Assessment of Diabetes Self-Management Practices Among Patients Attending a Tertiary Hospital in Anambra State, Nigeria

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Abstract
Despite the known benefits of lifestyle modification, adherence to treatment among patients remains issue of concern among some patients.This study assessed glycaemic control, lifestyle modification practices, and the perceived impact of these practices on quality of life among diabetic patients attending a tertiary hospital in Anambra State, Nigeria. A descriptive cross-sectional study was conducted among 154 diabetic patients attending diabetic clinic in the hospital. Participants were selected using consecutive purposive sampling. Data were collected using a validated researcher-structured questionnaire (Cronbach's alpha=0.72). Glycaemic control was assessed using random blood glucose levels. Data were analyzed using SPSS version 23, employing descriptive statistics and Chi-square tests at a 0.05 level of significance. Most participants exhibited poor glycaemic control, with a large proportion recording blood glucose levels above 200 mg/dL. Lifestyle modification practices were moderately adopted, with higher adherence to foot care (50.0%) and fruit and vegetable consumption (37.7%), while physical activity and weight management were less consistently practiced. The participants generally had a positive perception of lifestyle modification (grand mean=2.8). Significant association was found between lifestyle modification practices and glycaemic control (χ^2=75.91, p = 0.02), as well as between duration of diabetes and both lifestyle practices (χ^2=10.73, p=0.04) and glycaemic control (p=0.02).

Keywords: Diabetes mellitus; Glycaemic control; Lifestyle modification; Self-management; Nursing care.

1. Introduction

Diabetes Mellitus is a chronic metabolic disorder characterized by persistent hyperglycaemia resulting from defects in insulin secretion, insulin action, or both. If not properly managed, it can lead to severe complications such as cardiovascular diseases, nephropathy, neuropathy, and retinopathy, thereby significantly affecting patients' quality of life (American Diabetes Association [ADA], 2021). It is broadly classified into type 1 and type 2 diabetes. Type 1 diabetes results from autoimmune destruction of pancreatic beta cells, leading to absolute insulin deficiency, while type 2 diabetes is characterized by insulin resistance and relative insulin deficiency (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2017). Type 2 diabetes is the most prevalent form and is strongly associated with lifestyle and environmental factors.

Globally, diabetes represents a major public health concern. According to the International Diabetes Federation (2019), approximately 463 million adults were living with diabetes worldwide, with projections indicating a rise to 700 million by 2045. In Nigeria, about 3.9 million adults were living with diabetes in 2019, reflecting a growing burden in low- and middle-income countries (International Diabetes Federation, 2019).

Effective management of diabetes requires a multifaceted approach, with lifestyle modification forming a cornerstone of care. Lifestyle modification includes adherence to healthy dietary practices, regular physical activity, weight management, smoking cessation, and regular monitoring of blood glucose levels (ADA, 2021). These interventions are essential for achieving optimal glycaemic control and preventing complications.

Evidence suggests that regular physical activity improves insulin sensitivity and glycaemic control (Syeda et al, 2023), while dietary interventions such as reduced intake of refined carbohydrates and increased consumption of fruits and vegetables significantly improve metabolic outcomes (Sievenpiper et al., 2018). Additionally, self-monitoring of blood glucose enables patients to make informed decisions regarding diet, medication, and activity levels (Frontiers in Clinical Diabetes and Healthcare, 2023; Pleus et al., 2022).

Despite the proven benefits of lifestyle modification, adherence remains suboptimal among many diabetic patients. Factors such as financial constraints, limited knowledge, inadequate access to healthcare resources, and poor social support systems have been identified as major barriers (Akadri & Akadri, 2020; IDF, 2019).

In Nigeria, there is limited empirical evidence on the extent to which diabetic patients adopt lifestyle modification practices, particularly in tertiary healthcare settings. Understanding these practices and their relationship with glycaemic control is crucial for designing effective interventions. Evidence consistently shows that dietary modification plays a central role in diabetes management; however, the magnitude of its effect varies across studies. For instance, a randomized controlled trial by Esposito, et al (2014) demonstrated that a Mediterranean-style diet significantly improved both glycaemic control and lipid profiles among patients with type 2 diabetes.

Physical activity is another critical determinant of glycaemic control. Holmes-Truscott (2023), in a systematic review and meta-analysis, found that structured exercise interventions significantly reduced HbA1c levels. Similarly, Nuhoho, et al. (2018) reported improved glycaemic and lipid outcomes following a physical activity intervention in Ghana. A meta-

analysis by Gallardo-Gómez et al. (2024) offers stronger and more up-to-date statistical evidence. Weight reduction is strongly associated with improved glycaemic outcomes. The American Diabetes Association (ADA, 2020) recommends a 5%–10% weight loss for overweight or obese individuals with type 2 diabetes. Supporting this, the Look AHEAD Research Group (2022), demonstrated that intensive lifestyle interventions significantly improved glycaemic control and cardiovascular risk factors. While the Look AHEAD trial provides robust longitudinal evidence, its implementation in resource-limited settings may be challenging due to cost and infrastructure demands. This highlights a gap between evidence-based recommendations and practical applicability in developing countries.

Continuous glucose monitoring (CGM) provides real-time insights into glucose trends while postprandial monitoring helps assess dietary effects (IDF Diabetes Atlas, 2021; Sun et al. 2022). Additionally, insulin sensitivity indices provide further understanding of metabolic control (ADA, 2021). Sustained hyperglycaemia is widely recognized as a major cause of diabetes-related complications (Tomic et al., 2022; Aronow, 2023). In addition to hyperglycaemia, genetic and autoimmune factors may also contribute to disease progression. Buehler et al. (2013) found that improved glycaemic control reduces the risk of microvascular complications but increases the likelihood of hypoglycaemia suggesting a close monitoring of the glucose level.

Medication adherence remains a cornerstone of diabetes management. Evidence from systematic reviews and meta-analyses has demonstrated a strong association between improved adherence and better glycaemic control, including reductions in HbA1c levels (Presley et al., 2019). Similarly, studies conducted in sub-Saharan Africa have confirmed this relationship, showing that poor adherence is consistently associated with suboptimal glycaemic outcomes among diabetic patients (Kolling et al., 2020).

Self-monitoring of blood glucose (SMBG) has been shown to improve glycaemic control, particularly among insulin-treated patients. Recent evidence demonstrates significant reductions in HbA1c among patients who regularly monitor their blood glucose (Pleus et al., 2022). This is consistent with findings from African settings, where adherence to SMBG has been associated with better glycaemic outcomes (Omole et al., 2021). In the opinion of structured healthcare interventions have demonstrated positive outcomes in diabetes management as Chan et al. (2018), found that a nurse-led intervention significantly improved glycaemic control.

Managing DM is expected to be achieved through patient-centered and system-level interventions (Keyserling et al., 2020) with lifestyle modification as fundamental to diabetes control. Megahed et al. (2021) demonstrated that lifestyle interventions improves glycaemic outcomes. Lingaraju et al. (2022) and Peter et al. (2022) reported that although patients often have good knowledge and positive attitudes, actual practices remain poor. Similarly, IDF Atlas (2021) noted high rate of poor glycaemic control despite moderate engagement in self-care behaviors.

Despite this evidence, most studies focus on controlled environments, with limited attention to real-world adherence, particularly in low-resource settings such as Nigeria. Therefore, this study seeks to assess, glycaemic control and lifestyle modification practices among diabetic patients attending diabetic clinic at a Teaching Hospital, in Anambra State, Nigeria.

1.1 Specific Objectives

1. To determine the glycaemic control (random blood glucose levels) among diabetic patients attending the diabetic clinic in the Teaching Hospital.
2. To assess the lifestyle modification practices (diet, physical activity, medication adherence, and blood glucose monitoring) among diabetic patients attending the diabetic clinic in the Teaching Hospital.
3. To determine the perceived impact of lifestyle modification practices on the quality of life of diabetic patients attending the diabetic clinic in the Teaching Hospital.

The following null hypotheses were tested at 0.05 level of significance:

1. H_{01}: There is no significant association between lifestyle modification practices and glycaemic control among diabetic patients attending the diabetic clinic in the Teaching Hospital.
2. H_{02}: There is no significant association between duration of diabetes mellitus and lifestyle modification practices and glycaemic control among diabetic patients attending the Teaching Hospital.

2. Research Methodology

2.1 Research Design

This study adopted a descriptive cross-sectional research design to assess diabetes self-management practices among patients. This design is appropriate for describing characteristics of a population and examining relationships among variables without manipulation. A similar design was employed by Lingaraju et al. (2022) in their study assessing attitudes toward lifestyle modification among diabetic patients in a rural area under Varuna PHC, Mysuru District.

2.2 Area of Study

The study was conducted at the diabetic clinic of Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Nigeria. NAUTH is a tertiary healthcare institution that provides specialized medical services and receives referrals from various health facilities within and outside the state. The hospital is fully accredited and staffed with qualified healthcare professionals who deliver comprehensive care to patients, including those with chronic conditions such as diabetes mellitus.

2.3 Population of the Study

The target population comprised **250** diabetic patients who were receiving care at the diabetic clinic and regularly attending follow-up visits during the period of the study. Patients who were admitted in the hospital at the time of data collection were excluded from the study.

2.4 Sample Size Determination

A sample size of 154 respondents was drawn from the study population using the Taro Yamane formula for finite populations:

n=N1+N(e)2n = \frac{N}{1 + N(e)^2}n=1+N(e)2N

Where:

- n = required sample size
- N = population size (250)
- e = level of precision (0.05)

2.5 Sampling Technique

Consecutive purposive sampling was used to select participants. Every diabetic patient who meets criteria of being diagnosed of the disease for three or more, attended clinic for not less than three times with willingness to participate in the study were included in the study. Though a non-probability sampling method but significantly reduces selection bias while retaining feasibility.

The inclusion criteria were:

- Patients diagnosed with diabetes mellitus for at least three month
- Patients who regularly attended clinic appointments for not less than three times.
- Patients who demonstrated adherence to prescribed treatment regimens

2.6 Instrument for Data Collection

Data were collected using researchers-structured questionnaire titled *Diabetes Self-Management Questionnaire (DSMQ)*. The instrument was subjected to validation by experts in the field to ensure face, content and construct validity. Internal consistency was determined by pilot-testing it using Cronbach's alpha which yielding a reliability coefficient of 0.72, indicating acceptable internal consistency.

2.7 Procedure for Data Collection

Ethical approval was obtained from the Health Research and Ethics Committee of NAUTH, (NAUTH/C5/66/VOL.17/VER.3/103/2024/081), with which permission was sought from the Matron-in-Charge of the diabetic clinic. The purpose and objectives of the study were clearly explained to both the clinic management and the participants.

Data collection was conducted through face-to-face administration of the questionnaire on clinic days. A total of 154 copies of questionnaires were administered and successfully retrieved, resulting in a 100% response rate. The data collection process spanned four months, with an average duration of 45 minutes per participant to ensure thorough responses without causing fatigue. Flexible scheduling was adopted to suit participants' convenience.

2.8 Method of Data Analysis

Data collected were coded, sorted, and analyzed using the Statistical Package for the Social Sciences (SPSS), version 23 (IBM).

Both descriptive and inferential statistics were employed:

- Descriptive statistics (frequency, percentages, mean, and standard deviation) were used to address the study objectives
- Inferential statistics (Chi-square test) were used to test the study hypotheses at a 0.05 level of significance

Results were presented in tables for clarity and ease of interpretation.

2.9 Ethical Considerations

Ethical approval for the study was obtained from the Health Research and Ethics Committee of NAUTH with reference number: NAUTH/C5/66/VOL.17/VER.3/103/2024/081.

Informed consent was obtained from the participants prior to data collection. Participation was strictly voluntary, and respondents were assured of their right to withdraw at any point without penalty. Confidentiality, anonymity, and privacy of the participants were strictly maintained. Additionally, the study posed no psychological or physical harm to the participants.

3 Research Results

3.1 Table 1: Socio-demographic data of respondents (n = 154)

Items	Frequency (n)	Percentage (%)
Sex		
Male	92	59.7
Female	62	40.3
Age (years)		
20–29	25	16.2
30–39	33	21.4
40–49	50	32.5
50 and above	46	29.9

Mean age = 44.5 years

Items	Frequency (n)	Percentage (%)
Highest level of education		
O level	19	12.3
ND	14	9.1
NCE	14	9.1
BSc	49	31.8
MSc/PhD	18	11.7
No formal education	40	26.0
Marital status		
Married	113	73.4
Single	18	11.7
Widow/Widower	15	9.7
Divorced	8	5.2
Duration of disease		
< 1 year	22	14.3
1–2 years	56	36.3
2–4 years	44	28.6
> 4 years	32	20.8

Table 1 shows that the majority of respondents were male (59.7%), with a mean age of 44.5 years. Most respondents were within the 40-49 years age group (32.5%). A higher proportion had a Bachelor's degree (31.8%), while 26.0% had no formal education. The majority were married (73.4%), and most had lived with diabetes for 1–2 years (36.3%).

3.2 Glycaemic status of respondents

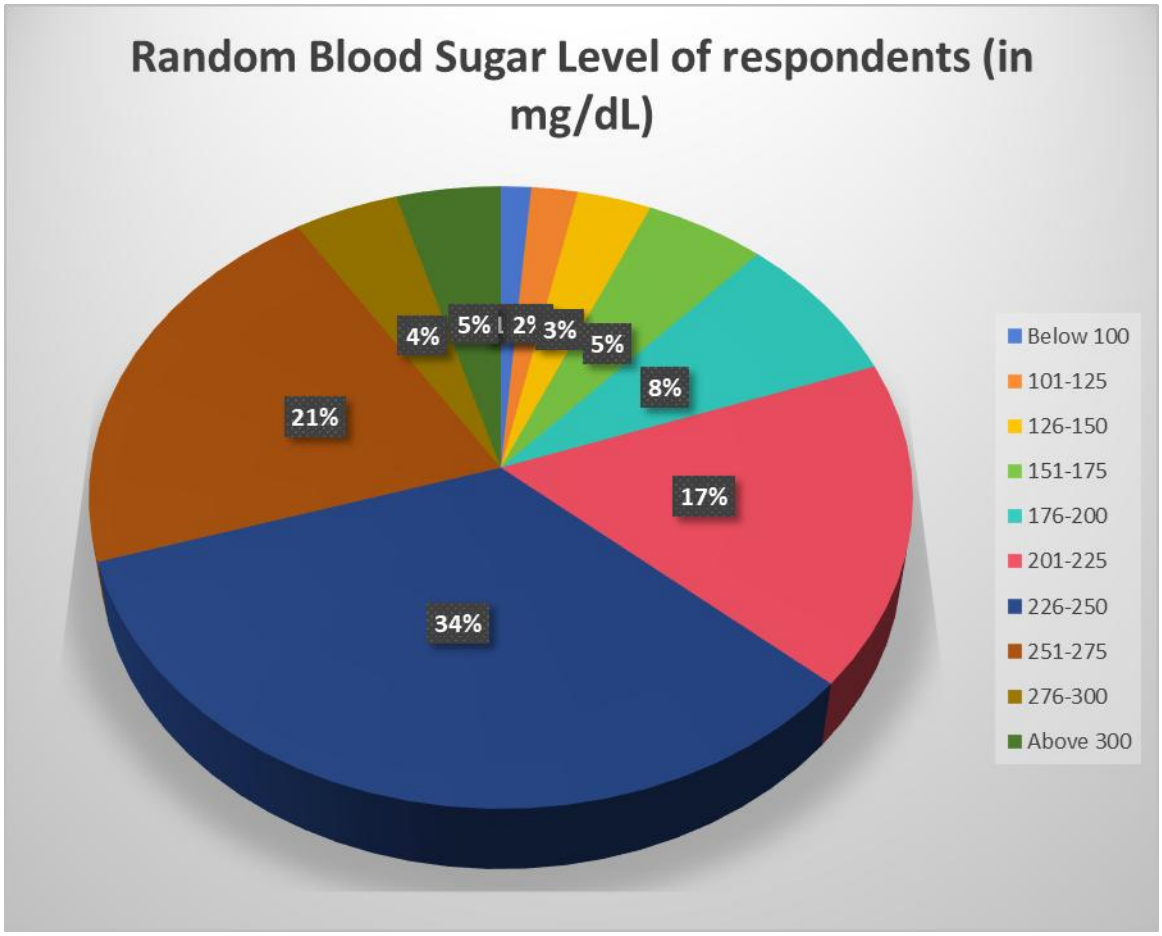

Figure 1: Glycaemic index of the respondents (n = 154)

The figure shows that most of the respondents (34%) had random blood glucose levels between 226–250 mg/dL, while 21% had levels between 251–275 mg/dL. Only a small proportion (1%) had values below 100 mg/dL. This indicates that a large proportion of respondents had poor glycaemic control.

3.3 Table 2: Lifestyle modification practices among respondents (n = 154)

Item	Daily (%)	Twice a week (%)	Once a week (%)	Regularly (%)	Never (%)	Mean
Vigorous regular exercise	22 (14.3)	35 (22.7)	28 (18.2)	54 (35.1)	15 (9.7)	3.0
Consumption of fruits and vegetables	33 (21.4)	37 (24.0)	26 (16.9)	58 (37.7)	0 (0)	3.3
Maintenance of weight through exercise	29 (18.8)	42 (27.3)	34 (22.1)	40 (26.0)	9 (5.8)	3.3

Item	Daily (%)	Twice a week (%)	Once a week (%)	Regularly (%)	Never (%)	Mean
Regular foot check for complications	54 (35.1)	17 (11.0)	6 (3.9)	77 (50.0)	0 (0)	3.3

Table 2 shows that respondents practiced lifestyle modification to varying degrees. The most commonly practiced behavior was regular foot care (50.0%), followed by consumption of fruits and vegetables (37.7%). Engagement in regular exercise (35.1%) and weight maintenance (26.0%) were also reported. Overall, the table indicates moderate adherence to lifestyle modification practices.

3.4 Table 3: Perceived impact of lifestyle modification (n = 154)

Item	SA (%)	A (%)	D (%)	SD (%)	Mean
Improves overall quality of life	50 (32.5)	88 (57.1)	10 (6.5)	16 (10.4)	3.2
Improves physical health	42 (27.3)	74 (48.0)	24 (15.6)	14 (9.1)	2.9
Improves mental/emotional wellbeing	54 (36.0)	76 (49.4)	14 (9.1)	10 (6.5)	3.1
Improves social relationships	48 (31.2)	60 (39.0)	28 (18.1)	18 (11.7)	2.9
Negatively affects health	12 (7.8)	22 (14.3)	65 (42.2)	55 (35.7)	1.9
Negatively affects socio-economic life	52 (33.8)	66 (42.9)	24 (15.6)	12 (7.8)	3.0

Grand mean = 2.8

Table 3 indicates that respondents generally had a positive perception of lifestyle modification, as reflected by a grand mean score of 2.8. Most respondents agreed that lifestyle modification improves overall quality of life, physical health, and psychological well-being.

3.5 Table 4: Association between duration of disease, lifestyle modification and glycemic control of the diabetics

Lifestyle modification	Duration of the disease				Chi-Square value	Df	p-value
	<1 year	1-2 years	2-4 years	>4 years			
Vigorous Regular exercise.	2	10	7	3	10.73	3	0.04

Consumptions of fruits and vegetables.	11	16	10	12			
Maintenance of adequate weight through exercise	5	17	12	10			
Frequent check of feet for any signs of complications	4	13	15	7			
Glycemic index							
Below 70	0	2	2	1	75.91	6	0.02
70-80	1	4	2	2			
81-90	3	6	9	0			
91-100	2	3	4	3			
101-110	4	7	4	7			
111-120	5	10	12	9			
Above 120	7	24	11	10			

The analysis revealed a significant association between lifestyle modification practices and glycaemic control ($\chi^2 = 75.91$, df = 6, p = 0.02). Since the p-value is less than 0.05, the null hypothesis is rejected.

There was a significant association between duration of disease and lifestyle modification ($\chi^2 = 10.73$, df = 3, p = 0.04). Additionally, duration of disease was significantly associated with glycaemic control ($\chi^2 = 75.91$, df = 6, p = 0.02).

4. Discussion

4.1.1 Socio-demographic characteristics of respondents

Findings from this study showed that more than half of the respondents were male (59.7%), with a mean age of 44.5 years. This aligns with studies conducted in Ethiopia and other developing settings where middle-aged adults constitute the majority of diabetic clinic attendees (Asmelash et al., 2019). The predominance of middle-aged individuals may be attributed to the higher occurrence of type 2 diabetes in this age group, often linked to lifestyle and metabolic risk factors (American Diabetes Association [ADA], 2021). However, this finding contrasts with some studies that reported a higher prevalence among older populations above 50 years, suggesting possible demographic variations across regions (Gregg et al., 2021).

The high proportion of married respondents (73.4%) may positively influence disease management, as social support has been shown to improve adherence to diabetes self-care practices (Chao et al., 2021).

4.1.2 Glycaemic control among respondents

The study revealed that a substantial proportion of respondents had poor glycaemic control, with most recording random blood glucose levels above 200 mg/dL. This finding is consistent with studies conducted in Nepal and other low- and middle-income countries, where poor glycaemic control remains prevalent among diabetic patients (Khatri et al., 2022; Kushwaha & Kadel, 2020). Similarly, IDF Atlas (2021) reported that over 90% of diabetic patients had poor glycaemic control (HbA1c ≥7%), reinforcing the global challenge of achieving optimal glycaemic outcomes. However, lower prevalence rates have been reported in India (Bhansali et al., 2020), may reflect differences in screening strategies, healthcare access, and patient education.

These findings highlight persistent gaps in diabetes management despite clinical follow-up.

4.1.3 Lifestyle modification practices

The study demonstrated that respondents engaged in certain lifestyle modification practices, particularly foot care (50.0%) and consumption of fruits and vegetables (37.7%). This is partially consistent with findings by Mekonnen et al. (2020), who reported engagement in lifestyle practices such as smoking cessation and glucose monitoring.

However, unlike the present study where foot care was highly practiced, Mekonnen et al. (2020) found that foot care practices were relatively low. This discrepancy may be due to differences in patient education, healthcare delivery systems, and cultural practices.

Evidence from global studies suggests that adherence to lifestyle modification remains inconsistent despite awareness (Peter et al., 2022). This suggests that knowledge alone may not translate into practice, emphasizing the need for behavioural interventions (ADA, 2021).

4.1.4 Factors influencing lifestyle modification

Financial constraints (90.9%) and lack of knowledge (72.7%) were identified as major barriers to lifestyle modification. This finding is strongly supported by Akadri and Akadri (2020), who also identified economic challenges and inadequate patient education as key determinants of poor adherence in Nigeria.

Similarly, international studies have shown that socioeconomic status significantly influences access to healthy diets, medications, and monitoring tools (International Diabetes Federation [IDF], 2019).

The persistence of these barriers highlights systemic issues in healthcare delivery, particularly in low-resource settings.

4.1.5 Perceived impact of lifestyle modification on quality of life

The study found a positive perception of lifestyle modification, with a grand mean of 2.8, indicating that most respondents believe lifestyle changes improve their quality of life. This aligns with findings by Mekonnen et al. (2020), where patients reported improved well-being following lifestyle interventions. Additionally, structured lifestyle programs have demonstrated significant improvements in quality of life and disease outcomes, as shown in long-term follow-up studies of intensive lifestyle interventions (Diabetes Prevention Program Research Group, 2019). This suggests that while adherence may be suboptimal, patients recognize the benefits of lifestyle modification.

4.1.6 Association between lifestyle modification and glycaemic control

The study found a statistically significant association between lifestyle modification and glycaemic control ($\chi^2 = 75.91$, $p = 0.02$). This finding is consistent with previous studies showing that adherence to diet, exercise, and self-care behaviours improves glycaemic outcomes (Uloko, et al., 2018).

Similarly, systematic reviews have demonstrated that structured lifestyle interventions significantly reduce HbA1c levels among patients with type 2 diabetes (Esposito et al., 2014). This reinforces the critical role of lifestyle modification as a cornerstone of diabetes management.

4.1.7 Association between duration of disease and lifestyle modification/glycaemic control

The study also found a significant association between duration of diabetes and lifestyle modification practices, as well as glycaemic control. This is consistent with findings by Anioke et al. (2019), who reported that longer disease duration is associated with poorer glycaemic outcomes.

One possible explanation is that prolonged disease duration may lead to treatment fatigue, reduced adherence, and progression of complications. Conversely, patients with longer disease duration may also have increased exposure to education and healthcare interventions, influencing their practices differently.

These mixed effects suggest the need for continuous patient education and follow-up throughout the disease trajectory.

4.2 Conclusion

This study revealed that a significant proportion of diabetic patients attending the tertiary hospital had poor glycaemic control despite moderate engagement in lifestyle modification practices. While patients demonstrated good awareness of the benefits of lifestyle modification, actual adherence especially in areas such as physical activity and weight management, which remained suboptimal.

The study also established a significant association between lifestyle modification practices and glycaemic control, as well as between duration of diabetes and both lifestyle practices and glycaemic outcomes. These findings underscore the critical role of sustained lifestyle modification in effective diabetes management.

Overall, the study highlights the need for targeted interventions that address not only knowledge deficits but also socioeconomic and behavioural barriers to optimal diabetes self-management.

4.3 Recommendations

The researchers recommend the following:

- Healthcare providers, especially nurses, should intensify structured and continuous diabetes education programs.
- Hospitals should adopt nurse-led diabetes management programs to improve adherence and glycaemic outcomes.

- Government and healthcare institutions should subsidize essential diabetes care services, including medications and glucose monitoring tools.
- There is need to establish support groups and community outreach programs to enhance social support and patient engagement.

4.4 Limitations of the Study

The study design limits the ability to establish causality between lifestyle practices and glycaemic control.

Data on lifestyle practices were self-reported and may be subject to recall bias or social desirability bias.

Glycaemic control was assessed using random blood glucose rather than HbA1c, which provides a more comprehensive measure of long-term control. The use of purposive sampling may introduce selection bias but this was managed through transparent reporting.

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4.6 Authors' Declaration of Interest

The authors declare that there are no conflicts of interest in the course of this study and its publication.

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