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Patients' Belief and Knowledge about Medicine and Diabetes disease on Medication adherence and Glycemic control among Type 2 Diabetes Mellitus Patients at Alamata General Hospital, Northern Ethiopia

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A thesis submitted to the Department of Pharmaceutics and Social Pharmacy, School of Pharmacy, in partial fulfillment of the requirements for the degree of Master of Science in Pharmacoepidemiology and Social Pharmacy.

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This is to certify that the thesis prepared by Fikadu Hadush, entitled: Patient's belief and knowledge about medicine and diabetes disease on medication adherence and glycemic control among T2DM patients at Alamata General Hospital, Northern Ethiopia and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Pharmacoepidemiology and Social Pharmacy complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

Patients' belief and knowledge about medicine and diabetes disease on medication adherence and glycemic control among T2DM patients at Alamata General Hospital, Northern Ethiopia

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Addis Ababa University, 2020

Introduction: About 45% of T2DM patients had poor glycemic control and 45.2% of patients had poor medication adherence, those could be affected by diabetic disease knowledge, belief about medicines, socio-demographic and clinical determinants. However, there is dearth of data in the Northern part of Ethiopia with regards to glycemic control status and medication adherence.

Objective: To assess influence of patient's belief and knowledge about medicine and diabetes disease on medication adherence and glycemic control among T2DM patients at Alamata General Hospital, Northern Ethiopia.

Methods: A cross sectional study design was conducted among T2DM patients at Alamata General Hospital from September to December, 2019. Data was collected through medical chart review and face-to-face interview of patients using structured questionnaires. Descriptive statistics and multivariable logistic regression were employed to identify predictors of medication adherence and glycemic control.

Results: A total of 305 T2DM patients were included in the study where a little over half were male and had no formal education with mean age of 56.5 ± 12.4 years. Of these, 44.6% of the patients had poor medication adherence, 75.7 % had poor glycemic control and 84.3 % of patients had poor diabetes disease knowledge. Patients who had T2DM disease for more than 10 years (AOR=3.87; 95%CI (1.48-10.07)), high concern belief of anti-diabetic drugs (AOR= 20.63, 95%CI (5.15-82.61) and poor diabetes disease knowledge (AOR=4.54; 95%CI (1.53-13.46)) were determinants of poor medication adherence. Conversely, having high necessity

belief of anti-diabetic drugs (AOR=0.21; 95%CI (0.11-0.40) was inversely associated with poor medication adherence. Meanwhile, being high school student (AOR= 5.54; 95%CI (1.11–27.60)), TVET/Diploma holder (AOR=9.27; 95%CI (1.98–43.36)) and poor diabetes disease knowledge (AOR=4.34; 95%CI (1.74-10.81)) were predictors of poor glycemic control level. Whereas, patients who were taking combination of oral hypoglycemic agents and insulin (AOR=0.33; 95%CI (0.15- 0.71)) and those who had house hold monthly income more than or equal to 3925 ETB (AOR=0.18; 95%CI (0.06-0.48)) were inversely associated with poor glycemic control.

Conclusions: About half of T2DM patients had poor medication adherence and three-fourths of the patients had poor glycemic control. Therefore, regular diabetes health education should be given to enhance their awareness about their disease and medicine use.

Keywords: Medication adherence, T2DM, glycemic control, belief about medicines and diabetes disease knowledge.

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List of acronyms

AAU	-	Addis Ababa University
AFR	-	Africa Region
BMQ	-	Beliefs about Medicines Questionnaire
FBG	-	Fasting Blood Glucose
EFDA	-	Ethiopian Food and Drug Administration
HbA1c	-	Glycosylated Hemoglobin A1c
IDF	-	International Diabetes Federation
MARS	-	Medication Adherence Rating Scale
MoH	-	Ministry of Health
MSDKS	-	Michigan Simplified Diabetes Knowledge Scale
MVD	-	Micro Vascular Dysfunction
OHA	-	Oral Hypoglycemic Agent
SPSS	-	Statistical Package for Social Sciences
T2DM	-	Type 2 Diabetes Mellitus
WHO	-	World Health Organization

1. Introduction

1.1. Back ground

Diabetes is a chronic metabolic disorder and it is one of the four priority non-communicable diseases in the globe. Both the number of cases and the prevalence of diabetes have been steadily increasing over the past few decades. Type 2 diabetes mellitus (T2DM) accounts for between 90% and 95% of diabetes, with highest proportions in low- and middle income countries (WHO, 2016).

Poor medication adherence is widespread and continuous health care issue, specifically for chronic disease patients including diabetes mellitus patients. Though a lot of research has been conducted, the interventions were neither cost effective nor clinically effective to bring the desired patient medication adherence (Lehane & Mccarthy, 2007). Beliefs about medicines are one of the predictors which determine medication adherence level. Specific-necessity and specific-concern showed significant association with adherence of medication (Jamous *et al.*, 2014). Meanwhile, the existence of low knowledge about diabetes disease has been revealed in Ethiopia (Feleke *et al.*, 2013 ; Berhe *et al.*, 2014). Diabetes self-management is a foundation for the effective management of patients with diabetes, and diabetes outcomes could be improved through diabetes education (MoH, 2016).

Generally, the harmful consequence of hyperglycemia are macro vascular complications (Peripheral arterial disease, coronary artery disease, and stroke) and micro vascular complications (retinopathy, neuropathy, and nephropathy) (Chawla *et al.*, 2016). Metabolic physiology and micro vascular are tightly connected. Hyperglycemia causes micro vascular dysfunction (MVD) and micro vascular disease. MVD precedes, and contributes to, hyperglycemia in T2DM through impairment of insulin mediated glucose disposal and, possibly, insulin secretion (Stehouwer, 2018). About 45% of patients with T2DM had poor

glycemic control (HbA1c > 7%). Poor medication adherence is the major contributing factor. Medication non-adherence is prevalent and associated with poor glycemic control, raised unhealthful and death, and raised expenditure of outpatient care, patients stay at hospital, emergency visit and complication management of diabetes (Polonsky & Henry, 2016).

In Ethiopia the prevalence of diabetes ranges from 0.3% to 7.0% with notable difference in prevalence of diabetes between urban and rural residents. High prevalence of diabetes in urban could be due to increasing urbanization and life style changes (Abebe *et al.*, 2016). Some studies conducted in Ethiopia in diabetes patients revealed high prevalence of micro- and macro-vascular complications. The prevalence of those complication were common among T2DM patients (Abejew *et al.*, 2015; Tesfaye *et al.*, 2015). Moreover, those complications were due to poor glycemic control (Fasil *et al.*, 2019; Mohan *et al.*, 2013).

1.2. Statement of the problem

A study conducted in Nigeria revealed about 4% of T2DM patients had micro-vascular complications and it was associated with poor glycemic control which was connected to poor medication adherence. In addition to this, non-adherence was the major factor that could lead to increased morbidity and mortality in diabetes patients (Awodele & Osuolale, 2015).

A cross-sectional study conducted among T2DM patients at Zewditu Memorial Hospital, Addis Ababa, Ethiopia revealed about 45.2% of the participants were non-adherent. This study also revealed poor knowledge on medication was the significant predictor of poor medication adherence (Ali *et al.*, 2017). Facility based cross-sectional study conducted in Jimma University Teaching Hospital, Southwest Ethiopia among T2DM patients showed 24.9% had low medication adherence. Medium level of diabetes disease knowledge, being merchant and good glycemic control were significantly associated with low medication adherence (Kassahun *et al.*, 2016a). Likewise, a cross-sectional study conducted at the diabetes clinic in Tikur

Anbessa Specialized Hospital, Addis Ababa, Ethiopia among T2DM patients suggested 33.2% of patients were non-adherent. Also, being farmer or daily laborer, being with age range of 51 to 60 years and increased number of prescribed medications were predictors of anti-diabetic medication non-adherence (Tsehay *et al.,* 2016). Moreover, another study conducted among diabetes patients in Felege Hiwot Referral Hospital, Bahir Dar City Administration, Northwest Ethiopia concluded about 68.8% of the participants were non-adherent toward their medications (Abate, 2019).

A cross-sectional study conducted among diabetes patients in Jimma University Specialized Hospital, Ethiopia revealed about 59.5% of the diabetes patients had sub optimal blood sugar level with their glycosylated hemoglobin A1c (HbA1c) test value exceeding 7% (Cheneke *et al.,* 2016). A study conducted from Malaysia examined the association of diabetes disease knowledge, medication adherence and glycemic control among T2DM patients. A significantly higher score for knowledge and adherence ($P < 0.05$) was found in those patients with lower HbA1c. Higher diabetes knowledge and higher medication adherence were significant predictors of good glycemic control (Al-Qazaz *et al.*, 2011).

Some research suggested poor medication adherence is a major barrier for existence of sub-optimal glycemic outcome among T2DM patients. Hence, sub optimal glycemic control could increase the risk of complications and associated healthcare costs. In Ethiopia, some studies were conducted about the factors influencing medication adherence, as well as glycemic control. These investigations were focused on socio-demographic and clinical factors (Tsehay *et al.,* 2016; Abebaw *et al.,* 2016). Medication adherence is considered to be affected by determinants apart from demographic and clinical determinants for instance: patients belief about medicines and diabetes disease knowledge (Dias *et al.*,2014). Additionally, medication beliefs and degree of ailment associated awareness are distinct among diverse cultures (Al-Saeedi *et al.,* 2003). There is however dearth of data in Ethiopia, especially in the Northern

part, with regards to T2DM patients' glycemic control status, medication adherence and the influence of the above-mentioned factors.

Therefore, the aim of this study was to assess influence of patients' belief and knowledge about medicine and diabetes disease on medication adherence and glycemic control among T2DM patients in Alamata General Hospital, Northern Ethiopia.

2. Literature review

2.1. Epidemiology of diabetes mellitus

Globally, adult population (20-79 years) with diabetes were 463 million with 9.3% prevalence in 2019 and this number is projected to be 700.2 million with 10.9% prevalence adults with same age range by 2045, will have diabetes. About 70.9% of diabetes was estimated to live in low- and middle-income countries. Two-thirds of people with diabetes live in urban areas and three out of four are of working age. Over 4 million people aged 20-79 years was estimated to die from diabetes-related causes in the same year. Further, in 2019 total healthcare expenditure for diabetes was estimated to be 760.3 billion USD (IDF, 2019).

There is an apparent increase of diabetes mellitus prevalence with economic development in Africa Region (AFR) with rates of 4.4% in lower-income, 5.0% in lower-middle income and 7.0% in upper-middle income countries. T2DM prevalence among 20–79-year-olds is 4.9% with the majority of people with diabetes <60 years old; the highest proportion (43.2%) is in those aged 40–59 years. Moreover, life-expectancy increments in this region is another factor which will aggravate the prevalence of T2DM disease (Peer *et al.*,2014). According to International Diabetes Federation (IDF) report the prevalence of diabetes in Africa Region (AFR) in 2019 was 3.9%, as well as estimated to be 4.1% in 2045. At the same time, 19.4 million of adult population was with diabetes in 2019 and it was estimated for this figure to be 47.1 million in 2045.In addition to this, there was 366,200 deaths of adults with age range of

20 to 79 years because of diabetes in Africa Region in the same year. Likewise, in Ethiopia 1,699.4 of adults 20–79 years with diabetes in 1,000s and 3.2% diabetes national prevalence in adults with same age range estimated (IDF, 2019).

2.2. Poor anti-diabetic medication adherence and its associated factors

The factors influencing medication adherence have been widely investigated. However, still clear and comprehensive conceptual frame work which includes all possible barriers has not been explicitly defined.

A cross-sectional study was conducted at Al-Makhfia governmental diabetes primary health care clinic in Palestine to investigate the influence of belief about medicines, diabetes disease awareness, demographic and clinical determinants on medication adherence among Palestinians with T2DM patients. A convenient sampling technique was employed to recruit four hundred and five patients as study participants. In this research, using Morisky 8-item Medication Adherence Scale (MMAS-8) about 42.7% of patients had poor medication adherence. Meanwhile, patients with high diabetes disease knowledge score [O.R = 0.8, 95% C.I of 0.78-0.97] and those who had strong necessary belief on anti-diabetic medication for their health [O.R = 0.93, 95% C.I of 0.88-0.99] were less likely to be non-adherent. On the other hand, patients who had concern on the adverse effects of anti-diabetic medication and those with high belief that all medicines are harmful in general were more likely to be non-adherent ([O.R = 1.09,95% C.I of 1.04 - 1.16] and [O.R = 1.09, 95% C.I of 1.02 – 1.16] respectively). This research was not able to link medication adherence, belief about medicines and diabetes disease knowledge with glycemic control of patients (Sweileh *et al.*, 2014).

A cross-sectional study was conducted at primary health care clinic of the Palestinian Medical Military Services in Nablus with 185 chronic illness patients that includes diabetes patients. Majority of the patients (79.6%) agreed or strongly agreed their anti-diabetic medications are

necessary for their current health. However, about 58.2% and 57.8% of patients had concern on regular use of anti-diabetic medication and on becoming dependent on their medicine respectively. In this research none of the demographic and clinical factors were associated with medication adherence. Patients who had higher necessity belief were more likely [O.R = 1.107, 95% C.I of 1.023-1.197] to be adherent. On the other hand, those who had higher concern belief were less likely [O.R = 0.908, 95% C.I of 0.845-0.975] to be adherent. Therefore, this research concluded that belief of patients about their medicines was main predictor of medication adherence. However, the main gap of this research was small sample size which makes it difficult to generalize (Jamous *et al.*, 2014).

A health facility based cross-sectional study was conducted in Kirkos Sub City, Addis Ababa, Ethiopia and it included only 155 T2DM patients. More than half of the patients had low level of medication adherence. Patients who were male and those with high concern of the adverse effects of anti-diabetic medication were negatively associated with medication adherence. The gap of this research was small sample size and make it difficult to generalize and to get significant predictors with this sample size (Bizu & Habte, 2016).

2.3. Poor glycemic control and its associated factors

Though understanding of diabetes, and availability of new drugs and technologies improves, a significant number of diabetes patients are not able to achieve the required glycemic goal. Poor medication adherence is the major contributor of poor glycemic control. Therefore, it requires innovative approaches to achieve glycemic targets in clinical practice (Edelman & Polonsky,2017). Even after stringent adjustment of key demographic and medical baseline features of glycemic control, self-reported adherence to diabetes medication predicts long-term glycemic control (Aikens & Piette,2012).

A cross-sectional investigation from Gaza-Palestine has examined the relation of medication adherence and glycemic control with a convenience sample of 148 T2DM patients. About

52.7% and 56.1% of the patients had poor medication adherence and glycemic control respectively. Multivariable analysis showed that patients who were with unmarried status were more likely [O.R = 3.69, 95% C.I of 1.31-10.37] to be non-adherent. Contrarily, patients' adherent with diet (O.R = 0.38, 95% C.I of 0.18-0.82) and those who did not receive education about diabetes disease (O.R = 0.06, 95% C.I of 0.008-0.52) were more likely to be adherent. Also, there was a significant relation between medication non-adherence and having negative view on medicines in entire (O.R = 0.87, 95% C.I of 0.78-0.97). Moreover, poor medication adherence was a significant predictor of poor glycemic control (Almadhoun & Alagha,2018).

2.4. Barriers to diabetes medication adherence and its association with glycemic level model

The conceptual model of this study shows the factors influnecing medication adherenece.The primary emphasis of this model was on variables of belief of patients on medicines, diabetes disease knowledge and medication adherance. The purpose of this research was to determine predictors of anti-diabetic medication adherence and its association with glycemic level.

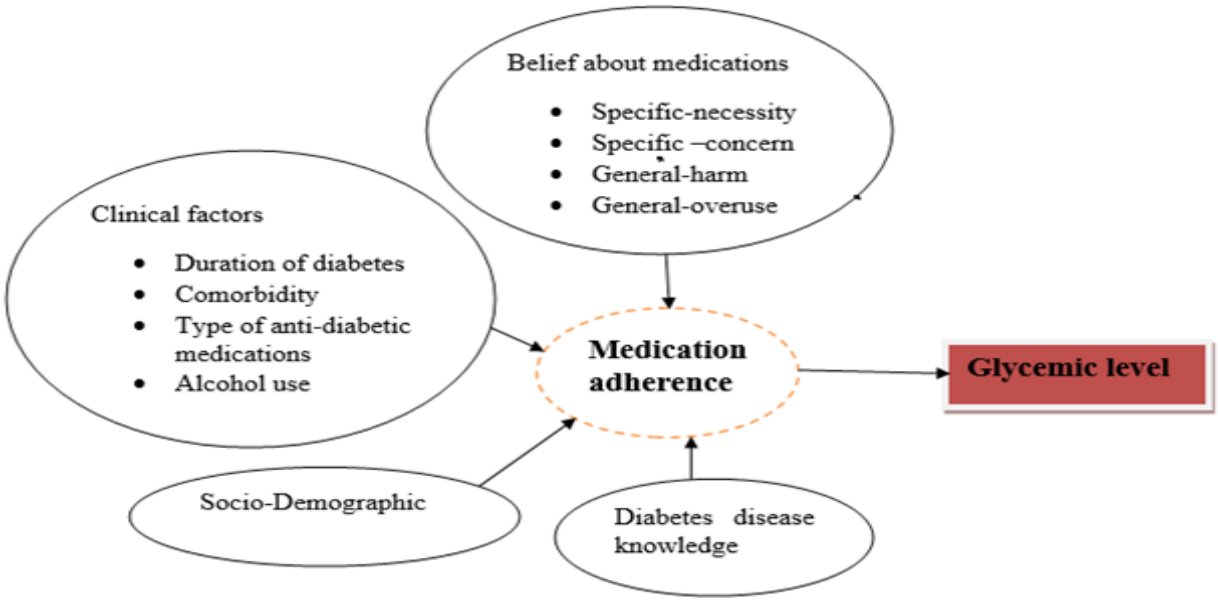

Fig. 1 Conceptual framework of predictors influencing medication adherence and its association with glycemic level

3. Objective

3.1. General objective

To assess influence of patient's belief and knowledge about medicine and diabetes disease on medication adherence and glycemic control among T2DM patients at Alamata General Hospital, Northern Ethiopia.

3.2. Specific objectives

- To assess the influence of patients' beliefs about medicines on medication adherence among T2DM patients at Alamata General Hospital, Northern Ethiopia
- To determine the effect of diabetes disease knowledge on medication adherence among T2DM patients at Alamata General Hospital, Northern Ethiopia
- To assess the level of glycemic control among T2DM patients at Alamata General Hospital, Northern Ethiopia
- To determine the association of medication adherence with glycemic control among T2DM patients at Alamata General Hospital, Northern Ethiopia

4. Methodology

4.1. Study setting

This study was conducted in Alamata General Hospital, South Zone of Tigray Region, Northern Ethiopia. In the city, there are two governmental health facility (one general hospital and one health center). Alamata General Hospital was inaugurated in 1991 G.C. It provides its service with 120 beds for the catchment of population more than one million. It has 264 health professionals providing inpatient, ambulatory and emergency services with over 9 diagnostic and medical treatment services. The hospital district health informatics system was estimated; it provides service for 148,000 patients annually. Moreover, it has a separate chronic illness clinic run by three health care professionals (internist, general practitioner and nurse) in which diabetes patients are regularly monitored every Tuesday of the week.

4.2. Study design and period

A hospital based cross-sectional study was conducted among T2DM patients from September to December, 2019.

4.3. Source and study population

The source population was all diabetes patients who visited the chronic illness clinic of Alamata General Hospital while the study population was all adult T2DM patients on follow-up clinic at Alamata General Hospital during the study period and fulfilled the eligibility criteria set for the study.

4.4. Eligibility criteria

The inclusion criteria for the study includes patients with complete medical records and those who had three consecutive FBG measurements from the last visit. On the other hand, recently diagnosed patients who were less than 6 months and those who were severely sick were excluded from the study.

4.5. Sampling technique and sample size determination

The sample size was determined based on the following assumptions: proportion of medication non-adherence to be 45.2% (Ali *et al*., 2017), Confidence interval width of 5% and confidence level to be 95%. Cochran's sample size formula was employed (Cochran, 1963).

$$n = \frac{\left(z\,{}^{\alpha}/_{2}\right)^{2} pq}{d^{2}}$$

$$n = \frac{(1.96)^{2}(0.452)(0.548)}{(0.05)^{2}} = 380$$

Where

z = confidence level (95%), n = sample size, p = proportion of medication non-adherence (0.452), $q = 1 - p$, d = margin of error (5%)

The sample size was adjusted with correction formula because the source population was less than 10,000 and estimated 1200 T2DM patients visited the chronic referral clinic during the study period. Also, 10% non-response rate was considered. Accordingly, the required minimum sample size was 317 T2DM patients. Moreover, patients were recruited consecutively when they attended for follow up in the chronic illness referral clinic during the study period.

4.6. Study variables

4.6.1. Dependent variables

- Medication adherence
- Glycemic control

4.6.2. Independent variables

- Socio-demographic characteristics (gender, age, marital status, educational status, income status)
- Alcohol drinking, smoking and chat chewing status

- Clinical characteristics (duration of diabetes disease, type of anti-diabetic medications, presence of co-morbidity)
- Belief about medicines (general belief about medicines and specific belief about anti-diabetic medicines)
- Diabetes disease knowledge

4.7. Data collection procedures

In the current study, participants were recruited when they attended for follow up at the chronic referral clinic during the study period using consecutive sampling technique and it employed eligibility criteria. Prior to interview informed verbal consent were obtained, then purpose of the study and their willingness to participate were considered for each participant. They were assured of their right to stop participating from the interview at any instant of time if they felt any discomfort. Data was collected through structured face-to-face interview of study participants by trained BSc nurses, and using data abstraction format from patients' medical history charts. Demographic and clinical information, patients' belief about medicines, diabetes disease knowledge and medication adherence were collected through structured face-to-face interview of participants. On the other hand, some medical characteristics were taken from patients' medical chart.

4.8. Data collection tools

To get information on belief of patients on medicines, diabetes disease knowledge and anti-diabetic medication adherence we employed local languages (Amharic and Tigrigna) version instruments of belief about medication questionnaire (BMQ), Michigan simplified diabetes knowledge scale (MSDKS) and medication adherence rating scale (MARS) which were translated through forward and backward translation methods. A structured data collection

method was used to gather demographic and clinical characteristics of the patients. Also, data abstraction format was used for some clinical information from patients' medical history card.

4.8.1. Medication adherence rating scale

The medication adherence rating scale (MARS) has been published in 1999 G.C. It consists of ten items with yes/no possible answers. This scale has multidimensionality nature as it consists items about adherence behavior, attitude toward medication taking, and negative side effects and attitude to anti-diabetic medications. As result, it helps not only to measure adherence behavior but also to identify barriers of medication taking behavior. For adherent yes response for question 1-6 & 9-10 and no response for question 7&8. The possible score is 0- 10 (Thompson *et al.*, 2000). Furthermore, it has adequate psychometric properties (reliability and validity), as finding showed from large scale study (Fialko *et al.*, 2008). Also, it has been used as measure of medication adherence of diabetes patients (Stange *et al.*, 2013) and research that used this self-report medication adherence measurement for T2DM patients reported acceptable level of reliability as measured by Cronbach's alpha which was 0.79 (Aflakseir, 2012). Moreover, those who scored ≥ 80 % was considered adherent. Conversely, those who scored < 80 % took as non–adherent (Wei *et al.*, 2002).

4.8.2. Beliefs about medicines

The belief of patients about medication was measured by belief about medication questionnaire (BMQ). It has strong psychometric properties in both its construct validity and internal consistency (Horne *et al*., 1999). BMQ consists of two sections which are specific and general beliefs about medications.

The first specific section further classified into specific necessity and concern beliefs about anti-diabetic medications. This section focused both on the relevance of anti-diabetic medication for current and future health, and it also emphasizes on patients concern on long term consequence of adverse effects of anti-diabetic medicines and their concern about life

long dependence on anti-diabetic medications. The specific necessity, and specific concern section, each subscale consists of five statements. Moreover, each statement has 5- points' Likert scale. As result, the respondents could describe their degree of agreement as follows: 1 = strongly disagree; 2= disagree; 3 = neutral; 4= agree; and 5 = strongly agree. The possible score for each subscale was 5–25 (Horne *et al*., 1999).

The second section is a general belief about medication, and it comprises two subscales which are the general overuse and harm subscales. This section assessed both the belief of patients on the way of prescribing medicines in general by physicians, and their perception of medicines are essentially harmful. General overuse and harm sections, each subscale consists of four statements. In addition, each statement has 5- points' Likert scale which are: 1 = strongly disagree; 2= disagree; 3 = neutral; 4= agree; and 5 = strongly agree. The possible score for each subscale was 4 – 20. High general overuse and harm scores show respondents perceived overprescribing of medicines by physicians and had negative view on medicines in general respectively (Horne *et al.*, 1999).

4.8.3. Michigan brief diabetes knowledge test

Diabetes Knowledge Scale was published by Michigan Diabetes Research Center in 2016 G.C. Its objective was for assessment of patients' knowledge about diabetes and its care (Fitzgerald *et al.*, 2016). For this research Michigan Simplified Diabetes Knowledge Scale (MSDKS) was employed for appropriateness purpose. It contains 20 statements with true-false format. It assessed different aspects of diabetes knowledge of patients e.g. diet, exercise, blood glucose levels and testing, and self-care activities. This simplified version could be employed for different patient populations especially for those with low literacy and knowledge status. Importantly, it has favorable psychometric characteristics, for example its internal reliability via Cronbach's alpha was 0.71. Also, its item total correlations ranged from 0.26 to 0.58, which had good discrimination (Collins *et al.*, 2011).

4.8.4. **Demographic and clinical information**

Demographic and clinical characteristics of patients which were gathered through structured face-to-face interviews were the followings: age, sex, marital status, educational status, economic status, occupation, alcohol drinking status, chat chewing status, and smoking status. Meanwhile, some of the clinical information was collected from medical chart using structured data abstraction format to record duration of diabetes since diagnosed, current anti-diabetes medicines, presence of comorbidities and three consecutive FBGs.

4.9. Quality assurance

In Korem General Hospital, the instruments and procedures were pretested in 20 T2DM patients to identify problem areas, minimize instruments bias, reduce patient burden, assess whether or not participants are understanding questions accurately, and make sure appropriate way of administration of questions for study participants. Also, this research employed previously standardized instruments, which were validated in different languages. Two days training was given for data collectors. The data were collected by two Bachelor of Science holder nurses who had been assigned to the chronic outpatient unit. The principal investigator checked the completeness and consistency of data every day at the end of data collection.

4.10. Data analysis

The data were checked for any missing, coded, entered into and analyzed using Statistical Package for Social Science (SPSS) software version 20. Frequency was considered for categorical data. At the same time, mean and standard deviation were employed for all continuous data which were normally distributed. To assess the factors associated with outcome variables inferential statistics were considered. Binary logistic regression was taken as a statistical approach because the outcome variables were dichotomous. As a result, binary logistic regression analysis employed for each factor in relation to outcome variable (adherence and glycemic control status). Then, factors with p-value ≤ 0.25 took to multivariable logistic

regression analysis. Finally, those showed significance (p–value ≤ 0.05 and 95% CI) in multivariable analysis considered as factors affecting the dependent variables.

4.11. Operational definitions

We defined glycemic control according to the Ethiopian Standard Treatment Guidelines for General Hospitals recommendation, where the patient's status was classified as good and poor glycemic control (FMHACA, 2014).

Good glycemic control: patient glycemic control status was defined as good when the average fasting blood glucose measurement is 70 – 130 mg/dl (FMHACA, 2014).

Poor glycemic control: patient glycemic control status was defined as poor when the average fasting blood glucose measurement is < 70 mg/dl and > 130 mg/dl (FMHACA, 2014).

Good diabetes disease knowledge: respondents who scored ≥ 65 % considered as they have good knowledge about their disease (Collins *et al.*, 2011).

High necessity belief: respondents who believed on the relevance anti-diabetic medications for their current and future health (i.e. had scores greater than or equal 20) (Bondesson *et al.*, 2009).

High concern belief: respondents had concern about the adverse consequence of their medication (i.e. had scores greater than or equal 20) (Bondesson *et al.*, 2009).

4.12. Ethical considerations

Ethical approval was obtained from the School of Pharmacy Ethics Review Committee, College of Health Sciences, Addis Ababa University (ERB/SOP/59/04/2019). A support letter was obtained from the School which was submitted to Tigray Regional Health Bureau, which checked its credibility and forwarded to Alamata General Hospital. Finally, permission to access the data from patients' history card was granted from the hospital. Informed verbal consent was obtained for each participant prior to interview. Meanwhile, brief description of the study was given. Also, the right to withdraw from an interview at any time was revealed. Patients were assured about the confidentiality of their information obtained in the study by excluding any personal identifiers. Personal identifiers such as medical record number, name, address and phone number were excluded in the personal information interview.

5. Results

5.1. Patients' demographic and clinical characteristics

A total of 305 T2DM patients were involved in the study and this results 96.2% response rate. About half (51.2%) of the participants were males, majority of the participants were married (66%) and Orthodox Christian followers (73.8%) and more than half (53.1%) of the participants had no formal education. Their mean age was 56.5 ± 12.4 years, ranged from 30 to 85 years. More than half (57.1%) of the respondents had house hold monthly income less than or equal to 2275 ETB. Moreover, patients were not getting health education about diabetes disease in the past 12 months [Table 1].

Table 1 Socio-demographic characteristics of T2DM patients on follow up at Alamata General Hospital, Alamata, Ethiopia, September to December, 2019 (N=305)

Variables		N (%)
Sex		
	Male	156 (51.15)
	Female	149 (48.85)
Age (in years)		
	30-39	29 (9.51)
	40-49	65 (21.31)
	50-59	84 (27.54)
	60-69	66 (21.64)
	> = 70	61 (20)
Religion		
	Orthodox	225 (73.77)
	Muslim	78 (25.57)
	Catholic and Protestant	2 (0.66)
Marital status		
	Single	6 (1.97)
	Married	203 (66.56)
	Divorced	47 (15.41)
	Widowed	49 (16.06)
Educational status		
	No formal education	162 (53.11)
	Primary school	61 (20)
	High school	24 (7.87)
	TVET/Diploma	35 (11.48)
	Degree and above	23 (7.54)
Occupation		

Government	57 (18.69)
Merchant	70 (22.95)
Farmer	94 (30.82)
House wife	19 (6.23)
Private	18 (5.90)
Unemployed	9 (2.95)
Daily labor	6 (1.97)
Others	32 (10.49)
House hold monthly income (ETB)	
< = 2275	174 (57.05)
2276-3924	50 (16.39)
> = 3925	81 (26.56)

note: TVET=technic and vocational education and training, others (retired, house rent, student, maid and sharia court), absolute poverty line 598.67 birr per month, real per adult total consumption expenditure average birr 1032.58 per month and adult equivalent household size=3.8

More than one-tenth (12.5%) of the patients were daily alcohol drinkers and about 5.6% patients were daily khat chewers. Duration of diabetes for most patients (56.7%) was less than 5 years since diagnosis. About one-third (30.5%) of the patients had co-morbidity and the most common co-morbidity was hypertension (24.3%) followed by HIV (5.2%). Two hundred nineteen (71.8%) of the participants were taking oral hypoglycemic agents only and the most prescribed anti-diabetic drug was metformin (34.1%) [Table 2].

Table 2 Clinical characteristics of T2DM patients on follow up at Alamata General Hospital, Alamata, Ethiopia, September to December, 2019 (N=305)

Variables	N (%)
Smoking status	
Daily	4 (1.31)
Not at all	287 (94.10)
Occasionally	14 (4.59)
Alcohol use	
Daily	38 (12.46)
Not at all	194 (63.61)
Occasionally	73 (23.93)
Khat use	
Daily	17 (5.57)
Not at all	264 (86.56)
Occasionally	24 (7.87)
Duration of diabetes (years)	
<5	173 (56.72)

	5-10	87 (28.53)
	>10	45 (14.75)
Co-morbidities		
	No comorbidity	212 (69.51)
	Hypertension	74 (24.26)
	HIV	16 (5.25)
	Others	3 (0.98)
Type of anti- diabetes medication		
	OHA	219 (71.80)
	OHA and insulin injection	53 (17.38)
	Insulin injection	33 (10.82)

note: OHA=oral hypoglycemic agents, HIV=human immunodeficiency virus, others (asthma, tuberculosis and hyperlipidemia) and occasionally=during special conditions or irregularly

5.2. Adherence level and predictors of poor anti-diabetes medication adherence in T2DM patients

One hundred thirty-six (44.6%) patients were non-adherent toward their ant-diabetic medications. Mean adherence score of the patients was 7.7 ± 1.6. About two hundred seventy-four (89.84%) of patients were not reckless at time of taking their anti-diabetics. Two hundred seventy-six (90.49%) were not stopping taking their medication when they feel better. Two hundred eighty-one (92.13%) were not stopping taking their medication when they feel worse. About one hundred twenty-eight (42%) of patients felt weird when they take their medications [Table 3].

Table 3 Self-reported medication adherence score of T2DM patients on follow up at Alamata General Hospital, Alamata, Ethiopia, September to December, 2019 (N=305)

S. no	Frequencies of responses on the MARS	
	Item	Adherent; n (%)
1	Do you ever forget to take your anti- diabetic medication?	189 (61.97 %)
2	Are you careless at times at taking your anti- diabetic medication?	274 (89.84 %)
3	When you feel better do you sometimes stop taking your anti-diabetic medication?	276 (90.49 %)
4	Sometimes if you feel worse when you take the anti-diabetic medication do you stop taking it?	281 (92.13 %)
5	I take my anti-diabetic medication only when I am sick.	301 (98.69 %)
6	It is unnatural for my mind and body to be controlled by anti-diabetic medication.	141 (46.23)
7	My thoughts are clearer on anti-diabetic medication.	241 (79.02 %)

8	By staying on anti-diabetic medication, I can prevent getting sick.	273 (89.51 %)
9	I feel weird, like a zombie, on anti-diabetic medication.	177 (58.03 %)
10	Anti-diabetic medication makes me feel tired and sluggish.	188 (61.64 %)

note: adherent= 'no' response for q 1-6, 9-10 & 'yes' response for q 7, 8; range=1 – 10.

With regard to predictors of adherence, the study showed that patients who had T2DM for greater than 10 years since diagnosis (AOR=3.87, 95%CI (1.48-10.07)) were 3.87 times to be non-adherent than those who had T2DM for less than 5 years since diagnosis. Patients who had high concern on anti-diabetic medication negative effects (AOR=20.63, 95%CI (5.15-82.61)) were 20.63 times to be non-adherent to their medication, compared to those who had low concern. Also, patients who had low awareness about diabetes disease (AOR=4.54, 95%CI (1.53-13.46)) were 4.54 times to be non-adherent to their medications than those who had good knowledge about their disease. On the other hand, patients who had high necessity belief of anti-diabetic medication for their health (AOR=0.21, 95%CI (0.11-0.40)) were inversely related with poor medication adherence, compared to those who had low necessity belief [Table 4].

Table 4 Multivariable logistic regression analysis of predictors of poor medication adherence in T2DM patients at Alamata General Hospital, Alamata, Ethiopia, September to December, 2019 (N=305)

Variables	Status of medication adherence, n (%)				
	Adherent	Non-adherent	COR (95% C.I)	AOR (95% C.I)	P-value
Duration of illness					
<5 years	106 (61.27)	67 (38.73)	Reference		
5-10 years	43 (49.43)	44 (50.57)	1.62 (0.96-2.72)	1.87 (0.92-3.78)	0.084
>10 years	20 (44.44)	25 (55.56)	1.98 (1.02-3.84)	3.87 (1.48-10.07)	0.006*
Specific – necessity					
Low necessity	29 (30.21)	67(69.79)	Reference		
High necessity	140 (66.99)	69 (33.01)	0.21 (0.13-0.36)	0.21 (0.11-0.40)	0.000*
Specific – concern					

Low concern	165 (58.72)	116 (41.28)	Reference		
High concern	4 (16.67)	20 (83.33)	7.11 (2.37-21.36)	20.63 (5.15-82.61)	0.000*
Diabetes disease knowledge					
Good knowledge	40 (83.33)	8 (16.67)	Reference		
Poor knowledge	129 (50.19)	128 (49.81)	4.96 (2.24-11.01)	4.54 (1.53-13.46)	0.006*

note: COR=crude odds ratio; AOR=adjusted odds ratio; *=significant factors

5.3. Glycemic control and its contributing factors in T2DM patients

Two hundred thirty-one (75.7%) of patients had poor glycemic control. Education, occupation, house hold monthly income, anti-diabetic medication types, specific-concern belief, diabetes disease knowledge and adherence to medication were the candidate variables for multivariable logistic regression.

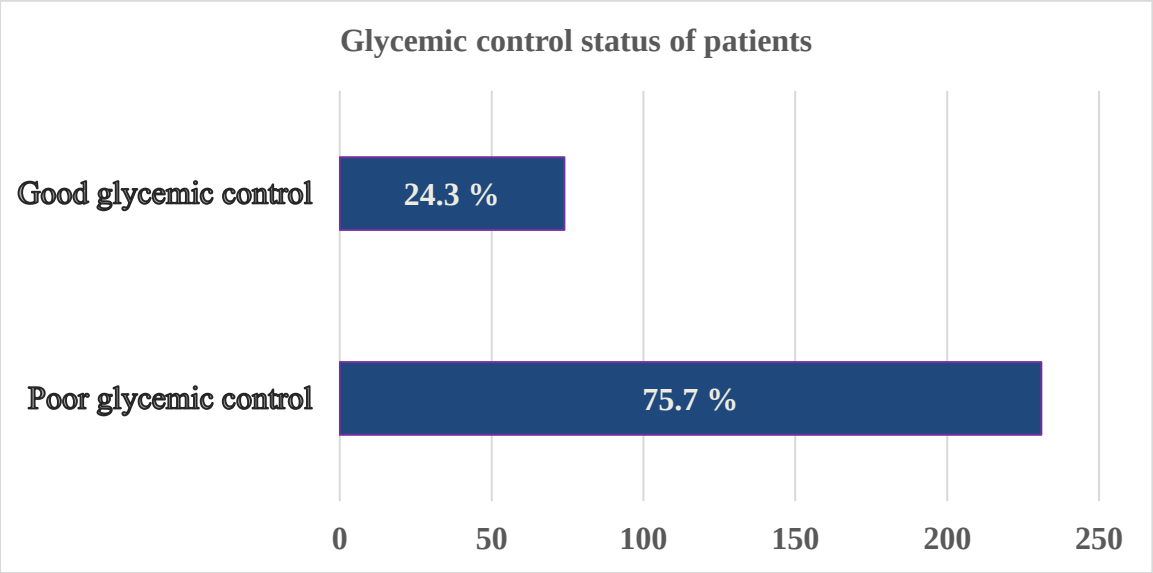

Fig. 2 Glycemic control level of T2DM patients on follow up at Alamata General Hospital, Alamata, Ethiopia, September to December,2019 (N=305)

In the multivariable analysis, patients who were high school students (AOR=5.54, 95%CI (1.11–27.60)) and TVET/Diploma holder (AOR=9.27, 95%CI (1.98–43.36)) had 5.54 and 9.27 times respectively poor glycemic control than those who had no formal education. Also, patients who had poor awareness about diabetes disease (AOR=4.34, 95%CI (1.74-10.81)) had

4.34 times poor glycemic control, compared to those who had good knowledge about their disease. On the other hand, patients who had house hold monthly income greater than or equal 3925 ETB (AOR=0.18, 95%CI (0.06-0.48)) were inversely associated with poor glycemic control, compared to those who had house hold monthly income less than or equal 2275 ETB. Similarly, patients who were taken combination of OHA and insulin injection for their disease (AOR=0.33, 95%CI (0.15–0.71)) were inversely related with poor glycemic control than those who were used OHA only [Table 5].

Table 5 Factors independently associated with poor glycemic control in T2DM patients at Alamata General Hospital, Alamata, Ethiopia, September to December, 2019 (N=305)

Variables	Glycemic level		COR (95% C.I)	AOR (95 % C.I)	P-value
	Good, n (%)	Poor, n (%)			
Education					
No formal education	31 (19.14)	131 (80.86)	Reference		
Primary school	20 (32.79)	41(67.21)	0.49 (0.25-0.94)	1.03 (0.43-2.47)	0.955
High school	3 (12.50)	21 (87.50)	1.66 (0.46–5.91)	5.54 (1.11–27.60)	0.037*
TVET/ Diploma	8 (22.86)	27 (77.1 4)	0.8 (0.33–1.93)	9.27 (1.98–43.36)	0.005*
Degree and above	12 (52.17)	11(47.83)	0.22 (0.09-0.54)	2.53 (0.52-12.40)	0.252
House hold monthly income (ETB)					
< = 2275	33 (18.97)	141 (81.03)	Reference		
2276-3924	6 (12)	44 (88)	1.72 (0.68-4.36)	1.26 (0.42-3.80)	0.686
> = 3925	35 (43.21)	46 (56.79)	0.31 (0.17-0.55)	0.18 (0.06-0.48)	0.001*
Type of anti-diabetes medication					
OHA	47 (21.46)	172 (78.54)	Reference		
OHA and insulin	19 (35.85)	34 (64.15)	0.49 (0.26–0.93)	0.33 (0.15–0.71)	0.005*
Insulin only	8 (24.24)	25 (75.76)	0.85 (0.36-2.02)	0.52 (0.17-1.55)	0.241
Diabetes disease knowledge					
Good knowledge	23 (47.92)	25 (52.08)	Reference		
Poor knowledge	51 (19.84)	206 (80.16)	3.72 (1.95-7.08)	4.34 (1.74-10.81)	0.002*

note: COR=crude odds ratio; AOR=adjusted odds ratio; *=significant factors

6. Discussion

The main goal of diabetes management is to ensure optimal glycemic control. This study has investigated both the magnitude of poor medication adherence and poor glycemic control and its association with belief about medicines and diabetes disease knowledge in T2DM patients. In this research, both suboptimal glycemic control and medication non-adherence were important problems for significant number of T2DM patients. Diabetes disease knowledge, type of ant-diabetic treatment regimen, educational level and socio-economic status were predictors of poor glycemic control. Meanwhile, beliefs about medicines, duration of diabetes and awareness about the disease were significant factors for medication non-adherence.

Result of this study revealed about 44.6% of patients were with poor medication adherence which was comparable to other Study from Ethiopia (Ali *et al.*, 2017), and elsewhere (Sweileh *et al.*, 2014) which however used MMAS-8. On the other hand, it was higher than from studies conducted in Southwest Ethiopia 24.9% (Kassahun. *et al.*, 2016a) which also used MMAS-8 and Addis Ababa 33.2% (Tsehay *et al.*, 2016) which was employed four-item Morisky adherence measure. The reason for variation might be due to different ways of assessment of medication adherence level, dissimilarity of educational status of the participants and methodological difference.

This research using FBGs showed majority of patients (75.7%) had poor glycemic control and was comparable with studies conducted in Ethiopia, which employed FBGs such as, by Tekalegn *et al.*, (2018), Kassahun et al., (2016b), and Fiseha *et al.*, (2018). However, it was higher than studies conducted in South West Ethiopia (59 %) [Yigazu & Desse, 2017], North West Ethiopia (63.5%) [Fseha, 2017] and Tikur Anbessa Specialized Hospital (68.3%) [Demoz *et al.*, (2019)] which also used FBGs. The possible reason for this difference could be due to a difference in socioeconomic status, level of education, difference in duration of diabetes disease, variety in type of prescribed anti-diabetic medication and extent of co-morbidity.

Studies from other countries also showed comparable findings, (Kibirige *et al.*, 2017; Pablo *et al.*, 2018) in Uganda and Fijian of Indian Descent respectively. The poor glycemic control of the study participants in the present study makes them susceptible to higher risks of developing diabetes complications. Hyperglycemia is the principal cause of micro-vascular complication but also play an important role in causation of macro-vascular complication (Chawla *et al.*, 2016) and it is also related with significant immediate and long-term healthcare costs (Alva *et al.*, 2014). Therefore, it requires diabetes self-management education on modifiable risk factors to bring optimal glycemic control.

This research revealed patients had low awareness about diabetes disease in relation to healthy diet, importance of physical activity, diabetes related complications, and blood glucose level and tests. Diabetes disease knowledge of patients was positively related with both medication adherence and glycemic control which was consistent with study conducted in Malaysia in T2DM patients (Al-Qazaz *et al.*, 2011). Majority of the patients (84.3%) had poor knowledge about diabetes disease, which is comparable with the study conducted in Saudi Arabia (78.4%) [Almalki *et al.*, 2017]. It was higher than studies conducted in Bahir-Dar and Mekelle where 50.2% and 56 % respondents had poor diabetes disease knowledge respectively (Feleke *et al.*, 2013 ; Berhe *et al.*, 2014). This difference could be due to different distribution of patients' characteristics (educational background, diabetes health education level and duration of diabetes since diagnosis), the type of instrument employed, and sample size. Therefore, they should have diabetes specific health education in the chronic illness referral clinic.

It was also apparent that patients who were using OHAs only as treatment regimens were negatively related with glycemic control, compared to those who were on combination of OHAs and insulin regimen similar other study (Camara *et al.*, 2015). The possible reasons could be low adherence with OHA (Mcclintock *et al*, 2014), sub-therapeutic OHA dose and delayed initiation of insulin (Nichols *et al.*, 2007). This finding suggested the need of early

intensification of treatment regimen for some of the patients when the initial regimen did not achieve the glycemic target (Khunti *et al.*, 2020).

House hold monthly income was another issue which was associated with poor glycemic control among T2DM patients. Meanwhile, Mcbrien *et al.*, (2016) concluded patients with lower standard economic levels were associated with suboptimal glycemic level. Therefore, strengthening the health insurance schemes both the community-based health insurance and social health insurance is advisable through awareness creation and enrolling patients especially with low socio-economic status to be the member these schemes. Because, some studies reported promising findings in relation to the impacts of these schemes for instance: improves access through making health services affordable and equitable, improves health outcomes including glycemic controls and decrease out-of-pocket expenditures for health care services (Jembere, 2018).

Interesting finding in this research was, being high school student and TVET/Diploma holder were 5.54 and 9.27 times had poor glycemic level, compared to those who had not formal education. Conversely, studies reported that being illiterate was significantly correlated with suboptimal blood sugar level (Fekadu *et al.*, 2019; Kassahun. et al., 2016b; Yigazu and Desse, 2017). Patients who had not formal education might strictly have followed the instruction of physicians and or might be due to lack of diabetes health education in this hospital in the past one year could be the reasons for the variation.

This research revealed that majority of patients (68.5%) perceived ant-diabetic drugs are necessary for their current and future health. Medication adherence and high-necessity belief of anti-diabetic medication was positively associated. Similarly, study conducted in Palestine also concluded that patients who had positive attitude on their anti-diabetic regimen were more

likely to be adherent and most of their patients strongly believe anti-diabetes medications are important for stable health (Sweileh *et al.*, 2014).

Even though the majority of the patients believe that anti-diabetic drugs are necessary for their health, some of the patients (7.9%) had high concern about negative effects of anti-diabetic drugs. Also, there was strong negative association between medication adherence and high-concern belief of the patients. Similarly, study conducted in Addis Ababa, Ethiopia concluded that high concern belief about anti diabetic medication was factor for the existence of poor medication adherence (Bizu & Habte, 2016). Another study conducted in two large urban hospitals in China on patients with stroke, diabetes mellitus and rheumatoid arthritis were consistent with our findings (Wei *et al.*, 2017). Moreover, Sweileh et *al.*, (2014) also endorsed concern belief about anti-diabetic drugs was predictor of poor medication adherence. Therefore, health care providers should provide diabetes health education to reassure about the safety profile of anti-diabetic's drugs on their long-term use and create an awareness about the chronicity and progressive nature of the illness and it could be controlled through regular use of anti-diabetic only. By addressing all these concerns, they could improve the medication taking behavior of patients.

Duration of diabetes since diagnosis was also a predictors of poor medication adherence. Patients who had T2DM disease for greater than 10 years of duration were 3.87 times more likely to be non-adherent toward their anti-diabetic medications, compared to those who were with T2DM disease for less than 5 years. This finding was in agreement with the study conducted in Kenya in which patients who had diabetes for 2 to 10 years were found to have less adherence to their anti-diabetic drugs than those with less than for 2 years duration of disease (Waari *et al*., 2018).

7. Limitations

This research had some limitations. First, to measure medication adherence of T2DM patients self-reported adherence measurement was used. Though this subjective measure possibly leads overestimation of adherence of participants, it is valid measure to assess medication adherence in T2DM patients as studies indicated. Second, cross sectional study design restricts causal relationship between predictors and outcome variables. Therefore, interpretation of findings should consider those limitations.

8. Conclusions

In conclusion, about half of T2DM patients had poor medication adherence and three-fourths of the patients had poor glycemic control. The predictors of poor medication adherence were high-necessity belief, high-concern belief, poor knowledge about diabetes disease, and having diabetes disease for greater than 10 years. Likewise, lack of knowledge about diabetes disease, the use of a combination of OHAs and insulin as treatment regimen, house hold monthly income greater than or equal 3925 ETB, and high school and TVET/Diploma educational level were factors independently associated with poor glycemic control.

9. Recommendations

Findings suggested that health care providers should communicate and create awareness on the belief of the patients on their anti-diabetic medications. Importantly, addressing their concern on adverse effects of anti- diabetic drugs and being dependent on anti-diabetic drugs through improving their awareness on long term safety profile of drugs and chronicity nature of the disease respectively. Regular diabetes disease health education should be given to improve their diabetes disease knowledge and their belief on medication. Also, strengthening health insurance schemes should be takes into account as they help to improve access of health services especially for those with low socio-economic status at affordable price. By addressing those issues, we could improve both the medication adherence and glycemic control. Generally, to achieve the desired glycemic target, it requires multi sectorial collaboration and patient center decision.

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Appendices

ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PHARMACY

DEPARTMENT OF PHARMACEUTICS AND SOCIAL PHARMACY

Title: Patients' Belief and Knowledge about Medicine and Diabetes disease on Medication adherence and Glycemic control among Type 2 Diabetes Mellitus Patients at Alamata General Hospital, Northern Ethiopia

ID NO._____

Annex I: <u>Verbal consent form</u>

Dear participant, my name is ----------, professionally I am pharmacist and now I am post graduate student at AAU at the stream of Pharmacoepidemiology and Social Pharmacy. Now, I am collecting data for master thesis on 'Patients' Belief and Knowledge about Medicine and Diabetes disease on Medication adherence and Glycemic control among Type 2 Diabetes Mellitus Patients at Alamata General Hospital, Northern Ethiopia'. So, I would like to ask you a few questions in relation to socio-demographic issues, knowledge about diabetes disease, belief about medicines, and medication taking behavior. The interview would take a maximum of 20 minutes of your time. The purpose of this study is to examine the influence of knowledge about diabetes disease and belief about medicine on medication adherence and glycemic control in type 2 diabetes mellitus patients. Now, I would like to ask your willingness to participate in this research by your full of interest. Also, I would like to tell you as you have full rights to participate or not participate in this study and as you have right to stop participation at any time during the interview. Moreover, anonymous will be employed for each participant to ensure confidentiality. Also, personal identifiers (name, address) will not be considered for this research.

So, you are being asked to take part in a research study?

Yes □ No □

If yes, let's proceed to the questions

በ ፋርማሲ ትምህርት ቤት
የኢቲካል ሪቪው ቦርድ

አዲስ አበባ ዩኒቨርሲቲ
Addis Ababa University

School of Pharmacy
Ethical Review Board

ቀን Date: April 08, 2019

ቁጥር Ref. No.: ERB/SOP/59/04/2019

To: **Fikadu Hadush**
School of Pharmacy

Re: **Ethical Clearance**

It is to be recalled that you submitted a study proposal entitled ***"Influence of patient's disease knowledge and belief about medicines and medication adherence and blood glucose control among patients with type 2 Diabetes Mellitus in Alamata Genreal Hospital, Tigray North Ethiopia "*** for ethical approval by the School's Ethical Review Board (ERB). The Board thoroughly reviewed the proposal based on its operational guidelines and found it to fulfill all ethical requirements stipulated in the guidelines. This is, therefore, to inform you that the proposal is ethically approved for implementation.

With best regards,

Arebu Issa
Chairperson, ERB

☎ 00251156 02 12 ✉ 1176 ቴሌክስ Telex: 21205 ፋክስ Fax: 00251(11)1558566 ቴሌግራም Cable: AAUNIV

Annex II. <u>Demographic and clinical information</u>

Section 1: Socio-demographic information		
S.no	Background information	Answers
1.	Gender	Male □ Female □
2.	Age	_____Years
3.	Marital Status	Single □ Divorced □ Married □ Widowed □
4.	Religion	Orthodox □ - Catholic □ Protestant □ Muslim □ No religion □ Others, Specify: _____
5.	Level of education	No formal education □ Primary 1st cycle (1-4 grade) □ Primary 2nd cycle (5-8 grade) □ High school (9-12 grade) □ TVET (Diploma) □ Bachelor degree and above □
6.	Occupation	Employed □ Unemployed □ Merchant □ Farmer □ Daily laborer □ House wife □ Others, Specify: _____
7.	House hold monthly income	_____ETB
8.	Cigarette smoking status	Daily □ Not at all □ Occasionally□
9.	Alcohol drinking status?	Daily □ Not at all □ Occasionally□
10.	Chat chewing status?	Daily □ Not at all □ Occasionally□
11.	How many times took diabetes health education during the last 12 months?	_____
Section 2: Medical Characteristics (to be filled through chart review by data collectors)		

12.	Please describe the name of current anti-diabetic medication:	Metformin □ Gilbenclamide □ Others, please specify it _____
13.	Is the patient currently using insulin?	Yes □ No □
	If yes, please describe the type of insulin injection	NPH/Intermediate acting □ Regular insulin/Short acting□ Others, please specify it_____
14.	Duration of the diabetes disease since diagnosis:	_____(in months)
15.	Do you have other comrbidty? If yes, which one of the following:	Hypertension□ Hyperlipidemia□ Ischemic heart disease□ Stroke□ Others, specify: _____
16.	FBG reading in the past 3 months from medical records:	V1_____ V2_____ V3_____

Annex III: Beliefs about medicines questionnaire (BMQ)

Please indicate your agreement or disagreement with the following statements by encircling one number on the provided scales: **1= strongly disagree; 2= disagree; 3= uncertain; 4= agree; 5= strongly agree**.

Section 1: BMQ Specific						
Items		Your Level of Agreement				
17.	My health, at present, depends on my medicines	1	2	3	4	5
18.	Having to take medicines worries me	1	2	3	4	5
19.	My life would be impossible without my medicines	1	2	3	4	5
20.	Without my medicines, I would be very ill	1	2	3	4	5
21.	I sometimes worry about long-term effects of my medicines	1	2	3	4	5
22.	My medicines are a mystery to me	1	2	3	4	5
23.	My health in the future will depend on my medicines	1	2	3	4	5
24.	My medicines disrupt my life	1	2	3	4	5
25.	Sometimes worry about becoming too dependent on my medicines	1	2	3	4	5
26.	My medicines protect me from becoming worse	1	2	3	4	5
Section 2: BMQ General						
27.	Doctors use too many medicines	1	2	3	4	5
28.	People who take medicines should stop their treatment for a while every now and again	1	2	3	4	5
29.	Most medicines are addictive	1	2	3	4	5

30.	Natural remedies are safer than medicines	1	2	3	4	5
31.	Medicines do more harm than good	1	2	3	4	5
32.	All medicines are poisonous	1	2	3	4	5
33.	Doctors place too much trust in medicines	1	2	3	4	5
34.	If doctors had more time with patients, they would prescribe fewer medicines	1	2	3	4	5

Annex IV: Revised Michigan Diabetes Knowledge Scale – true/false version.

Here are 20 statements about diabetes, some are true statements and some are false. Please read each statement and then indicate whether you think it is true or false by putting a circle round either true or false. If you do not know the answer, please put a circle around don't know.

Items		True	False	Don't know
35.	The diabetes diet is a healthy diet for most people.			
36.	Fasting blood sugar is a test that measures your blood glucose level in the past weeks.			
37.	A pound of chicken has more carbohydrate in it than a pound of potatoes.			
38.	Orange juice has more fat in it than low fat milk.			
39.	Urine testing and blood testing are both equally as good for testing the level of blood glucose.			
40.	Unsweetened fruit juice raises blood glucose levels.			
41.	A can of diet soft drink can be used for treating low blood glucose levels.			
42.	Using olive oil in cooking can help prevent raised cholesterol in the blood.			
43.	Exercising regularly can help reduce high blood pressure.			
44.	For a person in good control exercising has no effect on blood sugar levels.			
45.	Infection is likely to cause an increase in blood sugar levels.			
46.	Wearing shoes, a size bigger than usual helps prevent foot ulcers.			
47.	Eating foods lower in fat decreases your risk for heart disease.			
48.	Numbness and tingling may be symptoms of nerve disease.			
49.	Lung problems are usually associated with having diabetes.			
50.	When you are sick with the flu you should test for glucose more often.			
SKIP TO QUESTION 53 IF YOU DON'T TAKE INSULIN				
51.	High blood glucose levels may be caused by too much insulin.			
52.	If you take your morning insulin but skip breakfast your blood glucose level will usually decrease.			

53.	Having regular check-ups with your doctor can help spot the early signs of diabetes complications.			
54.	Attending your diabetes appointments stops you getting diabetes complications.			

Annex V: Medication Adherence Rating Scale (MARS)

	Items	**Yes**	**No**
55.	Do you ever forget to take your medication?		
56.	Are you careless at times about taking your medicine?		
57.	When you feel better, do you sometimes stop taking your medicine?		
58.	Sometimes if you feel worse when you take the medicine, do you stop taking it?		
59.	I take my medication only when I am sick.		
60.	It is unnatural for my mind and body to be controlled by medication.		
61.	My thoughts are clearer on medication.		
62.	By staying on medication, I can prevent getting sick.		
63.	I feel weird, like a ‘zombie’, on medication.		
64.	Medication makes me feel tired and sluggish.		

NB: Dear data collectors don’t forget to sign on each of filled questionnaire after rechecked as all questions are answered.

Data collector: Name and signature: ---------- Date: -----/----/---

Tell Phone number of data collector: +2519----------

Data Quality Checked by: Name and signature: ---------- Date: -----/---/---

THANK YOU FOR YOUR HELP!!

የአማርኛ ትርጉም (Amharic version)

ቅጽ 1: የጥናቱ መረጃ ቅጽ

ውድ የቃለ መጠይቅ ተሳታፊ፤ እንደምን አደሩ/ርሽ?

የጥናቱ መግቢያ

እኔ_____ ስሆን ይህ ቃለ መጠይቅ የሚፈጸመው በአዲስ አበባ ዩኒቨርስቲ የፋርማሲ ትምህርት ክፍል ትዕዛዝ መሠረት ነው። በአሁኑ ወቅት በአላማጣ የመንግስት ሆስፒታል ላይ በስኳር ታካሚዎች መካከል የሕክምና ውጤቶች እና ተያያዥነት ባላቸዉ ጉዳዩች ዙሪያ የሚደረግ ግምገማ ላይ ጥናትን እያካሄድኩ እገኛለሁ። ለዚህ ጥናት እርስዎ እንደ ተሳታፊ የተመረጡ ሲሆን ለተሳትፎው ፈቃድዎን ከመስጠትዎ በፊት ከጥናቱ ጋር ተያያዥነት ያላቸውን አስፈላጊ የሆኑ መረጃዎችን በሙሉ ማወቅ ይኖርብዎታል። ይህን ተከትሎም የሚከተለው መረጃ በዝርዝር ተጠናቆ ቀርቧል።

የጥናቱ አላማ

በስኳር ሕክምና ውጤቶች እና ተያያዥነት ባላቸዉ ጉዳዩች ዙሪያ በ በአላማጣ፤ትግራይ፤ኢትዮጵያ ላይ የሚካሄድ ጥናት ነው። የእርስዎ መረጃ የሕክምናውን ውጤቶች ለመገምገም እና ተያያዥነት ያላቸዉን ጉዳዩች ለመለየት እጅግ ጠቃሚ የሆነ መረጃ ነው።

የእርስዎ ስምና ፊርማ በዚህ ቅጽ ላይ አይጻፍም። በእርስዎ የሚሰጡ ማንኛውም አይነት መረጃዎች ለዚህ ጥናት ብቻ አገልግሎት ላይ የሚውሉ ይሆናል። ተሳትፎ በእርስዎ የበጐ ፈቃደኝነት ላይ የተመሠረተ ሲሆን መመለስ የማይፈልጉትን ጥያቄ የመመለስ ግዴታ አይኖርብዎችም።

መቀጠል እንችላለን? አዎ ☐ አይደለም ☐

አዎ ከሆነ፤ ወደ ጥያቄዎቹ ማለፍ እንችላለን

አይደለም ከሆነ፤ እናመሰግናለን ለነበርን ግዜ

ቅጽ 2፡ ቃለ-መጠይቅ ከታካሚው ጋር አጠቃላይ ማህበራዊ፤ስነ-ፆታዊ እናም የሕክምና ባህሪያት

የካርድ ቁጥር፡ _____

ክፍል 1፡ስለታካሚው አጠቃላይ መገለጫዎች		
ተ.ቁ	ጥያቄዎች	አማራጭ መልሶች
1.	ፆታ	ወንድ ☐ ሴት ☐
2.	ዕድሜ	ዓመት
3.	የጋብቻ ሁኔታ	ያላገባ/ ች ☐ ፍቺ ☐ ያገባ/ች ☐ ባል የሞተባት /ሚስት የሞተችበት ☐
4.	ሃይማኖት	ኦርቶዶክስ ☐ ካቶሊክ ☐ ፕሮቴስታንት ☐ ሙስሊም ☐ ምንምሃይማኖትየለም☐ ሌሎች, እባክዎን ይግለጹ_____
5.	የትምህርት ሁኔታ	በትክክለኛዉ መንገድ ያልተማረ ☐ የመጀመሪያ ደረጃ ት/ቤት 1ኛዙር (1-4 ክፍል) ☐ የመጀመሪያ ደረጃ ት/ቤት 2ኛዙር (5-8 ክፍል) ☐ ሁለተኛ ደረጃ (9-12) ☐ ተክንክ ወይም ኮለጅ ድፕሎማ ☐ ድግሪ እና ከዛ በላይ ☐
6.	የሥራ ሁኔታ	ተቀጣሪ/ የሲቪል አገልጋይ ☐ ስራ አጥ ☐ ነጋዴ ☐ ገበሬ ☐ የጉልበት ሰራተኛ / የዕለት ተዕለት ሥራ ☐ የቤት እመቤት ☐ የግል ሠራተኛ ☐ ሌሎች (ግለጽ)
7.	ወርሃዊ የቤተሰብ ገቢዎ ስንት ነዉ?	ብር
8.	ትንባሆ ተጠቅመዉ ያቃሉ?	በየቀኑ ኣጨሳሎህ ☐ ኣላጨስም ☐ ኣንዳንዴ ኣጫሳሎሁ ☐
9.	መጠጥ ይጠቀማሉ?	በየቀኑ ☐ የለም ☐ ኣንዳንዴ ☐
10.	ጫት ይጠቀማሉ?	በየቀኑ ☐ የለም☐ ኣንዳንዴ ☐
11.	የስኳር በሽታ ጋር ተያያዥ ትምህርት ባለፉት 12 ወራት ዉስጥ ስንት ግዜ ወስደዋል?	

ቅፅ 3፡ ስለ መድሃኒት መጠይቅ እምነት

ከሚከተሉት ዓረፍተ ነገሮች ጋር ያለዎት የመስማማት ወይም ያለመስማማት ደረጃ ከቀረቡት መለኪያዎች አንድ ቁጥር በማክበብ አመልክት ፤ 1 = በደንብ አልስማም ፤ 2 = አልስማማም ፤ 3 = እርግጠኛ አይደለሁም ፤ 4 = እስማማለሁ እናም 5 = በደንብ እስማማለሁ

ክፍል 1፡ ስለ ስኳር መድኃኒት መጠይቅ እምነት						
መጠይቆች		የስምምነት ደረጃ				
12.	ጤንነቴ በአሁኑ ሰዓት በስኳር መድኃንቶች ላይ የተመሰረተ ነው።	1	2	3	4	5
13.	የስኳር መድሃኒቶች መውሰድዎ ያስጨንቅወታል።	1	2	3	4	5
14.	ያለ የስኳር መድሃኒቶች ህይወት ሊኖረኝ አይችልም።	1	2	3	4	5
15.	የስኳር መድሃኒቶች ባይኖሩ ኖሮ በጣም ታምሜ ነበር።	1	2	3	4	5
16.	አልፎአልፎ የስኳር መደኃኒቶች የረጅም ጊዜ ተጽእኖዎች ያስጨንቀኛል።	1	2	3	4	5
17.	የስኳር መድሃኒቶች ለእርሶ ምሥጢር ናቸው።	1	2	3	4	5
18.	ወደፊት ጤንነትዎ በስኳር መድኃኒቶች ላይ የሚወሰን ይሆናል ብለዉ ያምናሉ።	1	2	3	4	5
19.	የስኳር መድኃኒቶች ሕይወቴን ያዛቡታል ብለዉ ያምናሉ።	1	2	3	4	5
20.	በስኳር መድኃኒቶች ላይ ጥገኛ ስለመሆን አልፎ አልፎ ያስጨንቀዎታል።	1	2	3	4	5
21.	የስኳር መድኃኒቶች ከባሰ ሁኔታ ይጠብቁኛል ብለዉ ያምናሉ	1	2	3	4	5
ክፍል 2፡ አጠቃላይ ስለ መድሃኒት መጠይቅ እምነት						
22.	ሐኪሞች ብዙ መድሃኒቶችን ይጠቀማሉ ብለዉ ያምናሉ።	1	2	3	4	5
23.	መድሃኒት የሚወስዱ ሰዎች ህክምናውን ለተወሰነጊዜ በየጊዜው ማቆም አለባቸው።	1	2	3	4	5
24.	አብዛኞቹ መድሃኒቶች ሱስ ናቸው ብለዉ ያምናሉ።	1	2	3	4	5
25.	ባህላዊ መድሃኒቶች ከዘመናዊ መድሃኒቶች የተሻሉ ናቸዉ ብለዉ ያምናሉ።	1	2	3	4	5
26.	መድሃኒቶች ከመልካም የበለጠ የጎንዮሽ ጉዳት ያመጣሉ ብለዉ ያምናሉ።	1	2	3	4	5
27.	ሁሉም መድሃኒቶች መርዛማ ናቸው ብለዉ ያምናሉ።	1	2	3	4	5
28.	ዶክተሮች በመድኃኒቶች ላይ በጣም ብዙ እምነት ይጥላሉ ብለዉ ያምናሉ።	1	2	3	4	5
29.	ዶክተሮች ከሕመምተኞች ብዙ ጊዜ ብኖሯቸዉ በቁጥር ጥቂት መድሃኒቶችን ያዙ ነበር ብለዉ ያምናሉ።	1	2	3	4	5

ቅፅ 4፡የስኳር እውቀት መመዘኛ መጠይቆች

ከስኳር በሽታ ጋር የተዛመደ እውቀትን ለመገምገም 20 ጥያቄን ይጠቀማል ፤ ከነዝህም የተወሰኑት እዉነት ስሆኑ ፤ የተወሰኑት ደግሞ ሃሰት ናቸዉ። እባክዎ እያንዳንዱ ጥያቄ ያንብቡ ከዛም እዉነት ነዉ ብለዉ ካሰቡ እዉነት ከምለዉ ኣምድ ላይ የእርማት ምልክት (√) ይጠቀሙ ፤ ሃሰት ነዉ ብለዉ ካሰቡ ደግሞ ሃሰት ከምለዉ ኣምድ ላይ የእርማት ምልክት (√) ይጠቀሙ። ማያቁት ከሆነ ኣላቀዉም ኣምድ ላይ የእርማት ምልክት (√) ይጠቀሙ።

መጠይቆች		እዉነት	ሃሰት	ኣላቀዉም
30.	ለስኳር በሽታ ተስማሚ ኣመጋገብ ለኣብዛኛዉ ሰዉ ጤናማ ኣመጋገብ ነዉ።			
31.	ምግብ ሳይበላ የምንለካዉ የሱካር ሊቴት በደምህ ውስጥ ያለውን ያለፉ ሳምንታት የስኳር መጠን ያሳያል።			

32.	የተጠበሰ ዶሮ ከተመሳሳይ ክብደት ካለዉ የበሰለ ድንች ጋር ሲነፃፀር ከፍተኛ ሐይል ሰጭ ንጥረ ነገር በዉስጡ ኣለዉ፡፡			
33.	ብርቱካን ጭማቂ ከወተት በላይ ከፍተኛ የቅባት መጠን አለዉ፡፡			
34.	በደም ውስጥ ያለ የግሉኮስን መጠን ለመለካት ሁለቱም ዘዴዎች ማለትም የሽንት እና የደም ምርመራ እኩል ጠቀሜታ አላቸዉ፡፡			
35.	ማጣፈጫ ያልተጨመረበት የፍራፍሬ ጭማቂ የደም ስኳር መጠንን ይጨምራል፡፡			
36.	ማጣፈጫ ያልተጨመረባቸዉ ለስላሳ መጠጦች ዝቅተኛ የደም ስኳርን ለማከም ይጠቅማሉ፡፡			
37.	ምግብ ስናበስል የወይራ ዘይትን መጠቀም ደማችን ዉስጥ የኮሌስትሮል ክምችት እንዳይኖር ይከላከላል፡፡			
38.	መደበኛ የኣካል ብቃት እንቅስቃሴ ማድረግ የደም ግፊትን ለመቀነስ ይረዳናል፡፡			
39.	ጥሩ የደም ስኳር መጠን ቁጥጥር ውስጥ ያለ ሰው፣ የኣካል ብቃት እንቅስቃሴ ማድረግ በደሙ ውስጥ ለለው የግሉኮስ መጠን ምንም ተጽዕኖ የለውም፡፡			
40.	በበሽታ አምጭ ተህዋሲያን መጠቃት በደም ውስጥ ያለውን የስኳር መጠን እንዲጨምር ያማድረግ እድል ይኖሮዋል፡፡			
41.	ከተለመደው የጫማ ቁጥር የበለጠ መጠን ያላቸዉ ጫማዎችን መጠቀም የእግር ቁስለትን ይከላከላል፡፡			
42.	አነስተኛ የቅባት መጠን ያላቸዉን ምግቦች መጠቀም የልብ ህመም ስጋት ይቀንሳል፡፡			
43.	የመደንዘዝና እና መዉጋት ስሜቶች የነርቭ በሽታ ምልክቶች ሊሆኑ ይችላሉ፡፡			
44.	የሳምባ ችግር ኣብዛኛዉን ግዜ ከስኳር በሽታ ጋር ይያያዛል፡፡			
45.	በ ጉንፋን በሽታ በምንያዝበት ወቅት በደማችን ያለውን የግሉኮስ መጠን በተደጋጋሚ በመለካት ማወቅ አስፈላጊ ነዉ፡፡			
በመርፌ ምወሰደዉ መድሃኒት ማይጠቀሙ ከሆነ ወደ ጥያቄ ቁጥር 46 ይለፉ፡፡				
46.	ከፍተኛ የደም ስኳር መጠን በጣም ብዙ ኢንሱሊን (በመርፌ የሚሰጥ የስኳርመድሃኒት) በመዉሰድ ሊከሰት ይችላል፡፡			
47.	ጠዋት የሚወሰደዉን በመርፌ የሚሰጥ የስኳርመድሃኒት(ኢንሱሊን) ወስደዉ ቁርስዎን የማይመገቡ ከሆነ፡አብዛኛውን ግዜ የደም ስኳር መጠን ሊቀንስ ይችላል፡፡			
48.	ከሃኪምዎ ጋር መደበኛ ክትትል በማድረግ ከስኳር በሽታ ተያያዥነት ያላቸዉ ችግሮችን የመጀመሪያ ምልክቶችን ለመለየት ይረዳል፡፡			
49.	የስኳር ህክምና ቀጠሮን በማክበር ብቻ በበሽታዉ የሚመጡ ተያያዥ ችግሮችን ማቆም ይቻላል፡፡			

ቅፅ 5፡ መድኃኒትን በታዘዘው መሰረት በአግባቡ ስለመውሰድ" መለኪያ (MARS)			
ጥያቄዎች		አዎ	የለም
50.	መድኃኒት መውሰድን ዘንግተው ያውቃሉ?		
51.	አንዳንድ ጊዜ ላይ መድኃኒትን ለመውሰድ ግድየለሽ ሆነው ያውቃሉ?		
52.	የተሻለ ስሜት ሲሰማዎ አንዳንድ ጊዜ መድኃኒትዎን መውሰድ ያቆማሉ?		
53.	አንዳንድ ጊዜ መድኃኒቱን በሚወስዱበት ጊዜ ሕመሙ ሲባባስብዎ መድኃኒቱን መውሰድ ያቆማሉ?		
54.	መድኃኒቱን የሚወስዱት ሲያሞት ብቻ ነው፡፡		
55.	ለአይምሮዬ እና ለሰውነቴ በመድኃኒት ቁጥጥር ሥር መሆን ተፈጥሮአዊ አይደለም፡፡		
56.	በመድኃኒቶች ላይ ያለወት አመለካከት ግልጽ ነው፡፡		
57.	በመድኃኒቱ ላይ በመቆየት ከመታመም ራሴን መከላከል እችላለሁ ብለዉ ያምናሉ፡፡		
58.	መድኃኒቱን በሚጠቀሙበት ወቅት እጅግ የተለየ ስሜት ይሰማወታል፡፡		
59.	መድኃኒቱን መዉሰድዉ ድካም እንዲሰማዎት እና ደካማ እንደሆኑ ያደርገዎታል ብለዉ ያምናሉ፡፡		

ማሳሰብያ፡ ውድ መረጃ ሰብሳቢዎች ሁሉም ጥያቄዎች በትክክል መሞላታቸዉ ደግመዉ ካረጋገጡ ቡሃላ በእያንዳንዱ የተሞሉ መጠይቆች ላይ መፈረምዎን አይረሱ፡፡

መረጃ ሰብሳቢ፤ ስም እና ፊርማ፤----------/----------ቀን -----/----/ ---

የመረጃ ስብሳብዉ ስልክ ቁጥር፤ +2519 ----------

የመረጃ ጥራት ገምጋም፤ስም እና ፊርማ፤----------/----------ቀን -----/----/---

ናይ ትግርኛ ትርጉም (Tigrigna version)

ቅፅል 1: ኣብ መፅናዕቲ ንምስታፍ ናይ ፍቃደኝነት መግለፂ ቅጥዒ

ኣነ----------ዝተብሃልኩ ፣ኣብዝ ሐዚ ስዓት ኣብ ኣላማጣ መንግስታዊ ሆስፒታል ኣብ ሞንጎ ስኳር ሕሙማት ዘሎ ናይ ሕክምና ዉፅኢትን ፅልዋ ዘሕድሩ ምክንታትንምፅናዕ ብፍቓዱ ሓድስ ዝተብሃለ ኣብ ኣዲስ ኣበባ ዩኒቨርሲት ፋርማሲ ቤት ትምህርት ናይ ፋርማኮኢፒዲሚዮሎጂን ሶሻል ፋርማሲን ድሕረ ምረቓ ተምሃራይ ዝግበር መፅናዕቲ ሓበሬታ ኣካቢ እየ። ናይዚ ኣብ መፅናዕቲ ንምስታፍ ፍቃደኝነት መግለፂ ቅጥዒ ዋና ዓላማ ንዓኩም ንተሳተፍቲ እዚ መፅናዕቲ ስለ እንታይነት እቲ ምርምር መብርሂ ምሃብ እዩ።

ናይዚ ምርምር ዋና ዓላማ ናይ ስኳር ሕክምና ዉፅኢትን ፅልዋ ዘሕድሩ ምክንታትን ኣብ ኣላማጣ፤ትግራይ፤ኢትዮጵያ ዝካየድ ፅንዓት እዩ። ናይኩም ሐበሬታ ናይ ሕክምና ዉፅኢታት ንምግምጋምን ፅልዋ ዘሕድሩ ምክንታትን ንምፍላይ ብጣዕሚ ጠቓም ሓበሬታ እዩ። ናይዚ መፅናዕቲ- ዕላማ ንምስካዕ ድማ ናታትኩም ናይዚ መፅናዕቲ ተሳተፍቲ ኣብ ሰናይ ፍቓድ ዝተመስረተ ቅኑዕ ተሳትፎ ወሳኒ ተራ ኣለዎ።

ኣብዚ መፅናዕቲ ንምስታፍ ካብ ዘለኩመ ግዜ 20 ደቂቃ መስዋእቲ ንክትገብሩ ዘክእል እንትኸውን፤ ነዚ መፅናዕቲ ንምስታፍ ዘተመረፅኩም በኣጋጣሚ እዩ። ኣብዚ መፅናዕቲ ምስታፍ ሙሉእ ብሙሉእ ኣብ ናትኩም ፍቓደኝነት ዝተመስረተ እዩ። ማንም ሰብ ብዘይካ ናትኩም ሙሉእ ፍቃደኝነትን ድሌትን ንምስታፍ ፅልዋ ከሕድረልኩም ኣይክእልን። ከምኡውን እንተዘይደሊኩምን ዘይተመችኩምን ኣብ ዝኾነ ግዘ ነቲ መፅናዕቲ ናይ ምግዳፍ መሰል ኣለኩም እዩ።

ኣብዚ መፅናዕቲ እንትትሳተፉ ዝህብዎ ዝኾነይኹን ሓበሬታ ሚስጥራዉነቱ ዝተሓለወን ነቲ መፅናዕቲ ካብ ዘካየዱ ሰባት ወፃኢ ነቲ ዝሃብዎ ሓበሬታ ክረክብዎ ኮነ ክጥቀምሉ ከምዘይክእሉ ክንሕብረኩም ንፈቱ።ኣብቲ ቃለ ማሕተት ናትኩም ስም ኮነ ካልእ ናኣኹም መለለይ ዘገልግል ምልክት የብሉን።

ካባኹም ካብ ተሳተፍቲ እንረክቦ ሓበሬታ እቲ ምርምረ ክሳብ ዝዉዳእ ብጥንቃቐ ተታሒዙ ኣብ መወዳእታ ብዉሑስ ኩነት ክዉገድ እዩ። ብዛዕባ እቲ ምርምር ተወሳኺ ሕቶ ወይም ሓበሬታ እንተደልዮም በዚ ዝስዕብ ኣድራሻ ነቲ ዋና ምርምር መካየዲ ምሕታት ይክኣል እዩ።

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ቅፅል 2: *ቃለ መሕትት*

እዚ ምርምር ኣብ ኻልኣይ ዓይነት ናይ ሽኮር ሕማም ዘለዎም ሰባት ዝግበር መፅናዕቲ እንትኸውን ዓላማ እቲ ፅንዓት ድማ፤ ተሳተፍቲ ናይ ሽኮር ሕማም ዘለዎም ፍላጠትን ከምኡውን ስለ መድሃኒት ዘለዎም እምነትን ምስ መድሃኒት ብትክክል ምክትታል ዘልዎ ርክብ ንምፅናዕ ዝቐረበ ቓለ-መሕትት እዩ።

ካርዲ ቁፅሪ ---------- *ቃለ መሕትት* ዝተገበረሉ ዕለት ----------

1ይ ክፋል:ስነ-ህዝባዊ መረዳእታ		
ተ.ቁ	ሕቶታት	መማረፂ መልሲታት
1.	ፆታ	ተባዕታይ ኣንስተይቲ
2.	ዕድመ:	_____ ዓመት
3.	ኩነታት ሓዳር	ዘይተመርዓወ/ት ዝፈትሐ/ት ባዓልሓዳር ብሞትዝተፈለየቶ/ያ
4.	ሃይማኖት	ኦርቶዶክስ ካቶሊክ ፕሮቴስታንት ሙስሊም ሃይማኖትዘይብሉ ካልእ _____
5.	ናይ ትምህርቲ ደረጃ	ዘይተምሃረ ቀዳማይብርኪ1ይ ዙር (1-4 ክፍሊ) ቀዳማይብርኪ2ይ ዙር (5-8 ክፍሊ) ካልኣይብርኪ (9-12ክፍሊ) ቴክኒክ (ኮለጅ ዲፕሎማ) ድግርን ካብኡንላዕልን
6.	ኩነታት ስራሕ	ስቪል ሰራሕተኛ ስራሕ ዝስኣነ ነጋዳይ ሓረስታይ ናይ መዓልቲ ሰራሕተኛ ብዓልቲ ቤት/ናይ ገዛ እመቤት ካልእ _____
7.	ወርሓዊ ናይ ቤተሰብ እቶት	ቅርሺ
8.	ሽጋራ ናይ ምትካኽ ልምዲ ይህልዎም ዶ?	በብ ምዓልቲ የትክኽ እየ ኣይፋል ሓደሓደ ግዜ
9.	ናይ መስተ ልምዲ ይህልዎም ዶ?	በብ ምዓልቲ ኣይፋል ሓደሓደ ግዜ
10.	ጫት ይጥቀሙ ድዮም?	በብ ምዓልቲ ኣይፋል

		ሓደሓደ ግዜ
11.	ኣብ ዝሓለፈ 12 ኣዋርሕ ክንደይ ግዜ ዝኣክል ኣፍልጦ ትምህርቲ ብዛዕባ ሕማም ሽኮር ወስዶም?	

ቅፃል 3፡ ምስ መድሓኒት እምነት/ኣመለኻኽታ ዝተትሓሐዘ ቃለ መሕተት

ንዞም ዝስዕቡ ዘለዉ ሙልእ ሓሳባት ናይ ምስምዒማዕ ወይም ዘይምስምዕማዕ ደረጃ ንምምልካት ካብቶም ዝተቐመጡ መለክዒታት ሓደ ኣኽብብ ፧ 1 = ብደንቢ ኣይስማዕማዕይ ፧ 2 = ኣይስማዕማዕይ ፧ 3 = እርግጠኛ ኣይኾንኹይ ፧ 4 = እስማማዕእየ ፧ 5 = ብደንቢ እስማማዕእየ

1ይ ክፋል፡ እምነት ኣብ ስኳር መድሓኒት ቃለ መሕተት						
ቃለ መሕተት		ደረጃ ምስምዕማዕ				
12.	ኣብዚ ሐዚ ግዜ ጥዕናአይ ኣብ ስኳር መድሓኒት ዝተመስረተ እዩ።	1	2	3	4	5
13.	ናይ ስኳር መድሓኒት ብምውሳድኻ ብዙሕ ኣጭንቐካሎ።	1	2	3	4	5
14.	ብደይ ስኳር መድሓኒት ክነብር ብልኻ ትኣምን ዶ።	1	2	3	4	5
15.	ናይ ስኳር መድሓኒት ተዘይህልዩ ብጣዕሚ ምሓመምኩ ነብረ ብኻ ትኣምን ዶ።	1	2	3	4	5
16.	ሓደ ሓደ ጊዜ ናይ መድሓኒት ናነዊሕ እዋን ዕዕንቶ ኣጭንቐካሎ ዶ።	1	2	3	4	5
17.	ና ስኳር መድሓኒት ንዓይ ምስጢር እዮም ብልኻ ትኣምን ዶ።	1	2	3	4	5
18.	ንመጻኢ ናተይ ጥዕና ኣብ ስኳር መድሓኒት ዝተመስረተ እዩ ብኻ ትኣምን ዶ።	1	2	3	4	5
19.	ና ስኳር መድሓኒታት ሂወተይ ኣመዛብሎሞ ብኻ ትሓስብ ዶ።	1	2	3	4	5
20.	ሓደሓደግዜ ኣብ ስኳር መድሓኒት ብጣዕሚ ጽግዕተኛ ምኻንኹም የጭንቐኩም ዶ።	1	2	3	4	5
21.	ናይ ስኳር መድሓኒታት ንዝኽፍኡ ኩነታት ከይቃላዕ ይከላኽሉኒ እልኩም ትኣምኑ ዶ።	1	2	3	4	5
2ይ ክፋል፡ ጠቕላላ እምነትኣብ መድሓኒት ቃለ መሕተት						
22.	ሓካይም ብዙሕ መድሓኒት ይእዝዙ ይኦም ብኻ ትኣምን ዶ።	1	2	3	4	5
23.	መድሃኒት ዝወስዱ ሰባት ሕክምናኦም ንትወሰነ ግዜ በብግዚኡ ክቋዋርፁ ኣለዎም።	1	2	3	4	5
24.	መብዛሕትኦም መድሓኒታት ወልፊ ይኦም ብሎም ይኣምኑ ዶ።	1	2	3	4	5
25.	ባህላዊ መድሓኒት ካብ ዘመናዊ መድሓኒት ዝሐሸ እዮም ኢልኩም ትኣምኑ ዶ።	1	2	3	4	5
26.	መድሓኒት ካብ ጥቕሞም ጉድኣቶም ይበለፅ ኢሎም ይኣምኑ ዶ።	1	2	3	4	5
27.	ኹሎም መድሓኒት መርዛም እዮም ኢሎም ይኣምኑ ዶ።	1	2	3	4	5
28.	ሓካይም ኣብ መድሓኒት ብጣዕሚ ልዑል እምነት ኣሎዎም ኢልኩም ትኣምኑ ዶ።	1	2	3	4	5
29.	ሓካይም ምስ ሕሙማት ብዙሕ ግዜ ተዘሕልፉ ነይሮም ፧ዝእዝዎ በዝሒ መድሓኒት ክቕንስ ኔይሩ እልኩም ትኣምኑ ዶ።	1	2	3	4	5

ቅፅል 4: ብዛዕባ ሕማም ሽኳር ፍልጠት መመዘኒ ቃለ መሕትት

ካብዚ ንታሕቲ ምስ ሕማም ሽኮር ዝተትሓሐዘ ኣፍልጦ ንምምዛን 20 ሕቶታት ኣለዉ።ካብዝኦም ዝተወሰኑ ሕቶታት ሓቂ እነትኾኑ፤ዝተወስኑ ድማ ሓሶት ሕቶታት እዮም። ሕድሕድ ሕቶታት ኣንብብ ካብኡ ሓቂ እዩ ኢሎም ንዝሓሰብዎ ኣብ ሓቂ ዓምዲ ናይ እርማት ምልክት (√) ይጠቐሙ፤ሓሶት እዩ እሎም ንዝሓሰብዎ ድማ ኣብ ሓሶት ዓምዲ ናይ እርማት ምልክት (√) ይጠቐሙ። እንድሕር መልሱ ዘይፈልጥዎ ኾይኖም ኣብ ኣይፈልጦን ዓምዲ ናይ እርማት ምልክት (√) ይጠቐሙ።

ሕቶታት		ሓቂ	ሓሶት	ኣይፈልጦን
30.	ን ሕማም ሽኳር ዝስማማዕ ኣመጋግባ ንመብዛሕትኡ ሰብ ወናኒ ምሉእ ጥዕና ኣመጋግባ እዩ።			
31.	ምግቢ ኬይበላዕና እንገብሮ ናይ ደም ስኳር ምርመራ ናይ ዝሐለፉ ሰሙናት መጠን ደም ስኳር የርኢ።			
32.	ማዕረ ክብደት ዘለዎ ዝተጠበሰ ደርሆን ካብ ዝበሰለ ድንች ዝለዓለ ሓይሊ ዉሃቢ ምግቢ ኣብ ዉሽጡ ዝሓዘ እዩ።			
33.	ጽማቕ ኣራንሺ ካብ ፀባ ዝለዓለ ናይ ስብሒ ትሕዝቶ ኣለዎ።			
34.	ሽንቲ ምርመራን ደም ምርመራን ብማዕረ ናይ ደም ስኳር መጠን ንምልካዕ ይጠቅሙ።			
35.	ምንም ዓይነት ስኳር ዘይተሓወሰሉ ናይ ፍራምረ ፅሚቔ ናይ ደም ስኳር መጠን ክዉስኽ ይገብር።			
36.	ምንም ዓይነት ስኳር ዘይተሓወሰሎም ልስሉስ መስተታት ትሑት ናይ ደም ስኳርመጠን ንምሕካም ይጠቅሙ።			
37.	ናይ ኣዉልዕ ዘይቲ ንምግብነት ምጥቓም ናይ ደም ኮሌስትሮል ንከይውስኽ ይከላከል።			
38.	መደበኛ ኣካላዊ ምንቅስቓስ ምግባር ናይ ደም ፀቕጢ ንክቕንስ ይሕግዝ።			
39.	ኣብ ጽቡቕ ናይ ደም ስኳር መጠን ዘሎ ሰብ፤ኣካላዊ ምንቅስቓስ ምግባር ምንም ዓይነት ለውጢ ኣብ ደም ስኳር መጠን ኣየምፅእን።			
40.	ብሕማም መምፃእቲ ተሃዋስያን ምቅላዕ መብዛሕትኡ ግዜየ ናይ ደም ስኳር መጠን ንክውስኽ ይገብሩ እዮም።			
41.	ካብ ልሙድ ቐፅሪ ዝበለጸ ጫማ ምጥቓም ናይ እግሪ ቐስለት ንምክልኻል ይጠቅም እዩ።			
42.	ቱሑት ስብሒ ዘለዎም ምግቢታት ምጥቓም ንልቢ ሕማም ንከይንቃላዕ ይጠቅም እዩ።			
43.	ምድንዛዝን ናይ መርፍእ ምዉጋእ ዓይነት ስሚዕታት ናይ መትኒ ሕማም ምልክታት ክኾኑ ይኽእሉ እዮም።			
44.	ናይ ሳምባ ፀገም መብዛሕትኡ ግዜ ምስ ሕማም ሽኮር ምህላዉ ዝተትሓሐዘ እዩ።			
45.	ብስዓል ኣብ እንጥቅዐሉ እዋን ብተደገጋሚ ናይ ደም ስኳር መጠን ምልካዕ ኣድላይ እዩ።			
ብመርፍእ ዝዉሰድ መድሓኒት ዘይወስዱ ተኾይኖም ናብ ሕቶ ቐፅሪ 46 ይሕለፉ።				
46.	ልዑል ናይ ደም ስኳር መጠን ብጣዕሚ ብዙሕ ኢንሱሊን ብምዉሳድ ምኽንያት ክመፅእ ይኽእል እዩ።			

47.	ናይ ንጉሆ ብመርፍእ ዝዉሰድ መድሓኒት ወስድኻ ነገርግን ቐርስኻ እንዲሕር ዘይተመግብካ መብዛሕትኡ ግዜ ናይ ደም ስኳር መጠን ይቕንስ እዩ።			
48.	መደበኛ ናይ ሕክምና ክትትል ምስ ሓክሚኻ ምህላዉ ምስ ምልክታት ሕማም ሽኮር ዝተትሓሐዙ ፀገማት ኣቐድምካ ንምፍላይ ይጠቅም እዩ።			
49.	ኣብ ናይ ሕማም ሽኮር ቐፀሮ ምርካብ ጥራሕ ምስ ሕማም ሽኮር ዝተትሓሐዙ ፀገማት ጠጠዉ ንክብል ይገብር ።			

ቅፅል 5፡ መድሓኒት ብዝትኣዘዞ መሰረት በኣግባቡ ስለምውሰድ" መለክዒ (MARS)			
ሕቶታት		እወ	የለን
50.	መድሓኒት ምውሳድ ረስዒኹም ትፈልጡ ዶ?		
51.	ሐደሓደ ጊዜ መድሓኒት ምዉሳድ ችላ ኢሊኹም ትፈልጡ ዶ?		
52.	ዝሐሸ ስምዒት ክስምዐኩም ከሎ ሐደሓደ ጊዜ መድሓኒት ምዉሳድ ተቋርፀ ዶ?		
53.	ሐደሓደ ጊዜ መድሓኒት ኣብ ዝወስድሉ እዋን ሕማሙ እንተብእሱኩም መድሓኒት ምዉሳድ ተቋርፀ ዶ?		
54.	መድሓኒት ዝትወስዱ ከሕመኩም ከሎ ጥራይ ድዩ።		
55.	ንኣእምሮይን ንሰዉነተይን ኣብ መድሓኒት ቁፅፅር ምኻን ተፈጥሮኣዊ ኣይኮነን ኢልኩም ተሓስቡ ዶ።		
56.	ኣብ መድሓኒት ዘለኩም አመለኻኽታ ግልጽ ድዩ።		
57.	መድሓኒት ብትክክል ብምዉሳድ ባዒለይ ካብ ሕማም ክከላኸል ክኽእል እየ ብኻ ትኣምን ዶ።		
58.	መድሓኒት ኣብ ዝትወስድሉ እዋን ብጣዒሚ ፍልይ ዝበለ ስሚዒት ይስሚዐኩም ዶ።		
59.	መድሓኒት ምዉሳድኹም ድኻም ስምዒት ንክስምዐኩምን ድኹም ክኽዉን ገይሩኒ ኢልኩም ትኣምኑ ዶ።		

መትሓሳሰቢ፡ ክቡራት ሓበሬታ ኣከብቲ ኩሎም ሕቶታት ብትኽክል ምሙላኦም ደግሞም ምስኣረጋገፁኩም ኣብ ሕድሕድ ዝተመልአ ቃለ መሕተት ምፍራም ከይዝንግፁ።

ናይ ሓበሬታ ኣካቢ ስምን ፊርማን፤----------/----------

ናይ ሓበሬታ ኣካቢ ስልኪ ቐፅሪ፤ +2519 ----------

ናይቲ መፅናዕቲ ኣተሓባባሪ ስምን ፊርማን፤----------ዕለት ----- /---- /---

ንስናይ ምትሕብባርኩም ካብ ልቢ የመስግን!