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Nutritional Status and Factors Influencing Blood Sugar Self-Management of T2DM Patients in State Hospital Abeokuta

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ABSTRACT

Diabetes Mellitus is a chronic metabolic condition of public health concern, Nigeria included. This study aimed to assess nutritional status and identify factors influencing blood sugar self-management in patients with Type 2 diabetes in a government hospital in Abeokuta, Nigeria. The primary objective was to provide insights into this critical aspect of diabetes care in Nigeria. A cross-sectional study was conducted in government-owned State Hospitals in Ogun State, Nigeria. Data was collected using a structured questionnaire, covering socio-demographic characteristics, dietary patterns, self-management attitudes, and biochemical parameters. Descriptive statistics, chi-square analysis, and contingency table analysis were employed to analyze the data. Results showed that 78% of respondents reported a lack of financial resources, 58.7% cited insufficient education, 55.3% reported negative primary care experiences, and 52.7% reported poor glycemic control as a significant barrier to self-management of Type 2 Diabetes. Nutritional counseling, lifestyle modifications, and regular check-ups are crucial for patients. Further research should explore self-management factors in different geographical areas to provide comprehensive solutions for diabetes management.

Keywords: Nutritional status; Glycemic control; Self-management; Obesity; Type 2 diabetes.

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INTRODUCTION

Diabetes Mellitus is a chronic metabolic disorder of public health concern and one of the top four non-communicable diseases (NCDs) on the agenda of the United Nations **(UN, 2015)**. Diabetes mellitus (DM) was termed 'the fastest growing global health emergency' by the International Diabetes Federation, in 2019 **(Tönnies *et al.*, 2021)**. The federation further stated that the 463 million cases reported globally in 2019 were expected to increase by 51% in 2045; with a much higher increase of 143% expected in Africa. Type 2 diabetes together with all other forms of diabetes results in approximately 1.5 million deaths globally **(WHO, 2016)**.

A high prevalence of DM complications including kidney failure, heart attack, and other cardiovascular complications has also been reported among Nigerians **(Agofure *et al.*, 2020)**. Nigeria has the highest burden of the disease in Africa, with about 1.7 million individuals living with type 2 diabetes (T2D) in 2006 with this count projected to rise to 4.8 million by 2030 **(WHO, 2006)**.

Studies show that patients who received self-management training have improved self-management of blood glucose, dietary habits, and glycemic control **(Reyes *et al.*, 2017)**. Self-management activities include self-monitoring blood glucose, making healthy lifestyle choices, preventing diabetes complications (self-monitoring of foot health; active participation in screening for eye, foot, and renal complications; and immunizations), and setting self-selected behavioral goals **(Akhtar, 2008)**.

Optimum self-care practice in diabetes is associated with improved glycemic control, prevention of cardiovascular risk factors such as hypertension, decrease in unnecessary healthcare utilization, and improved diabetes-specific quality of life. Nevertheless, many patients face challenges in implementing the recommended diabetes self-care practices **(Gurmu *et al.*, 2018)**. Diabetes self-management may place a significant and overwhelming strain on the patient and the healthcare system **(Dahiru *et al.*, 2008)**. Previous study showed that the majority of persons in the semi-urban/rural areas were unfamiliar with diabetic self-management **(Dahiru *et al.*, 2008)**.

According to **Enikuomehin *et al.*, 2021**, the degree to which individuals with diabetes adhered to recommended self-care practice components was less than satisfactory. Nevertheless, we have little information concerning factors that could influence the diabetes patient's engagement in self-care practice in this country and especially there.

Furthermore, studies exploring the factors influencing diabetes self-management, particularly in Abeokuta are scarce. Hence, this study aims to assess nutritional status and identify the factors influencing blood sugar self-management in patients with type 2 diabetes in government hospital Abeokuta. This study provides holistic evidence about the factors influencing blood sugar self-management among patients with Type 2 diabetes in State Hospital Abeokuta.

MATERIALS AND METHODS

Study Area

The research was carried out at State Hospital Ijaye, Sokenu, Abeokuta, Ogun State. The investigation was conducted within the outpatient clinics of five government-owned State Hospitals in Ogun State, namely State Hospitals Abeokuta, Ota, Ijebu-ode, Ilaro, and Isara-Remo. These state hospitals offer a comprehensive range of primary and secondary healthcare services to the state's residents and the general public.

Study Design

In this study, a descriptive cross-sectional design was employed. The primary objective of the study was to provide a detailed account of the respondents' characteristics, encompassing sociodemographic and socioeconomic aspects, as well as their food consumption patterns and anthropometric indices.

Study Population

The research was centered on individuals aged 18 to 70 who have been diagnosed with diabetes mellitus and were receiving care at State Hospital Abeokuta.

Sampling Techniques

The research employed a multi-stage sampling approach to ensure a representative sample. In the first stage, State Hospital Abeokuta, Ijaye, the largest among government-owned hospitals in the area, was purposively chosen due to the scarcity of diabetic patients in other hospitals. In the second stage, a simple random sampling method was used to select participants with type 2 diabetes from the outpatient department of State Hospital Abeokuta, Ijaye, ensuring a diverse and relevant sample. This approach enhanced the research's validity and comprehensiveness.

Sample Size Determination

The sample size for this study was determined using a formula appropriate for known populations, as the number of patients attending the hospital was known. The formula used was: $n = N / (1 + N(e)^2)$, where 'n' represents the sample size, 'N' is the estimated population, and 'e' is the marginal error. Given an estimated population of 240 patients and a marginal error of 0.05, the sample size was calculated as follows: $n = 240 / (1 + 240(0.05)^2)$, resulting in a sample size of 150.

Eligibility Criteria

Participants in the study must be registered outpatients at the general outpatient department of State Hospital, Abeokuta, aged 18 to 70 years, willing to participate, and in good health at the time of data collection.

The individual below the age of 18, those with disabilities affecting anthropometric measurements, critically ill patients, and those who decline consent are not eligible for the study.

Data Collection

The data collection for this study involved the use of a well-structured semi-structured questionnaire. The questionnaire was designed to align with the study's objectives and was divided into several sections:

Section A: Socio-economic and Socio-demographic Characteristics of the Respondents

An interviewer-administered semi-structured questionnaire was used to collect data on the aforementioned characteristics of study participants.

Section B: Self-management Attitude of Respondents

Data was collected using a self-report measure, specifically the diabetes self-management questionnaire-revised (DSMQ-R) designed for both type 1 and type 2 diabetes **(Schmitt *et al.*, 2022)**.

Section C: Biochemical Characteristics of the Respondents

This section included parameters like FBS (Fasting Blood Sugar), RBS (Random Blood Sugar), and OGTT (Oral Glucose Tolerance Test), which were obtained through standardized testing procedures as per the guidelines explained by **Mathew *et al*. (2023)**. Additionally, HBA1c was collected as secondary data.

Section D: Assessment of Respondents Using Anthropometric Measurements

Anthropometric measurements of height, weight, waist circumference, hip circumference, and the calculation of body mass index (BMI) and waist-to-hip ratio (WHR) were taken. These measurements were conducted following the standardized procedures outlined by **Casadei and Keil (2022) and the World Health Organization (WHO)**.

Ethical Approval

The State Hospital in Ijaiye, Ogun State's Ethical Review Boards granted the study ethical approval. The hospital's medical/research director was consulted for approval before the study was carried out. Informed written consent was taken from individual respondents before the questionnaire was administered. The study data was kept confidential and used strictly for research purposes. The Declaration of Helsinki's guiding principles were followed in both the study protocol and conduct.

Data Analysis

Data was statistically analyzed with descriptive statistics using Statistical Product and Service Solutions (SPSS version 27). The descriptive variables were represented using descriptive statistics, such as frequency, means, standard deviations, etc. Scores on self-management were graded as excellent, fair, or bad rating. The Chi-square was used to test for statistical significance, and cross-tabulation was used to evaluate associations between dependent and independent variables.

RESULTS

Socio-demographic and Socio-economic Characteristics of the Respondents.

Table 1 gives a breakdown of the socio-demographic and socio-economic characteristics of the respondents. More than half of the respondents (52.7%) were male. Similarly, over half of the respondents (56.7%) were above 50 years, having 22% and 34.7% fall between the age range of 51-60 and 61 years and above respectively. The majority (59.3%) of respondents were married and 40.0% of them had a tertiary level of education. Most (58.7%) of the respondents were Christians, 26.0% of the respondents were traders, and about half (44.7%) of them earn ₦50,000 naira or less monthly.

Anthropometric Characteristics of the Respondents.

Table 2 shows the Anthropometric characteristics of the respondents. Nearly half (44.7%) of the participants exhibited a healthy body mass index. A third (33.3%) were classified as overweight, while 16.7% fell into the obese category, encompassing Grades I, II, and III. A small minority (5.3%) were categorized as underweight. Furthermore, the waist-to-hip ratio result shows that the majority (52.1%) of the female respondents had high (prominent) abdominal obesity and were at risk of developing of cardiovascular disease while almost half (41.8%) of the male respondents had high abdominal obesity and were at high risk of developing of cardiovascular disease. The result of the waist circumference revealed that only a few (11.8%) of the male respondents have a low risk of developing cardiovascular disease while it also shows that the majority of the female respondents were at risk of cardiovascular disease. The statistical analysis found no significant difference in waist-to-hip ratio between the male and female respondents while

statistical analysis found that a significant difference exists in waist circumference between the male and female respondents.

Table 1: Socio-demographic and economic characteristics of the respondents

Variables	Frequency	Percentage	Mean
Gender			
Male	79	52.7	
Female	71	47.3	
Age			
≤ 40	34	22.7	
41-50	31	20.7	
51-60	33	22.0	53.32
> 60	52	34.7	
Marital status			
Single	22	14.7	
Married	89	59.3	
Divorced	15	10.0	
Widow	18	12.0	
Separated	6	4.0	
Highest level of education			
No formal education	29	19.3	
Less than primary	12	8.0	
Primary education completed	10	6.7	
Secondary education completed	39	26.0	
College/University completed	45	30.0	
Postgraduate degree	15	10.0	
Religion			
Christianity	88	58.7	
Islam	59	39.3	
Traditionalist	3	2.0	
Primary occupation			
Trader	39	26.0	
Civil servant	26	17.3	
Artisan	3	2.0	
Farmer	7	4.7	
Retiree	11	7.3	
Unemployed	18	12.0	
Student	4	2.7	
Others	41	27.3	
Monthly income (₦)			
≤ ₦ 50,000	67	44.7	
₦50,100 - ₦100,000	49	32.7	₦87,073.33k
₦100,100 - ₦200,000	20	13.3	
> ₦200,000	14	9.3	
Total	150	100.0	

Source: Field survey 2023

Table 2: Anthropometric Characteristics of the Respondents

Variables	Male F (%)	Female F (%)	Total F (%)	P-value
BMI(Kg/m^2)				
Underweight (BMI≤ 18.49)	6 (7.6)	2 (2.8)	8 (5.3)	0.004*
Normal (BMI=18.50-24.99)	36 (45.6)	31 (43.7)	67 (44.7)	
Overweight (BMI=25-29.99)	25 (31.6)	25 (35.2)	50 (33.3)	
Obese Grade I (BMI=30-34.99)	6 (7.6)	7 (9.9)	13 (8.6)	
Obese Grade II (BMI=35-39.99)	3 (3.8)	5 (7.0)	8 (5.3)	
Obese Grade III (BMI ≥ 40)	3 (3.8)	1 (1.4)	4 (2.6)	
Waist Circumference (cm)				
Low Risk of cardiovascular disease (male; <94, Female; <80)	57 (72.2)	24 (33.8)	81 (54.0)	0.041*
Moderate Risk of cardiovascular disease (male;94-102, female; 80-88)	13 (16.5)	10 (14.1)	23 (15.3)	
High Risk of cardiovascular disease (male; >102, female; >88)	9 (11.4)	37 (52.1)	46 (30.6)	
Waist to Hip Ratio (cm)				
Low Abdominal Obesity (male; <0.85, Female; <0.75)	32 (40.5)	24 (33.8)	56 (37.3)	0.158
Moderate Abdominal Obesity (male; 0.85-0.90, female; 0.75-0.80)	14 (17.7)	10 (14.1)	24 (16.0)	
High Abdominal Obesity (male; >0.90, female; >0.80)	33 (41.8)	37 (52.1)	70 (46.7)	

Source: Field survey 2023, BMI = Body Mass Index, F = Frequency, % = Percentage, * Indicates significance of p-value at $P < 0.05$.

Table 3: Biochemical Characteristics of the Respondents based on Gender

Variables	Male F (%)	Female F (%)	Total F (%)	P-value
HbA1c (%)				
Good Control (<6.5)	16 (20.3)	20 (28.2)	36 (24.0)	0.100
Fair Control (6.5-7.9)	18 (22.8)	17 (23.9)	35 (23.3)	
Poor Control (≥8.0)	45 (57.0)	34 (47.9)	79 (52.7)	
	79 (52.7)	**71 (47.3)**	**150 (100.0)**	
FBS (mg/dl)				
Good Control (<145)	12 (15.2)	10 (14.1)	22 (14.7)	0.288
Fair Control (145-180)	11 (15.2)	17 (23.9)	28 (18.7)	
Poor Control (>180)	56 (70.9)	44 (62.0)	100 (66.7)	
	79 (52.7)	**71 (47.3)**	**150 (100.0)**	
RBS (mg/dl)				
Good Control (<180)	3 (3.8)	3 (4.2)	6 (4.0)	0.318
Fair Control (180-250)	16 (20.3)	8 (11.3)	24 (16.0)	
Poor Control (>250)	60 (75.9)	60 (84.5)	120 (80.0)	
	79 (52.7)	**71 (47.3)**	**150 (100.0)**	
OGTT (mg/dl)				
Good Control (<150)	4 (5.1)	3 (4.2)	7 (4.7)	0.387
Fair Control (150-220)	46 (58.2)	49 (69.0)	95 (63.3)	
Poor Control (>220)	29 (36.7)	19 (26.8)	48 (32.0)	
	79 (52.7)	**71 (47.3)**	**150 (100.0)**	

Source: Field survey 2023, F = Frequency, % = Percentage; HBA1c = Glycated Hemoglobin, FBS = Fasting Blood Sugar, RBS = Random Blood Sugar, OGTT = Oral Glucose Tolerance Test.

Biochemical Characteristics of the Respondents.

Table 3 presents the Biochemical characteristics of the respondents. 24% of the respondents have good control of their glycosylated hemoglobin, which included 28.2% of the female respondents. Conversely, more than half (52.7%) of the total respondents have poor control of their glycosylated hemoglobin which included 57.0% of the male respondents. For fasting blood sugar, 14.7% of the respondents have good control, out of which 15.2% of the male respondents were included. On the contrary, two-thirds (66.7%) of the total respondents have poor control which included 70.9% of the male respondents. Concerning the Random Blood Sugar, only 4.0% of the respondents have good control, which consisted of 4.2% of the female respondents while 80.0% of the total respondents have poor control out of which 84.5% of the female respondents were included.

Oral Glucose Tolerance Test (OGTT) results show the distribution of individuals across different levels of glucose control, categorized by gender. Among females, 5.1% had good control, 58.2% had fair control, and 36.7% had poor control. For males, 4.2% had good control, 69.0% had fair control, and 26.8% had poor control. Overall, 4.7% of individuals had good control, 63.3% had fair control, and 32.0% had poor control. The statistical analysis found no significant difference in glucose control levels between males and females (p-value = 0.387, not significant at the 0.05 level).

Self-management Attitude of Respondents

The attitude of the respondents on self-management is presented on Table 4. Using the mean values, the result revealed that patients considered that diabetes demands effective management (2.80), they have thought about consuming more fruits and vegetables since being diagnosed with diabetes (2.75), they adhere to the dietary advice offered by the nutritionist or other doctors (2.61), they considered diabetes to be a severe medical issue (2.61), they see the doctor regarding their blood sugar self-management (2.55), they are mindful of their food and serving portions whenever they have food to eat (2.51) and they made eating decisions while keeping in mind their health condition (2.50).

Factors Influencing Blood Sugar Self-management of Respondents

Table 5 presents the factors influencing blood sugar self-management among the respondents. A majority (78.7%) of them affirmed that lack of funds was a factor influencing their self-management. More than half of the respondents (58.7%) expressed that lack of education about the practice of blood sugar self-management was a contributing factor influencing their self-management. 55.3% of them affirmed that negative primary care experience was a factor. 54.0%, 54.0%, and 50.0% of the respondents indicated that poor access to community resources, lack of awareness of diabetes mellitus, and fear of injury from exercise were influencing factors towards their self-management respectively. However, only 39.3% of the respondents declared that cultural expectation and values was an influencing factor.

Relationship between Socio-Economic Characteristics of the Respondent and the Nutritional Status of the Diabetic Patients

Table 6 shows chi-square analysis of relationship between socio-demographic and economic characteristics against the nutritional status of the respondents. It shows there was a significant relationship between the nutritional status of the diabetic patients and their age (χ^2 = 28.874; $p<0.001$) and Occupation (χ^2 = 47.779; $p<0.001$).

Table 4: Distribution by Self-management Attitude of Respondent

Blood Sugar Self-Management	Never	Rarely	Some times	Always	Mean	Rank
Have you ever considered diabetes to be a severe medical issue?	26 (17.3)	39 (26.0)	52 (34.7)	33 (22.0)	2.61	3rd
Have you ever considered that diabetes demands effective management?	25 (16.7)	35 (23.3)	35 (23.3)	55 (36.7)	2.80	1st
Have you made eating decisions while keeping in mind your health condition?	33 (22.0)	34 (22.7)	58 (38.7)	25 (16.7)	2.50	7th
Have you been mindful of your food and serving portions whenever you have food to eat?	33 (22.0)	42 (28.0)	41 (27.3)	34 (22.7)	2.51	6th
Since being diagnosed with diabetes, have you ever thought about consuming more fruits and vegetables?	45 (30.0)	51 (34.0)	25 (16.7)	29 (19.3)	2.75	2nd
Have you thought about working out to lose weight?	59 (39.3)	44 (29.3)	33 (22.0)	14 (9.3)	2.01	12th
To prevent gaining weight, have you been mindful of how much food you eat at each meal?	45 (30.0)	44 (29.3)	43 (28.7)	18 (12.0)	2.23	9th
Do you adhere to the dietary advice offered by the nutritionist or other doctors?	30 (20.0)	27 (18.0)	65 (43.3)	28 (18.7)	2.61	3rd
Have you ever considered that you manage your diabetes poorly?	58 (38.7)	34 (22.7)	38 (25.3)	20 (13.3)	2.13	11th
Have you ever forgotten to use your medications?	44 (29.3)	48 (32.0)	38 (25.4)	20 (13.3)	2.23	9th
To control blood sugar, have you been taking herbal concoctions?	44 (29.3)	28 (18.7)	38 (25.3)	40 (26.7)	2.49	8th
Do you see the doctor regarding your blood sugar self-management?	28 (18.7)	40 (26.7)	54 (35.9)	28 (18.7)	2.55	5th

Source: Field survey 2023 Note: *Percentage are in parenthesis*

Table 5: Distribution by Factors Influencing Blood Sugar Self-Management of the Respondents

Factors	Frequency	Percentage (%)
Lack of funds	118	78.7
Poor access to community resources	81	54.0
Lack of awareness of diabetes mellitus	81	54.0
Negative primary care experience	83	55.3
Fear of injury from exercise	75	50.0
Cultural expectations and values	59	39.3
Lack of education about the practice of blood sugar self-management	88	58.7

Source: Field survey 2023

DISCUSSION

The study included 150 respondents of which more than half (52.7%) were males. This was in contrast to the study of **Okeye and Ohenhen, 2021** done in the Southern Nigerian tertiary hospital which recorded more than two-thirds (68.9%) of the respondents to be female as well as the report of **Olatona *et al.* (2019)**, who indicated that majority (64.6%) of diabetic patients attending teaching hospitals in Lagos were females. 34.7% were above 60 years. In addition, the mean age was 53.32±14.29years. Relating to the respondents' religion, the majority (58.7%) were Christians which was similar to the study of **Olatona *et al.* (2019)**. This could be attributed to the population of Christians in the Southwestern region of the country.

The majority (59.3%) of the respondents were married which is not surprising and indicates their level of responsibility. **Daely *et al.* (2021)** expounds the link between age and one's marital status. Since the research was carried out amongst adults, this could be a determining factor in the high percentage of married people. Talking about the respondents' educational level and occupation, 56.0% of the respondents had at least secondary education showing a level of literacy and only 12.0% are unemployed. This was also consistent with the findings of **Adeniyi *et al.* (2015)** in Ibadan, Nigeria who reported that 64.8% of respondents had at least secondary education and only 10.1% were unemployed. The respondents' average monthly income was ₦87,073 close to half (44.7%) earning ₦50,000 or less monthly. This agrees with Olatona *et al.* (2019) who narrated that those diabetic patients attending teaching hospitals in Lagos (43.9%) earned between ₦10,000 to ₦50,000 monthly. This could be attributed to the economy of the country.

Overweight and obesity are associated with increased resistance of the cells to the insulin activity. Concerning the body mass index of the respondents, almost half (44.7%) had normal BMI while about 33.3% were overweight and 16.7 percent were obese. There is also a significant difference in BMI between genders. This finding agrees with that of **Odeyinka and Ajayi (2017)** who recorded 56.4% of the respondents to be normal weight and 42.6% to be overweight and obese. About half (46.7%) of the male respondents and majority (52.1) of the female respondents had high abdominal obesity. This finding is similar with the study of **Uthman-Akinhanmi *et.al* (2023)** that reported that the majority of the respondents both male and female, had high risk of developing cardiovascular diseases in southwestern Nigeria. This study also revealed that the female respondents had a higher waist-to-hip ratio when compared to their male

counterparts. This result is in alignment with the study of **Uthman-Akinhanmi *et.al* (2023)** that reported that 91.8% of females and 63.1% of males had high risk of acquiring cardiovascular diseases. More than half (54%) of the respondents had recommended waist circumference appropriate for their gender which is in contrast with the study of **Makwero *et al.*, 2018** who observed 14.8% of the respondents had recommended waist circumference appropriate for their gender. It was also ascertained in the study that the male and female respondents' waist-to-hip ratio is significantly different at $p<0.05$.

Table 6: Chi-square analysis of the relationship between the selected socio-economic characteristics of the respondent and the nutritional status of Diabetic patients

Variables	**Body Mass Index**						
	Under weight	**Normal weight**	**Over weight**	**Obese**	**χ^2 Value**	**df**	**p-value**
Sex							
Male	6 (75.0)	36 (53.7)	25 (50.0)	12 (48.0)	1.992	3	0.574
Female	2 (25.0)	31 (46.3)	25 (50.0)	13 (52.0)			
Age							
≤ 40	1 (12.5)	17 (25.4)	10 (20.0)	6 (24.0)	28.874	9	0.001*
41-50	0 (0.0)	14 (20.9)	13 (26.0)	4 (16.0)			
51-60	0 (0.0)	10 (14.9)	10 (20.0)	13 (52.0)			
> 60	7 (87.5)	26 (38.8)	17 (34.0)	2 (8.0)			
Marital status							
Single	1 (12.5)	12 (17.9)	5 (10.0)	4 (16.0)	16.341	12	0.176
Married	3 (37.5)	38 (56.7)	32 (64.0)	16 (64.0)			
Divorced	0 (0.0)	7 (10.4)	6 (12.0)	2 (8.0)			
Widowed	4 (50.0)	7 (10.4)	6 (12.0)	1 (4.0)			
Separated	0 (0.0)	3 (4.5)	1 (2.0)	2 (8.0)			
Level of education							
No formal education	2 (25.0)	15 (22.4)	9 (18.0)	3 (12.0)	20.485	15	0.154
Less than primary	0 (0.0)	3 (4.5)	5 (10.0)	4 (16.0)			
Primary education	0 (0.0)	4 (6.0)	2 (4.0)	4 (16.0)			
Secondary education	1 (12.5)	15 (22.4)	16 (32.0)	7 (28.0)			
College/university	2 (25.0)	23 (34.3)	13 (26.0)	7 (28.0)			
Postgraduate Degree	3 (37.5)	7 (10.4)	5 (10.0)	0 (0.0)			
Occupation							
Trader	0 (0.0)	16 (23.9)	15 (30.6)	8 (32.0)	47.779	21	0.001*
Civil servant	0 (0.0)	11 (16.4)	8 (16.3)	7 (28.0)			
Artisan	0 (0.0)	1 (1.5)	2 (4.1)	0 (0.0)			
Farmer	0 (0.0)	2 (3.0)	4 (8.2)	1 (4.0)			
Retiree	4 (50.0)	5 (7.5)	2 (4.1)	0 (0.0)			
Unemployed	4 (50.0)	7 (10.4)	5 (10.2)	2 (8.0)			
Student	0 (0.0)	3 (4.5)	0 (0.0)	1 (4.0)			
Others	0 (0.0)	22 (32.8)	13 (26.5)	6 (24.0)			
Monthly income							
≤ 50,000	4 (50.0)	30 (44.8)	21 (42.0)	12 (48.0)	4.683	9	0.861
50,100-100,000	1 (12.5)	20 (29.9)	20 (40.0)	8 (32.0)			
100,100-200,000	2 (25.0)	10 (14.9)	6 (12.0)	2 (8.0)			
> 200,000	1 (12.5)	7 (10.4)	3 (6.0)	3 (12.0)			
Total	**8 (100)**	**67 (100)**	**50 (100)**	**25 (100)**			

Source: Field survey 2023; * Indicates significance of p-value at $P < 0.05$
Note: Percentage are in parenthesis

Biochemical parameters were tested to observe the efficacy of self-management. HbA1c was reported and categorized as a good, fair, and poor control for values ranging from <6.5%, 6.5-7.9, and ≥8.0 respectively. Poor control was noticed in more than half of the respondents and was particularly prominent in the male respondents. This could be because of non-compliance with the stipulated dietary guidelines for diabetics. This finding was in contrast with that of **(Ebead Mohammed, 2019)** who recorded a mean value of 10.30 ±1.44 in males and 13.79±1.73 in females both higher than normal respectively. Fasting blood sugar (FBS) was recorded as <145 mg/dl, 145-180 mg/dl, and >180 mg/dl for good, fair, and poor control respectively. FBS was poorly controlled in the majority of the total respondents which amounted to more than two-third of the male respondents. This reflected a mirror finding with the result of **(Fiseha *et al.*, 2018)** in Ethiopia which asserted that the majority of the male respondents poorly managed the blood glucose.

In addition, the random blood sugar (RBS) of the respondents was documented as <180 mg/dl, 180-250 mg/dl, and >250 mg/dl for good, fair, and poor control respectively. Majority of the female respondents had poor control and there was no statistically significant difference between male and female respondents. More so, the oral glucose tolerance test was also recorded as <150 mg/dl, 150-220 mg/dl, and >220 mg/dl for good, fair, and poor control respectively. Only 32.0% of the respondents have poor control including 36.7% of the male respondents. There was also no significant difference between male and female respondents. Referring to the study of **(Mohammed, 2019)**, the recorded mean OGTT was higher in male than female respondents and that of the total respondents was 297.92±71.21mg/dl.

Using the mean values, the result of the analysis of Self-management Attitude of Respondent reveal that patients considered that diabetes demands effective management (μ =2.80; Rank: 1st). Respondents have thought about consuming more fruits and vegetables since being diagnosed with diabetes (μ =2.75; Rank: 2nd). Indeed, several studies have consistently shown that the attitude of the DM in the general population seems to be low, a similar observation in the study **Julius *et al.* (2019),** which revealed majority of the diabetes patients relatively consumed moderate levels of fruit daily and relatively high levels of vegetable daily after their diagnosis. Most of the respondents in this study considered diabetes to be a severe medical (μ =2.61; Rank: 3rd). The World Health Organization also considered this as a serious public health concern when the organization reported that the number of people with diabetes rose from 108 million in 1980 to 422 million in 2014. Prevalence has been rising more rapidly in low- and middle-income countries than in high-income countries **(WHO, 2019)**.

The majority (78%) of the respondents have conveyed that a lack of financial resources is the primary influencing factor affecting their self-management of blood sugar levels. This discovery aligns with the findings of **Campbell et al. (2017)**, who asserted that financial constraints disproportionately burden individuals dealing with diabetes. Campbell's research also reveals that individuals experiencing financial difficulties tend to report higher levels of diabetes-related distress and lower physical and mental quality of life, thereby exacerbating the obstacles to effective self-management.

Additionally, this study has unveiled that over half of the participants attribute their challenges in blood sugar self-management to a lack of education. This observation resonates with the research conducted by **Lamptey *et al.* (2023)**, which explored diabetes self-management education interventions and self-management in low-resource settings. Lamptey et al.'s study disclosed a notable deficit in diabetes self-management knowledge and poor adherence to self-care recommendations among the participants. Much like this current study, **Lamptey *et al.* (2023)**

underscored the significance of cultural and economic factors, among others, as barriers to effective blood sugar self-management in diabetes patients.

Despite the increasing prevalence of diabetes, it is evident that the quality of care and control remains suboptimal. This predicament is primarily attributed to the intricate nature of diabetes management, inadequate healthcare resources, and relatively low-income levels, especially among individuals in low and middle-income countries **(Peer *et al.*, 2014)**.

The study shows a significant relationship between the nutritional status of the diabetic patients and their age (χ^2 = 28.874; p= 0.001) and Occupation (χ^2 = 47.779; p= 0.001). This indicates that the age and occupation of the respondents did determine their nutritional status. This agrees with the study of **Ebere *et al.* (2020)**, who examined the predictors of Hypertension among rural women in Western Kenya and revealed that age, duration lived in the Amagoro division, and level of education showed a significant relationship with their nutritional status.

CONCLUSION

Dietary management and lifestyle modification is crucial for self-management of Type II Diabetes. Management including food diversity, regular exercise, portion control, appropriate meal timing, and adequate rest will contribute significantly to the management of blood sugar in diabetes patients. Furthermore, nutrition counseling should be given to patients on food groups that are readily available and cost-effective to encourage compliance to dietary and lifestyle modifications and to avoid complications that may occur as a result of ignorance, wrong, or insufficient nutritional counseling by non-professionals. Also, regular checkups and personal documentation should be carried out by patients in the hospitals and at home to monitor prognosis. Finally, studies should be carried out to ascertain the factors influencing the self-management of Type 2 Diabetes across other geographical areas and provide a feasible solution to Diabetes management.

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