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Self-Care Management and its Effects on Blood Glucose Levels of Patients with Type 2 Diabetes Mellitus in a Tertiary Hospital in Nigeria

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Abstract

Diabetes Mellitus is a serious non-communicable public health disease that affects people of all age groups, more so, in their productive years in sub-Saharan Africa, with Nigeria being one of the worst hit. It has been observed that the rate at which T2DM patients develop complications due to neglect of self-care practices is alarming. Therefore, this study assessed the outcomes of self-care management on blood glucose control among T2DM outpatients who attend the endocrinology clinic at Federal Medical Centre, Owo. The study employed an exploratory sequential mixed-methods design and was conducted among adult patients with type 2 diabetes mellitus (T2DM). A total of 109 patients were recruited for the study using a purposive sampling method. Data collection was done through the use of a structured questionnaire, a checklist and ERBA MANNHEIM (XL-200) analyser. The quantitative data were analysed using SPSS version 28.0 with simple percentages, frequencies, logistic regression and Chi-square. Eleven (11) out of the 109 participants were involved in the qualitative strand, and data were analysed using a conventional content analysis method. The result showed a mean age of 51.3±25, while the majority were females, 64(58.7%). Furthermore, majority, 69(63%), had hyperglycemia, indicating poor glucose control, as 29(27%) had normal glucose levels. However, a few 11(10%) had hypoglycemia. It was also revealed that 33(30.3%) reported that poor self-care does not apply to them at all. The qualitative strand result revealed that most of the participants claimed to manage diabetes through strict meal plans, avoiding sugary or fried foods, and monitoring blood sugar daily using glucometers. Some participants recognised the importance of engaging in various exercises, such as walking and indoor dancing. Regarding adherence to medications, some of the participants reported taking their prescribed drugs. The challenges faced by the patients ranged from financial burden to emotional unrest. In conclusion, it is important to consider personalised approach to diabetes care, considering both educational and gender-related factors especially because a significant number had hyperglycaemia despite their submissions. Therefore, it is recommended that patients' education should be enhanced, particularly on healthy diets,

blood sugar monitoring, exercise, and foot care. Healthcare providers should advocate for involvement of family members in the care processes of T2DM patients by integrating family-focused interventions, such as educational sessions.
Keywords: Blood Glucose Control, Patients with Type 2 Diabetes Mellitus, Self-Care Management, Type 2 Diabetes Mellitus

Introduction

Adherence to prescribed treatment protocols is a significant determinant of successful disease management, particularly in chronic illnesses such as diabetes mellitus (Amber et al., 2019). Among the various components of disease management, adherence plays a pivotal role in altering disease progression and improving prognosis. Diabetes mellitus, especially Type 2 Diabetes Mellitus (T2DM), is a chronic metabolic disorder that significantly impairs individuals' quality of life and contributes to growing global health concerns (Agofure O, et. al 2024). The global burden of T2DM has steadily increased, largely due to unhealthy lifestyle changes, including poor dietary habits, physical inactivity, and chronic stress exposure (Lovic et al., 2020; Abiodun et al., 2024). Effective self-care management is, therefore, critical for achieving glycemic control and preventing associated complications (Abiodun et al., 2020).

According to the World Health Organisation (WHO), over 422 million adults were diagnosed with diabetes in 2014, positioning the condition as one of the top eight causes of death worldwide (Akpor et al., 2022). In Africa, the prevalence of T2DM nearly doubled from 3.1% in 1980 to 7.5% in 2019, amounting to an increase from 4 million to 27 million cases (Akpor et al., 2022). In Nigeria, the prevalence is equally alarming; with empirical studies showing rates ranging from 0%–2% in rural areas and 5%–10% in urban areas (Fasanmade & Dagogo-Jack, 2015). The implications of this epidemiological trend are severe: T2DM is now one of the major contributors to cardiovascular disease, chronic kidney disease, blindness, and non-traumatic lower-limb amputations (Quinn et al., 2018; Abiodun et al., 2020; Agofure et al., 2024; Thojampa, 2019).

T2DM complications such as neuropathy, nephropathy, retinopathy, and cardiovascular conditions are often preventable through diligent self-care practices (Aga et al., 2020). Self-care management refers to the intentional engagement of patients in their health processes through

daily practices such as self-monitoring of blood glucose (SMBG), medication adherence, dietary regulation, physical activity, and foot care (Scientific Resource Center Portland 2018; Abiodun et al., 2020; American Diabetes Association Professional Practice Committee, 2022). These practices transform patients from passive recipients of healthcare into active managers of their condition, improving both their glycemic outcomes and quality of life (Quinn et al., 2018; Aga et al., 2020). Additionally, patients' frequent interactions with healthcare facilities through regular follow-ups help reinforce their responsibility towards maintaining healthy behaviours (Sayeed et al., 2020).

Recent evidences suggest that self-care interventions significantly enhance health-related quality of life (HRQoL) and reduce long-term complications associated with T2DM (American Diabetes Association [ADA], 2017; Nikpour et al., 2022; International Diabetes Federation [IDF], 2020; Abiodun et al., 2024). Despite these benefits, many patients in Nigeria still experience poor outcomes due to non-adherence to self-care protocols. Several factors, including socioeconomic status, education, health literacy, and patient motivation, have been identified as influencers of self-care practices (Tefera et al., 2020; Abiodun et al., 2024). These determinants must be well understood to improve patient engagement and health outcomes in chronic disease management.

The paradigm of chronic disease care is also shifting from traditional provider-driven approaches to collaborative care models. In this newer approach, patients are required to make daily decisions regarding their care and engage in complex regimens that demand sustained commitment (Powers et al., 2015; Khardori, 2016). The importance of empowering patients with the knowledge, motivation, and resources necessary for effective self-management cannot be overstated (Agofure et al., 2024).

However, despite the growing recognition of self-care's role in T2DM management, the prevalence of complications arising from poor self-care practices remains high, especially in sub-Saharan Africa. Patients continue to experience adverse outcomes such as stroke, kidney failure, and amputations; all of which contribute to increased healthcare costs, reduced quality of life, and premature mortality (Ansari et al., 2018; Abiodun et al., 2020). These trends highlight the urgent need for more focused research on self-care management, particularly in resource-limited settings such as Nigeria.

In light of the foregoing, the study assessed the levels of blood glucose of patients with T2DM during data collection; determined the extent of self-care management among them; examined the effects of self-care management on their blood glucose levels and examined the relationship between self-care practices and glycemic control as well.

Materials and Methods

This study adopted an exploratory sequential mixed methods design, which combines qualitative and quantitative approaches. This design was chosen due to its suitability for population-based studies and its strength in uncovering and analyzing complex relationships between variables; particularly in chronic illness contexts such as Type 2 Diabetes Mellitus (T2DM). The qualitative phase allowed participants to express their perspectives in depth, while the quantitative phase enabled statistical examination of trends, patterns, and associations in self-care behaviours and glycemic outcomes. The study was conducted at the Federal Medical Centre (FMC), Owo**,** located in Ondo State, Southwestern Nigeria. Ondo State, established on February 3rd, 1976, has a diverse ethnic composition dominated by Yoruba sub-groups including Akoko, Akure, Ondo, Owo, Ilaje, Ikare, and Ijaw-speaking Arogbo and Akpo communities. The state capital is Akure.

FMC Owo is a tertiary healthcare facility that provides specialized and emergency care services 24 hours a day. It has over 380 beds and multiple departments, including Medicine, Surgery, Paediatrics, Family Medicine, Community Health, Psychiatry, Obstetrics & Gynecology, Orthopedics, and Ophthalmology. The hospital also functions as a teaching institution, offering undergraduate and postgraduate training across various health disciplines. Its Endocrinology Clinic sees an average of 125 T2DM patients monthly, making it a suitable location for this study.

The study targeted adult T2DM patients (18 years and above) receiving outpatient care at FMC, Owo. The focus was on individuals with established diagnoses who had been on treatment for a minimum of 12 months to ensure adequate exposure to self-care management practices. Participants were selected until data saturation was reached i.e., when no new information or themes emerged from additional interviews. This ensured a comprehensive understanding of participants' experiences without redundancy. With an average of 125 patients attending the clinic monthly, the sample size was calculated using Yaro Yamane's formula (Yamane, 1967): a

total sample size of 109 participants who met the inclusion criteria participated in the study. The inclusion criteria were; adults (≥18 years) with confirmed diagnosis of T2DM; those who were on treatment for at least 12 months before data collection and those who consented to participate in the study. However, those who were critically ill, mentally unstable and those with severe physical or neurological complications were excluded. Purposive sampling was used to select participants during clinic visits. This allowed access to participants who could provide in-depth insight into self-care practices of T2DM.

Three types of instruments were used for the study. The first one was an in-depth interview guide, a structured questionnaire and a blood glucose monitoring machine. The in-depth interview guide was used to explore patients' lived experiences of self-care of T2DM. Eleven (11) participants were involved in this and they were coded for confidentiality. Interviews addressed core areas such as daily routines, challenges, and motivations related to diabetes self-management. The second instrument was structured in three sections: Section A was used to collect socio-demographic information (age, gender, marital status, education, duration since diagnosis, etc.) of participants; section B contained the Diabetes Self-Management Questionnaire (DSMQ), consisting of 16 items across four domains: Glucose Management, Dietary Control, Physical Activity and Healthcare Use. Responses were rated on a four-point scale (0–3). Scores were standardized on a scale of 0–30 using recommended transformation techniques (Schmitt et al., 2013) and section C was used to identified the factors that influence self-care management using a series of Yes/No questions across nine indices. The third instrument was ERBA MANNHEIM (XL-200) analyzers which was used to measure participants' fasting blood glucose levels within the very week of data collection and six weeks after. The period between pre and post-blood glucose measurements was laced with 1 hour of active health education of participants on self-care practices of T2DM.

Ethical approval was obtained from the Ethics and Research Committee of FMC, Owo with reference number FMC/OW/380/VOL.CCXIV/90**.** Informed consent was secured from all participants before their participation in the study. Confidentiality was assured by using participant codes instead of names. Participants were informed of their right to withdraw at any stage without any form of penalty or victimization. Contents and construct validity were established via expert review and factor analysis. The questionnaire was vetted by specialists in

endocrine nursing and diabetology. The interview guide was developed after an extensive literature review and reviewed by experts in the field. A Pearson correlation coefficient of 0.81 was achieved, indicating high reliability after pilot testing. Trustworthiness of qualitative data was achieved using Lincoln and Guba's (1985) criteria (credibility, dependability, transferability and confirmability**).**

The qualitative strand was done first; eleven participants were interviewed in quiet and agreed-upon locations. Each session lasted 20–25 minutes. Interviews were audio-recorded, transcribed, coded manually and electronically for analysis. Also, the quantitative strand was done with the aid of two (2) trained research assistants who helped in administering the questionnaires after patients underwent fasting blood glucose tests. Participants were given sufficient time to complete the forms with guidance provided as needed. A total of 112 distributed were questionnaires but 109 were correctly completed and analyzed. Data were analyzed using conventional content analysis as described by Graneheim and Lundman (2004). Transcriptions were repeatedly reviewed and coded using MAXQDA v.10, from which themes were derived.

Quantitative data were processed using SPSS version 28.0. Descriptive statistics (frequency, percentages) summarized socio- demographic data and self-care practices. Logistic regression analysis was applied at a 5% significance level ($p < 0.05$) to determine factors influencing self-care management. Results were presented in tables and charts for clarity and ease of interpretation.

Results

Table 1: Socio-demographic Variables of the Interviewed Participants N=11

S/N	Participant	Age	Gender	Marital Status	Education Level	Occupation	Years Diagnosed
1.	P-A	54	Male	Married	Secondary	Farmer	5
2.	P-B	45	Female	Divorced	Tertiary	Teacher	8
3.	P-C	63	Female	Widowed	Primary	Retired	10
4.	P-D	37	Male	Single	Secondary	Shop Owner	3
5.	P-E	50	Female	Married	Secondary	Healthcare Assistant	6
6.	P-F	41	Male	Married	Tertiary	Business Owner	4
7.	P-G	58	Male	Married	Primary	Fisherman	12
8.	P-H	46	Female	Single	Secondary	Clerk	7
9.	P-I	52	Female	Married	Tertiary	Nurse	5
10.	P-J	39	Male	Divorced	Secondary	Technician	2
11.	P-K	60	Female	Widowed	No Formal Ed.	Unemployed	9

Table 1 above shows that there were more female (54.5%) with a slightly lower representation of males (45.5%). Participants were mostly in the middle-age range, with 3(27.3%) in the 45-54 and 3(27.3%) 55-64 age brackets each. Most respondents are married5 (45.5%), followed by singles 3 (27.3%). The highest level of education attained by most participants is secondary education 4(36.4%), followed by primary 3(27.3%). Christianity was the predominant religion among participants 5 (45.5%), followed by Islam 4 (36.4%). Yoruba respondents make up over half 6(54.5%) of the participants. Regarding employment, most participants were employed in the public sector 4(36.4%), and average income per month was below #70,000 among 5(45.5%) majority have been diagnosed with diabetes for 2-5 years and have been on treatment since then 5(45.5%).

Thème One : General Self-Care Practice

Most of the participants managed diabetes through strict meal plans, avoiding sugary or fried foods, and monitoring their blood sugar daily. They adhere to medication schedules, including insulin shots. Physical activity, such as walking or gym visits, was incorporated but can be inconsistent due to challenges like arthritis or busy schedules. Below is the submission of a few participants;

‘I try to stick to a strict meal plan. I eat more vegetables and avoid foods high in sugar, though sometimes it's hard during family gatherings. I check my blood sugar twice a week. I also take my medication as prescribed. Exercise is harder for me, but I try to walk for 30 minutes a few times a week’….(Participant A, Female).

‘I monitor my blood sugar every morning, I’ve changed my diet a lot since my diagnosis, cutting out fried foods and sugary snacks. I make sure to take my insulin shots on time. I try to walk around my neighbourhood most days, but my arthritis makes it difficult to do as much exercise as I’d like. I know it’s important, so I do what I can.”….(Participant D, Male).

I keep track of everything. I log my blood sugar readings every day, and I use an app to help me monitor it. I prepare my meals in advance to make sure they’re balanced, and I avoid eating out because it’s harder to control what’s in the food. Sometimes I skip meals, though, if I’m too busy…..(Participant F, Female).

Theme Two: Monitoring of Blood Sugar

Some of the participants monitor their blood sugar daily using glucometers mostly Fine-test and Accuchek glucometers. They submitted that when levels are high, they adjust their meals, drink more water and exercise, for low readings, they consume fast-acting sugars like juice or fruit and recheck levels.

"At first, I check my blood sugar every three days at a chemist close to my house but later, I bought my own (fine-test) and I started checking it every morning before breakfast. If my reading is higher than my target, I make sure to drink more water and adjust my meals for the day by reducing my carb intake. I sometimes go for a walk to bring the levels down. If it's too low, I’ll eat something sugary, like a fruit or a glucose tablet, and then check again in about 30 minutes."……Participant I (Male).

"I test my blood sugar two to three times a week but when high, I check it three times a day; before meals and sometimes before bed. When my levels are too high, I take an extra unit of insulin. I also avoid snacking but take more water to help bring it down. If it's low, I immediately eat something that contain sugar, like

Coca-Cola and follow up with a balanced snack, like nuts or crackers, to keep it stable."……Participant K (Male).

Participant C, a retired female "I monitor my sugar level every morning, using fine-test machine. It helps me keep track of fluctuations throughout the week. If my readings are high, I review what I've eaten, and sometimes I call my healthcare provider for advice on dose adjustments. When the levels drop too low, I eat a small snack, like a banana or a handful of grapes, and then rest to avoid further dips"

Theme Three: Dietary Management

Participants manage their diets by focusing on vegetables, lean proteins, and whole grains, while avoiding sugary or processed foods. Challenges include social gatherings, skipping meals due to busy schedules, and difficulty maintaining routines during travel or family visits as rightly pointed out by some of the participants:

"I try to stick to a low-carb diet, mainly focusing on vegetables, lean proteins, and whole grains. I avoid sugary snacks and processed foods. The biggest challenge is during social gatherings or work events where there are lots of temptations like cakes or sweets. It can be hard to resist, and sometimes I end up eating more than I should, which affects my blood sugar".....Participant G (Female).

"I manage my diet by planning meals ahead of time, so I can control the portions and the types of food I eat. I avoid refined sugars and try to balance my meals with healthy fats and proteins. The challenge I face is that I get really busy during the day, and sometimes I skip meals, which leads to blood sugar fluctuations. Finding the time to prepare meals can also be difficult."…. Participant H (Male)

"I follow a diabetic meal plan that includes regular portions of fruits, vegetables, and whole grains. I also measure my carb intake to keep it consistent. My challenge is maintaining this routine when I travel or visit family. It's not always easy to control what's available to eat, and I sometimes have to make compromises, which can lead to spikes in my blood sugar."…..Participant C (Female)

Theme Four: Exercise and Physical Activities

Some of the participants recognized the importance of physical activity for managing blood sugar levels, engaging in various exercises like walking and indoor dancing. For instance, p*articipant B (Male) said*

> *"Physical activity is very important for controlling my blood sugar levels. I try to go for a 30-minute walk every day, which helps me manage my glucose levels better. And I do notice that my blood sugar tends to spike when I miss a few days of exercise."*
>
> *"Exercise plays a huge role in my diabetes management. I do yoga and light strength training three times a week, and I notice that my blood sugar stays more stable when I'm active. When I don't exercise, I feel it in my blood sugar."…..Participant E (Male)*
>
> *"I know physical activity is important, but I struggle with consistency. I try do jogging a few times a week. When I'm active, my blood sugar stays lower, and I feel more energetic."…Participant J (Female).*

Theme Five: Adherence to Medications

Regarding adherent to medication, some of the participants were current with the drugs while some were not. Those who take their drugs regularly use reminders like alarm and other means. Below are some of their responses:

> *"I manage my medications by taking them at the same time every day. I've set reminders on my phone, which helps me stay consistent. However, there are days when I forget, especially when I'm away from home or if my routine changes. I'm doing my best, but I know I could improve my adherence."……Participant E (Male).*
>
> *"I tried to keep up to my medications as prescribed but no money to buy them. Some are expensive and no one to help me. But I thank God for everything. I usually take Agbo (bitter leaf) and it work for me."……Participant J (Female).*
>
> *"I have a routine where I take my medications first thing in the morning and before bed. My doctor also advised me to keep track of my insulin doses in a diary, which helps me stay on track but sometimes it's challenging when I travel for work or have family gatherings. I've missed a few doses here and there, but overall, I think I manage it well."…..Participant G (Female).*

Theme Six: Challenges Facing Patients with T2DM on Self-Care

Various challenges were identified by the patients. These challenges varies and were time involve, financial burden and emotional unrest. The responses of some of the participants were reported below:

> *"It's really hard to keep up with my diabetes care routine. Between work, family, and daily responsibilities, I often forget to check my blood sugar or take my medications on time. By the time I get home, I'm too tired to cook something healthy, and I just grab whatever's quick."*.....*Participant K (Male).*
>
> *"The emotional stress of managing this disease is overwhelming. I feel anxious all the time about what I'm eating or how my blood sugar will react. Some days, I just don't have the mental energy to follow the regimen, and that guilt weighs on me." Participant F (Female),*
>
> *"It's expensive to manage diabetes. The cost of insulin, blood sugar test strips, and healthy foods really adds up. I can't always afford to eat the recommended diet or see my doctor as often as I should. It feels like I'm fighting a losing battle." Participant J (Female).*

Table 2: Socio-demographic Information of Respondents (N=109)

Variable	**Categories**	**Frequency**	**Percentage**
Sex	Male	45	41.3
	Female	64	58.7
Age	≤34	10	9.2
(Mean age 51.3±25)	35-44	15	13.8
	45-54	30	27.5
	55-64	40	36.7
	≥65	14	12.8
Marital Status	Single	28	25.7
	Married	56	51.4
	Divorced/Separated	15	13.8
	Widow/Widower	10	9.2
Educational Qualification	No formal education	12	11.0
	Primary education	27	24.8

	Secondary education	40	36.7
	Tertiary	30	27.5
Religion	Christianity	64	58.7
	Islam	30	27.5
	Traditional Worshipper	15	13.8
Tribe	Yoruba	40	36.7
	Hausa	20	18.3
	Igbo	35	32.1
	Others	14	12.8
Current Employment Status	Unemployed	20	18.3
	Public Servant	35	32.1
	Employed by a private firm	30	27.5
	Retired	24	22.0
Average Income Per Month	Below N70,000	40	36.7
	N70,000	35	32.1
	Above N70,000	34	31.2
Years Since Diabetes Diagnosis	Less than 1 year	12	11.0
	2-5 years	41	37.6
	6-10 years	29	26.6
	11-15 years	15	13.8
	≥16 years	12	11.0
Number of Years Respondents have been Receiving Diabetes Treatment	Less than 1 year	10	9.2
	2-5 years	38	34.9
	6-10 years	30	27.5
	11-15 years	17	15.6
	≥16 years	14	12.8

Table 2 above shows that out of the total sample, there were more females 64 (58.7%). The mean age = 51.3±25,. more than half 56 (51.4%) of the respondents were married, while 28(25.7%) were single, and smaller percentages are divorced or widowed (13.8% and 9.2%, respectively). The educational backgrounds of respondents were diverse, with 40(36.7%) having secondary education, 30(27.5%) tertiary education, and 27(24.8%) primary education. The majority of respondents were Christians 64(58.7%), with 30(27.5%) identifying as Muslim and 15(13.8%) as

traditional worshippers. In terms of ethnicity, the largest group was Yoruba 40(36.7%), followed by Igbo 35(32.1%), and Hausa 20(18.3%).

A significant portion of the participants were employed, with 35(32.1%) in public service and 30(27.5%) employed by private firms. However, 20(18.3%) were unemployed, and 24(22.0%) already retired. While greater proportion 40(36.7%) of the participants earned less than the new minimum wage, 34(31.2%) earn above 70,000 naira. Regarding the duration of diabetes diagnosis, 41(37.6%) have had the condition for 2-5 years, followed by 29(26.6%) who have lived with it for 6-10 years. A similar pattern is observed in treatment duration, with 38(34.9%) receiving treatment for 2-5 years.

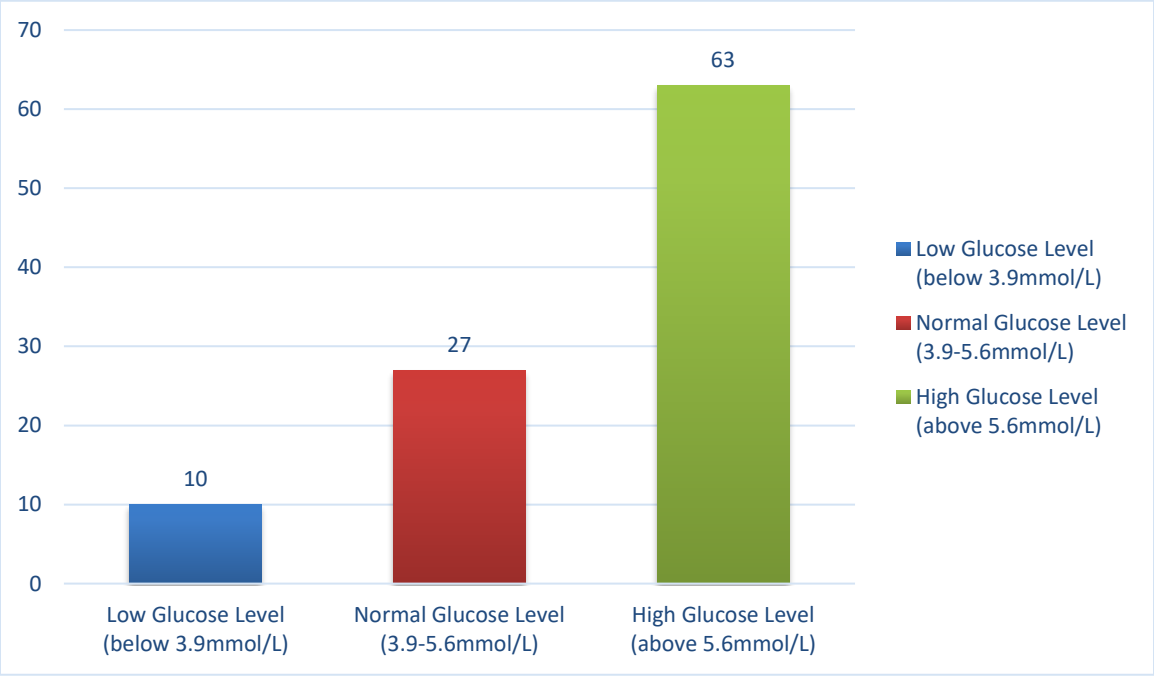


Figure 1: Level of Fasting Blood Sugar among the Respondents

Figure 1 above represents the distribution of participants based on their fasting blood glucose (FBG) levels during data collection. The FBG was categorized based on WHO (2024) classification (hypoglycaemia; below 3.9 mmol/L, Normal result; 3.9 - 5.6 mmol/L and hyperglycaemia; above 5.6 mmol/L). The chart above depicted that, majority 69(63%) had hyperglycaemia, indicating poor glucose control as only a smaller group 29(27%) had normal blood glucose levels. However, few 11(10%) had hypoglycaemia

Table 3: Diabetes Self-Care Practice among the Participants (N=109)

Statement	Applies to me very much	Applies to me to a considerable degree	Applies to me some degree	Not applicable to me at all
	Freq (%)	Freq (%)	Freq (%)	Freq (%)
1. I check my blood sugar levels with care and attention.	39 (35.8%)	45 (41.3%)	18 (16.5%)	7 (6.4%)
2. The food I choose to eat makes it easy to achieve optimal blood sugar levels.	50 (45.9%)	40 (36.7%)	16 (14.7%)	3 (2.8%)
3. I keep all doctors' appointments recommended for my diabetes treatment.	52 (47.7%)	40 (36.7%)	11 (10.1%)	6 (5.5%)
4. I take my diabetes medication (e.g., insulin, tablets) as prescribed.	42 (38.5%)	45 (41.3%)	15 (13.8%)	7 (6.4%)
5 Occasionally I eat lots of sweets or other foods rich in carbohydrates.	24 (22.0%)	29 (26.6%)	34 (31.2%)	22 (20.2%)
6. I record my blood sugar levels regularly.	38 (34.9%)	44 (40.4%)	18 (16.5%)	9 (8.3%)
7. I tend to avoid diabetes-related doctors' appointments.	16 (14.7%)	27 (24.8%)	29 (26.6%)	37 (34.0%)
8. I do regular physical activity to achieve optimal blood sugar levels.	32 (29.4%)	40 (36.7%)	22 (20.2%)	15 (13.8%)
9. I strictly follow the dietary recommendations given by my doctor.	44 (40.4%)	41 (37.6%)	17 (15.6%)	7 (6.4%)
10. I do not check my blood sugar levels frequently enough.	21 (19.3%)	30 (27.5%)	35 (33.1%)	23 (21.1%)
11. I avoid physical activity, although it would improve my diabetes.	15 (13.8%)	24 (22.0%)	28 (25.7%)	42 (38.5%)
12. I tend to forget to take or skip my diabetes medication.	17 (15.6%)	29 (26.6%)	27 (24.8%)	36 (33.0%)
13. Sometimes I have real 'food binges' (not triggered by hypoglycaemia).	12 (11.0%)	21 (19.3%)	32 (29.4%)	44 (40.4%)
14. Regarding my diabetes care, I should see my medical practitioner(s) more often.	29 (26.6%)	35 (32.1%)	22 (20.2%)	23 (21.1%)
15. I tend to skip planned physical activity.	17 (15.6%)	27 (24.8%)	34 (31.2%)	31 (28.4%)
16. My diabetes self-care is poor.	15 (13.8%)	23 (21.1%)	38 (34.9%)	33(30.3%)

The table above shows that a significant proportion of participants reported diligent monitoring of their blood sugar levels, with 39 (35.8%) stating they check their levels "very much," while 45 (41.3%) indicated a "considerable degree" of care in this practice. Regarding dietary choices, 50 (45.9%) affirmed that their food choices facilitate optimal blood sugar control "very much," and 40 (36.7%) acknowledged this to a "considerable degree." Similarly, 52 (47.7%) claimed they consistently keep medical appointments for diabetes treatment, with another 40 (36.7%) doing so to a "considerable degree". Few 24(22.0%) of participants were aware of their carbohydrate intake but still engage in high-sugar eating occasionally. While many 38(34.9%) respondents engage in regular recording of their blood sugar, the also practice dietary guidelines [very much 44(40.4%) and considerable degree 41 (37.6%)]. Regarding how often patients visit their physician, only 29 (26.6%) affirm very much, and 35 (32.1%) considerable degree.

Conversely, areas of concerns emerged, particularly regarding physical activity and medication adherence as only 15 (13.8%) respondents practiced physical exercise regularly, and 17 (15.6%) admitted to forgetting or skipping their medications very much. Generally, 15 (13.8%) rated their diabetic self-care as very much, 23 (21.1%) considerable degree while 33(30.3%) participants said it is not applicable to them.

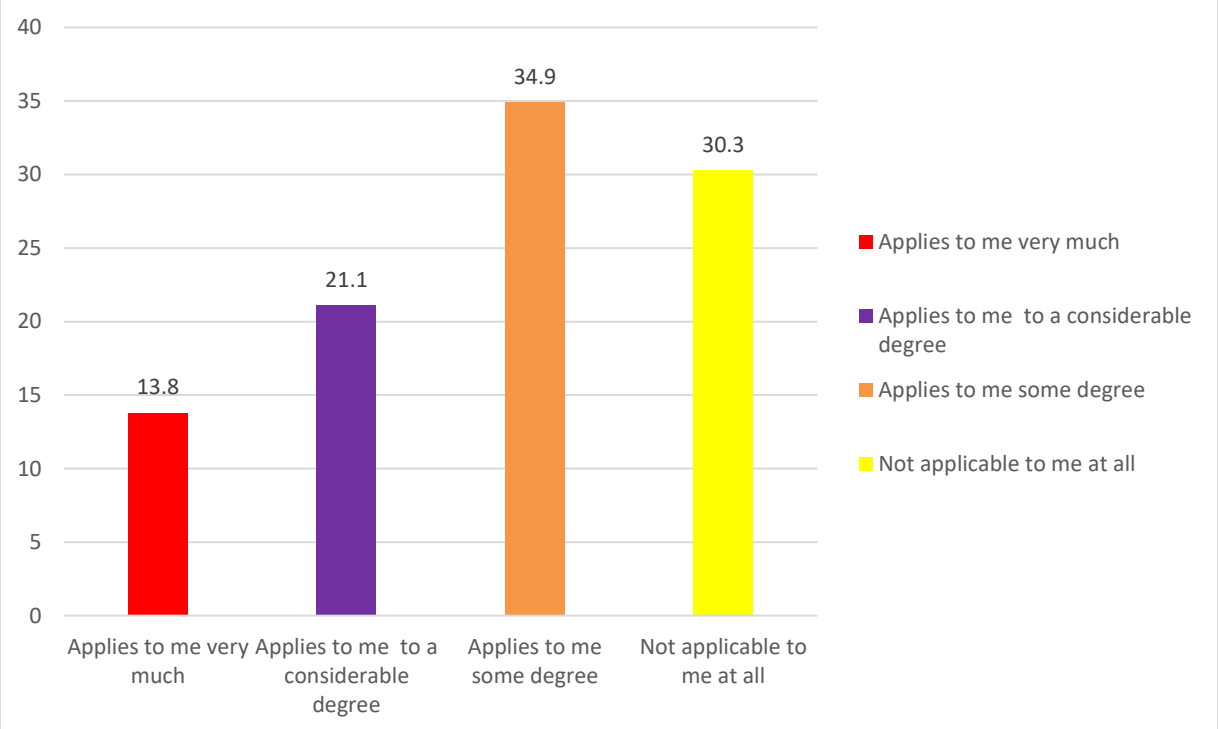


Figure 2 Shows Perceived Self-Care Management among the Participants

Figure 2 above shows that the data distribution of perceived self-care practices among respondents regarding diabetes management. A notable number, 38(34.9%) believed their self-care was poor to some degree, while 23(21.1%) reported this applies to them considerably, and 15(13.8%) viewed their self-care as very poor. In contrast, 33(30.3%) reported that poor self-care does not apply to them at all.

Table 4: Relationship between Self-Care Management and Blood Glucose Level

	Levels of Self-Care Management				
Glucose Level	**Excellent**	**Good**	**Poor**	**Total**	**P-value**
Low Glucose Level	5	3	3	**11**	0.031
Normal Glucose Level	10	9	10	**29**	
High Glucose Level	19	28	22	**69**	
Total	**34**	**40**	**35**	**109**	

Table 4 above shows a P-value of 0.031 which indicates a statistically significant association between glucose levels and self-care management, as it is below the conventional significance threshold of 0.05. This suggests that differences in glucose levels are associated with variations in the quality of self-care practices. The statistical result implies that participants' glucose levels may influence how well they manage their self-care, potentially highlighting the importance of targeted interventions to improve both glucose control and self-care behaviours. Therefore, the null hypothesis is rejected.

Discussion of Findings

The findings of this study as revealed in tables 1 and 2 show that most participants were female, aged between 55 and 64 years (mean age 51.3 ± 25), married, Christians, and of Yoruba ethnicity. Majority had completed secondary education; were employed in public service and had lived with diabetes for two to five years. Similar trends were observed by Jackson et al., (2019), who reported that most individuals with Type 2 Diabetes Mellitus (T2DM) were aged 50–59 years, followed by those aged 40–49 years. Likewise, Quinn et al., (2018) found the mean age of participants to be 52 years, 54% (50/92) were female and 40% (37/92). Conversely, Mekonnen and Hussien, (2021), in their study on self-care related knowledge, attitude, and practice among

T2DM patients in Ethiopia, it was reported that 54.2% of participants were males; 35.31% were over 60 years, 54.7% were Muslims, and 68.2% were married. Regarding education, 33.4% had primary education while 25.1% had no formal education.

These variations across studies can be attributed to demographic, cultural, and regional differences that influence population characteristics and health behaviours. The present study, conducted in Nigeria, included predominantly females, Christians, Yoruba participants with most of them having secondary education, whereas Mekonnen and Hussien, (2021) reported that most of their participants were males, Muslims, and older with lower educational levels in Ethiopia. Such differences in age, gender, religion, and socioeconomic factors significantly shape diabetes management outcomes and self-care practices across diverse settings.

The study revealed that a substantial proportion of participants consistently experienced hyperglycemia as shown in Figure 1, this indicates widespread poor glucose control. Persistent hyperglycemia among diabetic individuals poses serious health risks, including cardiovascular complications, neuropathy, and renal impairment (Abiodun et al., 2020). The high prevalence observed in this study may reflect inadequate self-care practices, limited access to quality healthcare, or insufficient knowledge about diabetes management. Only a small proportion of participants maintained normal blood glucose levels, likely due to adherence to medication, dietary control, and consistent lifestyle modifications. The World Health Organization (2024), along with other studies (Abiodun et al., 2020; Fekadu et al., 2019), emphasizes diabetes management as a global priority, given its health and economic implications.

Effective diabetes control requires a multidisciplinary approach centered on the patient and family, emphasizing self-management and collaborative care (Ahmad & Joshi, 2023; Abdulrhim et al., 2021). The coexistence of both hyperglycemia and hypoglycemia among participants underscores the need for balanced glycemic regulation to prevent extreme fluctuations that could compromise health and increase the risk of complications.

This study found that about half of the respondents demonstrated excellent self-care management, (Table 3 and Figure 2) while a significant number engaged in good self-care behaviours, including regular glucose monitoring, medication adherence, exercise, and dietary control, as revealed in the qualitative data. These findings are consistent with previous studies (Alaofè et al., 2021; Belsti et al., 2020; Kassahun & Mekonen, 2017), which also reported positive self-care practices among T2DM patients. However, the level of self-care observed here

was lower than those reported in other studies (Bayable et al., 2022; Baral & Baral, 2021; Diriba et al., 2020; Asmelash et al., 2019). Such differences may result from variations in population characteristics, healthcare access, level of diabetes education, and cultural beliefs influencing health behaviours. These disparities highlight the need for local diabetes education programmes that consider the unique socio-cultural contexts of each population.

Participants' consistent attendance in clinics contributed greatly to their self-care management. Regular clinical follow-ups enable timely medication adjustments, continuous glucose monitoring, and reinforced education (Sugandh et al., 2023). Many participants also paid attention to dietary choices and glucose self-monitoring, reflecting an awareness of their importance in glycemic control. However, potential gaps remain in other self-care areas, such as exercise and foot care. While participants actively managed the clinical aspects of diabetes, broader lifestyle factors require further reinforcement through targeted interventions.

A significant relationship was established between blood glucose levels and self-care management as shown in table 4. This indicates that individuals who maintain healthy self-care behaviours such as medication adherence, dietary regulation, and regular glucose monitoring tend to achieve better glycemic control. This finding underscores the importance of empowering patients through diabetes education and self-management training (Ahmad & Joshi, 2023; Nikpour et al., 2022; Gómez-Velasco et al., 2019; Abiodun et al., 2020). Improved health literacy enhances patients' capacity to manage their condition and prevent complications.

Furthermore, gender differences may also influence health-seeking behaviours and adherence patterns (Hernandez et al., 2018). These findings suggest that interventions designed to improve diabetes outcomes should account for gender and educational disparities. Conversely, age showed no significant influence on self-care management. While some studies have suggested that aging may hinder self-care due to cognitive or physical limitations (Wilson et al., 2021; Bertolazzi et al., 2024), meanwhile, others have reported that older patients often possess greater experience and knowledge of diabetes management (Li et al., 2022).

Conclusion

The study concludes that although most participants were knowledgeable about diabetes self-care and reported adherence to management practices, a large number still experienced persistent hyperglycemia. This reflects underlying challenges such as inconsistent self-care behaviors and limited access to continuous education or healthcare resources. Family structure also played a

key role, as participants from joint and extended families demonstrated better dietary adherence, underscoring the importance of social and familial support in maintaining consistent self-care routines.

Additionally, sex and educational level significantly influenced diabetes self-management. Higher education improved health literacy and enhanced adherence to recommended practices, while gender differences shaped health-seeking behaviors and treatment responses. These findings highlight the necessity for personalized and context-sensitive interventions in diabetes care. Strengthening education, enhancing family involvement, and addressing gender disparities are essential strategies for improving self-care management and glycemic control among individuals with T2DM.

Clinical Trial number

The clinical trial number is not applicable.

Funding Declaration

This research study received no specific funding whatsoever from any institution or agency.

Declarations

Ethical Approval

Ethical approval for the study was obtained from the Achievers University Health Research Ethics Committee (AUHREC), Nigeria (NHREC/AUHREC/05/11/23). Ethical clearance to conduct the study at the Federal Medical Centre, Owo, Ondo State, Nigeria, was obtained from the institution's Health Research Ethics Committee (FMCOWO/HREC/2024/95; reference number: FMC/OW/380/VOL.CCXIV/90). The study was conducted in accordance with the applicable ethical guidelines and regulations and the principles of the Declaration of Helsinki.

Consent to Participate

Informed consent was obtained from all participants before their participation in the study.

Consent to Publish

Not applicable. The manuscript does not contain identifiable individual participants' data or images requiring consent for publication.

Data Availability Statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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