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ORIGINAL RESEARCH

Factors Influencing Therapeutic Non-Adherence Behavior Among Patients with Type 2 Diabetes in Two Public Hospitals in the Gambia: A Cross-Sectional Study

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Background: Type 2 Diabetes Mellitus (DM) is a significant public health problem in The Gambia. While therapeutic non-adherence is widely recognized as a common and costly problem, very little is known about therapeutic adherence behavior among patients with diabetes in The Gambia.

Purpose: The objective of this study was to determine the prevalence and factors that influence diabetic therapeutic non-adherence behavior among patients with type 2 diabetes in The Gambia.

Methods: A cross-sectional study design was used, and participants were recruited from Edward Francis Small Teaching Hospital (EFSTH) and Kanifing General Hospital (KGH). The sample size of 145 patients with type 2 diabetes was included and data was collected using a structured questionnaire. Adherence to anti-diabetic medications was measured using the Morisky Medications Adherence Scale (MMAS-8). Logistic regression was used to determine the factors associated with diabetic therapeutic non-adherence.

Results: The prevalence of non-adherence to anti-diabetic treatment was 27.6%. Perceived barrier (forgetfulness, long-term medication use, and medication side effects) to diabetic treatment (OR = 0.265, 95% CI: 0.113–0.621, $p = 0.041$) was statistically significantly associated with non-adherence to anti-diabetic treatment. However, the frequency of doctor's visits (OR = 0.310, 95% CI: 0.046–2.111) was not significantly associated with non-adherence to anti-diabetic treatment.

Conclusion: The rate of non-adherence to antidiabetic treatment in this study was high. Perceived barriers to antidiabetic treatment such as forgetfulness, long-term medication use, and medication side effects influenced therapeutic non-adherence to antidiabetic treatment. While interventions should focus on how to eliminate these barriers, health education on diabetic self-care may help reinforce the importance of medication adherence to prevent complications.

Keywords: Type 2 diabetes, Health Education, Barriers, EFSTH, KGH, The Gambia

Introduction

The incidence and prevalence of type 2 Diabetes Mellitus (DM) is growing rapidly in both developed and developing countries posing a global public health concern.[1,2] In 2022, an estimated 24 million adults were living with the disease in sub-Saharan Africa (SSA) and this figure is projected to rise by 129% to 55 million by 2045.[3] With these statistics, the associated healthcare cost is also expected to rise and is projected to increase by 162.5% from USD 3.3 billion in 2018 to USD 6 billion by 2045.[4]

The treatment of DM includes insulin use, oral antidiabetic medication, diet, and exercise. These treatments are important for achieving appropriate glycemic control to avoid diabetes-related complications such as heart disease, renal disease, nerve damage, and lower and upper extremity ulcers.[5] Therapeutic adherence involves key self-care behaviors that may reduce or possibly eliminate occurrences of acute and long-term diabetes-related complications.[6] This includes

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not only medication adherence but also diet, exercise, and lifestyle changes. However, adherence to anti-diabetic treatment can pose a challenge to patients with diabetes, particularly in settings with low health literacy and where socio-cultural ideation could negatively influence treatment adherence.[7]

Therapeutic non-adherence in chronic disease conditions including diabetes is widely acknowledged as a common and costly issue.[8] The global prevalence of therapeutic non-adherence among patients with type 2 DM in 2016 ranged widely from 38% to 93%.[7,8] On the African continent, the rate of non-adherence has reportedly been very high. For instance, the prevalence in Ethiopia, Uganda, Botswana, Nigeria, and Ghana was 85.1%, 83.3%, 52%, 86.6%, and 31.5%, respectively.[9]

The high prevalence of therapeutic non-adherence can be influenced by multiple factors. Several studies have shown that forgetfulness, knowledge of the disease, level of education, marital status, number of pills taken, medication side effects, long-term medication use, and dietary restrictions are among the factors that influence therapeutic non-adherence.[9–11]

DM is a growing public health problem in The Gambia. In 2019 the prevalence was 1.6% and was projected to increase to 4% by 2030.[12] Data from the Gambia's Ministry of Health indicated a prevalence of 8.1% in 2021.[13] In addition, between 2017 and 2022, data from the 2019–20 Gambia Demographic Health survey indicate that diabetic admission was the major contributor to the 32% increase in all-cause admission.[14,15] Diabetes complications particularly lower extremity amputation are a common phenomenon mainly due to late diagnosis, poor glucose control, and unhealthy behavior.[16] Therapeutic non-adherence to anti-diabetic medication is a serious concern that is associated with long-term complications.[17] Although several studies have identified factors associated with non-adherence to anti-diabetic medication, differences, and changes in culture and lifestyle over time, the type of medication including dosage schedule and efficacy may affect adherence behavior. Thus, requiring regular evaluation of adherence for effective management of diabetes.

Given the above-mentioned and the gap in knowledge on therapeutic non-adherence among patients with diabetes in the Gambia, we aimed to investigate the prevalence and factors influencing non-therapeutic adherence behavior among patients with type 2 diabetes in The Gambia.

Contribution to Existing Literature

1. This work is the first known paper that specifically addresses adherence issues to therapeutic regimens among patients with type 2 diabetes in The Gambia.
2. This work provides information on the need to restructure the mode and approach of providing care to patients with type 2 diabetes.
3. This work can influence policy in the Gambia that paves the way for the development of more government-specialized clinics/centers for providing care to patients with type 2 diabetes.

Material and Methods

Study Design and Setting

A cross-sectional study design was used, and participants were drawn from Edward Francis Small Teaching Hospital (EFSTH) and Kanifing General Hospital (KGH). These two public hospitals provide the only weekly public diabetic clinic services in the country.

EFSTH is located in Banjul, the capital city. It has seven departments including the Polyclinic which provides specialized clinical services such as weekly diabetic clinics. The clinic sees all patients with diabetes visiting for routine follow-up care. The services provided are limited to medication refills, blood glucose, and blood pressure checks. KGH is located in Kanifing and the hospital has seven departments including the outpatient department (OPD) which houses the diabetic clinic. The clinic provides a similar service as the EFSTH clinic.

Study Population

The study population was all patients with type 2 diabetes attending the diabetic clinics at EFSTH and KGH during the study period. Eligible participants were all patients with type 2 diabetes diagnosed at least six months before data collection, were on antidiabetic medicine, and were 18 years and older. Those hospitalized or with psychiatric disorders were excluded.

Sample Size and Sampling

A successive sampling design was used to sample participants. The minimum estimated sample size was determined using Cochran's single population proportion formula[18] as $n = Z^2 P (1 - P) / D^2$ at a 95% confidence interval and 5% level of significance. Where "n' is the expected sample size, "Z" is the Degree of confidence, "P" is the estimated prevalence, which was 10%,[2] "D" is the acceptance margin of error at 5%. Adding 5% for non-response, a sample size of 145 was achieved. To determine the sample from each clinic, we obtained data on monthly diabetic clinic attendance for each clinic to determine the proportion of the sample for each site.

Recruitment and Data Collection

Recruitment and data collection were done by student nurses trained in administering the questionnaire in major local languages (Mandinka, Wolof, Fula). They received one-day training on how to interpret and administer the questionnaires in the main local languages. During data collection, they were supervised by the first author who eventually cross-checked all completed forms for completeness and accuracy.

The diabetic clinic was visited on each clinic day and while patients were waiting to receive care, they were approached to participate in the study. All participants arriving at the clinic between 08.30 (clinic start) to 14.00 (clinic end) were contacted to participate successively. Those who consented to participate and were eligible were taken to a secluded area and after undergoing the consenting process, they were administered a face-to-face questionnaire in their local language if the participant did not understand the English language. All participants provided written informed consent.

Data Collection Tools

Data was collected with the aid of a structured questionnaire composed of three parts. The Items included socio-demographic and clinical characteristics (age, gender, place of living, duration of DM, frequency of meeting appointments, medication used, etc.); These variables were identified based on previous studies.[5,19,20] We included the use of traditional treatment as this was a commonly observed phenomenon in the study setting. Traditional treatment was defined as the simultaneous use of both conventional and herbal treatments and frequency of doctor's appointments was defined as not missing more than one of four scheduled appointment visits. The Health Belief Model (HBM; 15 items), which was originally formulated and applied to the prediction of compliance with prescribed therapies;[21] and the eight-item Morisky Medications Adherence Scale (MMAS-8) were used to measure medication non-adherence for people with diabetes.[22–24]

The data collection tools were all adopted from scholarly materials.[25,26] Pilot testing was done at KGH on 10% of the study population and the Cronbach's alpha coefficients of the tools were obtained as follows: perceived benefits (0.79), perceived barriers (0.86), perceived susceptibility (0.91), perceived severity (0.71), and the MMAS-8 tool (0.60).

Measurement of Variables

The HBM uses a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) for measuring four components of the tool. These four components include perceived benefits (4 items), perceived barriers (side effects and general; 7 items), perceived susceptibility (2 items), and perceived severity (2 items), all having validated internal consistency of 0.90, 0.83, 0.84, and 0.86 respectively.[25,26] Non-adherence was measured with the MMAS-8 tool. According to Morisky,[27] the MMAS-8 tool has an alpha reliability of 0.83. This tool is answered with "yes" or "no".

Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics including percentages and frequencies, mean, and SD were used to obtain basic information about the variables.

The HBM tool consisted of four subscales, each having between two to seven questions. The 5-point Likert scale of the HBM was compressed into 'Yes' (having correct response) and "No" (having incorrect response). Each correct response was accorded a point and no point in the case of a wrong answer. Based on the correctly answered questions, scores for each of the HBM subscales were obtained by adding the number of correctly answered questions. The median score was used to classify the respondent's perception status as either yes or no.

The MMAS-8 tool consisted of eight questions that sought to determine the level of non-adherence. Each item had two responses (yes or no). The questions were negatively worded, so any affirmative response indicated non-adherence and was scored one point. All the points were summed to form a non-adherence score. Patients scoring less than three points were considered to be adherent while those scoring three points and above were considered to be non-adherent.

A chi-square test was performed to test the crude association between independent variables and the dependent variable (non-adherence to the therapeutic regimen). Those variables significant in the chi-square analysis were put in the multivariate analysis to determine their independent association with therapeutic non-adherence. However, alcohol consumption, which was significant in the chi-square analysis, was excluded in the multivariate analysis because of the high proportion of participants who reported not consuming alcohol. Significance was set at $p<0.05$.

Ethical Consideration

The School of Medicine and Allied Health Sciences, University of the Gambia Research and Publications Committee gave scientific approval and The Gambia Government/Medical Research Council Joint Ethics Committee granted ethical approval. Permission to conduct the study was obtained from EFSTH and KGH management. The study participants were informed about the purpose of the study, anonymity, confidentiality of the information, and their right to decline participation. Written informed consent was obtained from all the participants. The study was conducted per the declaration of Helsinki and the Council for International Organizations of Medical Sciences (CIOMS) guidelines.

Results

One hundred and forty-five (145) patients with type 2 diabetes participated in this study. Table 1 shows the sociodemographic, lifestyle, clinical, and health belief characteristics and the comparison of the respondents' factors by adherence and nonadherence to antidiabetic treatment. The mean age was 56.8±11.6 years. Most of the participants were females (108; 74.5%), married (111; 76.6%), and had no formal education (92; 63.4%). About

Table 1 Sociodemographic, Lifestyle, and Clinical Characteristics by Adherence to Antidiabetic Treatment Status (n=145)

Variables		Sample n(%)	Distribution		*p*-value
			Adherent (n=105)	Non-Adherent (n=40)	
Age (Mean=56.8; SD=11.6)(years)					0.640
	≤50	37(25.5)	29 (27.6)	8 (20)	
	51–60	48(33.1)	34 (32.4)	14 (35)	
	≥61	60(41.4)	42 (40)	18 (45)	
Sex					0.234
	Male	37(25.5)	24 (22.9)	13 (32.5)	
	Female	108(74.5)	81 (77.1)	27 (67.5)	
Marital Status					
	Single	4(2.8)	3 (2.9)	1 (2.5)	0.911
	Married	111(76.6)	79 (75.2)	32 (80)	
	Divorced	3(2.1)	2 (1.9)	1 (2.5)	
	Widowed	27(18.6)	21 (20)	6 (15)	

(*Continued*)

Table 1 (Continued).

Variables		Sample n(%)	Distribution		*p*-value
			Adherent (n=105)	Non-Adherent (n=40)	
Occupation					0.232
	Employed	61(42.1)	41 (39.0)	20 (50.0)	
	Unemployed	84(57.9)	64 (61.0)	20 (50.0)	
Monthly income (in Dalasi)					0.665
	<1500	41(28.3)	30 (28.6)	11 (27.5)	
	1500–2000	28(19.3)	22 (21)	6 (15)	
	>2000	76(52.4)	53 (50.5)	23 (57.5)	
Education					**0.041**
	No formal education	92(63.4)	73 (69.5)	19 (47.5)	
	Primary education	18(12.4)	10 (9.5)	8 (20)	
	Secondary and above	35(24.1)	22 (21.0)	13 (32.5)	
Estimated distance from hospital (Km)					
	≤15	25(17.2)	17 (16.2)	8 (20.0)	0.625
	16–30	71(49.0)	54 (51.4)	17 (42.5)	
	>30	49(33.8)	34 (32.4)	15 (37.5)	
Cigarette smoking					1.000*
	Yes	4(2.8)	3 (2.9)	1 (2.5)	
	No	141(97.2)	102 (97.1)	39 (97.5)	
Alcohol consumption					0.075*
	Yes	2(1.4)	0 (0.0)	2 (5.0)	
	No	143(98.6)	105 (100)	38 (95.0)	
Family history of diabetes					0.129
	Yes	87(60)	59 (56.2)	28 (32.2)	
	No	58(40)	46 (43.8)	12 (30.0)	
Length of diabetes (Years)					0.356
	≤10	99(68.3)	74 (70.5)	25 (62.5)	
	>10	46(31.7)	31 (29.5)	15 (37.5)	
Oral medication(s) used					0.690
	Metformin only	80(55.2)	59 (56.2)	21 (52.5)	
	Metformin and Glibenclamide	65(44.8)	46 (43.8)	19 (47.5)	
Traditional treatment used					0.179
	Yes	14(9.7)	8 (7.6)	6 (15.0)	
	No	131(90.3)	97 (92.4)	34 (26.0)	
Frequency of doctor's appointment					**0.049**
	Regularly	139(95.9)	103 (98.1)	36 (90.0)	
	Not regularly	6(4.1)	2 (1.9)	4 (10.0)	

(*Continued*)

Table 1 (Continued).

Variables		Sample n(%)	Distribution		*p*-value
			Adherent (n=105)	Non-Adherent (n=40)	
HBM: perceived barriers					**0.000**
	No	63(43.4)	35 (33.3)	28 (70)	
	Yes	82(56.6)	70 (66.7)	12 (30)	
HBM: perceived benefits					**0.041**
	No	37(25.6)	22 (21)	15 (37.5)	
	Yes	108(74.4)	83 (79)	25 (62.5)	
HBM: perceived susceptibility					0.170
	No	70(48.3)	47 (44.8)	23 (57.5)	
	Yes	75(51.7)	58 (55.2)	17 (42.5)	
HBM: perceived severity					**0.044**
	No	28(19.4)	16 (15.2)	12 (30)	
	Yes	117(80.6)	89 (84.8)	28 (70)	

Notes: SD Standard deviation; Km Kilometer; *Significance at **p<0.05**; *Fisher's Exact Test; Traditional treatment used (simultaneous use of both hospital and herbal treatments); Frequency of doctor's appointment (not missing more than one of four scheduled appointments). Copyright note: The MMAS-8 Scale (US Copyright Registration No. TX0008632533), content, name, and trademarks are protected by US copyright and trademark laws. Permission for use of the scale and its coding is required. A license agreement is available from MMAR, LLC., www.moriskyscale.com.

Table 2 Patient's Health Belief on Diabetes (n=145)

Items	Agree n(%)	Do not know n(%)	Disagree n(%)
Perceived benefits			
Sticking to my diabetes medication will help prevent diseases (complications) related to diabetes.	134 (92.4)	0 (0.0)	11 (7.6)
Sticking to my diabetes medication will help me control my diabetes.	135 (93.1)	0 (0.0)	10 (6.9)
Sticking to my diabetes medication will help me feel better.	134 (92.4)	0 (0.0)	11 (7.6)
Sticking to my diabetes medication will help me live longer.	76 (52.4)	2 (1.4)	67 (46.2)
Perceived barriers			
I have difficulty remembering when to take my diabetes medication.	20 (13.8)	0 (0.0)	125 (86.2)
Family problems make it difficult for me to take my diabetes medication regularly.	13 (9)	1 (0.7)	131 (90.3)
I would have to change too many habits to take my diabetes medication regularly.	12 (8.3)	1 (0.7)	132 (91)
Taking my diabetes medication interferes with my normal daily activities.	13 (9)	0 (0.0)	132 (91)
I do not feel motivated to take my diabetes medication regularly.	10 (22)	4 (2.8)	131 (90.3)
Diabetes medications cause annoying side effects.	22 (15.2)	0 (0.0)	123 (84.8)
I sometimes worry about the long-term effects of my diabetes medication.	21 (14.5)	0 (0.0)	124 (85.5)
Perceived susceptibility			
I am likely to develop the complications of diabetes or have the complications worsen.	75 (51.7)	0 (0.0)	70 (48.3)
I am likely to have a shortened life expectancy.	55 (37.9)	0 (0.0)	90 (62.1)
Perceived severity			
I consider diabetes to be a severe health problem.	133 (91.7)	0 (0.0)	12 (8.3)
I consider complications arising from diabetes to be severe health problems.	136 (93.8)	0 (0.0)	9 (6.2)
I am confident in my ability to take my diabetes medications exactly as directed by my doctor	135 (93.1)	1 (0.7)	9 (6.2)

half of the patients were unemployed (84; 57.9%), earned above GMD2000 (76; 52.4%), and lived within 16 to 30km from the hospital they visited (71; 49%). Most of the patients did not smoke (141; 97.2%), did not consume alcohol (143; 98.6%), and had a family history of diabetes (87; 60%). Most of the patients used only metformin (80; 55.2%), used only conventional treatment (131; 90.3), and regularly met their appointment with the doctor (139; 95.9%). Furthermore, forty (40; 27.6%) patients reported non-adherence to antidiabetic medications using the MMAS-8 scale. Chi-square analysis showed statistically significant relationships between respondents' educational statuses, alcohol consumption, frequency of doctor's appointments, perceived barriers, perceived benefits, perceived severity, and therapeutic non-adherence rate ($p \leq 0.05$).

Table 2 provides the descriptive statistics of the respondents' health beliefs about their diabetes. Most of the patients agreed that sticking to their diabetes medication will help prevent diabetes complications (134; 92.4%), help control their diabetes (135; 93.1%), help them feel better (134; 92.4%), and they are confident in their ability to take their medications exactly as directed by the doctor (135; 93.1%). Many patients consider diabetes (133; 91.7%) and its complications (136; 93.8%) to be severe health problems. Most patients disagreed finding it difficult to remember when to take their medications (125; 86.2%), having to change too many habits to take their medication regularly (132; 91%), and feeling demotivated to take their medications regularly (131; 90.3%).

Table 3 provides information on the predictors of therapeutic non-adherence among patients with type 2 diabetes. Findings from the multivariate logistic regression indicated a statistically significant association between perceived barriers and non-adherence to antidiabetic medications among T2DM patients (OR = 0.265, 95% CI: 0.113–0.621, p = 0.041). Compared to those with perceived barriers, those without were less likely to be non-adherent to antidiabetic medications. No statistically significant association was observed with the other variables.

Table 3 Predictors of Therapeutic Non-Adherence (n=145)

Variables	Responses	Odds ratio (95% CI)	*p*-value
Education			
	No formal education	1.59 (0.62–4.11)	0.335
	Primary education	0.36 (0.10–1.37)	0.135
	Secondary and above	Reference	
Frequency of meeting appointment with doctor			
	Regularly	3.91 (0.56–27.10)	0.168
	Not regularly	Reference	
HBM: perceived barriers			
	No	0.27 (0.11–0.62)	**0.002**
	Yes	Reference	
HBM: perceived benefits			
	No	0.51 (0.21–1.26)	0.144
	Yes	Reference	
HBM: perceived severity			
	No	0.68 (0.26–1.80)	0.437
	Yes	Reference	

Notes: CI – Confidence Interval; *Significance at* ***p*<0.05.**

Abbreviations: ADA, American Diabetes Association; CI, Confidence Interval; DALY, Disability Adjusted Life Years; DM, Diabetes Mellitus; DSME, Diabetic Self-Management Education; EFSTH, Edward Francis Small Teaching Hospital; HBM, Health Belief Model; IDF, International Diabetes Federation; KGH, Kanifing General Hospital; MMAS, Morisky Medication Adherence Scale; T2DM, Type 2 Diabetes Mellitus; WHO, World Health Organization.

Discussion

This study determined the prevalence and factors associated with non-adherence to anti-diabetic medication among patients with type 2 diabetes in The Gambia. The prevalence of non-adherence to anti-diabetic treatment was 27.6% and the main factor associated with therapeutic non-adherence was patients' perceived barriers to treatment.

The non-adherence rate (27.6%) found in this study is a concern. The WHO recommends an adherence rate of 80% or more for optimal therapeutic efficacy[28] and it is suggested that non-adherence with recommended therapy could result in a minimum of 100,000 avoidable deaths as well as $100 billion in annual preventable healthcare expenditure.[29] The high non-adherence rate could be attributed to the belief in and prevalent use of traditional medicine among the general population with chronic diseases in The Gambia.[30]

The prevalence reported in this study is similar to a study that was conducted in Nigeria.[31] This similarity could be due to the similarity in the study design and settings. The study in Nigeria used a cross-sectional design and reported a nonadherence rate of 27.5%.[31] Non-adherence prevalence was found to be lower in this study than in studies conducted across countries such as Cameroon, Kenya, Ethiopia, Uganda, and Rwanda.[9,19,20,32,33] The reason for the variation in non-adherence levels could be the differences in metrics used to assess non-adherence.[33] Some of the studies used the 4-item Morisky Medication Assessment scale while the recent 8-item Morisky Medication Assessment scale was us in our study. The difference between the MMAS-4 and the MMAS-8 is that MMAS-4 has a very low reliability than MMAS-8.[27,34] The prevalence of non-adherence to antidiabetic treatment was found to be higher in this study than in studies conducted in Eastern Uganda (16.7%), the USA (19.5%), and China (10.4%)[35–37] which may be associated to the free supply of medication and submissive behavior of patients. Wong[37] mentioned that when compared to other populations, Chinese patients are usually more submissive to physicians' advice which might lead to the reduced non-adherence level. The study in Eastern Uganda reported that the free supply of antidiabetic medications to patients contributed to the reduced non-adherence rate to antidiabetic medication.[35,37] This is unlike in the Gambia where there is no constant supply of such free medications in the clinics leading to out-of-pocket purchase of medications. Studies have shown that out-of-pocket financial costs associated with diabetic care negatively impact adherence to diabetic management.[32]

Poor adherence to antidiabetic treatment has been reported to be influenced by several factors.[38] This study revealed that patient's perceived barriers to treatment were one main factor associated with therapeutic non-adherence. The perceived barriers include forgetfulness, long-term medication use, and medication side effects. Patients with diabetes who did not feel any obstacle to taking their medications were less likely to be non-adherent compared to their counterparts who had obstacles. Similar relationships were reported in studies conducted in Turkey, Saudi Arabia, Ethiopia, Nigeria, Netherlands, USA.[5,19,25,31,39,40] One way to help address the problem of forgetfulness is the use of short message service (SMS) and other text-message-based support systems to remind patients about their medications. This tailored, text message-based, self-management support program could help to drastically reduce episodes of forgetfulness among the patients. Since most barriers are addressable by educating patients, courses on medication adherence should be developed and added to educational protocols for patients with diabetes. The contents should focus on complications, simplifying medication use, medication side effects, and accountability of patients. Additionally, tailoring the regimen to the patient's preferences and creating a treatment plan that is unique to each patient's lifestyle may help reduce non-adherence from long-term medication use. This specialized program may keep the patient intrigued and enthusiastic about each step in their care plan.[41,42]

The study is not without limitations. First, the cross-sectional design used limits the ability to affirm causal associations. Second, participants' self-reported medication adherence could be affected by their ability to recall thus leading to under or overestimation of the non-adherence rate. Third, diabetic parameters like HbA1c, blood glucose level, insulin treatment, and micro/macrovascular complications were not assessed. Additionally, this study did not look at some of the cultural factors that influence non-adherence tendencies. The strength of the study lies in its generalizability. The participants in the study were drawn from the only two public diabetic clinics in the country that receive the majority of patients with diabetes throughout the entire country. Thus, our findings could be generalizable to all patient with diabetic in the country. In addition, they could inform policy and interventions aimed at addressing identified barriers and

promoting adherence to anti-diabetic treatments applicable to persons with diabetes in the Gambia. They may be applied more broadly to populations at risk of nonadherence to chronic disease management plans.

Conclusion

Patients' non-adherence rate in this study is above WHO's recommended non-adherence rate of 20% required for optimal therapeutic efficacy. Patients perceived barriers to treatment which included forgetfulness, long-term medication use, and medication side effects were associated with therapeutic non-adherence. Addressing these factors may help ensure better control of diabetes and limit the incidence of complications. To reduce the therapeutic non-adherence rate, the development of more effective communication strategies between healthcare providers and patients with diabetes may be warranted.

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Disclosure

The authors report no conflicts of interest in this work.

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