East African Scholars Journal of Medical Sciences
Abbreviated Key Title: East African Scholars J Med Sci
ISSN: 2617-4421 (Print) & ISSN: 2617-7188 (Online)
Published By East African Scholars Publisher, Kenya

Volume-5 | Issue-7 | July-2022 | DOI: 10.36349/easms.2022.v05i07.003

OPEN ACCESS

Original Research Article

Overweight and Type II Diabetes among the Elderly Middle Belt Nigerians

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Article History
Received: 23.04.2022
Accepted: 31.05.2022
Published: 21.07.2022

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Background***: The increasing rate of obesity and type-2 diabetes (T_2DM) are impending major threats to the health of African Population but the magnitude of the two in middle age Nigerians is not known. We assessed the burden of obesity and T_2DM among elderly middle belt Nigerians. ***Methods***: A cross sectional prospective study was conducted among the population living in Lafia town. After biodata and clinical examination, including arthrometric measurements of weight and height was conducted. Standard BMI was calculated. A casual glucose and fasting blood glucose was determined using serum enzymatic glucose oxidase method. The diagnostic criteria were taken as fasting glucose at ≥ 7.0mmol/L and casual glucose at ≥ 11.1mmol/L. ***Results***: In Lafia town the prevalence of Class I obesity was 62.6% there is a perfect correlation of 1.000 between BMI and glucose, meaning that as the BMI of a person increases, blood glucose concentration always increases and vice versa. The correlation between age and glucose concentration (0.0447) reflects a very weak positive relationship, indicating that BMI may differ at different ages. i.e. as the age of a patient increases, there is a slight tendency that the BMI may also increase. ***Conclusion****:* This study showed high risk of T_2DM and obesity among middle belt Nigerians living in Lafia town due to sedentary lifestyle and lack of exercise in addition to indiscriminate diet. There is need for regular screening for diabetes and hypertension. Use of portable electronic BP machine is advocated. There should be lifestyle modification like regular exercise, control of excessive alcohol intake and dietary advice.

Keywords: obesity, diabetes, T2DM, clinical examination.

Abbreviations
BMI - Body Mass Index
T_2DM - Type-II Diabetes Mellitus Obesity

INTRODUCTION

Overweight and especially obesity, particularly at young age, substantially increase risk of diagnosed diabetes while the impact on diabetic risk life expectancy duration diminishes with age [1].

Type 2 diabetes mellitus (T_2DM) comprises about 80-94% of all diabetes cases and its prevalence has been steadily increasing. Obesity, classified as body mass index (BMI) ≥ 30kg/m^2, is a known predictor of T_2DM and has become a major public health problem in the US, affecting over one-third (35.7%) of the population [3]. The rise in prevalence of obesity among all age diet, and urbanization-explain the rising of diagnosed type-2 DM [4].

It is clear that increased body weight is a risk factor for type-II DM, the relationship between body weight and Type is more properly attribute to the quantity and distribution of body fat (adiposopathy). Increase adipose tissue distribution leads to peripheral insulin resistance leading to T_2DM. That is why decreasing weight proportionally lower blood glucose levels.

The clinical value of measuring BMI from a diabetes perspective lies the whether this measure can

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identify individuals who may have undiagnosed diabetes or may be at increased future risk for diabetes. In addition measuring BM1 also is important for managing diabetes for the purpose of weight control [4-6].

BMI cut off have been established to identify overweight (BMI ≥ 25kg/m^2) or obese (BMI > 30kg/m^2 individual).

The prevalence of excess boy weight has increased dramatically in the United States in the past 50 years. In 2010, 69.2% of the US adult population had a body mass index (BMI) above normal levels. Among adults older than age 60, the prevalence of excess weight was even higher. Adult obesity is predicted to rise by 33% in the next 2 decades, with a prevalence of severe obesity rising by 130%.

A study in Ghana showed a high risk of obesity and T_2DM among sub-Sahara Africa living in Europe [9].

In Nigeria, puppet *et al*., found over-weight to be 22.6% prevalence in Jos and appear to the increasing. This presence study is aimed at assessing the present effect of BMI1 on diabetes in Jos [10].

This study is aimed at exploring the threshold and onset of Diabetes mellitus at various age group.

MATERIALS AND METHOD

Sampling Data Collection and Analysis

This is a cross sectional prospective study covering Lafia metropolis and all the neighboring villages. Seven Hundred (700) elderly participants mostly retired civil servants in Lafia with age range 0f 40-90 years.

Both males and females were recruited into study. Physical examination was carried out by the authors. The weights of the subjects were measured to the nearest kilogram with a Hanson type bathroom weighing scale. The height was measured to the nearest centimeter. The body mass index (BMI) was calculated and recorded. Classification of BMI was done according to the recommendations of the WHO expert committee for the classification of overweighting [10].

Venous blood (2.5ml) was collected into fluoride oxalate and transported to the chemical pathology laboratory in Shalom Hospital. The WHO diagnostic criteria of casual blood glucose level ≥ 11.1mmol/L and fasting glucose value ≥ 7.0mmol/L.

Statistical Analysis

The data obtained were coded and entered into Stata Software for analysis. The data are presented as mean ±S.D. comparison was done by student's t-test for continuous variables.

The coefficient of variation for the glucose estimations was 6.4% at 5.6mmol/L and 2.1% at 18.3mmol/L.

Ethical Consideration

The study was conducted with adherence to ethical standards; informed consent was used in the recruitment of participants. Approval for this study was obtained from Ethics Committee of JUTH; confidentially was maintained in accordance with standard medical practice.

RESULTS

This study of 700 elderly Nigerian showed the following result. The glucose (mmol/L) levels and the weight (kg) and height (m), ages (years) Blood pressure (mmHg) and gender of all the participants reveal this results below.

Table 1

	BP	**BMI**	**Diabetes**
BP			
BMI	0.1183		1.000
Glucose	-0.0236		
Age	0.1284	0.0447	-0.0593
Gender	-0.0678	0.0149	-0.0274

From table one above, there is a perfect correlation of 1.000 between BMI and glucose, this means that as the BMI of a person increases, a glucose concentration always increases also.

The correlation between BP and BMI was 0.1183 meaning as the BMI increases the BP of the patient will slightly increase.

The correlation between age and BP (0.1284) reflects a positive relationship, indicating that as the age of a person increases, there is a tendency that the BP will also increase.

The correlation between age and glucose concentration (0.0447) reflects a very weak positive relationship, indicating that BMI may differ at different ages. i.e. as the age of a patient increases, there is a slight tendency that the BMI may also increase.

The correlation between BP and Diabetes reflects a weak negative relationship indicating that as the Blood pressure of patients increases there is a slight tendency that they won't be diabetic.

Table 2: BMI Class and population

	Underweight	Normal	Overweight	Class I Obesity	Class II Obesity	Class III Obesity
	< 18	18-24	25-29	30-34	35-39	≥ 40
Population	37	220	362	50	28	3
% Population	4.03	24.43	62.60	5.45	2.73	0.53

From the table above overweight have the highest percentage population of 62.6 Class I (2.73%) with least in Class II (0.3%).

Table 3: Glucose values and corresponding population

Glucose (mmol/L)	1-5	6-10	11-15	16-20
Population	100	230	78	6
% Population	10.91%	25.08%	8.51%	0.65%

In Table 3 the glucose concentration in mmol/L was classified into new diabetic range of 1-5mmols and the prediabetes and diabetic range i.e. 6-10, 11-15.

The highest population falls into the range of 6-10mmol/L and the diabetic range is 11-15mmol giving us 8.51% population as diabetics.

Diagnosed diabetes fallen as casual glucose of 11.1mmol/L

Histograms

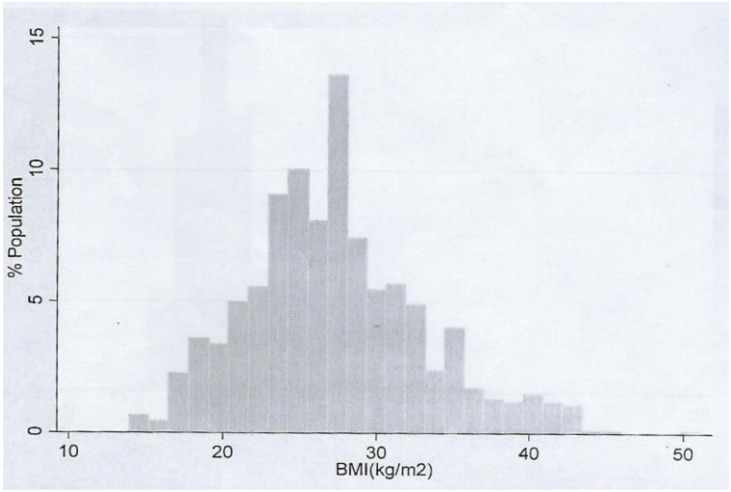

Fig 1: Body Mass Index

Fig 1 is a histogram showing the percentage of patients BMI

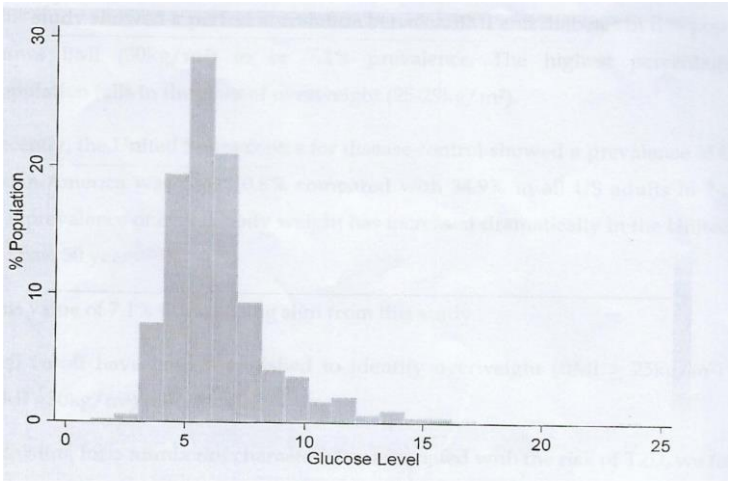

Figure 2: Histogram showing percentage of population glucose level

DISCUSSION

This study showed a perfect correlation between BMI and diabetes in this population. It shows BMI (30kg/m^2) to be 7.1% prevalence. The highest percentage (62.6%) population falls in the class of overweight (25-29kg/m^2).

Recently, the United States centre for disease control showed a prevalence of obesity in Asian-America was only 10.8% compared with 34.9% in all US adults in 2011-2012 [12]. The prevalence of excess body weight has increased dramatically in the United States in the past 50 years [12-14].

This value of 7.1% is a warning sign from this study. BMI cutoff have been established to identify overweight (BMI ≥ 25kg/m^2) or obese (BMI ≥ 30kg/m^2) individuals.

Adjusting for a number of characteristics associated with the risk of T_2DM, we found that, compared with normal BMI, overweight and obesity was statistically significantly associated with the risk of being diagnosed with T_2DM among individuals without any other prior evidence of T_2DM.

We further found that the risk of a T_2DM diagnosis was increasing larger for individuals in higher BMI categories than for individuals in lower BMI categories [15-17].

These results agrees with other studies that have examined the association between BMI and risk of T_2DM using nationally representative samples. For example, using data from the 2001 Behavioral Risk Surveillance System.

Furthermore, found statistically significant and increasingly larger ORs and T_2DM among overweight adults (1.59, 95% C1: 1.46-1.73) adults with BMI between 30 and 39.9kg/m^2 (3.44, 95% C1: 3.17-3.74), adults with BMI ≥ 40kg/m^2 (7.37, 95% C1: 6:39-8.50) relative to adults with normal BMI (20) [18-20].

Moreover, BMI values were clinically measured in the current study, compared with BMI calculated from self-reported height in those earlier studies. Self reported weight and height considerably underestimate the individuals measured BMI and many thus have weakened the association between obesity and risk of T_2DM and/or biased the estimated results. This may explain the lower ORs associated with BMI levels in the Mokdad, *et al* study compared to the current study [21, 22].

The risk of developing T_2DM for individuals who were overweight or obese was about 1.5-5 times higher than for individuals with normal BMI, as estimated in our study. This demonstrates the importance of continuous weight management, which not only can reduce the disease burden of obesity but also may prevent further progression to T_2DM weight management is particularly important for people with severe obesity who never disproportionally at higher risk.

The influence of time and modernization may explain the difference between these two studies. Advancing age was another identified independent risk factor for diabetes, which was more prevalent in subjects aged 50years and above. Johnson and McLarty *et al*., found that the peak incidence of diabetes in Nigeria and Tanzania, respectively was after 45-50years of age. It is well known that the prevalence of diabetes increases with age [19]. In Nigeria, the risk of diabetes increases 3-4 folds after the age of 44years [11]. The worsening of insulin resistance with age and increasing longevity of diabetic patients due to improved care, all contribute to the rising prevalence of type-2 diabetes with age [14-19].

Physical inactivity is a well-known risk factor for type-2 diabetes. The risk of diabetes is reduced by 50% among men who take moderately vigorous exercise. This suggests that not all diabetes is the same or that other factors markedly influence its impact on health.

The cardiovascular sequelae of diabetes may differ, depending on whether the diabetes is hyperinsulinemic, early or late in onset caused by some known cause, or treated or untreated.

Some studies of cigarette smoking among diabetics have been punished [20-22]. The finding of reduced cigarette consumption among diabetic males appears to be unique.

In general, it does not appear that diabetics cope less well with risk factors than do non-diabetics. Although the present analysis is based on a limited number of diabetics, the evidence of consistently against interaction between diabetes and cardiovascular risk factors.

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Cite This Article: Affi Ayuba, Dalili shabbal Mohammed, longwap AS, Solomon mercy Gunat, Daniel Aina Olagoke (2022). Overweight and Type II Diabetes among the Elderly Middle Belt Nigerians. *East African Scholars J Med Sci*, *5*(7), 205-209.