Knowledge Attitudes and Practices Regarding Adherence to Anti Diabetic Medication among Type 2 Diabetes Patients at Hoima Regional Referral Hospital

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ABSTRACT

The study aims to assess the knowledge, attitudes, and practices of type 2 diabetes patients at Hoima Regional Referral Hospital, Uganda, regarding adherence to anti-diabetic medication. The majority of participants (73.3%) were between the ages of 51 and 65. 80% of the participants in the study were women, consistent with previous studies. Religion can influence adherence to treatment, as it can discourage harmful practices like drinking or smoking. Catholics and Protestants made up the majority of the participants (73%). The study found that about 23.3% of participants reported not exercising at all, while half claimed to exercise once or twice a week. The study found that patients' knowledge score on diabetes medication usage is generally good, but the adherence practice of patients in the current study was suboptimal. Factors influencing adherence to diabetes treatment include affordability, clinic attendance, education level, waiting time, and accessibility. A majority of patients (86.7%) reported that inaccessibility to the hospital and long waiting times at the hospital negatively affect their compliance. Health service factors such as regular attendance at diabetes clinics, health education sessions, and improved knowledge about their condition can help patients adhere to treatment recommendations. Work, home, and hospital environmental settings also affect drug compliance. Occupation may influence adherence to treatment, as having time to see a physician on appointed dates for drug refills and some occupations predispose individuals to behaviors that oppose treatment adherence. Recommendations include government creating income-generating activities for individuals with chronic illnesses like diabetes mellitus, conducting adherence campaigns through local media, improving clinic setups, and conducting more research on factors influencing adherence to diabetes treatment recommendations in other parts of Uganda.

Key words: Type 2 Diabetes, Adherence, Medication, Knowledge, Accessibility, Adherence Factors

INTRODUCTION

Diabetes mellitus (DM) is a major public health issue globally [1]. Current estimates indicate that nearly 415 million people are affected and is set to escalate to 642 million by the year 2040, with a further 193 million people with diabetes remaining undiagnosed due to the often mild or asymptomatic nature of this condition, especially in type 2 DM (T2DM) [2,3]. Type 2 diabetes occurs when the body is not able to produce enough insulin to enable it to function properly, or the body's cells do not react to insulin. This means that glucose remains in the blood and is not used as fuel for energy. By the year 2014, the global prevalence of diabetes was estimated to be 9% among adults aged 18 years and above [4, 5]. Internationally, in 2012, an estimated 1.5 million deaths were directly caused by diabetes, whereas more than 80% of diabetes deaths occur in low- and middle-income countries. According to WHO [1], it is projected that diabetes was the seventh leading cause of death in 2030. The incidence of diabetes, especially type 2, is rapidly growing in the world. In 1985, an estimated 30 million people suffered from this chronic disease, which, by the end of 2006, had increased to 230 million, representing 6% of the world population. Of this number, 80% is found in the developing world, of which 4% had diabetes mellitus. It is estimated that, during the next 35 years, diabetic worldwide prevalence will reach 25%, with India being the hardest hit. By 2025 [6] it is estimated that more than 75% of people with diabetes will reside in low-income countries. Uganda is experiencing a marked upsurge of diabetes. In a random sample from Kampala, the capital city, and its neighboring district Mukono, the prevalence was estimated to be up to 8.1% [7]. A key dimension of healthcare quality is adherence to prescribed medications. According to the World Health Organization (WHO), adherence is the extent to which a person's behavior, such as taking medication, following a prescribed diet,

and/or executing lifestyle changes, corresponds with agreed recommendations from the healthcare provider [8,9] Diabetes is a lifelong disease that requires several activities to be performed by the patient, such as self-blood glucose monitoring, exercise, and taking medications as require. Effective management of diabetes is associated with lower morbidity, mortality, and healthcare utilization, hence reducing the cost and burden to the government and the community [10]. However, non-adherence to medication is particularly common among patients with diabetes, and inadequate adherence compromises safety and treatment effectiveness, leading to increased mortality and morbidity [11]. It also ultimately translates into significant direct and indirect costs to the healthcare system [12]. It is also argued that, because the magnitude of non-adherence and the scope of its effect are high, more health benefits worldwide would result from improving adherence to existing treatments than by developing new medical treatments [8]. However, despite the emphasis put on patients on the importance of appropriate medication use, many patients poorly adhere to drugs, especially for chronic diseases, and fall short of achievable health goals as a result [13].

Non-adherence is associated with factors that are patient-centered, therapy-related, or healthcare system-related [14] The patient-centered factors can be demographic (age, gender, educational level, and marital status) and psychological (patient's beliefs and motivation towards the therapy, negative attitude, patient-prescriber relationship, understanding of health issues, and patient's knowledge) [15]. The therapy-related factors include the route of medication, duration of treatment, complexity of treatment, type of medication, and the side effects of the medicines [7]. The factors linked to the healthcare system include availability and accessibility of healthcare, and the health provider-patient interactions [13]. Previously, numerous studies have explored potential risk factors of non-adherence to medicines across a variety of conditions. Frequently cited risk factors include age, sex, ethnicity, income, education, and co-morbidity, though their relationship to adherence has been inconsistent due to variations in study designs and sample populations. Medication-related side effects are also associated with non-adherence [16]. In Uganda, there is a scarcity of literature on adherence to diabetic treatment in rural areas whose population is generally poorer with less access to healthcare. The number of patients with diabetes in rural areas is on the increase. Therefore, there is a need to identify factors related to medication adherence [17,18]. Furthermore, most of the studies have been carried out in developed countries, leaving a gap in knowledge about the prevalence and factors that may be associated with adherence to diabetic treatment in rural settings [19]. This study assessed the factors associated with adherence to anti-diabetic medication among patients at Hoima Regional Referral Hospital, Uganda, so as to guide interventions for improving drug adherence and optimal glycemic control among type 2 diabetes patients. Diabetes mellitus (DM) is a major public health issue globally. Studies have emphasized the importance of achieving optimal glucose control through strict adherence to medications, diet, and exercise in order to minimize serious long-term complications [20]. These complications affect the patient's quality of life, increase mortality, morbidity, and economic cost to society [10]. Adherence to anti-diabetic medication is one of the major pillars of health service excellence [11]. Non-adherence to antidiabetic medication remains the most common reason for poor health outcomes among people with diabetes [19]. The levels of non-adherence to antidiabetic recommendations are highly variable but have significant effects on diabetes outcomes and the effectiveness of treatments [8]. Few studies on non-adherence to antidiabetic medication have been conducted in Uganda [17]. Moreover, no study has been conducted to assess adherence to anti-diabetic medication among patients at Hoima Regional Referral Hospital in Uganda. This study assessed the factors that influence adherence to anti-diabetic medication among diabetic patients at Hoima Regional Referral Hospital in Uganda. This will guide interventions for improving drug adherence among type 2 diabetic patients.

The study aims to assess the knowledge, attitudes, and practices of type 2 diabetes patients at Hoima Regional Referral Hospital, Uganda, regarding adherence to antidiabetic medication. It aims to understand patients' understanding of diabetes and anti-diabetic medication, their attitudes towards diabetes and anti-diabetic medication, and the practices associated with adherence to these medications.

METHODOLOGY
Study Design

A qualitative and quantitative cross-sectional study was conducted to determine the factors associated with adherence to anti-diabetic medication among patients at Hoima Regional Referral Hospital, Uganda.

Study Site

The study was conducted at Hoima Regional Referral Hospital, approximately 110 kilometers (68 mi) by road northwest of Mubende Regional Referral Hospital. It is approximately 198 kilometers (123 mi) by road northwest of Mulago National Referral Hospital in Kampala, Uganda's capital city. The coordinates of Hoima Regional Referral Hospital are 01°25'41.0"N, 31°21'16.0"E (Latitude: 1.428051; Longitude: 31.354451).

Hoima Hospital is a public hospital funded by the Uganda Ministry of Health, and general care in the hospital is free. It is one of the thirteen Regional Referral Hospitals in Uganda. The hospital is also one of the fifteen internship hospitals in Uganda where graduates of Ugandan medical schools can serve one year of internship

under the supervision of qualified specialists and consultants. The bed capacity of Hoima Hospital was reported to be 280 in 2013. Of the 337 gazetted staff positions, only 251 were filled as of March 2011, leaving 85 vacant positions. Established in 1935, the facility initially functioned as a district hospital. In 1994, it was upgraded to Regional Referral status for the Bunyoro sub-region. It also serves patients from nearby Eastern Democratic Republic of the Congo. In 2019, the Ugandan Ministry of Health estimated the hospital's catchment population to number approximately 3 million people.

The Hospital has a Diabetes clinic which operates once a week, on Wednesday for 6 hours starting from 9:00, making a total of four operational days a month. The clinic handled a total of 838 patients for the period of December 2021 to February 2022, averaging 279 patients per month with about 83 being male and 196 females. The drugs mainly available at the clinic include Metformin and Glibenclamide.

Study Population
The study was conducted among type 2 diabetic patients at Hoima Regional Referral Hospital, Uganda.

Inclusion Criteria
Type 2 diabetic patients on oral hypoglycemic agents (OHA) at Hoima Regional Referral Hospital, Uganda, who were willing to participate in the study.

Exclusion Criteria
All type 2 diabetic patients on Insulin.

Sample Size Determination and Rationale
The sample size was determined using the Kish Leslie's formula (1965)

$$n = \frac{Z^2 p.(1-p)}{e^2}$$

Where;
n is the desired minimum sample size required,
Z is 1.96 (for 95% confidence interval),
e = margin of error set at 5%,
p the assumed population of diabetic patients who are non-adherent.
P value taken to be 28.9 [17]

$$n = \frac{(1.96)^2 * 0.289 * (1-0.289)}{(0.05)^2}$$

n=316
Sample size = 316 patients.

Sampling Procedure
A systematic random sampling technique was used, considering every second patient attending the clinic to choose respondents to participate in the study, from whom data was collected.

Dependent Variable
Adherence to anti-diabetic medication

Independent Variable
Knowledge, attitudes, and lifestyle practices among patients and socio-demographic factors influencing adherence to anti-diabetic medication among patients at Hoima Regional Referral Hospital, Uganda.

Data Collection Method and Tool
Data was collected using an interviewer-administered questionnaire. The researcher met with the targeted respondents who took part in the study, after obtaining permission for data collection from respondents. Each participant was required to give informed consent before enrolling in the study. The researcher assisted the respondents in filling the questionnaires by explaining for clarifications. The properly filled questionnaires were then collected, and the data was taken for analysis. The researcher used a structured questionnaire, and participants were asked similar questions and provided with options from which they would pick the best alternative.

Data Entry and Cleaning
The data in the questionnaire was checked for completeness, cleaned, and sorted to eliminate obvious inaccuracies and omissions. The data was then coded and entered into a computer.

Data Analysis
The qualitative data collected was statistically analyzed and documented using Microsoft Excel and Word version 2019. The analyzed data was then presented in the form of tables and graphs, which was a basis for discussion and conclusion among others.

Quality Control

To ensure quality control, the researcher conducted a pretest using 5 questionnaires, and data was collected before the actual study to help in reconstruction of the questionnaire where necessary.

Ethical Considerations

Permission to conduct the study was sought from the administration of Hoima Regional Referral Hospital and the Kampala International University Research Ethics Committee. Participants were given information regarding the research to seek consent. Each participant's choice to participate or not was respected, and data collected from participants was kept confidential. The participants' names will not be included while filling out the questionnaire to maintain privacy. It was clearly communicated that the information obtained from the participants would be kept under lock and key to only be used for research purposes.

Dissemination of Results

The results from the study were disseminated as a manuscript to Kampala International University School of Medicine and Surgery repository.

RESULTS

Demographic Characteristics

A total of 316 people in all were included in the research. All of them were considered in the analysis. The socio demographic details of the research participants are shown in the above table. The majority of participants—232, or 73.3 percent—were between the ages of 51 and 65;74, or 23.3 percent, were under the age of 50; and 11, or 3.3 percent, were above the age of 65. 253 (or 80%) of the total participants were women. Catholics and Protestants made up the majority of the participants. Eleven (3.3%) of the 221 participants (70%) were Muslims, while 84 (26.7%) belonged to other religious groups. Additionally, 274 (86.7%) of the participants were married, compared to 11 (3.3%) who had never been married and 32 (10%) who had been divorced or separated. Furthermore, 144 (45.6%) of the participants had no formal education, compared to 60(18.9%), 70 (22.2%), and 42 (13.3%) who had completed their basic, secondary, and higher education, respectively.
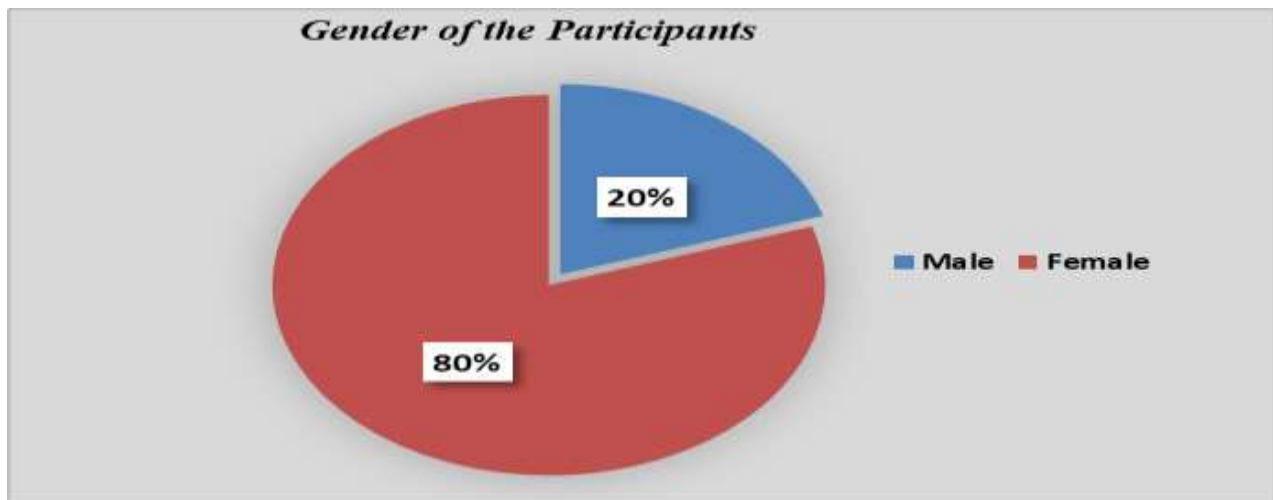

Figure 1: Gender of the Participants

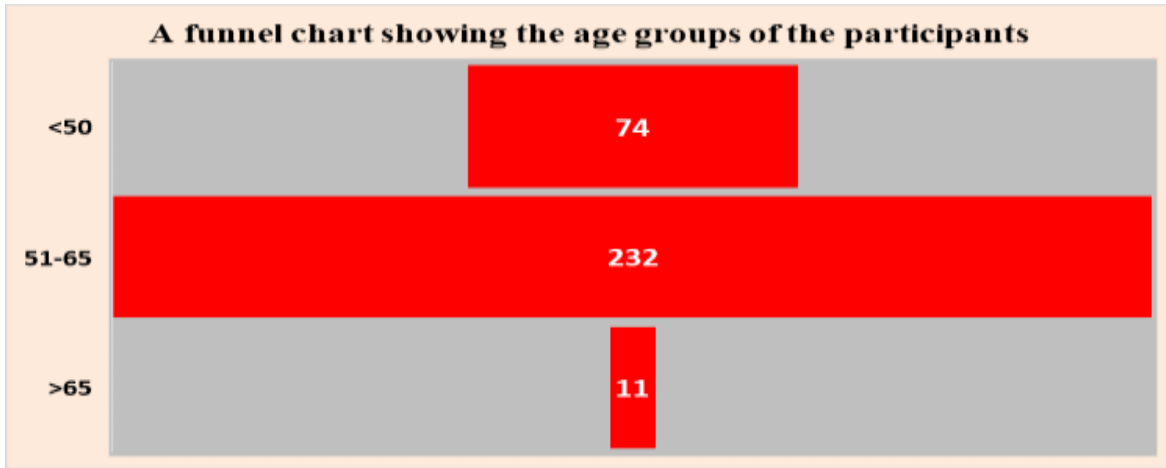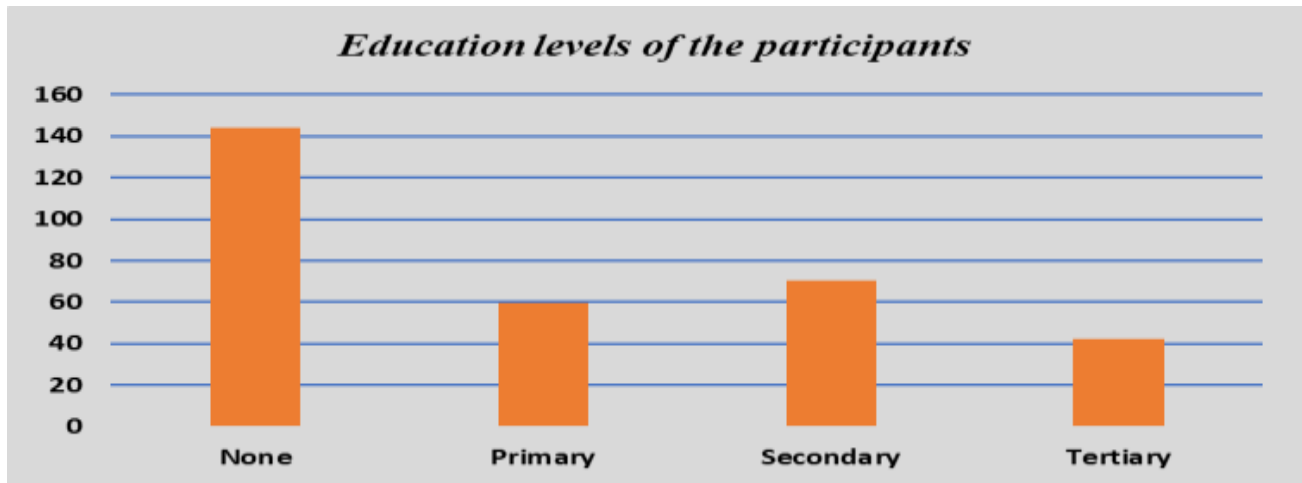**Figure 2: A funnel chart showing the age groups of the participants**

Figure 3: Education levels of the participants

Regarding their financial situation, the majority of participants—169 (53.3%) earned monthly salaries of less than one million, 32 (10%) between one million and two million, and 116 (36.7%) had salaries above two million. Additionally, 137 (43.3%) and 179 (56.7%) of the respondents resided in rural and urban regions, respectively. Most of them, 284 (90%), had never smoked, 263 (83.3%) reported not drinking, and 53 (16.7%) admitted to being moderate drinkers. The patients also indicated the time it took them to reach the health center where they received treatment: 0–30 minutes for 34 (23.35%) participants, 31–60 minutes for 116 (36.7%), 61–120 minutes for 84 (26.7%), and more than 120 minutes for 42 (13.3%). About 23.3 percent of participants reported not exercising at all, while half of them claimed to exercise once or twice a week.

Table 1: The distribution of participants by various variables

Variable	N	%
Occupation		
Business person	63	20.0
Civil servant (government employee)	74	23.3
Private sector	63	20.0
Retired person	32	10.0
Still a Student	0	0.0
Unemployed	84	26.7
Religion		
Orthodox	0	0.0
Muslim	11	3.3
Protestant, catholic	221	70.0
Other	84	26.7
Marital status		
Married	274	86.7
Never married	11	3.3
Separated/divorced	32	10.0
Cohabiting	0	0.0
Monthly income		
1,000,000-2,000,000	32	10.0
Lessthan1,000,000	169	53.3
Morethan2,000,000	0	0.0
No monthly salary	116	36.7
Time to reach clinic/hospital		
0–30min	74	23.3
31–60min	116	36.7
61–120min	84	26.7
>120min	42	13.3
Area of residence		
Rural	137	43.3
Urban	179	56.7
Smoking status		
Ever smoker	32	10.0
Never smoker	284	90.0
Alcohol consumption		
Non-drinker	263	83.3
Moderate drinker	53	16.7
High-risk drinker	0	0.0
Exercise(per week)		
No	74	23.3
1–2times	158	50.0
≥3times	**84**	**26.7**

Table 2: Disease Related Characteristics

Questions	N	%
Do you know the disease condition that you have?		
Yes	305	96.7
No	11	3.3
Duration of diabetes (Years)		
Less than1	21	6.7
1-5.	147	46.7
More than5	147	46.7
Do you have any member(s) of your family history who has/had diabetes?		
Yes	200	63.3
No	116	36.7
Do you know the diabetes complications?		
Yes	295	93.3
No	21	6.7
If yes to above, which of the following diabetes complication you know?		
Neuropathy	39	13.3
Diabetic foot ulcer	148	50.0
Kidney complications	79	26.7
Heart complications	89	30.0
Eye complication	226	76.7
Others	0	0.0
Do you have any diabetic complications?		
Yes	211	66.7
No	105	33.3

Figure 4: Prevalence of Complications among participants
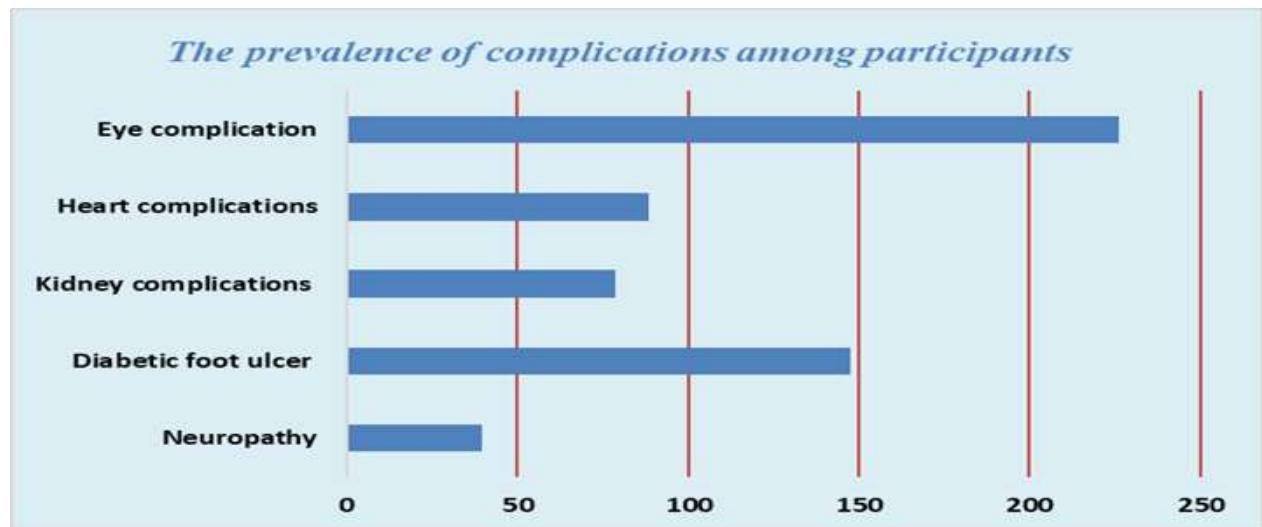
On the topic of medication knowledge, 80% of participants were able to identify their prescribed medication, 60% understood the dosage, and 100% knew the frequency and timing of medication intake. Most of them, 242 (76.7%), identified their medications by reading the labels on the bottles, while 74 (23.3%) relied on others for this information. Fifty-three individuals (16.7%) were unaware of their refill date, while 263 (83.3%) knew it. Adverse effects of their medication were unknown to more than half of the respondents, accounting for 56.7%. All patients

reported adhering to their diabetes medication regimen as prescribed by their doctors. One hundred ninety individuals, or 60%, expressed willingness to recommend the same medicine to friends or family experiencing similar symptoms. In terms of medication storage, 63 people (20%) stored their medication in a cabinet, 200 people (63.3%) kept it in a bag, and 53 (16.7%) in a small tin.

Table 3: Medication Knowledge and Practices.

Question	N	%
Can you name your medication?		
Yes	253	80.0
No	63	20.0
Do you know the dose to take?		
Yes	190	60.0
No	126	40.0
Do you know how many/or frequency of administration?		
Yes	316	100.0
No	0	0.0
Do you know when or what time to take your medication?		
Yes	316	100.0
No	0	0.0
How do you identify your medicine?		
Shape	0	0.0
Color	0	0.0
Depend on others to identify	74	23.3
Label	242	76.7
Are you suggesting the same prescription to your intimates with the same conditions?		
Yes	190	60.0
No	126	40.0
Where do you keep the medication?		
Fridge	0	0.0
Cupboard	63	20.0
Bag	200	63.3
In small tin	53	16.7
Other (Specify)	**0**	**0.0**
When is the next refill due?		
Aware	263	83.3
Not aware	53	16.7
How long do you have to take this medication for?		
For a short-term therapy	84	26.7
Unsure,	11	3.3
Knows if it is long-or short-term therapy	221	70.0
Do you know about any possible side effects of this medication?		
No idea of the side effects	179	56.7
Knows some of the side effects	74	23.3
Gave at least on side effect.	63	20.0
What would you do if you forgot to take a dose of this medication?		
Would act inappropriately (e.g. take double the quantity next time)	63	20.0
Would seek advice from pharmacist, nurse, caretaker, or GP	11	3.3
Would take appropriate action (e.g. take correct dose next time)	242	76.7
Do you take your anti diabetic drugs as advised by your doctor?		
Yes	316	100.0
No	0	0.0
Sometimes	0	0.0
Never	0	0.0

Figure 5: Showing Medication Knowledge and Practices Score.
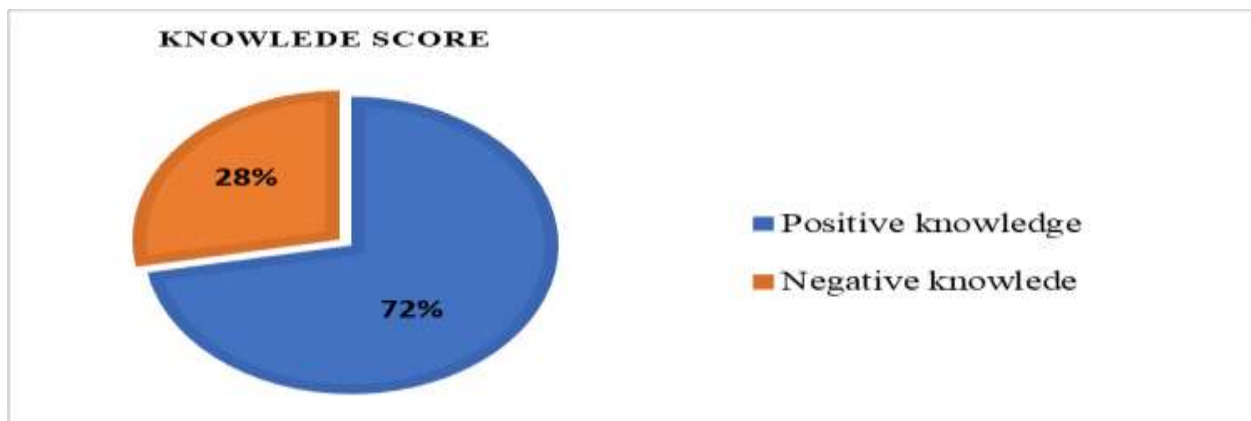
Table 4: Patients' responses on the causes of non-adherence

	Yes	%	No	%
I get encouraged by family members to take medicine	179	56.7	126	40.0
Work/Home/hospital environmental settings affect my drug compliance	147	46.7	158	50.0
Lack of money can cause non-compliance to medication	274	86.7	42	13.3
Accessibility to the hospital affects drug compliance negatively	274	86.7	32	10.0
Long waiting time at the hospital affects my compliance negatively	295	93.3	21	6.7
Difficulties in getting a physician affects my compliance negatively	84	26.7	190	60.0
Unsatisfied clinic visits affects treatment compliance negatively	116	36.7	200	63.3
My age affects treatment compliance negatively	84	26.7	232	73.3
My level of education influences compliance to treatment positively	74	23.3	232	73.3
My attitude and beliefs can negatively influence treatment compliance	74	23.3	242	76.7
My marital status can influence treatment compliance positively	32	10.0	274	86.7

Table 5: Medication Adherence and Practices.

	N	%
Do you sometimes forget to take your medicine?		
Yes	126	40.0
No	190	60.0
Thinking over the past 2weeks, were there any day when you did not take your medicine?		
Yes	200	63.3
No	116	36.7
Have you ever cutback or stopped taking your medicine without telling your doctor because you felt worse when you took it?		
Yes	74	23.3
No	242	76.7
When you travel or leave home, do you sometimes forget to bring along your medicine?		
Yes	74	23.3
No	242	76.7
Did you take all your medicines yesterday?		
Yes	284	90.0
No	32	10.0
When you feel like your symptoms are under control, do you sometimes stop taking your medicine?		
Yes	105	33.3
No	211	66.7
Taking medicine every day is a real in convenience for some people. Do you ever feel has sled about sticking to your treatment plan?		
Yes	126	40.0
No	190	60.0
How often do you have difficulty remembering to take all your medicine?		
Never/rarely	126	40.0
Once in awhile	158	50.0
Sometimes	21	6.7
Usually	11	3.3
All the time		

The practice was generally good (62.4%). Most (60%) of the patients said they rarely forgot to take their medication. However, more than half (63.3%) of the patients noted that there were days when they did not take their medicine in the previous two weeks. Half the respondents said they once in a while had difficulty remembering to take their medicine while only 3.3% had difficulty all the time.

Figure 6: Practice score of Medication Adherence and Practices.
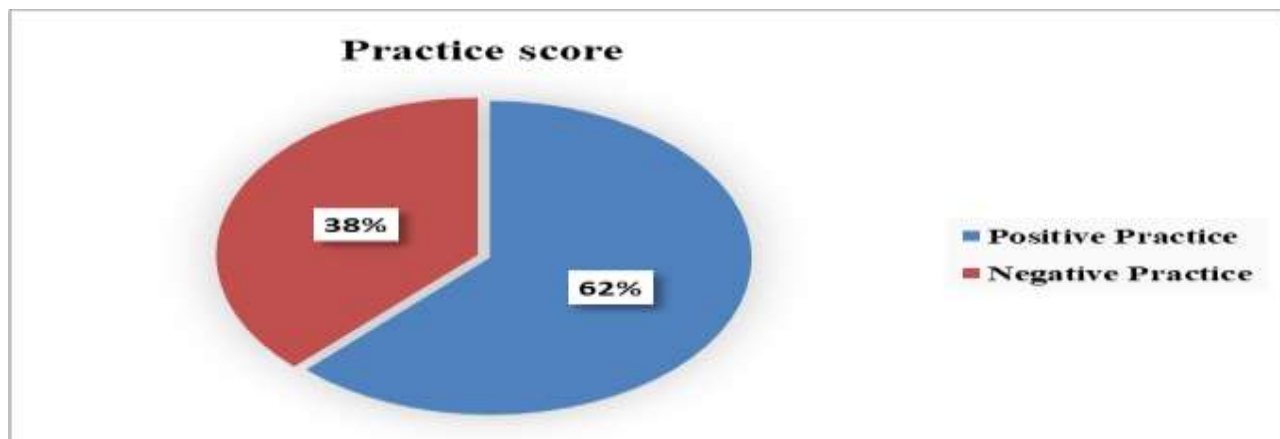
DISCUSSION

Ensuring patients' adherence to anti-diabetes medications to prevent complications of diabetes remains a major challenge to public health in many developing countries [21]. Non-adherence to medication is potentially one of the most serious problems facing diabetes care delivery, particularly in type 2 diabetes, and poor adherence to medications is the most important single reason for uncontrolled diabetes, serious complications, and wastage of healthcare resources [21]. This study attempted to identify factors associated with adherence to anti-diabetes medications. Research has shown that diabetes type 2 is more prevalent among individuals aged 51-60 years (26.9%) [22]. Consistent with the current study, the majority of participants (73.3%) were between the ages of 51 and 65. This observation aligns with the results of a study conducted in Ethiopia, where the majority of participants were in the 40 to 69 years age group [21] However, it contrasts with a study done in Awka, Nigeria, which revealed a prevalence of diabetes among the age group 71-80 years [23]. It is also worth noting that older individuals tend to behave more responsibly by complying with treatment recommendations compared to younger ones who may take life for granted. However, elderly individuals may also face difficulties with treatment compliance due to factors such as social activities and memory deterioration with age [23]. Females tend to have better health-seeking behavior compared to males; however, this is not always the case as many factors play a role in influencing health-seeking behavior. Regarding gender, 80% of the total participants in this study were women. This finding is consistent with a study conducted by Kalyango et al. [17] in Mulago hospital, Uganda, which found that the prevalence of non-adherence to diabetes treatment was 28.9%, and among the factors associated with non-adherence included female gender. This observation is, however, inconsistent with some studies conducted by other researchers in which the majority of the patients were male [25, 26]. Religion can influence adherence to treatment as it can discourage harmful practices like drinking or smoking, which are associated with poor diabetes treatment adherence [27]. Catholics and Protestants made up the majority of the participants (70%) in the current study. Additionally, 86.7% of the participants were married, compared to 11 (3.3%) who had never been married and 32 (10%) who had been divorced or separated. This finding is in line with the findings of Jones et al. (2013), who observed marital status and psychological factors to be some of the factors influencing adherence to diabetes treatment recommendations. Married individuals can offer treatment support to each other, such as sharing treatment bills and affording transport costs, among others, which could help improve adherence to diabetes treatment recommendations [28]. Furthermore, 144 (45.6%) of the participants had no formal education, compared to 60 (18.9%), 70 (22.2%), and 42 (13.3%) who had completed their basic, secondary, and higher education, respectively. Educated individuals have better access to health information and adopt healthy lifestyles more easily compared to uneducated ones; therefore, adherence to treatment is expected to be better among educated individuals, although this may not always be the case as some may intentionally ignore health advice.

Regarding their financial situation, the majority of participants-169 (53.3%), 32 (10%), and 116 (36.7%)-earned monthly salaries of less than one million, between one million, and two million respectively. Financial and employment status of a patient determines his or her ability to meet the cost of treatment, such as transport and medical bills, although certain occupations are also associated with poor adherence due to busy schedules or risky exposures. An example of this exposure is working in industries where alcohol is easily accessible. This study's findings are in line with the findings of Ransom et al. (2012), who stated that differential access to healthcare due to various reasons such as transportation difficulties can affect adherence to diabetes treatment recommendations.

In addition, 137 (43.3%) and 179 (56.7%) of the respondents, respectively, resided in rural and urban regions. Most of them, 284 (90%), had never smoked, 263 (83.3%) said they didn't drink, and 53 (16.7%) admitted to being moderate drinkers. The patients also stated how long it took them to go to the health center where they received treatment: 0–30 minutes 34(23.35%), 31–60 minutes 116(36.7%), 61–120 minutes 84(26.7%), and more than 120 minutes 42(13.3%). About 23.3 percent of participants reported not exercising at all, while half of them claimed to exercise once or twice a week.

Successful self-management of diabetes requires considerable knowledge of medication by patients and families, as it is crucial to understand the effects of diabetes on the body, treatment goals, and the effects of various behaviors on glucose regulation [26]. Unfortunately, people with different socio-demographic backgrounds may have different levels of education, thus affecting their level of knowledge. Consequently, due to lack of knowledge, patients may take treatment less seriously, thus unable to achieve successful treatment. Therefore, strategies to enhance and promote self-efficacy and self-management behaviors for patients are essential components of diabetes education programs to increase their medication adherence. The majority (96.7%) of the study participants knew the disease they suffered from, with 46.7% of them having had it for more than 5 years. According to the study, seventy-two percent of the participants had good knowledge while 28% had poor knowledge about their medication. The patients' knowledge score on the usage of diabetes medications is typically regarded as good (mean average 59.8 percent) [28] The majority of the population (66.7 percent) had experienced one or two

diabetes problems and had inadequate understanding (79 percent) of the negative effects of the diabetes medications they were taking. Several studies have been conducted to examine anti-diabetic medication adherence; however, many of them lack information on pharmacological adverse effects awareness [10]. Level of education may influence the ability to comprehend treatment instructions as well as the benefits of adherence to those instructions, thus potentially improving adherence. According to the results of this research, 74 (23.3%) of the respondents reported that their level of education positively influenced compliance to treatment. More than half, 179 (56.7%) of the patients, said they were encouraged by family members to take their medicine. Social support can promote adherence to diabetes treatment recommendations, as a patient can be encouraged or reminded to take medication at the right time [7]. Additionally, the treatment supporter may prepare the recommended diet for the client and remind them of the date of the next clinic visit, thus improving the psychological well-being of the patient. These findings are in line with that of earlier research which stated that greater social support was associated with better levels of adherence (95%) to dietary recommendations and insulin administration in women with gestational diabetes [29]. A majority, 274 (86.7%), also noted that inaccessibility to the hospital affects drug compliance negatively. Furthermore, 295 (93.3%) of the patients said that long waiting times at the hospital negatively affect their compliance. Health service factors that may affect adherence include regular attendance at diabetes clinics, which may benefit patients through health education sessions and improved knowledge about their condition, thereby encouraging adherence to treatment recommendations. Poor clinic setup with long queues and waiting times may discourage patients from attending the clinic, leading them to seek unconventional alternatives, which can negatively impact diabetes treatment recommendations [27]. Additionally, 147 (46.7%) of the patients noted that work, home, and hospital environmental settings affect their drug compliance. Occupation may influence adherence to treatment, as having time to see a physician on appointed dates for drug refills and some occupations predispose individuals to behaviors that oppose treatment adherence. Eighty-four (26.7%) of the respondents reported that difficulties in getting a physician affected their compliance negatively, while 116 (36.7%) said unsatisfactory clinic visits affect treatment compliance negatively. A good patient-provider relationship creates a friendly and comfortable atmosphere, facilitating clarification of any questions concerning adherence and ensuring the patient understands treatment instructions, such as dose, frequency, and any precautions. This study's findings are in line with those of Kwame et al., [30], who stated that for effective health behavior change to take place, healthcare providers should have a patient-centered approach, establish a good rapport, convey genuine interest in patients, cultivate a collaborative relationship, communicate clearly, and provide advice, enabling patients to learn more about new recommendations. Level of income can determine a client's ability to afford medications as well as pay for physician consultations [31]. A majority, 274 (86.7%), of the patients said that the lack of money can cause non-compliance to medication. Non-adherence is described as not taking more than 80% of the administered treatment in chronic diseases [32]. Attempts to explain and enhance adherence in patients often seem ineffective, with 50% of interventions failing, although successful adherence interventions exist [30]. Non-adherence to diabetes mellitus medical treatments remains a concern for medical professionals and social scientists alike [32] The management of diabetes mellitus may appear simple and direct, but the challenges it poses are likely to weigh heavily on diabetic patients, their families, healthcare systems, and higher authorities at large [33]. Adherence to diabetes mellitus treatment has been described in previous studies to be suboptimal, ranging from 23% to 77% [17,19]. The adherence practice of patients in the current study was suboptimal (62.4%). Adherence to antidiabetic medications in this study (85.1%) was lower than earlier findings in New York (72%), Malaysia (66%), Nigeria (72.5%), and Uganda (71%) [23,26]. The findings are likely because most of the mothers were fairly knowledgeable about their medication. Most (60%) of the patients said they rarely forgot to take their medication. However, more than half (63.3%) of the patients noted that there were days when they did not take their medicine in the previous two weeks. Half of the respondents said they once in a while had difficulty remembering to take their medicine, while only 3.3% had difficulty all the time.

CONCLUSION

The patients' knowledge score on the usage of diabetes medications is typically regarded as good. However, the adherence practice of patients in the current study was suboptimal. According to the patients, factors influencing adherence to diabetes treatment include affordability, clinic attendance, education level, waiting time, and accessibility.

Recommendations

1. Government should create income-generating activities for individuals with chronic illnesses like diabetes mellitus so that they can contribute to their medical bills, thereby improving treatment adherence.
2. Adherence campaigns through local media should be conducted to address patient fears about side effects and the complexity of treatment regimens by providing better options, such as seeking medical advice from the nearest health facility in case of severe drug reactions.

3. Improving clinic setups to shorten waiting times and improve patient-provider relationships will help improve diabetes treatment adherence.
4. More research should be done on factors influencing adherence to diabetes treatment recommendations in other parts of Uganda to come up with more comprehensive findings and better generalizing conclusions.

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