7)	
	>60	31(27.0%)	51(44.0%)	30(26.1%0	3(2.6%)	
	Total	70(25.5%)	110(40.0%)	82(29.8%)	13(4.7%)	
Marital Status	Single	3(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	
	Married	61(24.5%)	105(42.2%)	73(29.3%)	10(4.0%)	
	Separated	2(50.0%)	0(0.0%)	2(50.0%)	0(0.0%)	0.025
	Widow	4(21.2%)	5(26.3%)	7(36.8%)	3(15.8%)	
	Total	70(25.5%)	110(40.0%)	82(29.8%)	13(4.7%)	
Religion	Christianity	55(26.4%)	91(43.8%)	49(23.6%)	13(6.3%)	
	Islam	15(22.7%)	19(28.8%)	32(48.5%)	0(0.0%)	0.003
	Others	0(0.0%)	0(0.0%)	1(100%)	0(0.0%)	
Educational Level	Uneducated	22(26.2%)	26(31.0%)	28(33.3%)	8(9.5%)	
	Primary	29(35.8%)	22(27.2%)	25(30.9%)	5(6.2%)	
	Secondary	10(20.0%)	25(50.0%)	15(30.0%)	0(0.0%)	0.000

	Tertiary	9(15.0%)	37(61.7%)	14(23.3%)	0(0.0%)	
	Total	70(25.5%0	110(40.0%)	82(29.8%)	13(4.7%)	
Social Class	1	14(20.3%)	33(47.8%)	21(30.4%)	1(1.4%)	
	2	52(27.7%)	68(36.2%)	56(29.8%)	12(6.4%)	0.331
	3	4(22.2%)	9(50.0%)	5(27.8%)	0(0.0%)	
	Total	70(25.5%)	110(40.0%)	82(29.8%)	13(4.7%)	
Ethnicity	Yoruba	59(22.7%)	108(41.5%)	80(30.8%)	13(5.0%)	
	Hausa	3(100%)	0(0.0%)	0(0.0%)	0(0.0%)	
	Igbo	8(66.7%)	2(16.7%)	2(16.7%)	0(0.0%)	0.002
	Total	70(25.5%)	110(40.0%)	82(29.8%)	13(4.7%)	
Location	Rural	19(24.7%)	33(42.9%)	19(24.7%)	6(7.8%)	
	Urban	51(25.9%)	76(38.6%)	63(32.0%)	7(3.6%)	0.559
	Others	0(0.0%)	1(100.0%)	0(0.0%)	0(0.0%)	
	Total	70(25.5%)	110(40.0%)	82(29.8%)	13(4.7%)	

Obese participants were found in about one third (38.5%) of the females, age group 51-60 had the highest proportion (35.7%), about one half (50.0%) of the separated, about one third (33.3%) of participants, with no level of education, social class 1 with 30.4%, Yoruba ethnicity with 30.8%, Urban dwellers with 32.0%. A statistically significant association was found between age group, sex, marital status, religion, educational level and ethnicity.

Table 4: Association between Medical History and BMI

Medical History		**Normal weight**	**Overweight**	**Obese**	**Underweight**	**P-value**
Duration of diagnosis in years	<5	56(31.1%)	66(36.7%)	54(30.0%)	4(2.2%)	
	6-10	5(10.4%)	26(54.2%)	17(35.4%)	0(0.0%)	0.000
	>10	9(19.1%)	18(38.3%)	11(23.4%)	9(19.1%)	
	Total	70(25.5%)	110(40.0%)	82(29.8%)	13(4.7%)	
Hypertension	Absent	16(18.8%)	38(44.7%)	31(36.5%)	0(0.0%)	
	Present	54(28.4%)	72(37.9%)	51(26.8%)	13(6.8%)	0.015
	Total	70(25.5%)	110(40.0%)	82(29.8%)	13(4.7%)	

Proportion of obese participants was highest among the participants who had been diabetic for 6-10 years (35.4%), and those without hypertension (36.5%).
A significant association was found between duration of diagnosis of diabetes and hypertension

Discussion

Obesity is prevalent in patients with Type 2 diabetes mellitus and both has already become a worldwide epidemic with significant health and economic burdens[8]. The prevalence of obesity in this study was 29.8%. this was close to 28.8% and 27.4% found by Al-Sharafi et al[8] in Yemen and Gezawa et al[13] in Northern Nigeria. An higher prevalence of 40.1%, 49.5%,55.5%, 57.7% and 58.6% were found in other studies [4],[10],[11],[19],[20] while Parajuli et al[3] in Nepalgunj found a significantly very low prevalence of 4.2%. A prevalence which was half (14.4% and14.8%) of our finding was found by Basukala et al[2] and Obirikorang et al[15] while a slightly more than half of our prevalence (18.8%) was found by Bizuayehu et al.[16] This

study agreed with other studies reviewed that prevalence of obesity was higher in females than male counterpart[2],[3],[8],[15],[16],[19],[21]. This may be due to childbearing, hormonal status, high female illiteracy rate and cultural practices that limit physical exertion by females.[3]

Age group above 60 years had highest number of participants (41.8%). This may be because of improvement in standard of living seen over the past few years in Nigeria which resulted in aging of its populace[13]**.** This finding agrees with Gezawa et al[17] who observed increasing prevalence of diabetes mellitus with age. However, Obirikorang et al[15] in Ghana found a higher proportion among age group slightly lower than what was found in our study. A statistically significant association was found between age group of the patient and body mass index. This was in agreement with finding by Kasimu et al[4] in North- West Nigeria.

Female sex was more than half of the study participants. This may be because famales seek hospital care better than males. This agrees with findings in other studies[4],[13],[22] but in contrast to the findings in Jeddah,[23] Markurdi[21] and Maiduguri[17]. A significant association was found between the sex of the patient and their body mass index. This was supported by other researchers[4],[15],[16],[19]. The married constituted more than three quarter of the study participants and this agrees with Murad et al.[23] A significant association was found between marital status and BMI in this study.

Most of the study participants had no or only primary level of education and belong to social class 2. This may be because majority of the people in the study area were artisan and farmers. Gezawa et al[17] found highest prevalence of diabetes among participants in low socioeconomic class. However, only the educational level had a significant association with BMI in this study. This was found to be contrary by Damian et al[19] in Northern Tanzania. About two third of the participants dwell in the urban area. This may lead to nutrition transition and increasing sedentary lifestyle but there was no significant association found in this study as also confirmed by Damian et al.[19] Majority had duration of treatment less than 5 years and a significant association was observed with the BMI. This agrees with Vasanthakumar et al[10] in Belagavi.

Majority of study participants had hypertension. This may be because hypertension and obesity are significant risk factors for Type 2 diabetes. There was a significant association between this and BMI. This was corroborated by Bizuayehu et al[16] in an institutional based cross sectional study of 314 patients in Southern Ethiopia who found that BMI was strongly associated with systolic blood pressure and Vasanthakumar et al[10] in Urban area of Belagavi studied 380 patients and found an association with hypertension.

Conclusion

The prevalence of obesity among adult outpatients with Type 2 diabetes found in this study was high and was associated with age group, sex, marital status, educational level, duration of diagnosis of diabetes and level of blood pressure. Therefore, effort should be intensified to control obesity and achieve optimal blood pressure control among diabetic patients to prevent complications from ensuing.

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