

# Prevalence of Obesity among Type 2 Diabetic Patients Attending Diabetes Clinics in Sokoto Northwestern Nigeria

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## Abstract

Diabetes, is a metabolic disease, and is one of the most common endocrine disorders affecting almost 6% of the world's population. This study intends to determine the prevalence of obesity and risk factors among type 2 diabetic patients, with the aimed of providing some possible measures to the finding in order to improve the level of health care rendered to the patients. This was a hospital-based retrospective study carried out at metabolic clinic of Department of Chemical-Pathology of Usman Danfodiyo University Teaching Hospital, Sokoto Nigeria, from 1<sup>st</sup> January 2018 to 31<sup>st</sup> December, 2018. Patients with clinical features of type 2 Diabetes, who were on follow up, were recruited. Data were extracted from the chemical pathology register, other clinical parameters extracted from the patients case folder, entry and validation was done using Microsoft excel version 13. The data were exported it into SPSS version 23.0 (Chicago IL) for windows; for statistical analysis. Numerical data were summarized using measures of central tendency with their respective measures of dispersions. Frequency and percentages were used to summarize categorical data. There where a total of 182 type 2 diabetes mellitus patients confirmed during the study period, the mean age of patients was 53.2, with  $SD \pm 16.9$ , and the age range of (21-87 years) respectively, the peak age incidence occurred within 60-69 decade of life which accounted for 27.5%. More than two-third of patients (n=116, 63.7%) were females. While (n=66, 36.3%) were males. More than half of the study participants (n= 148, 81.3%) were overweight or obese at diagnosis of type 2 diabetes. The study showed that BMI is strongly associated with risk of being diagnosed with overweight or obese, high prevalence of overweight or obesity was observed in female patients as compared to their males counterparts 70.3%. Therefore, education on the complications of obesity and DM is very important to the diabetic patients.

**Keywords:** Diabetes, metabolic disease, Microsoft excel.

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## INTRODUCTION

Diabetes, is a metabolic disease, and is one of the most common endocrine disorders affecting almost 6% of the world's population[1]. 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[2]. Although the dramatic worldwide increase in the incidence of obesity and consequently in the incidence of type 2 diabetes, has been recognized, the exact etiologic link between these remains unclear. The prevalence of obesity has increased dramatically in industrialized and developing countries [3-5]. The enormous economic health cost of obesity, locates it among the most health care problems. Overweight and obesity are often determined by calculating the body mass index (BMI). Higher BMI is

associated with a higher risk of death by cardiovascular disease[6]. BMI does not reflect body fat distribution, whereas the intra-abdominal deposition of adipose tissue is a major contributor to the development of hypertension, insulin resistance, DM and dyslipidemia[7]. Obesity is prevalent in patients with type 2 diabetes mellitus (type 2 DM). In some areas such as the United Kingdom, approximately 86% of patients with type 2 DM are overweight or obese[8]. Saudi Arabia, the prevalence of the BMI  $\geq 25$  among patients with type 2 DM is around 87.5% and females had a higher prevalence of the BMI  $\geq 25$  (87.7%) in contrast to males (83.1%)[9]. Both obesity and diabetes are related multifactorial, complex diseases and a large proportion of the cases are preventable. Both conditions significantly raise the risk for cardiovascular disease (CVD) and stroke. In fact, the American Heart Association has identified body mass index of  $<25$  kg/m<sup>2</sup> and a fasting plasma glucose concentration of

<100 mg/dL as part of a construct of ideal cardiovascular health[10]. This study is aimed at examining the association between age, gender of the patients, and the body mass index (BMI) of the diabetics' patients in Sokoto Nigeria, in agreement with World Health Organization standard reference.

## MATERIAL AND METHODOLOGY

This was a hospital-based retrospective study carried out at the metabolic clinic of Department of Chemical-Pathology and Endocrinology of Usman Danfodiyo University Teaching Hospital, Sokoto. From 1<sup>st</sup> January 2018 to 31<sup>st</sup> December, 2018. Patients with clinical features of type 2 Diabetes, who were on follow up, were recruited. Data were extracted from the chemical pathology register, other clinical parameters extracted from the patients case folder, entry and validation was done using Microsoft excel version 13. The data were exported it into SPSS version 23.0 (Chicago IL) for windows; for statistical analysis. All variables were coded as binary dummy variables. For example gender (males = 1, females = 2), and so on. Age were categorized in to seven groups (20-29:80-89 years older), numerical data were summarized using measures of central tendency with their respective measures of dispersions. Frequency and percentages were used to summarize categorical data. Chi square test ( $\chi^2$ ) was used to determine association in prevalence of obesity and overweight by demographic characteristics. Bivariate logistic regression analysis was used to determine patient's characteristics predicting overweight/obesity among study population. Odds ratio (OR) with their corresponding 95% confidence intervals (CIs) were used to determine the strengths of association in a Bivariate analysis. P value < 0.05 was considered statistically significant.

## RESULT

A total of 182 type 2 diabetes mellitus patients confirmed during the study period. The overall mean age of patients was 53.2, with  $SD \pm 16.9$ , and the age range of (21-87 years) respectively, More than two-third of patients (n=116, 63.7%) were females with mean age of  $56.2 \pm 15.9$ . While (n=66, 36.3%) were males  $48.1 \pm 17.5$  years. The overall average of BMI was  $30.8 \pm 6.5$ , with regards to gender of the participant the

mean of BMI was significantly higher in females ( $32.1 \pm 5.9 \text{ kg/m}^2$ ) than in males ( $27.3 \pm 6.2 \text{ kg/m}^2$ ). Table 1: Shows the demographical characteristics of the participants, the peak age incidence was occurred within 60-69 decade of life which accounted for 50(27.5%), followed by 50-59 age group which accounted for 40 (22%) the lest age group affected occurred

With the age range of 40-49, and 80-89 years which had equal proportion 13(7.1%) each. The median duration of diagnosed type 2 DM was 4months, while most of the patients had been diagnose within 3-5 months accounting for higher percent 50%. In this study out of 182 diabetics patients confirmed, 34(18.7%) were diagnosed not overweight or obese. from the above observation 22(64.7%) were males, and 12(35.3%) were females identified not overweight or obese. More than half of the study participants (n= 148, 81.3%) were overweight or obese at diagnosis of type 2 diabetes. High prevalence of overweight or obesity was observed in female participants as compared to their male's counterparts i.e. 104(70.3%), vs. 44(29.7%). Among 148 patients, 43(25-29.9 $\text{kg/m}^2$  = 40%) were overweight and 105 ( $\geq 30 \text{ kg/m}^2$  60%) were obese. Table 2, shows the crosstab of age and gender of diabetic patients, the commonest group affected occurred within 6<sup>th</sup> -7<sup>th</sup> decade of life. However result indicated that females had the higher proportion that males [63/182 =34.6%], and [27/182 =14.8%]. Table 3. Illustrated the association between the age and BMI, where result indicated that there is a significant relationship between the age and BMI, considering the p-value ( $\chi^2 = 30.148$ , P=0.04). This shows that the more the age increase, the more likely to be overweight or obese. There was statistically significant association between obesity with gender ( $\chi^2 = 14.634$ , P=0.001) Table 4. Indicated the bivariate logistic regression analysis, the result showed females had 70.3% percent in odds of being overweight/obese compared to males [OR = 0.231; 95% CI 0.105–0.507]. Furthermore, the prevalence of overweight or obese was highest in patients aged >40 years (79.1%) comparing to those less than or equal 40 years (20.9%). Patients  $\geq 40$  years had higher odds of being overweight or obese compared to those less than or equal 40 years [OR = 4.246; 95% CI 1.944–9.273].

**Table -1: Demographical and clinical characteristics of type 2 diabetic patients**

Age distribution	Frequency	Percent
20-29	23	12.6
30-39	24	13.2
40-49	13	7.1
50-59	40	22
60-69	50	27.5
70-79	19	10.4
80-89	13	7.1
Total	182	100
<b>Duration since diagnosed with obesity</b>		
≤2	46	25.3
3-5	91	50
6-10	37	20.3
11+	8	4.4
Total	182	100
<b>BMI</b>		
<18.5kg/m <sup>2</sup>	2	1.1
18.5-24.9kg/m <sup>2</sup>	32	17.6
25-29.9kg/m <sup>2</sup>	43	23.6
≥30kg/m <sup>2</sup>	105	57.7
<b>Total</b>	<b>182</b>	<b>100</b>

**Table-2: cross-tabulation of Age and Gender of type 2 diabetic patients**

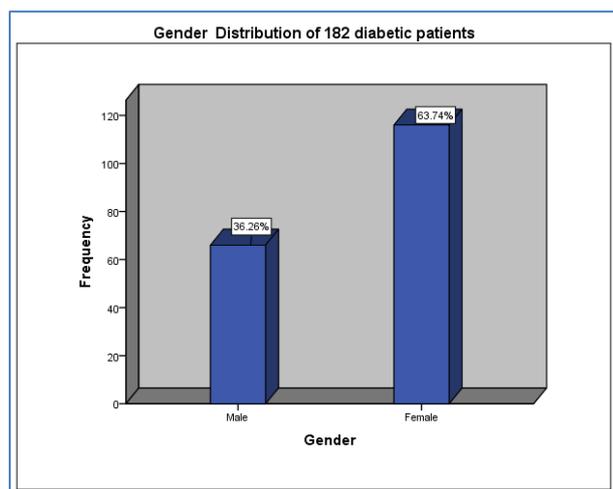
Age	Male	Female	Total
20-29	13	10	23
30-39	13	11	24
40-49	5	8	13
50-59	11	29	40
60-69	16	34	50
70-79	6	13	19
80-89	2	11	13
<b>Total</b>	<b>66</b>	<b>116</b>	<b>182</b>

**Table-3: Association between age and BMI of diabetic patients**

Age	<18.5kg/m <sup>2</sup>	18.5-24.9kg/m <sup>2</sup>	25-29.9kg/m <sup>2</sup>	≥30kg/m <sup>2</sup>	Total	X <sup>2</sup>	P-value
20-29	1	9	7	6	23	30.148	0.04
30-39	0	7	8	9	24		
40-49	0	1	2	10	13		
50-59	0	3	8	29	40		
60-69	0	6	13	31	50		
70-79	1	3	3	12	19		
80-89	0	3	2	8	13		
Total	2	32	43	105	182		

**Table-4: Prevalence of overweight and obesity according to demographic characteristics**

Characteristics	Total	Overweight/Obesity		OR	CI
		No	Yes		
Gender					
Male	66	22(33.3%)	44(66.7%)		
Female	116	12(10.3%)	104(89.7%)	0.231	0.105-0.507
Age					
≤40 years	49	18(36.7%)	31(63.3%)		
>40years	133	16(12%)	117(88%)	4.246	1.944 - 9.273



## DISCUSSION

Based on the findings from this study; the results revealed that females were the preponderance (63.7%) among the diabetic patients in our center. This finding did not correspond to other findings from the southern part of the country where the diabetic patients had equal proportion in gender[11]. In this study the mean age of diabetic patients was found to be 53.2, furthermore this was slightly similar with other finding in the same country[12]. Generally study observed high prevalence of (81.3%) of overweight/obesity among type 2 diabetic patients who were attending care clinics in these setting. This finding is in line with those reported from both population and facility-based studies conducted in Saudi Arabia [13-15], United States[16], United Kingdom[17], Iran[18], Yemen[19], and Ghana[20]. The research found higher prevalence of overweight or obesity in female participants as compared to their male's counterparts i.e. 104(70.3%), vs. 44(29.7%). This may be due to lack of physical activities such as exercise. This investigation is corroborated with the finding from Tanzania[21]. We found that there is a significant relationship between the age and BMI, ( $\chi^2 = 30.148$ ,  $P = 0.04$ ). This shows that the more the age increase, the more likely BMI to increase which would lead to be overweight or obese. There was statistically significant association between obesity with gender and age. ( $\chi^2 = 14.634$ ,  $P = 0.001$ ). In contrast this finding is not similar to an earlier study from neighboring state Kano, Nigeria[22].

In conclusion this study showed high prevalence of overweight and obesity among diabetic patients, whereby females had the enormous proportion than the males, therefore education, and public awareness, are very important key concept to be considered.

Future population studies in these regions are required to provide further insight into the geographic patterns of obesity among diabetics' patients.

## CONCLUSION

The study showed that BMI is strongly associated with risk of being diagnosed with overweight or obese, high prevalence of overweight or obesity was observed in female patients as compared to their male's counterparts 70.3%. Therefore education on the complications of obesity and DM is very important to the diabetic patients.

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