



**ADDIS ABABA UNIVERSITY**  
**COLLEGE OF HEALTH SCIENCES,**  
**SCHOOL OF NURSING AND MIDWIFERY**  
**DEPARTMENT OF MEDICAL-SURGICAL NURSING**

**Diabetes Health Literacy, Self-Care Behaviors and Associated Factors among Adult Diabetes Patient Attending Follow-Up Care at Public Hospitals in the East Arsi Zone, Oromia Region, Ethiopia, 2025.**

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**A Thesis submitted to the graduate studies of the Department of Medical-Surgical Nursing, School of Nursing and Midwifery, College of Health Sciences, Addis Ababa University in partial fulfillment of the requirement for the Degree of Masters of Science in Adult Health Nursing.**

**June, 2025**

**Addis Ababa, Ethiopia**

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**Master of Science research project submission form:**

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Full title of the research project	Diabetes Health Literacy, Self-Care Behaviors and Associated Factors among Adult Diabetes Patient Attending Follow-Up Care at Public Hospitals in East Arsi Zone, Oromia Region, Ethiopia,2025
Duration of study	From January 20 to February 20,2025
Study Area	Five selected public Hospitals found in East Arsi zone, Oromia Region
Total cost of the project	41,965 ETB
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# APPROVAL SHEET


I, hereby certify that I have read and evaluate this Thesis entitled by Diabetes health literacy, Self-care behaviors and associated factors among adult diabetes patient attending follow-up care at selected public hospitals in East Arsi zone, Oromia region, Ethiopia, 2025. I recommend that it is submitted as fulfilling the thesis requirement.

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## **ACKNOWLEDGEMENT**

First, I would like to express my sincere gratitude to Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery, for providing me the opportunity and support to develop this thesis and also Rehoboth Harme College for sponsoring me to attend this master program at AAU.

Second, I would like to extend my deepest appreciation to my advisor, Dr. Fekadu Aga (PhD, Associate Professor), and Sr. Sosina Workineh (BSc, MSc, Lecturer), who assisted me in the development of this thesis by providing technical advice and various literature to enrich it. I truly appreciate their genuine guidance and encouragement throughout this process.

## **LIST OF ABBREVIATION AND ACRONYM**

AOR	Adjusted Odds Ratio
BSc	Bachelor of Sciences
CI	Confidence Interval
DM	Diabetes Mellitus
DHL	Diabetes Health Literacy
DSCP	Diabetes Self Care Practice
DSME	Diabetes Self-Monitoring Education
FBS	fasting blood sugar
HbA1c	Hemoglobin A1C or Located hemoglobin
IDF	International Diabetic Federation
MSc	Masters of Sciences
SPSS	Statistical Package for Social Science
SMBGL	Self-Monitoring Blood Glucose Level

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## ABSTRACT

**Background:** Diabetes health literacy and self-care behavior play an important role in avoiding and controlling complications of diabetes mellitus and are positively associated with good glycemic control and quality of life improvement. However, we lack evidence describing their magnitude in the East Arsi zone of the Oromia regional state of Ethiopia.

**Objectives:** This study was aimed to assess the magnitude of diabetes health literacy, self-care behavior, and associated factors among adult diabetes patients attending follow-up care at selected public hospitals in East Arsi zone, Oromia, Ethiopia, 2025.

**Methods:** An institutional based cross-sectional study was employed in five public hospitals found in East Arsi zone, which was selected by simple random sampling, with a sample size of 468 adult diabetes patients. Data were collected using a structured questionnaire and analyzed using binary logistic regression to assess associations between dependent and independent variables.

**Result:** More than half, 270 (57.7%) of the study participants had low diabetes health literacy level (DHL), and 260(55.6%) had poor self-care behavior. Being male (AOR=0.602, 95%CI:0.401-0.905), low level of education (AOR=0.519, 95%CI: 0.283-0.949), living in rural areas (AOR=1.619, 95%CI: 1.055-2.485), had not attended diabetes education (AOR=1.588, 95%CI:1.004-2.513) and receiving diabetes information only from one source (AOR=0.629, 95%CI: 0.414-0.955), were significantly associated with low DHL. Again, younger (AOR=3.397,95%CI:1.407-11.224), lives in rural (AOR=0.489, 95%CI:0.316-0.755), never having been exposed to DM education (AOR=1.796, 95% CI: 1.111-2.901) and a monthly income of <1000 (AOR=0.234, 95% CI: 0.092-0.591) and 2001-3000 (AOR=0.531, 95% CI: 0.142-0.869) were significantly associated with poor diabetes self-care behavior.

**Conclusion:** Large number of the study participant had low diabetes health literacy level and poor self-care behavior; improving and monitoring awareness of diabetes patient will improve further.

**Keyword:** Diabetes mellitus, health literacy, self-care behavior

# **1. Introduction**

## **1.1 Background**

Diabetes mellitus (DM) is one of the most common serious chronic illness characterized by elevated blood glucose levels (1). This occurs either due to insufficient insulin production or the body's resistance to insulin. The two primary forms of diabetes are Type 1, which is often diagnosed in childhood and involves an autoimmune response that destroys insulin-producing cells, and Type 2, which is more common and mostly occurs in adults , frequently linked to lifestyle factors (2, 3).

In recent decades, diabetes has rapidly increased globally, affecting both developed and developing countries and emerged as a significant public health crisis with profound economic and healthcare implications(4). According to the International Diabetes Federation (IDF), in 2021 an estimated 537 million adults between the ages 20-79 had diabetes globally and by 2030; 643 million people will have diabetes globally, which will increase to 783 million by 2045(4). In sub-Saharan Africa (SSA), it is also quickly rising ,estimated to affect 40.7 million people by 2045, which is up from 15.9 million people in 2017 (5).

In Ethiopia, DM affects 1.3 million people and its prevalence is around 3.2%, and it became one of the four priorities of non-communicable diseases (6).This upward trajectory of diabetes is influenced by various factors, including population growth, aging demographics, urbanization, sedentary lifestyles, and unhealthy dietary habits (7, 8) .

For individuals who experience type II diabetes, it may take multiple instances before symptoms appear. Common symptoms of type II diabetes includes excessive hunger(polyphagia), excessive thirst (polydipsia), frequent urination (polyuria), weight loss, blurred vision, numbness, fatigue; slow healing of sores, and an increased susceptibility to recurrent infections (1).

Effective management of diabetes requires a multi-faceted approach to prevent long-term complication of the disease (9). Health literacy is a critical aspect for patients with such a life-altering disease like diabetes and it has been well documented that diabetes patients must continuously obtain and process health information for competent self-management(10).

Health literacy is personal characteristics and social resources that enable individuals and communities to access, understand, evaluate, and use information to make informed health related decisions(11, 12). Diabetes health literacy encompasses skills like following instructions, understanding appointment details, interpreting educational materials, and reading medication labels (12, 13).

Self-care is gradually acquiring skills and developing an understanding of the ways of living with diabetes(14). Studies show a significant relationship between diabetes health literacy and self-care behaviors(15, 16). Higher health literacy leads to better self-care, while lower literacy results in poor health knowledge and adherence to care programs(17, 18).

## **1.2 Statement of the problem**

Diabetes is a worldwide health burden, ranking as the 11<sup>th</sup> leading cause of disability and leading to serious complications like blindness, kidney disease, cardiovascular disease, eye disorders and amputations (19, 20). Effective diabetes control is dependent on diabetes health literacy and an activated patient role in self-care behavior like medication, diet, blood sugar monitoring, exercise, risk reduction, problem-solving and healthy coping (21, 22). Achieving optimal glycemic control is essential to avert diabetes-related complications and mortality it (23); however, 98% of diabetes management is patient-dependent, so adherence to self-care tasks by nature is complicated and challenging in nature (21).

Poor adherence to self-care behaviors (24, 25) among diabetes patients can lead to uncontrolled diabetes and serious complications(24). Self-care involves skills and knowledge necessary for proper control and their lack may worsen the consequence of the disease (26). One study in Uganda found diabetes patients' prevalence of adherence to self-care as 36.5% (27), while in Ethiopia, diabetes patients' levels of self-care behaviors are extremely varied (28), but studies in Yekatit 12, Addis Ababa, and Debrebrehan Hospital revealed poor adherence rates of 52% and 44.7% (29, 30) respectively, revealing a pressing need for effective self-management interventions, especially in resource-scarce settings.

Health literacy significantly influences self-care behavior because it enables individuals to understand medical instructions as well as negotiate health care systems, which plays a role in diabetes management (31). Even though the direct influence of health literacy on health outcomes is still under investigation, low health literacy has been associated with numerous adverse health outcomes (32).

Low diabetes health literacy (DHL) is a crucial element that affects diabetes control efficacy (33). It is always accompanied by low knowledge about diabetes and low self-care activities, resulting in a low quality of life and negative health outcomes.

Those with lower levels of health literacy have difficulty adhering to medical instructions and actively participating in the healthcare process (34, 35). Low diabetes health literacy has been referred to as a silent epidemic by health professionals, as the patients may have poor self-esteem and be embarrassed by their inability to manage their disease (36). A recent systematic review showed that low prevalence of DHL ranges from 7.3% to 9.7% (37), while in some Asian countries it is high at 71.7% to 82% (38, 39).

Research in Ethiopia revealed that health literacy deficiency is prevalent of 30.3% individuals in Bale and 26.3% in Gonder (12,59). Its deficiency not only impedes the proper management of diabetes but, also leads to excessive health care expenditure, which is found to be responsible for 3% to 5% of the overall cost (40).

A number of health literacy interventions have been developed aimed at improving understanding and diabetes self-care, but evidence suggests poor outcomes persist, partly because such tools are not used adequately (40). Underlying conditions like low education, older age, and lower socioeconomic position are linked with limited health literacy, which negatively impacts diabetes self-care (40, 41).

Level of health literacy needs to be measured in developing effective education programs, particularly in countries like Ethiopia, where literacy levels are poor (42). Many countries have recognized the contribution of inadequate health literacy to diabetes management and have taken steps to counter such problems (43).

Diabetes self-care behavior and health literacy are strongly related with improved glycemic control, fewer complications, and quality of life, and whose large impact on diabetes care, evidence is that inadequate health literacy and poor self-care behavior are linked with worse outcomes. Few studies in southeast Ethiopia have assessed the percentage of diabetes health literacy and self-care behavior, which is insufficient for planning effective health interventions. This study aims to bridge this knowledge gap by evaluating the level of diabetes health literacy and self-care behaviors among adult diabetes patients receiving follow-up care at public hospitals in the Arsi Zone, Oromia Region, Ethiopia.

### **1.3 Significance of the study**

As health literacy and self-care behavior are key determinants of diabetes outcomes, this study is vital to understand the dynamics in Ethiopia, where comprehensive data are limited. This study will try to establish key determinants of health literacy and self-care behavior and enhance awareness among communities on their importance. This will provide an environment favorable for upholding healthy behavior among diabetes.

In addition, healthcare workers will be assisted by the findings through patient health literacy and self-care knowledge, which will enable one-to-one communication and more effective management interventions. Policemakers are able to utilize this study through the creation of specific health intervention programs and as reference in the future studies.

## **2. Literature review**

Diabetes mellitus is a global public health problem and an increasing chronic condition in the globe with a global prevalence of 10.5% in adults (44). Early diagnosis and early treatment of this chronic disease are most important to preventing its complications and associated diseases (45, 46). However, diabetes is hard to diagnose in resource-poor settings (47). It is due to bad awareness, fatalistic attitudes, delayed diagnosis, poor treatment, and genetic predisposition, leading to high complications(9).

Diabetes patients need to be informed about the disease, self-management, and self-care activities for better outcomes. Amongst all those factors which enhance the level of knowledge and management of diabetes are diabetes health literacy. It is necessary to know the level of diabetes health literacy and self-care behavior, and identify what factors they are correlated with for better diabetic management (45, 46).

### **2.1 Diabetes health literacy magnitude**

European HL survey indicated that close 48% of the sample were poorly diabetic in health literacy (48). ). In a similar way, close to 33% of the United States population does not have sufficient diabetes health literacy (49). The incidence of poor diabetes health literacy in the United States was placed at 30% in a recently conducted systematic review. Prevalence in Europe, according to a meta-analysis study, varied from 7.3% in Switzerland to 9.7% in the Netherlands (37). In Asian nations, it varied between 71.7 % in South Korea and 82 % in Taiwan (37, 38).

A Chinese cross-sectional study has also found that 52.9% of the population surveyed possessed good diabetes health literacy (50), and a South Korean national survey showed that 61% of the population had inadequate health literacy (51). On the other hand , a multi-ethnic Israel survey disclosed that 69% of the study population possessed adequate health literacy (52), and that 80.5% of respondents in Singapore showed adequate functional health literacy (53).

Conversely, a Mexican and Iranian study reported that only 17.6% and 18.2% of the sample population, respectively, had adequate diabetes health literacy (54, 55). In addition, a case study in Iran showed that the mean and standard deviation of health literacy score of diabetic patients were  $2.70 \pm 0.44$  (55). Cross sectional study conducted in 3 primary health care centers of Al Ahsa, Saudi Arabia showed that 37.1%, 27.3%, and 35.5% of respondents had high, moderate, and low level of health literacy respectively (56).

Study from Kigali, Rwanda also showed that 14.3% of the respondents had a high functional health literacy level (56). Similarly in Ethiopia, a cross-sectional survey conducted at Gonder found that 56.5% of participants had high, 17.3% moderate and 26.3% low diabetes health literacy (57). Similarly, another study conducted in Debre Brehan also indicated that out of all the participants, 300(49.1%) were low, 174(28.5%) moderate and 137(22.4%) were high diabetes health literacy level (58). Also, a cross sectional study conducted in Bale, patients with low, moderate, and high diabetic health literacy were 41.8%, 27.9%, and 30.3% (12) respectively.

### **2.1.1 Factors associated with diabetes health literacy**

#### **2.1.2 Socio-demographic related factors:**

Diabetes health literacy (DHL) is influenced by a variety of demographic factors globally. Education at higher levels, regular employment, and increased annual income are positively correlated with DHL in China, (59). Similarly, research in Iran indicates that age, gender, education, job, income, and residence are significantly predictors of diabetes health literacy (55, 60, 61).

In Singapore, older adults, lower educational level (secondary or below), working status, and marital status were identified to have a higher rate of insufficient (53). In addition, a Malaysian study shows that English proficiency correlated to health literacy (62).

Similarly, age, and educational status have significant roles in governing the extent of health literacy in Kigali, Rwanda study (63). In Ethiopia, Bale found high correlation between educational status and DHL (36), and in Gonder, men and people who were better scored better in DHL(57).

### **2.1.3 Clinical factors**

In China, research indicated that diabetes duration (DM) influenced the level of health literacy (50). In Iran, history of DM in the family predicted better diabetes health literacy (64). In Ethiopia, shorter disease duration predicted higher health literacy among patients in the Bale zone (12), while among patients in Gonder, family history of DM had better health literacy scores (57).

### **2.1.4 Information accessibility and psychosocial related factors**

Access to the internet accessibility was among the predictors of the diabetes health literacy level, as in China (50). Social support and attendance at diabetes education classes were negatively associated with the level of diabetes health literacy, while such was in Malaysia (62). In a cross study in the Bale zone, an array of over 3 sources of diabetes information and high social support were identified to be factors with a high diabetes health literacy level (12).

## **2.2 Magnitude of Self-care behavior**

Malawian and Mexican cross-sectional research show that 33%, and 33.5% of diabetes patients, respectively (65, 66), while United Arab Emirate based study shows that 37.7% of the participants had good self-care behavior (67). Landside Nazila's result showed that 63.6% of patients had lacked self-care due to inadequate monitoring of blood sugar, failure to adhere to medication, and iphysical exercise (29).

The Uganda proves 36.5% adherence rate to self-care (27). Good knowledge about diabetes (AOR=2.5; 95% CI= 1.2-5.3,  $p = 0.016$ ), and strong self-efficacy (AOR=3.9; 95% CI= 1.8 – 8.7,  $p = 0.001$ ) were correlated with adherence to self-care (27). Five hospitals study conducted in Kenya found the level of diabetic self-care behavior was 7.6 out of 14 points which is near the mean (68).

Results of Ethiopia overall demonstrate varying levels of prevalence of adherence to diabetes self-care (69). Prevalence in good self-care practice varied from 46.7% in Tigray (70) to 60.7% in West Ethiopia (71), while in Yekatit 12 in Addis Ababa, and Debrebrehan Hospital poor adherence were 52% and 44.7% (29, 30) respectively.

Another study at Jimma revealed that 49.1% of the respondents engaged in self-care activities. The results indicated that higher educational levels (AOR = 3.1, 95% CI: 1.7–5.8) and family history of diabetes (AOR = 0.5, 95% CI: 0.3–0.9) were significant predictors of good self-care behavior (24). Similarly, findings in Gonder correlated poor self-care with rural residence (AOR = 3.33, 95% CI: 1.61–6.88), low income (AOR = 2.16, 95% CI: 1.17–3.98), and lack of social support (AOR = 0.31, 95% CI: 0.15–0.62) (72).

A study in Nekemte documented 60.7% rate of adherence to diabetes self-care (71), and worse behavior was more common among male patients (AOR = 5.551, 95% CI: 2.055–14.997), rural residents (AOR = 5.517, 95% CI: 2.184–13.938), and short duration of diabetes (AOR = 41.023, 95% CI: 7.373–228.257). The worst knowledge of diabetes was at greatest risk for having poor self-care behavior (AOR = 67.917, 95% CI: 8.212–561.686) (71).

### **2.2.1 Factors Associated with self-care behaviors**

Various determinants influence diabetes patients' understanding about DM and self-care behaviors (19). Diabetes self-care involves the management of the disease through seven key behaviors: healthy eating, medication adherence, exercise, monitoring, foot care, psychosocial support, and smoking cessation (22, 73).

### **2.2.1.1 Dietary behavior**

Dietary habits play a crucial role in making sure of maximum caloric intake coupled with insulin therapy, exercise, and weight reduction, thus playing a significant role in diabetes self-management education. Adherence to a regimen of eating is, however, difficult for most individuals (1, 74, 75)

Studies on dietary habits of diabetes patients report low adherence rates globally. According to a cross-sectional study in Sri Lanka, 56.6% did not adhere to healthy diet recommendations(76). In Malawi, 57.28% were on a general diet, but none of them consumed fruits and vegetables daily (77). Even in a Bangladesh study, it is seen that only 48% of patients were compliant with dietary advice (78) , and in Lagos, Nigeria, 53.5% of them had adequate dietary knowledge (79).

Systematic review in Ethiopia indicated that 50% of Type-II diabetes patients had good dietary habits (80). Studies in Tigray and North-East Ethiopia indicated 49.8% and 36.3% had good compliance, respectively (30, 70). In Addis Ababa, a qualitative study showed poor self-care behavior where the participants avoided sugar but had no meal planning (81). While Cross-sectional studies also reported high non-adherence rates (75.9%–83.5%) in Addis Ababa (82) and in Nekemte 69.4% of diabetes patient follow proper dietary plan (71), marital status, income, and age were positively associated with dietary adherence (83, 84).

### **2.2.1.2 Physical Activity**

In Sri Lanka 55.3% of respondents were physically active for  $\geq 30$  minutes/day for  $\geq$ three days/week and 23.7% were completely inactive (76). Young adults ( $\leq 49$  years) were more active than older adults ( $\geq 50$  years) (OR = 2.46, 95% CI = 1.37 - 4.44, p = 0.002). A Lebanon shows that 15.9% of diabetics patients were physically active (84), whereas in a Bangladesh study , 33.2% of them were non-compliant with exercise regimens (85).

Conversely, a Malawi showed that 77% of diabetics patients did physical activities for 30 minutes a day for over three days a week (65).

A sub-Saharan Africa systematic review indicated exercise compliance ranging from 46% to 95% in rural environments (86). The Third National African's Wellbeing and Nutrition Examination Study found 30% of diabetics to be patients physically inactive, with 40% below the guideline levels of activity (86). In Diredawa, 58.1% of participants exercised at guideline levels, and 53.8% exercised daily for over 30 minutes (87). Researches from Dilla Referral Hospital (49%) and Nekemte (63.5%) indicates various compliance (71, 80, 88). In Addis Ababa, a qualitative research found no regular exercise, influenced by variables like sex, marital status, duration of diabetes, occupation and education(81).

### **2.2.1.3 Blood glucose monitoring**

Self-monitoring of blood glucose (SMBG) is a constituent part of diabetes management, allowing patients to measure glucose levels from a small blood sample (1). SMBG prevalence varies across-study : 43% in the UK (89), 27.3% in China (90) and less than 30% in sub-Saharan Africa, where HbA1c improvements are modest (91).

A cross-sectional study conducted in Bangladesh reports that non-adherence to SMBG was around 37% of the population (85). While a study conducted in the United Arab Emirates reports that 41.7% always check blood glucose, 11.9% check occasionally, and 24% never check (67). In Sri Lanka also, only 19.7% of the subjects checked their blood glucose three or more times a week (86).

A systematic review revealed routine blood glucose testing in Ethiopia was performed 28% (80). In Benishangul-Gumuz, via study, it was revealed the participants with own glucometers adhere to improved diabetic self-care as compared to non owners (86), while a Diredewa study showed glucometer owners had three times the chance of monitor (92).

A study from Tigray shows that a personal glucometer was owned by only 11.9% of the participants (70) and an institutional study at Nekmete Hospital showed 15% compliance, equivalent to Australia (71). A qualitative study in Addis Ababa showed no systematic monitoring, and a cross-sectional study showed 37% non-adherence, with largely equated to variables such as education and marriage impacted monitoring, with primary education equating to lower compliance (82).

#### **2.2.1.4 Foot care in diabetes**

Foot ulceration can easily be prevented by proper foot care and frequent foot examination with good glycemic control, and the lifetime prevalence of diabetic foot ulceration is 19–34%, while the annual incidence is 2% (93). The prevalence of diabetic foot ulcers in sub-Saharan Africa is the second highest in the world at 7.2% (95% CI: 5.1–9.3) (94).

A study in Lahore found merely 14% practiced good foot care (95). In Bangladesh, 43.2% didn't activate foot care (85), while 49.7% in Sri Lanka didn't practice weekly foot care (76), and even a across-sectional study conducted in Malawi shows that 69% of diabetes patients have checked their feet daily, with social support linked with better foot care (65).

In Tanzania, 37.9% of them inspected their feet daily (96). A study conducted in Sudan reported that half of the foot ulcer patients and more than 56% of the patients with numbness, tingling and itching of the feet had poor self-care behavior, 25% had medium, and the remaining 18.2% had good behavior (97).

A cross-sectional study in Ethiopia indicated that 66.6% in Addis Ababa (98), 37.4% in Benishangul-Gumuz (26), and 82.9% in Nekemte (71) diabetes patients practice diabetic foot care. At Jimma Medical Center 92.5% inspected their feet and 82.75% bathed their feet once daily but 42.4% never dried between their toes after bathing (99).

### **2.2.1.5 Medication adherence**

Adherence to medication plays a significant role in the treatment of diabetes since non-adherence leads to poor control and complications (91). In Sri Lanka, 80% adherence (76) was documented in a study, while in Iran the use of insulin was linked with enhanced self-care (100) and in Saudi Arabia 54.4% often forgot their medication (101).

In Zewditu Hospital, a survey indicated 54.8% medication non-adherence, influenced by education and residency (102). In Bahir Dar, 68.8% of the patients were not adherent (103), while in Jimma 24.9% were of low and 37.2% were of high adherence and among them younger adults were highly likely to adhere (AOR [95% CI] = 11 [1.03–13.6]) (24).

### **2.2.1.6 Cessation of smoking**

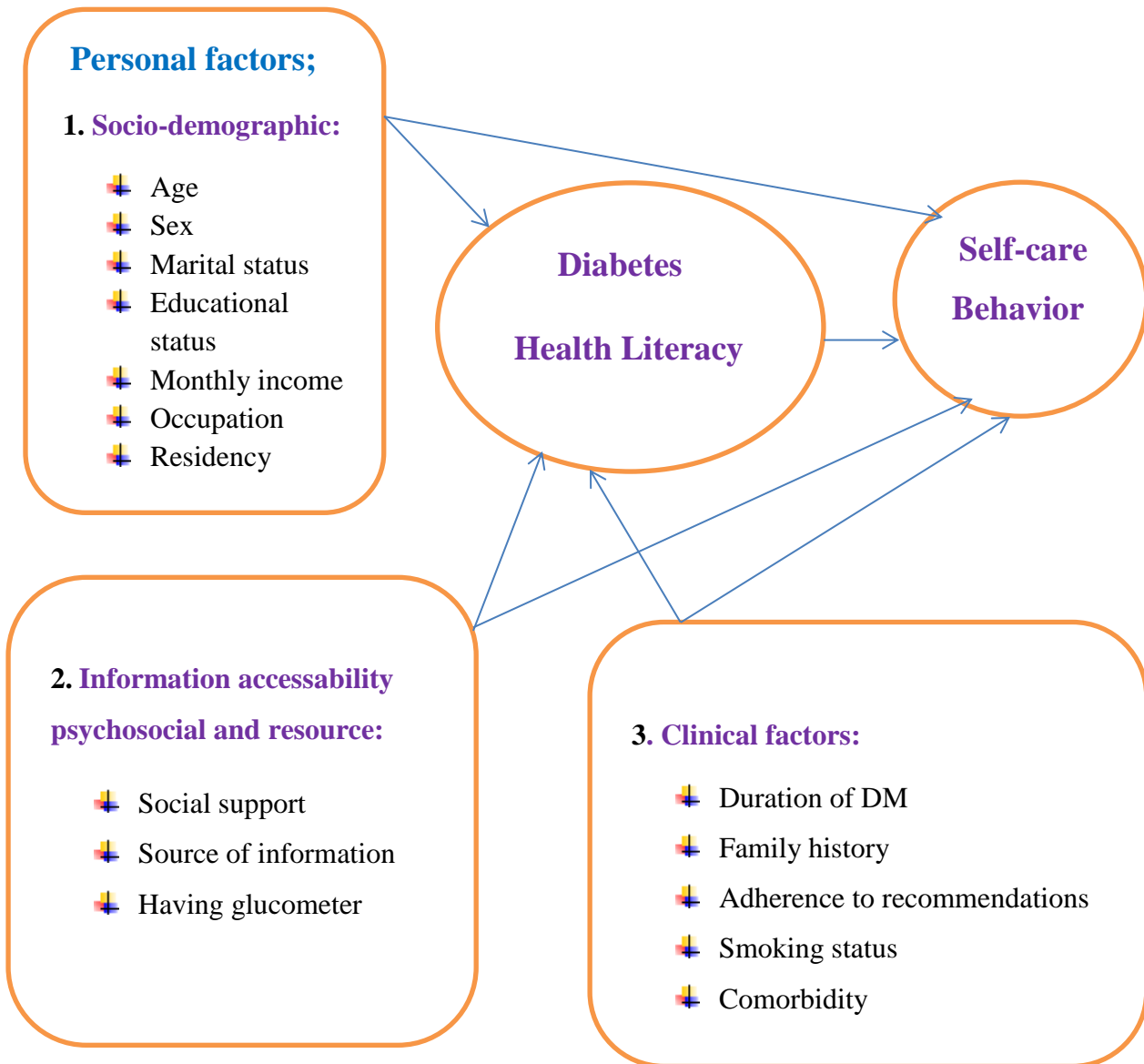
A study conducted in India found that 45.5% of men were smokers and 48.8% were advised to quit (104). In Bangladesh, a cross-sectional survey had found 37.2% of diabetic patients to be non-smokers (78). A Tigray survey found that 36% of the population were smokers (70).

### **2.2.1.7 Psychosocial support**

Study conducted in Korea indicate that family, friends, and health care providers, social support correlates significantly with diabetes self-care, suggesting that increased social support leads to good diabetes self-care (105). Psychosocial factors, including social, emotional, and environmental factors are determinants of diabetes control, (106). Study in Gonder indicated that increased social support reduced the risk of poor diabetes care by 69% (72).

## 2.3 Conceptual framework

This conceptual model was developed after a review of various sources of literature (12, 26, 70, 107, 108). This diagram shows the proposed relationships between independent variable (socio-demographic, accessibility of information, psychosocial, and resource and clinical factors) and dependent variables (DHL and Self-care behavior) for the adult diabetes patient.



**Figure 1:** Conceptual framework of health literacy and self-care behaviors study among adult diabetes patients in public hospitals, East Arsi zone, Oromia, Ethiopia.

### **3. Objective**

#### **3.1 General objective**

The general objective of this study is to assess the magnitude of diabetes health literacy, self-care behavior and associated factors among adult diabetes patients attending follow-up care at public hospitals in East Arsi zone, Oromia, Ethiopia, 2025.

#### **3.2 Specific objectives**

1. To determine the magnitude of diabetes health literacy among adult diabetes patient attending follow-up at public hospitals in East Arsi zone, oromia, Ethiopia
2. To determine the magnitude of self-care behavior among adult diabetes patient attending follow-up at public hospitals in East Arsi zone, oromia, Ethiopia
3. To assess factors associated with diabetes health literacy among adult diabetes patient attending follow-up at public hospitals in East Arsi zone, oromia, Ethiopia
4. To identify factor associated with self-care behavior among adult diabetes patient attending follow-up at public hospitals in East Arsi zone, oromia, Ethiopia.

## **4. Methods and Materials**

### **4.1 Study area and period**

East Arsi zone is bordered by Bale zone to the south, West Arsi zone to the southwest, East Shewa zone to the northwest, Afar Region to the north, and West Hararghe zone to the east. It spans an area of 19,825.22 km<sup>2</sup> and is divided into 25 districts (woredas). The highest point in the zone is Mount Chilalo. The administrative center is Asela, located 168 km south of Addis Ababa, with latitude and longitude of 7°57'N 39°7'E and an elevation of 2,430 meters(109).

The Zone has a population of 2,637,657 as per the 2007 census, with an estimated 3,894,248 in mid-2022. The majority of the population is Oromo (84.15%) and Amhara (14.3%), with Oromiffa spoken by 81.38% and Amharic by 17.76%. The study was conducted from January 20 to February 20, 2025, in five public hospitals (Asela Referral and Teaching Hospital, Abomsa Hospital, Bekoji Hospital, Kersa Primary Hospital, and Robe Didaa General Hospital) diabetes follow-up units. There were 1,621 registered adult diabetes patients attending follow-ups monthly in the zone(109).

#### **4.1.1 Study design**

Institutional based cross-sectional study was utilized.

#### **4.1.2 Sources Population**

All adult diabetes patients living in East Arsi Zone

#### **4.1.3 Study population**

All adult diabetes patients who were attending follow up care at of selected public health hospitals in Arsi zone at the time of data collection.

#### **4.1.4 Study Unit**

Systematically selected adult diabetes patients who were attending follow up clinics at selected hospitals during data collection period

## 4.1.5 Eligibility Criteria

### 4.1.5.1 Inclusion Criteria

- Patients with DM aged 18 years old and above
- Those residing with DM for a period of 6 months and above since diagnosis

### 4.1.5.2 Exclusion Criteria

- Diabetes patient who was severely ill
- Those suffering from hearing and/or visual impairment
- Those unwilling to participate

## 4.2 Sample size calculation

The current study's sample size was determined using the formula for a single population proportion with 95% confidence level, margin of error (d) of 0.05, design effect of 1.5, and diabetes health literacy of 30.3% and poor self-care behavior of 49.1%, according to previous studies in Bale and Jimma (12, 24) respectively.

$$n = \frac{(Z\alpha/2)^2 p(1-p) \times g}{d^2}$$

Where n = Size of the sample required for the study.

z = Z-value for the required confidence level (1.96 for 95% confidence).

p = Estimated proportion

q = Proportion not having the condition (1 - p).

d = margin of error taken as 5%, for the proportion of high diabetes health literacy level 30.3%, the required sample size was calculated in the following manner;

$$n = \frac{(1.96)^2 0.303(1-0.303) \times 1.5}{0.05^2} = 487$$

Where, n=the minimum required sample size

Z= the value of the standard normal distribution curve for the 95% confidence level (1.96)

P= Estimated proportion of high diabetic health literacy study done in Bale (12, 24) since p=0.303

q = Proportion without condition (1 - p).

d= Acceptable level of accuracy needed assumed to be 0.05

g= design effect

Similarly Sample size for the self-care behavior was calculated based on the formula for estimating a single population proportion. And the proportion (P) is 49.1%, from a previous study in Jimma (12, 24).

$$n = \frac{(1.96)^2 0.491(1-0.491) \times 1.5}{0.05^2}$$

$$n=576$$

An independent sample size was determined for the two particular objectives of the present study, and the higher sample size was chosen to enable the successful achievement of both objectives. The largest sample size was determined using the formula for a single population proportion estimating poor self-care behavior in DM patients. To approximate this a 49.1% prevalence of poor self-care behavior (p) was utilized, from a similar study in a similar setting, Oromia, Ethiopia. Thus, the sample was approximated at 576 based on the relevant variables. Since less than 10,000 diabetic patients were allotted follow-up in Arsi Zone Public Hospital, a correction formula would be used in the calculation of the final sample size.

Final sample size will be computed with: -  $n_f = n_i / [1 + n_i/N]$ , where  $n_f$  = final sample size,  $n_i$  = initial sample size 576 and  $N$  = estimated total diabetes patients in all the hospitals annually (1621).  $n_f = n_i / [1 + n_i/N]$ , =  $576 / [1 + 576/1621] = 425$ . For a consideration of non-response rate of 10%, final sample size was computed to be 48 participants.

### 4.3 Sampling technique

A total of 10 Public hospitals were found in East Arsi zone (ARTH, Abomsa PH, Bekoji Hospital, Bele Gasgar PH, Gobesa PH, Gololcha PH, Huruta PH, Kersa PH, RGRH, and Sude PH), from those hospitals five of them (Asela Referral Hospital, Abomsa Primary Hospital, Bekoji Hospital, Kersa Primary Hospital and Robe Dida'a General Hospital) were selected through simple random sampling (lottery method).

Monthly patient flow data is obtained from patient records and the Health Management and Information System (HMIS) of these hospitals. The total number of adult diabetes patients registered for follow-up care is gathered, and study participants was proportionally allocated among the selected hospitals to ensure data representativeness (see Table 1).

**Table 1:**Proportional allocation of study samples

<b>No:</b>	<b>Hospital</b>	<b>Total numbers of adult diabetes patients registered for follop-up care(N)Monthly</b>	<b>N</b>
1	Asela referral hospital	696	201
2	Abomsa primary hospital	304	88
3	Bekoji hospital	88	25
	Kersa primary hospital	204	59
5	RobeDida'a General Hospital	329	95

Lastly, participants in the study would be selected for interview from interviewees for one month using systematic random sampling from the selected hospitals. As N is 1621 and n is 468, K is 3 and every third patient was interviewed based on appointment using a lottery technique to determine the first participant.

## **4.4 Study Variables**

### **4.4.1 Dependent Variable**

- Diabetes health literacy
- Self-care behavior

### **4.4.2 Independent Variables**

Socio-demographic variables:

- Age of the patient
- Sex (male, female)
- Religion
- Marital status
- Education level
- Occupation
- Monthly income
- Residency

Psychosocial and resource variables:

- Social support
- Information source
- Having glucometry

Clinical variables:

- Duration of diabetes
- Family history of diabetes
- FBGL

#### 4.5 Operational Definition

**High diabetes health literacy:** If diabetes health literacy assessment score is 75% and above (12, 57).

**Low Diabetes health literacy:** If diabetic health literacy assessment score is less than or equal to 74% (12, 57).

**Poor social support:** out of 14 total score if participant's social support scale scored between 3-8 (110).

**Moderate social support:** out of 14 total score if the participant's social support scales scored 9-11 (110).

**Strong social support:** out of 14 total score if the participant's social support scales scored greater than or equal to 12 (110).

**Low monthly income:** participants who have 2970 Ethiopian birr and less/month(111).

**High monthly income:** participants who had > 2971 Ethiopian birr/month(111).

**Controlled Glycemic target:** If the patients had 80–130 mg/dl of fasting blood glucose upon measurement of three consecutive visits, otherwise uncontrolled glycemic targets (112).

**Self-care-** All seven components of self-care practice were scored from 0-7 and after calculating the overall mean score, it was classified as having “good self-care behavior” if the patient scored >3 or “poor self-care behavior” if the patient scored < 3 (69).

**Comorbidity:** The existence of one or more chronic conditions with diabetes.

## **4.6 Data collection tools and procedures**

### **4.6.1 Data collection tools**

Data would be gathered through semi-structured questionnaire and the data collection instrument would be formulated on based on previous similar publications which consists of Seven sections; Sociodemographic factors (age, sex, marital status, educational status, monthly income, occupation, residence), Clinical factors (type of DM, duration of DM, type of treatment, family history, complications, comorbidities, fasting blood glucose), Information accessibility factors (information sources, exposure to diabetes education), diabetes knowledge, diabetes health literacy, summary of diabetes self-care activities (SDSCA), and Oslo social support OSSS-3 is employed for psychosocial support are utilized to evaluate the DHL and self-care behavior (113).

**15-item diabetes health literacy** scale from literature would be employed to measure the patient level of diabetes health literacy with 5-point likert scale. It assesses the overall information, numeracy, and communicative aspects of diabetes health literacy level which can be utilized (57, 112). Mean score would be calculated and converted to percentage (5 points = 100%) to measure the level of diabetes health literacy (12, 57). Diabetes health literacy scale reliability test was confirmed and has high internal consistency with Cronbach's alpha 0.91.

**Diabetes self-care behavior;** participants' self-care activity has been assessed by the Summary of Diabetes Self-Care Activities (SDSCA), and the respondents are required to give ratings of the number of days over the last 7 days that they have done a particular self-care activity (113). The scale contains an 11-item core to assess the diabetes self-care activities in diet, exercise, self-monitoring of blood glucose, foot check, and smoking. It also consists of 1 item to assess the taking of medication, with a total of 12 items to be used within this study. Respondents report number of days during the week they engaged in a given self-care activity and scores have been calculated for each factor.

**Glycemic control:** The American Diabetes Association-recommended glycemic control target was utilized as the cutoff point in the current study. Hemoglobin A1c cutoff point less than 7 mg/dl / and FBS less than 126 mg/dl is normal (49). Three fasting blood glucose levels were read from the patient's card, and the average number was used to establish the patient's glycemic status.

**Social support** of the patient is assessed with the Oslo Social Support Scale (OSSS-3). A total score is the total of the raw scores of items. The range of the sum of raw scores is 3 to 14. Score of 3–8 was regarded as poor social support, score of 9–11 was regarded as moderate social support, and scores  $\geq 12$  were regarded as strong social support (110).

**Diabetes knowledge:** The Revised Michigan Diabetes Knowledge Test general knowledge section (DKT2) was utilized in assessing the knowledge of the participants on diabetes (114). Scoring for the test is based on the percentage correct on questions. The general section of DKT2 consists of 14 items, but because of irrelevance to the Ethiopian context, item number 4 was not utilized in the current study, with 13 items.

#### **4.7 Data collection procedure**

The data was collected by 5 BSc nurses and 2 MSc Nurses (supervisor) through face-to-face interviews. Data collectors and supervisors were trained on diabetes health literacy and self-care behavior had clinical area work experience. Patients who fulfilled the exclusion criteria were invited to take part in the study and explained the purpose and the process of the study. Patients who consented to be recruited in the study were interviewed. All the patients were interviewed uniformly and additional information was gathered by the data collectors when the patient cannot comprehend the technologies used in the questionnaire. The process of collecting data was carried out for a period of 1-month.

#### **4.8 Data quality control**

For the sake of data quality assurance, the questionnaire was pre-tested for content validity by expert seniors in the study area and pretest was conducted on 5% of the overall population of Huruta hospital. Study purpose, questionnaire description, interviewing style, importance of privacy, and maintaining confidentiality of the respondents were included in two-day data collector and supervisor training. And besides, the mistake experienced during pretests and testing by experts had been modified and the modification was incorporated in the final draft of the questionnaire for data collection. To confirm that there was no mistake, the questionnaire was inputted into English, translated into “Afan oromo and Amharic” and then back into English by languages using different multilingual translators.

#### **4.9 Data processing and Analysis**

The Epi data 4.7.0.0 software was used to enter, code, and clean the data before exporting them to SPSS version 27.0 for analysis. Descriptive statistics were computed, such as percentage and frequency tables for categorical variables and mean, median, standard deviations, and range values for continuous variables.

Independent and dependent variables were also tested for association by binary logistic regression analysis. Multivariable logistic regression analysis was also done for variables for which the p-value in bivariate logistic regression analysis was  $< 0.25$ . The relationship of independent variables with diabetes health literacy and self-care behavior were measured in adjusted odd ratio (AOR) with a 95% confidence interval and Hosmer-Lemeshow goodness-of-fit test was conducted to evaluate the multivariable logistic regression model's fit ( $P=0.72$ ).

#### **4.10 Ethical Clearance**

Ethical approval was received from Addis Ababa University College of Health Sciences Institutional Review Board (IRB) and then Official letter would be received from Department of Nursing to conduct study settings. Following hospital clearance, the informed consent of the patients was received prior to commencing the data collection. Confidentiality of the study participants was ensured at all levels of project work by not writing down the names and any personal identifier of the participants; but they used code numbers. Rights of participants in refusing to participate, in posing any question or withdrawing at any point in the data collection process were communicated to them.

#### **4.11 Dissemination plan**

The findings of the study will be submitted to the Department of Medical-Surgical Nursing, School of Nursing and Midwifery, College of Health Science, Addis Ababa University. It will be disseminated to selected public hospitals of East Arsi zone, Oromia, Ethiopia. The findings will also be presented at different seminars and conferences and published in a reputable journal.

## 5. Results

### 5.1 Socio-demographic characteristics of the participants

The study included a total of 468 adult patients who were diagnosed with diabetes and response rate was 100%. More than half of the respondents (60.9%) were categorized as male and 284(60.7%) respondents were older than 65 years old.

The educational level showed more than one-fourth, 120 (25.6%) of the participants were Unable to read and write and less than one-third (20.5%) of them were collage/university graduates, more than half 268(61.1%) of the participants were married, and also two-third (64.1%) were rural dwellers.

More than one-third, 230(40.6%) of the study participants were muslims. Among all study participants nearly a quarter (22.0%) of them were merchant and 19.4% was housewife, and of all total study participants more than one-third, 169(36.1%) have low monthly income (Table 2).

**Table 2:** Socio-demographic characteristics of diabetes patients attending follow-up care at selected public hospitals in East Arsi zone, Oromia Region, Ethiopia 2025 (n=468).

Variables	Category	Frequency	Percent (%)
Sex	Male	285	60.9%
	Female	183	39.1%
Age	18-30	20	4.3%
	31-50	73	15.6%
	51-65	91	19.4%
	>65	284	60.7%

Religion	Orthodox	139	29.7%
	Muslim	190	40.6%
	Protestant	110	23.5%
	Catholic	20	4.3%
	Others *	9	1.9%
Marital status	Single	94	20.1%
	Married	286	61.1%
	Divorce	32	6.8%
	Widowed	56	12.0%
Educational status	Unable to read and write	120	25.6%
	Able to read and write	103	22%
	Primary	73	15.6%
	Secondary	76	16.2%
	College and above	96	20.5%
Occupational status	Student	18	3.8%
	Private	26	5.6%
	Farmer	85	18.2%
	Government employee	97	20.7%
	Merchant	103	22.0%
	Housewife	91	19.4%
	Daily labor	47	10.0%
	NGO employe	1	0.2%
Place of Residence	Rural	300	64.1%
	Urban	168	35.9%
Monthly income (ETB)	<1000	169	36.1%
	1001-2000	121	25.9%
	2001- 3000	74	15.8%
	3001-5000	55	11.8%
	>5001	49	10.5%

ETB: Ethiopian Birr; Others\*, wakefeta, juba

## **5.2 Clinical and Behavioral Characteristics Related to Diabetes among the Participants**

The results showed that more than three-fourth ,412(88.1%) of the respondents were type 2 DM patients, participants who had family history of DM were accounted 276(59%) and more than half, (57.3%) of the participants were lived with different kinds of complications, hypertension comprised the highest percent (49.3%).

With regards to treatment, almost more than half (53.2%) of them were on insulin injection, and also, more than one-fourth, (26.3%) and less than one-third (20.5%) of them utilize oral hypoglycemic agent and both insulin & OHA respectively. One hundred seventy-two (36.8%) of the respondents were didn't regulate their blood glucose level, in addition that almost 138 (29.5%) of them were cigarette smokers and 165(35.3%) were live with diabetes for 1-5 years (See Table 3)

**Table 3:** Diabetes related clinical and behavioral characteristics of diabetes patients attending follow-up care at selected public hospitals in East Arsi zone, Oromia Region, Ethiopia 2025 (n=468).

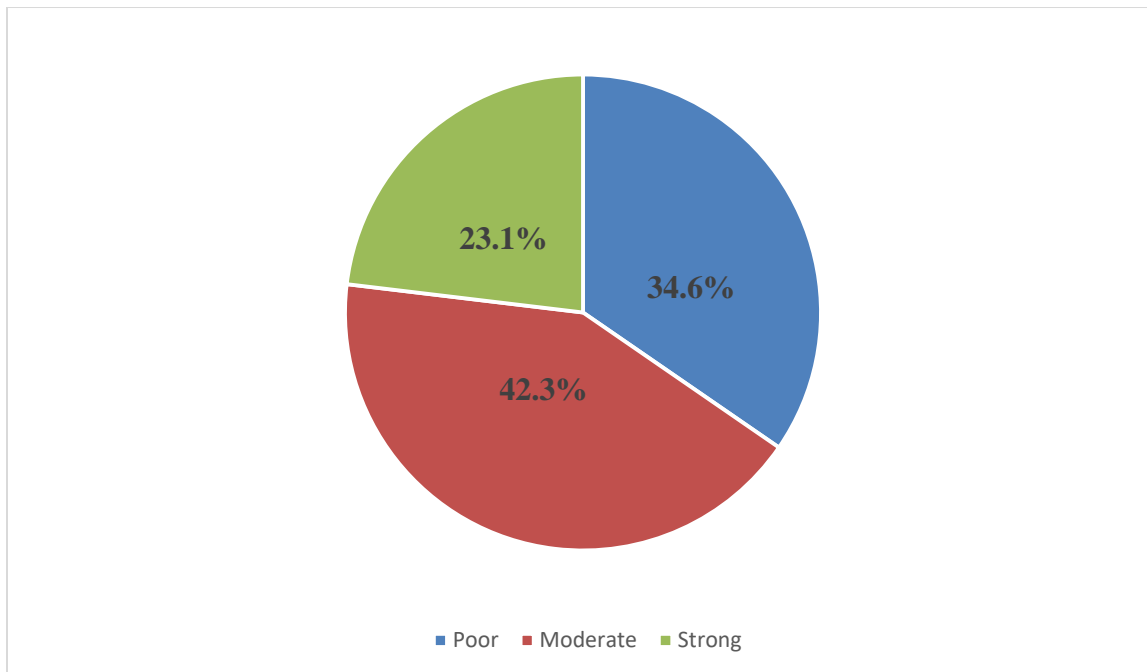
<b>Variables</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
Family history	Yes	276	59%
	No	192	41%
Types of DM	Type 1	56	11.9%
	Type 2	412	88.1%
Duration	<1	6	1.3%
	1-5	165	35.3%
	6-10	117	25.0%
	11-15	74	15.8%
	16-20	62	13.2%
	>20	44	9.4%
Diabetes education	Yes	342	73.1%
	No	126	26.9
FBS (mg/dl)	Controlled	296	63.2%
	Uncontrolled	172	36.8%
Types of treatment	Oralhypoglycemic agent	123	26.3%
	Insulin injection	249	53.2%
	Both insulin & OHA	96	20.5%
Cigarate smoking	Yes	138	29.5%
	No	330	70.5%
Complication	Yes	268	57.3%
	No	200	42.7%

N.B: FBS; fasting blood sugar; DM: Diabetes mellitus

### 5.3 Information, resources accessibility, and social support of the participants

In this study, more than one-fourth (37.6%) of the respondents got information's from just a single source, and more than one-third,209(44.7%) of the respondents also had only1–2 people so close to them to go to in case they faced a major personal problem.

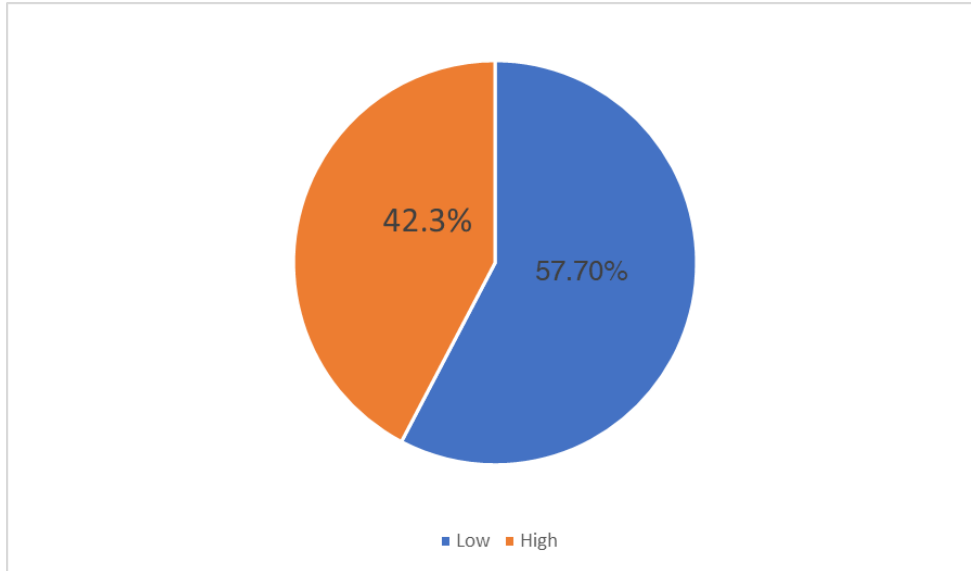
Additionally, more than one-fourth ,183(39.1%) of the participants have got a little concern and interest from other peoples for what they did, which is mostly inverse from what they expect and more than one- third ,162(34.6%) of study participants had poor social support. (See Figure 2).



**Figure 2:** Status of social support for diabetes patients who attending follow-up care at selected public hospitals, East Arsi zone, Oromomia, Ethiopia 2025

## 5.4 Diabetes health literacy

Among total participants, more than half (57.7%) of them had low diabetes health literacy level. (See figure 3)



**Figure 3:**Status of daiabetes health literacy level of the respondents.

Amongst the total, more than one-fourth, 172(36.8) respondents were didn't know how it is required to check their blood glucose level throughout the day because they were diabetes patient. Again, more than half, 284(60.7) of them took their routine diabetes medication, but 341(72.9%) were found to have a change of appointment time and date for their check-up, and also, less than one-third 105(22.4%) of them weren't sure for the question if they can calculate the time when they take the next diabetes medication exactly.

More than one-third, (35.7%) didn't know and more than half, 242(51.7 %) of the sample agreed on their normal range blood glucose level and also, less than one-fourth (16.2%) of the sample was agree for the question asking about assuming if diabetes related information is believable.

Out of the total, about 140 (29.9%) of the respondents were didn't comprehend diabetes information appropriately which can be provided to them by means of educational materials and booklets which transmits useful diabetes information and secondly, fewer than one-fourth (9.6%) of the respondents were strongly agree with their own habits they need to explain their diabetes health status to the health professionals, surprisingly only four (0.9%) of the respondents possess habits to ask question which is mainly associated with their diabetes health conditions. (See Table 4).

**Table 4:** Diabetes health literacy of diabetes patients attending follow-up care at selected public hospitals in East Arsi zone, Oromia region, Ethiopia 2025 (n=468).

Diabetes health literacy questions	Strongly Disagreed	Disagree	Uncertain	Agree	Strongly agreed
I can convey the reason why I should have diabetes diet	3(0.6%)	12(2.6%)	82(17.5%)	339(72.4%)	32(6.4%)
I can judge whether diabetes information is reliable	0%	9(1.9%)	76(16.2%)	354(75.6%)	29(6.2%)
I know and practice the appropriate storage of diabetes medication	0%	6(1.3%)	97(20.7%)	331(70.7%)	36(7.7%)
I understand all the information related to diabetes medication	-	6(1.3%)	74(15.8%)	355(75.9%)	33(7.1%)
I understand all information I sought on diabetes	-	9(1.9%)	102(21.8%)	321(68.6%)	36(7.7%)
I alter the appointment date or time for a medical checkup	-	5(1.1%)	79(16.9%)	341(72.9%)	43(9.2%)
<b>Communicative</b>					
I can Explain my diabetes condition for the health care provider	1(0.2%)	4(0.9%)	100(21.4%)	318(67.9%)	45(9.6%)
I ask health professionals a question	-	4(0.9%)	88(18.8%)	334(71.4%)	42(9.0%)

I understand the information on diabetes management from health care provider	1(0.2%)	2(0.4%)	81(17.3%)	350(74.8%)	34(7.3%)
<b>Numeracy(functional)</b>					
I can read and understand educational materials and booklets	-	12(2.6%)	140 (29.9%)	270(57.7%)	46(9.8%)
I understand the written information provided at the appointment	-	9(1.9%)	128 (27.4%)	278(59.4%)	53 (11.3%)
I understand diabetes related information presented with graphs or pictures	1(0.2%)	13(2.8%)	123 (26.3%)	282(60.3%)	49 (10.5%)
I can determine the carbohydrate content per serving from nutritional label	-	13(2.8%)	146 (31.2%)	268(57.3%)	41(8.8%)
I can calculate the next time to take diabetes medication	1(0.2%)	6(1.3%)	105 (22.4%)	305(65.2%)	51 (10.9%)
I can interpret whether my blood glucose level is within the normal range	1(0.2%)	7(1.5%)	167 (35.7%)	242(51.7%)	51 (10.9%)

## **5.5 Factors associated with diabetes health literacy**

For predicting of diabetes health literacy, all the variables with p value <0.25 in the bivariate analysis (Sex, Age, educational status, residence, family history of DM, exposure to diabetes education and number of diabetes information source) were included in the multivariate logistic regression model. For this, sex, educational status, residence, exposure to diabetes education and source of diabetes information were found to be significantly associated with diabetes health literacy.

Among the respondents, male adult diabetes patients were 39.8% times less likely to have high diabetes health literacy level (AOR=0.602, 95% CI: 0.401, 0.905) than adult female diabetes respondents. Respondents who cannot read and write were 51.9% times less likely to have high diabetes health literacy level (AOR=0.519, 95% CI: 0.283, 0.949) than those who are college and above level.

According to attendance of diabetes health literacy session, respondents who never exposed to diabetes education were 1.6 times more likely have low level of diabetes health literacy (AOR=1.588, 95% CI:(1.004,2.513) than those respondents who are exposed and respondent who lives in rural residence had 1.6 times more likely have low DHL level (AOR = 1.619; 95% CI (1.055, 2.485) than those participants who live in urban, and also participants who receive diabetes health information from single source were 62.9% less likely to have high level of diabetes health literacy when compared to whose participants who have gain diabetes related information from two and more than two sources. (See Table 5).

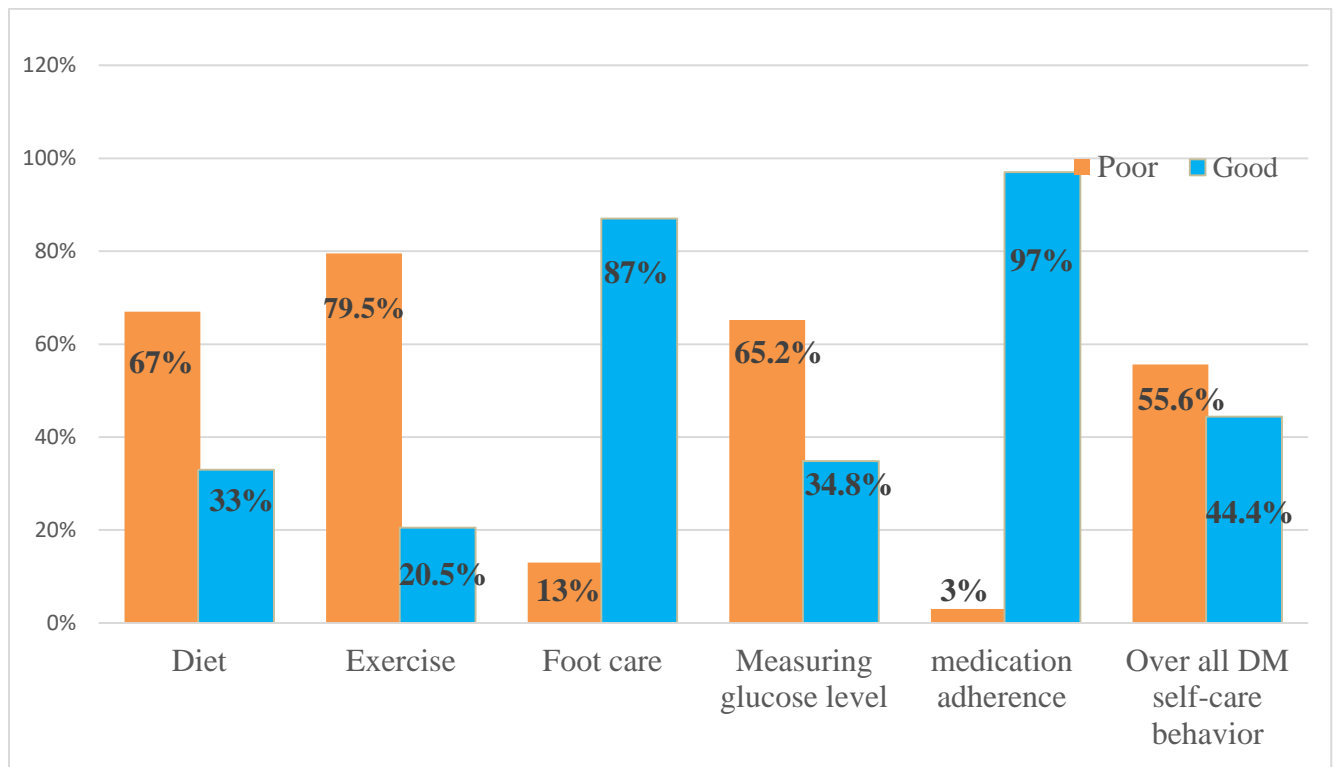
**Table 5:** Bivariate and multi-variate logistic regression analysis of factors associated with diabetes health literacy for the patient attending diabetes follow-up care at selected public hospitals, East Arsi zone, 2025 (n=468).

Variables		Diabetes health literacy level		p-value	COR (95%CI)	p-value	AOR (95%CI)
		Low Freq (%)	High Freq (%)				
Sex	Male	175(37.4)	110(23.5)	0.043	1.474 (1.012-2.145)	<b>0.015*</b>	0.602(0.40-1-0.905)
	Female	95(20.3)	88(18.8)			1	1
Age	18-30	9(1.92)	9(1.92)	0.537	1.333(0.535-3.322)	0.725	1.195 (0.442-3.236)
	31-50	20(4.3)	18(3.85)	0.081	1.586(0.945-2.661)	0.183	1.452 (0.839-2.516)
	51-65	57(12.2)	58(12.4)	0.055	1.594(0.991-2.565)	0.057	1.626 (0.986-2.684)
	≥ 65	184(39.3)	113 (24.15)			1	1
Education	Unable read and write	75(16)	44(9.4)	0.248	0.722(0.416-1.254)	<b>0.033*</b>	0.519(0.28-3-0.949)
	Able read and write	69(14.74)	46(9.83)	0.578	0.852(0.484-1.500)	0.147	0.637(0.34-7-1.171)
	Primary	44(9.4)	29(6.2)	0.697	0.884(0.476-1.642)	0.283	0.697(0.36-1-1.347)
	Secondary	23(4.91)	36(7.7)	0.021	2.057(1.115-3.795)	0.074	1.819(0.94-3-3.511)
	College and above	59(12.6)	43(9.2)			1	1
Residence	Rural	165(35.3)	138(29.5)	0.019	0.627(0.425-0.926)	<b>0.027*</b>	1.619(1.05-5-2.485)
	Urban	105(22.4)	60(12.8)			1	1

Diabetes Family history	Yes	152(32.5)	123(26.3)	0.23	0.797(0.548-1.610)	0.500	1.147(0.770-1.711)
	No	118(25.2)	75(16)			1	1
Source of diabetes information	One source	102(21.8)	64(13.7)	0.044	0.674 (0.459-0.989)	<b>0.029*</b>	0.629(0.414-0.955)
	≥Two source	168(35.9)	134(28.6)			1	1
Attending on diabetes education session	No	192(41)	156(33.3)	0.018	1.677(1.094-2.571)	<b>0.048*</b>	1.588(1.004-2.513)
	Yes	78(16.7)	42(9)			1	1

## 5.6 Diabetes Self-care behavior

Among all the study participants, more than two-thirds, 313(67%) were having poor diet habit and more than three-quarters (79.5%) of them never engaged in specific physical activity in the last seven days, almost more than half, (65.2%) of them never monitored their blood sugar level, and 29.5% of study participant smoke at least one puff of cigarette in the last seven days. Overall, more than half 260(55.6%) of the study subjects had poor self-care behavior (Figure 4).



**Figure 4:**Status of diabetes self-care behavior, for adult diabetes patient attending follow-up care at selected public hospitals, East Arsi zone, Oromia, Ethiopia,2025 (n=468).

## **5.7 Factors associated with diabetes patient self-care behavior**

Bivariate logistic regression showed factors like sex, age, estimated monthly income, residence, level of education, glucometer ownership, on diabetes education attended, and social support were factors statically associated with diabetes self-care behavior with p-value of less than 0.25 choosebale candidates for multivariate analysis.

Our study multivariable logistic regression shows, among respondents those whose age was under category of 18-30 years were about 3.4 times more likely (AOR=3.397, 95% CI= 1.407, 11.224) to have poor self-care behavior compared to those who were above 65 years old.

Among the partipants, adult patients of diabetes who live in rural had 51.1% times less likely to have good diabetes self-care behavior (AOR=0.489, 95% CI: 0.316, 0.755) than with those who live in urban. Regarding attendance on diabetes health education session, respondents who had never been expose to the diabetes education were 1.8 times more likely have poor diabetes sef-care behavior (AOR =1.795, 95%CI:1.111, 2.901) than with those who had been exposed.

Additionally, the respondents with less than one thousand monthly incomes have been 76.6% times less likely (AOR = 0.234; 95% CI: 0.092, 0.591) and participants with 1001-2000 monthly income were 46.9% times less likely (AOR = 0.531; 95%CI: 0.142, 0.869) had good diabetes self-care behaviors respectively, compared to those with more than five thousand one Ethiopian birr (See Table 6).

**Table 6:**Bivariable and Multivariable logistic regression analysis for self-care behavior of diabetes patients attending follow-up care in East Arsi zone of selected public hospitals, 2025 (n=468).

Variables	Catagories	Diabetes self-care behavior		P-value	COR (95% CI)	P-value	AOR (95% CI)
		Poor Freq	Good Freq				
Sex	Male	148	137	0.049	1.460(1.001-2.130)	0.138	1.382(0.901-2.120)
	Female	112	71	1		1	1
Age	18-30	7	111	0.038	2.729(1.057-7.049)	<b>0.009*</b>	3.397(1.407-11.224)
	31-50	20	18	0.760	1.085(0.644-1.826)	0.394	1.280(0.726-2.259)
	51-64	58	57	0.026	1.714(1.066-2.758)	0.078	1.604(0.948-2.715)
	≥65	175	122	1		1	1
Education	Unable read and write	84	40	<0.001	0.230(0.129-0.407)	0.297	0.675(0.323-1.411)
	Able read and write	73	44	<0.001	0.303(0.169-0.543)	0.285	0.674(0.327-1.389)
	Primary	45	27	<0.001	0.297(0.157-0.561)	0.072	0.499(0.234-1.064)
	Secondary	28	26	0.008	0.429(0.231-0.799)	0.555	0.8(0.380-1.680)
	College and above	30	71	1		1	1
Residence	Rural	194	106	<0.001	2.828(1.916-4.177)	<b>0.001*</b>	0.489(0.316-0.755)
	Urban	66	102	1		1	1
Own glucometer	Yes	98	110	0.001	1.855(1.281-2.687)	0.203	1.313(0.863-1.999)
	No	162	98	1		1	1

Attending on diabetes education	No	180	162	0.037	1.565(1.028-2.383)	<b>0.017*</b>	1.795(1.111-2.901)
	Yes	80	46	1		1	1
Income	<1000	117	52	<0.001	0.129(0.061-0.271)	<b>0.002*</b>	0.234(0.092-0.591)
	1001-2000	71	50	<0.001	0.204(0.095-0.437)	<b>0.024*</b>	0.531(0.142-0.869)
	2001-3000	37	37	0.003	0.289(0.129-0.651)	0.069	0.418(0.163-1.069)
	3001-5000	24	31	0.024	0.374(0.157-0.881)	0.09	0.452(0.181-1.131)
	>5001	11	38	1		1	1
Social support	Poor	99	63	0.011	0.529(0.323-0.865)	0.098	0.627(0.361-1.090)
	Moderate	112	86	0.062	0.638(0.398-1.022)	0.237	0.730(0.434-1.229)
	Strong	49	59	1		1	1

Note: COR, Crude odds ratio; AOR, Adjusted odds ratio; CI, Confidence Interval, 1=Reference, P-Value: \*= significant at p-value < 0.05.

## 6. Discussion

Diabetes, like most endocrine disease, can be managed by the active engagement of patients, which to a great extent is influenced by the patient's ability to access, comprehend, appraise and use diabetes-related information known collectively as diabetes health literacy (45, 46), and engagement of self-care behaviors that have principal roles for the management of diabetes status such as having a good diet plan, foot care ,medication adherence, frequent checking of blood sugar level, engaging in specific physical activity and being free from smoking, which can indicate the level of diabetes self-care behavior to a great extent (21, 22).

This study was aimed to assess both the magnitude of diabetes health literacy, self-care behavior and associated factors among adult diabetes patients who attends follow-up care at outpatient of selected public hospitals in East Arsi zone, Oromia region, Ethiopia.

Of the respondent, our study finding showed that, more than half (57.7% ) of the participants had low diabetes health literacy level.This finding is higher than study which was conducted by European health letracy survey (48%)(48), in Saudi Arabia(35.5%) and United state,(33%),(46,(56). On contract, this finding was lower than the study conducted in South Korea (61%)(51). This discrepancy might be due to difference in tools utilized, study populations and setting, health care delivery system, habits of giving high attention for diabetes education, and also economical and socio-cultural variation may lead to having this difference.

From the respondent, our research finding revealed that, more than half (57.7%) of the respondents possessed low diabetes health literacy level. This finding is more than study which was conducted by European health letracy survey (48%)(48), in Saudi Arabia (35.5%) and United state,(33%),(46,56). Contrarirly, this finding was less than study which was conducted in south korea (61%) (51). This discrepancy might be due to difference in tools utilized, study populations and setting, health care delivery system, habits of giving high attention for diabetes education, and also economical and socio-cultural variation may lead to having this difference.

In contrast, the result of this study shows that only 42.3% of the respondents had high DHL level, which is lower than what has been found in studies conducted in China (52.9%), Israel (69%), Singapore (80.5%), (47, 49,50), and higher than those conducted at Mexico (17.6%) and Iran (18.2%) respectively, ,(51, 52). In a different manner, the result achieved from this finding was high, in relation to the result achieved from Kigali, Rwanda which showed that 14.3% of the participants had a high diabetes health literacy level (53).

This finding was also higher than cross-sectional study in Bale (41.8%), Debre-brehan (49.1) and Gondar (26.3%) (58). The probable cause this disparity may be due to variation in difference of sample size which results variation to the number of participants in terms of educational status of the respondents, where the number of participants which could not read and write in this research was higher compared to those studies and the small adjustment made on the tools that was used for this study might be another reason for why this difference would exist.

Male gender in this study was significantly associated with low-level diabetes health literacy. This finding is consistent with study done in Iran, China and Rwanda(50) ,and while it is inverse with that of study conducted at Gonder (57).This difference might be due to socio-cultural, habits and study setting variation.

Educational status was also significantly associated with diabetes health literacy. This finding is consistent with study done in Iran, China and Rwanda(50), that indicates low level of educational status, which was unable to read and write, as well as only able to read and write had strongly associated with low diabetes health literacy as compared to those who had above this level. Again, this result is also consistent with a study from Gondar and Bale, in which participants with greater educational status had a high mean score of diabetes health literacy (57,12).

The possible explanation for this might be, with greater access to education, the reading, interpreting, and judging capacity of information as well as the availability to health information and capacities increases. It may also be that educated patients have the ability to learn more about their disease from a different set of diabetes health resources like TV programs which are basically health educative, internet, books, ticktack, magazines etc. Furthermore, a highly educated person might be more receptive to health education and able to understand and differentiate useful health information betterly.

In this study, rural resident had lower diabetes health literacy compared to that of Urban. This finding is supported by study conducted in Gondar (57), where rural had lower mean score of diabetes health literacy than those score was lower in rural than those in urban. This may be because education may be difficult to access in rural settings, which may affect patients' ability to get access to information concerning diabetes and it also may be because rural may not have much access to health information because of low availability of many sources of information that enables enhancement of the patient level of health literacy.

A positive relationship between diabetes education exposure and diabetes health literacy was discovered by this study. This result is positively correlated with Malaysian level (62). This may be because respondents who were given a lot of diabetes education, may be able to feel and identify changes related to their state of health, what they do to maintain their health betterly, measures of preventing it, and had a good level of confidence to talk with health care providers and ask new situation happen in their states of health.

Moreover, this study also shows that multiple sources of information were positively associated with the level of diabetes health literacy. This is in agreement with studies done in Bale (12), where plurality of sources of information was positively associated with diabetes health literacy. This is because the person who has other sources of information will get other ideas about health and bring something new that can strengthen the earlier knowledge and become more knowledgeable then, it can update themselves based on available evidences.

The present study showed that diabetes health literacy has no association with age, and family history after they passed to multivariate logistic regression. To this finding, family history of DM was also different in health literacy score in Northeast Iran (54, 55), and the Bale study (12) even stated that there was no significant association between family history and diabetes health literacy that can support our finding.

Apart from that, the outcome of this is that, 44.4% of participants had only good diabetes self-care practice and this was higher than study conducted in Malawi, Mexico and United Arab Emirate (33%, 33.5% (37.7%), respectively (65, 66), and Landside lower than study conducted at Nazila (63.6%) (29).

But, it is higher than study done in Uganda reporting 36.5% (27), smaller in reverse to study in Tigray (46.7%)(70), in West Ethiopia (60.7%)(71), in Yekatit 12, Addis Ababa and Debreberhan Hospital (44.7%), (29, 30), once again of Nekemte and Jimma (60.7%, 49.1%) respectively,(71,24). The possible difference might be due to sample size, research design and source study population. For instance, study conducted in Tigray and Debreberhan were only done in single institution which might have a bearing on sampling.

This study found out that more than two-third (67%) of the participants were not following recommended dietary behavior in the last seven days and this result was lower than study in Sri Lanka (56.6%) (76), and this study found that only 33% of the respondents had maintained proper diet guideline during the last seven days, this is lower than study at Bangladesh (48%) (78), and in Lagos, Nigeria, (53.5%), (79).

It is also lower compared to that of Tigray, Northesat Ethiopia, Nekemte and Addis Ababa (48.8%,36.3%,69.4%and 75.9%–83.5%) respectively (30, 70).The difference obtained could be due to study environment, social desirability bias, recall bias and food choice, geographical difference, socio-cultural and economical conditions.

This study revealed, only 20.5% study participant were involved in physical activity at least 30 minute for three or more days per a week, the result was lower than as compared with a study conducted in Sri Lanka(55.3%),(76) Bangladesh(32.9%)(85),Malawi which was around (77%)(65), and within sub-Saharan Africa ranging from 46% to 95% (86).

In addition, also lower than from studies at Diredawa (53.8% ) (87), Dilla Referral Hospital (49%) and Nekemte (63.5%) ,(71, 80, 88). Socio-cultural difference, living habits and study environment can potentially be important factors for the occurrence of this difference.

In the present study, blood glucose self-monitoring (BGSM) is around 34.8% and the result was lower than study conducted in United Kingdom (43%) (89), Bangladesh around (37%) (85), United Arab Emirates (41.7%) always check blood glucose (67). But the result is higher than Tigray study 11.9% (70), Nekmete and Australia (15%) (71).

This study illustrates that almost 65.2% of participant hadn't own glucometer which essential material to have good self-care behavior regarding of BGSM, due majority of them hadn't it, the behavior was become poor, mostly related with the study conducted in Benishangul-Gumuz(86), and Diredewa study which showed that glucometer owners were three times more likely had good self-care behavior(92).The difference may be due to sample size, geographical, socio-economic and study setting variation.

The majority of the patients (87%) maintained good foot care practice of inspection and washing that is higher than finding revealed by study conducted in Bangladesh, 43.2% (85), Tanzania, 37.9% (96), and Malawi 69%(65), and also higher than cross-sectional study done in Addis Ababa 66.6% (98), 37.4% in Benishangul-Gumuz (26), and 82.9% in Nekemte (71), but lower than study done in Jimma Medical Center 92.5% (99).

This difference can be occurring due to socio-cultural, sample size, study setting, level of diabetes health literacy, and study participants' self-care habit difference.

For medication adherence, this study shows more than three-fourth (97%) of the participants had good practice of diabetes self-care, this could be slightly higher as a study in Sri Lanka showed 80% (76), and in Saudi Arabia 54.4% (101), similarly high a study in Zewditu Hospital showed 54.8%, influenced by education and residency (102), in Bahir Dar, 68.8% (103), and in Jimma which could be 37.2% with younger adults having better chances of compliance (24).

This study revealed that more than one-fourth (29.5%) of the participant had cigarettes smokers dominated by males, this is mainly lower in comparison to study in India 45.5% (104) and Tigray 36% (70). The reason may be socio-cultural difference, study location, samples as well as understanding of the participant about the harmful effect of smoking on health.

Diabetes patients having strong social support better practiced good diabetes self-care than who had no or poor social support as having strong social support significantly encourages diabetes patients to stick to good diabetes self-care and the result of this study show that, those who had strong social support were more likely to practice good diabetes self-care than those who had poor social support and this result was in line with Studies conducted in Korea (105), and in Gonder 69%(72).This similarity might be happens due to due socio-cultural uniqueness.

Lastly, the present study found that, diabetes self-care behavior had no association with sex, being owner of glucometer and social support after they had advanced to multivariate logistic regression.

## 6.1 Conclusion

The overall level of diabetes health literacy and self-care behavior were low in comparison to other studies conducted in Ethiopia. This research found that being male, having lower educational status, with one source for diabetes information, living in rural place and un-exposed to diabetes education were factors associated with low diabetes health literacy level. These factors were not found to be significant in earlier studies done in Bale, Ethiopia and the results of this study also showed that family history and age were not associated with diabetes health literacy level.

Additionally, it shows being younger, rural residence, never attend on diabetes education session and having low monthly income were factors mainly associated with poor self-care behavior. And also, revealed that, sex, educational status, being owner of glucometer and social support were not associated with self-care behavior, though; these factors were significant in other studies.

## 6.2 Recommendation

In light of the study's findings, the following suggestion is made:

**To East Arsi zonal health office:** it is expected to start work on the dissemination of health-related information, effective communication and organized health education that focused on patients who are male, younger, low educational level, lives in rural, low monthly income and for who had poor social support. Preparation and dissemination of posters, flyers, and health education through mass media are all important especially for those with lower social support and living in rural areas where information source is less.

**To health professionals:** Regular screening of the health literacy level also must be considered by working with health professionals for a better health for all communities.

It is expected from health professionals to provide health education using simple language, explaining medical words, communicating in a way that is linguistically and culturally appropriate, and giving patients the chance to ask questions and give thoughtful responses and need to motivate and promote owning of glucometer for better monitoring of blood glucose level and need remind every patient on available self-care recommendation and assess smoking and counsel on how to quit.

**Future Researchers** are expected to do other researchers on this area to strengthen this result by using interventional studies and including other factors that weren't addressed by this research.

### **6.3 Srength and limitation**

#### **6.3.1. Strengths**

This study included five selected hospitals found East Arsi zone and believed to better represent the study area and enable generalization. Face-to-face patient interviews were used to gather data directly from patients, which has allowed me to have access to more thorough data and the confounding effect of variables could be reduced by using multivariable logistic regression analysis and also, diabetes patients who received follow-up care were also generalized.

#### **6.3.2. Limitations**

This study may prone to social dilatability bias as it considers some of the sensitive topics like eating habits and smoking and the research asks for the patient's self-care activity for the past seven days and there may be a recall bias from the respondents. Attitionally, it excluded patients who didn't visit the health facility during the data collection period and it excluded private health facilities, many of which offer services for diabetes health care, again bulky number of questions in the questionnaire tool make respondents so reluctant.

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## **ANNEXES:**

### **Annex 1: Subject Information Sheet (English Version):**

Good morning/Good afternoon. My name is\_\_\_\_\_. This questionnaire is prepared for research work to be conducted on the diabetes health literacy, self- care behaviors and associated factors among adult diabetes patients in East Arsi zone, Oromia region, Ethiopia, 2024/2025. The research proposal is conducted to fulfill the thesis requirement of MSc degree in Adult Health Nursing: Addis Ababa University, School of Nursing and midwifery. Dear respondents, below are questions, which are designed to assess the magnitude of diabetes health literacy, self - care behaviors and related factors. Knowing the related factors will help us at a zone level as well as country level to work on the developments of DHL and self -care behaviors. You are selected for you are diabetes patient and your participation depends on your voluntariness only. Although you are sacrificing your time there is no benefit in personal or payment that you get for your participation in this study. But your honest response to these questions will help us to have better understand about the DHL and self-care behavior of patients and will also help as the contribution for the country's level effort to develop trends of DHL and self-care behavior. During you participation in this interview your name and any identity that may express you are not written/mentioned/, and it will never be used in connection with any of the information you provide. We would like to express our heartfelt appreciation for your collaboration and thank you in advance.

In case if you need to contact with the investigator, you may use the following address:

**Name: Abebe Basha Biru**

**Tel: 0933-62-4994**

**Email: [abebebasha2127@gmail.com](mailto:abebebasha2127@gmail.com)**

**Thank you!**

## **Annex 2: Subject Information Sheet (Afan Oromo Version)**

Akkam bultan? Maqaan Koo\_\_\_\_\_jedhama, bakka bu'aa gaafataa **Abbaba Baashaa** dha. Inni barnoota digirii lammataa isaa Yunivarsiitii Finfinneetti, Kolleejjii fayyaa, dippartimentii narsiingii barataa jira. Yoo fedhii keessan ta'e yaada keessan naaf ergisaatii waa'ee mata duree qorannoo isaa isiniifan ibsa. Mataa dureen qorannoo isaa, Afaayaa Fayyaa Dhukkuba Sukkaaraa, Yaala of-egannoo dhukubsatoota dhibe sukkaara fi wantoota isaan akka sirriitti hin hordofne taasisan hospitaalota mootummaa godinaa Arsii bahaa, Mootummaa Naannoo Oromiyaa"Kan qopha'edhaa.Kun qorannoo haala odeffannoo gaha fi yaala of-eegannoo dhibee sukkaaran wal-qabatee jiru hospitaloota filatamoo godinaa Arsii bahaa keessa jiru hubachuuf isin afeeru dha. Kayyoon qo'aannoo kanaa odeffannoo gaha waaye sukkaara, yaala off-egannoo fi dhukubsatoota dhibe sukkaara fi sababawwan kana waliin jiran qorachuu ta'a.

Of-eeganoon dhibe sukaara yaaluu keessati murtesa waan ta'eef, waan kana sirriti rawwachuun barbaachisa fi rakkowan hamatoo dhibe kana wajiin dhufan akka hin dhufne bira darbuun adeemsa isaa illee nii murtesa. Kanaafu, qo'aannon Kun ragaawwan odeffannoo gaha waaye sukkaara fi haala of-eegano dhibe sukkaaraa waliin jiru sasabuun odeffannoo barbaachisoo ta'an qaama dhimi isaa ilaalatuf laata.

Hirmaanan qo'aannoo kanaa guutama guutuutti fedhi irraati Kan hunda'eedha, akkasumas dhima kana irraati hirmaachuu dhisuu keessanin adabbiin ykn tajaajila isiinif malu hin dhorkisisu. Hirmaatootni hundu qo' aannoo kana irraa addaan kutu, hirmaachuu dhiisu fi didu ni danda'u. Dhumaratti, qo'annoon Kun kutaa sagantaa nursii fi midwayifarii irraa Kan eyyamamefi dha. Yeroo barbaadanittit yaada fi gaaffii kamiyyuu qabanaan karaa armaan gadii kanan gaafachuu dandeessu.

Maqaa Abbaan qorannoo: **Abbaba Baashaa**

**Lakka bilbilaa: +251-0933-62-4994**

**E-mail: abebabasha2127@gmail.com**

**Annex 3: Subject Information Sheet (Amharic Version):**

ጤና ይስጥልኝ።። ይህ መጠይቅ የተዘጋጀው በአዲስ አበባ ዩኒቨርሲቲ የነርቲቫ ትምህርት ክፍል በአዋቂዎች ጤና እና እንክብካቤ ለድህረ ምረቃ ዲግሪ መመሪያ የስኳር ሕመምተኞች የስኳር በሽታ ጤና ንድፍ፣ ስኳር ቸውን ለመቆጣጠር የሚያደርጉትን ጥረት እና ስኳር ቸውን እንዳይቆጣጠሩ የሚያደርጋቸውን ተያያዥ ነገሮች ለማወቅ የሚሰራ ጥናት ነው። ክቡር መላሻችን ከዚህ በታች የስኳር ሕመምተኞች ስኳር ቸውን ለመቆጣጠር የሚያደርጉትን ጥረት ለማወቅ የሚረዱ የተለያዩ ጥያቄዎች ይገኛሉ።

እነዚህን ሁኔታዎች ማወቅ በምስራቅ አርሲ ዞን ሆነ በአገር አቀፍ ደረጃ የበሽታውን ስር ጭት ለመግታት ለሚደረገው ጥረት ከፍተኛ የሆነ አስተዋጽኦ ይኖረዋል። በዚህ ጥናት ላይ ተሳታፊ እንዲሆኑ የተደረገው የስኳር ሕመምተኛ በመሆኖ ሲሆን ጥናቱ ላይ የሚሳተፉት ፈቃደኛ ከሆኑ ብቻ ነው። ምንም እንኳን ጊዜዎችን መሰዋት ቢያደርጉም በዚህ ጥናት ላይ በመሳተፊት በግለሰብ ደረጃ የሚያገኙት ጥቅምም ሆነ ክፍያ አይኖርም። ሆኖም ግን የእርስዎ ቀና እና ትክክለኛ መልስ ከላይ የተገለጹ ጸድን ነገሮች ይበልጥ እንድንረዳ የሚያግዘን ሲሆን በተጨማሪም በሀገር ደረጃ በሽታውን ለመቆጣጠር ለሚደረገው ጥረት አስተዋጽኦ ያደርጋል። ይህ ቃለመጠይቅ ሚስጥርነቱ የተጠበቀ ነው ሲሞሉ ስምዎን እንዲጽፉ አይፈለግም። በመሆኑም ለሚያደርጉልን ቀና ትብብር በቅድሚያ ከልብ እና መሰግናለን። አጥኚውን ማነጋገር ከፈለጉ ይህንን አድራሻ መጠቀም ይችላሉ።

**ስልክ : 251933-62-4994**

**ኢሜይል : [abebebasha2127@gmail.com](mailto:abebebasha2127@gmail.com)**

## Annex 4: Informed Consent Form (English Version):

I have read this form or it has been read to me in the language I understand. I have clearly understood the purpose of the research, the procedure, the risk and benefits, issue of confidentiality, the right of participating and the contact address for any queries. As you take part in this study, your name will not be mentioned and any information you give will be kept confidential and only used for this specific study. You have the right to refuse and/or to interrupt the interview at any time. The information that you provide is quite useful to generate important evidence for the advancement of self-care practice in the area. By knowing the pros and cons of the study, are you willing to participate in this specific study?

1. Yes-----Continue with the interview 2. No ----- (say thanks!)

How long have you visiting Diabetes mellitus Follow –up clinic

If < 6 months, thanks and stop interviewing.

If >6 months, continue interviewing thank you for being voluntary to participate in the study

If yes, by thanking the interviewee, proceed to the interview.

If the answer is No thank and don't force or reinforce a selected interviewee to participate in the survey.

Hospital name \_\_\_\_\_

Interview's code \_\_\_\_\_

Interviewer Name \_\_\_\_\_ signature \_\_\_\_\_

Date of interview \_\_\_\_\_

Supervisor's Name \_\_\_\_\_ signature \_\_\_\_\_

Time of interview began \_\_\_\_\_ time of interview finished \_\_\_\_\_

Checked on \_\_\_\_\_ date \_\_\_\_\_ month/2024 G.C

Completeness: 1. Complete \_\_\_\_\_ 2. Incomplete \_\_\_\_\_ 3. Other (specify) \_\_\_\_\_

## Annex 5: Informed Consent Form (Afan Oromo Version):

Yaadooliin waa'ee bu'aa qorannoo kanaa, mirgii fi dirqamni ani qabu, jechuun yeroon barbaadetti gaafatamuu addaan kutuu fi gaaffii ani hin barbanne deebisuu dhisuu, akkasumas, Qorannoo kana irraati hirmachuu dhisuu ykn diduudhaaf yeroo kamiyu mirga guutu akka qabu. Yammuu qorannoo kana irraati hirmatan, maqaan keessan kan hin baroofne fi ragaan isin kennitan hundumtuu iccitiin isaa kan egame dha. Odeefanoon isin kenitan odeffannoo gaha waaye sukkaara fi yaala of-eeganoo dhibe sukkaara naannoo kana irraa jiranif fayyidaa guddaa Kan kennu dha. Fayyidaaf midhaa isaa hubachuun, qo'annoo kana irraati hirmachuuf fedhii qabdu?

1. Eyyee -----itti fufi

2. Lakkii-----galaatefadhu bira darbi

Kanaan dura Horddofii dhibe sukaaraa hagamiif gotee?

Ji'a jahaa gadiif itti dhisi/addaan kuti

Ji'a jahaa oliif gaaffii gafachuu itti fufi

Yoo deebiin Eyyee ta'e, galatoomfachuun gaaffii fi deebii itti fufi

Yoo deebiin lakkii ta'e, galatefadhu akkasumas hirmaata filatamee akka ini hirmaatuf dhibbaa itti hin godhin.

Maqaa hospitaala\_\_\_\_\_

Koodii Gaafanno\_\_\_\_\_

Maqaa gaafataa\_\_\_\_\_Mallattoo\_\_\_\_\_

Guyyaa gaaffii fi deebii\_\_\_\_\_

Maqaa to'ataa\_\_\_\_\_Mallattoo\_\_\_\_\_

Sa'aatii gaaffii fi deebiin itti jalqabe\_\_\_\_\_sa'aatii xummurame\_\_\_\_\_

Guyyaa itti illaalame\_\_\_\_\_ji'a\_\_\_\_\_bara 2017.

1. Unkii guutudha\_\_\_\_\_ 2. Guutu miti 3. Yaada biraa\_\_\_\_\_

**Annex 6: Informed Consent Form (Amharic Version):**

እኔ የጥናቱ ተሳታፊ ፡ ተመራማሪው ስለ ጥናቱ አስፈላጊውን መረጃ ሁሉ አስረድቶኛል በተጨማሪም አለመሰተፍ እና በማንኛውም ጊዜ የማቋረጥ መብት እንዳለኝ ተነግሮኛል። በመረጃው መሰረት በጥናቱ ላይ ለመሰተፍ እና አስፈላጊውን መረጃ ለመስጠት መስማማቴን አረጋግጣለሁ።

የተሳታፊው ፊርማ \_\_\_\_\_ ቀን \_\_\_\_\_

የ መረጃ ሰብሳቢው ስም \_\_\_\_\_ ፊርማ \_\_\_\_\_ ቀን \_\_\_\_\_

## Annex 7: Questionnaire (English Version):

### Part I: - socio-demographic data

S.N	Questions	Choice
101	What is your age (in years)?	_____
102	Gender	1. Male 2. Female
103	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others _____
104	What is your marital status?	1. Single 2. Married 3. Divorced 4. Widowed
105	What is your educational status?	1. Unable to read and write 2. Able to read and write 3. Primary education 4. Secondary education 5. College and above
106	What is your occupation	1. Student 2. Government Employed 3. NGO employee 4. House wife 5. Private 6. Farmer 7. merchant 8. Others: _____
107	What is your average monthly Income?	_____
108	What is your Place of residence?	1. Urban 2. Rural

**Part II: - Diabetes related Clinical characteristics**

SN	Questions	Choice
21	How long has it been since you were diagnosed with DM?	_____
22	Age at which the Diabetes Mellitus occurred (in years)	_____
23	What type of treatment are you taking?	<ol style="list-style-type: none"> <li>1. Diet &amp; exercise only</li> <li>2. Oral hypoglycemic agent</li> <li>3. Insulin</li> <li>4. Insulin &amp; oral hypoglycemic agent</li> </ol>
24	How long has it been since you started the treatment (in month or years?)	-----
25	Is there a family member who has been diagnosed with DM?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>
27	Have you ever attended a diabetes education session?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>
28	Complications	1. Yes 2. No

**Part III: Information accessibility and resource related factors**

SN	Questions	Choice
301	What is your source of information?	<ol style="list-style-type: none"> <li>1. Medias</li> <li>2. Health care workers</li> <li>3. Friends/relatives</li> <li>4. Others (teacher, religious leader, Books...)</li> </ol>
302	Currently do you have your own glucometer at home?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>

## Part IV: Diabetes knowledge

S.N	Questions	Choice
401	The diabetes diet is:	<ul style="list-style-type: none"> <li>a. the way most Ethiopian people eat</li> <li>b. healthy diet for most people</li> <li>c. too high in carbohydrate for most people</li> <li>d. too high in protein for most people</li> </ul>
402	Which of the following is highest in carbohydrates?	<ul style="list-style-type: none"> <li>a. chicken sauce</li> <li>b. cheese</li> <li>c. boiled potato</li> <li>d. Peanut butter</li> </ul>
403	Which of the following is highest in fat?	<ul style="list-style-type: none"> <li>a. Low fat (2%) milk</li> <li>b. Orange juice</li> <li>c. Corn</li> <li>d. Honey</li> </ul>
404	A1C is a measure of your average blood glucose level for the past:	<ul style="list-style-type: none"> <li>a. day</li> <li>b. week</li> <li>c. 6-12 weeks</li> <li>d. 6 months</li> </ul>
405	Which is the best method for home glucose testing?	<ul style="list-style-type: none"> <li>a. Urine testing</li> <li>b. Blood testing</li> <li>c. Both are equally good</li> </ul>
406	What effect does unsweetened fruit juice have on blood glucose?	<ul style="list-style-type: none"> <li>a. Lowers it</li> <li>b. Raises it</li> <li>c. Has no effect</li> </ul>
407	Which should not be used to treat low blood glucose?	<ul style="list-style-type: none"> <li>a. 3 hard candies</li> <li>b. 1/2 cup orange juice</li> <li>c. 1 cup diet soft drink</li> <li>d. 1 cup skim milk</li> </ul>
408	For a person in good control, what effect does exercise have on blood glucose?	<ul style="list-style-type: none"> <li>a. Lowers it</li> <li>b. Raises it</li> <li>c. Has no effect</li> </ul>
409	What effect will an infection most likely have on blood glucose?	<ul style="list-style-type: none"> <li>a. Lowers it</li> <li>b. Raises it</li> <li>c. Has no effect</li> </ul>

410	The best way to take care of your feet is to:	a. look at and wash them each day b. massage them with alcohol each day c. soak them for one hour each day d. buy shoes a size larger than usual
411	Eating foods lower in fat decreases your risk for:	a. nerve disease b. kidney disease c. heart disease d. eye disease
412	Numbness and tingling may be symptoms of:	a. kidney disease b. nerve disease c. eye disease d. liver disease
413	Which of the following is usually not associated with diabetes?	a. vision problems b. kidney problems c. nerve problems d. lung problems

### Part V: - Diabetic Health literacy

The questions listed below will help you to determine your diabetes health literacy level. Please select the option that best describes your level of agreement related to your level of diabetes health literacy.

No	Questions					
501	Your status of diabetes health literacy?    1. Low    2. High					
	<b>Informational skills</b>	Strongly disagree (1)	Disagree (2)	Uncertain (3)	Agree (4)	Strongly agree (5)
502	I can convey the reason why I should have a diabetic diet					
503	I can judge whether diabetes-related information is reliable					
504	I know and practice the appropriate storage conditions of diabetic medications					

505	I understand all diabetic-related medication information					
506	I comprehend the information I sought on diabetes					
507	I alter the appointment date or time for a medical checkup					
<b>Communicative skills</b>						
508	Explain my diabetes condition to a healthcare provider					
509	I ask health professionals a question.					
510	I understand the information on diabetes management from the health-care provider					
<b>Numeracy (Functional) skills</b>						
511	I can read and understand educational materials and booklets					
512	I can understand the written information provided at the appointment					
513	I understand diabetic related information presented on graphs or pictures					
514	I can determine the carbohydrate content per serving from nutritional label					
515	Calculating the next time to take diabetic medication is easy for me					
516	I can interpret whether my blood-glucose level is within the normal range					

**Part VI: Summary of diabetes self care activities:**

The questions below ask you about your diabetes self-care activities during the past 7 days. If you were sick during the past 7 days, please think back to the 7 days that you were not sick.

601	Your status of diabetes self-care behavior? 1. Poor 2. Good								
<b>Diet</b>		<b>Number of days</b>							
602	How many of the last SEVEN DAYS have you followed a healthful eating plan?	0	1	2	3	4	5	6	7
603	On average over the past month, how many DAYS PER WEEK have you followed your eating plan?								
604	On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?								
605	On how many of the last SEVEN DAYS did you eat high fat foods Such as red meat or full fat dairy products?								
606	On how many of the last SEVEN DAYS did you space carbohydrates evenly through the day?								
<b>Physical activity</b>									
607	On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity?(total minutes of continuous activity, including walking )								
608	On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?								
<b>Blood sugar testing</b>									
609	On how many of the last SEVEN DAYS did you test your blood sugar?								
610	On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your healthcare provider								
<b>Foot care</b>									
611	On how many of the last SEVEN DAYS did you check your feet?								
612	On how many of the last SEVEN DAYS did you inspect the inside of your shoes?								

613	On how many of the last SEVEN DAYS did you wash your feet?								
614	On how many of the last SEVEN DAYS did you soak your feet?								
615	On how many of the last SEVEN DAYS did you dry between your toes after washing?								
<b>Medication adherence</b>									
616	On how many of the last SEVEN DAYS did you take your recommended diabetes mellitus?								
617	On how many of the last SEVEN DAYS did you take your recommended insulin injections?								
618	On how many of the last SEVEN DAYS did you take your recommended number of diabetes pills?								
<b>Smoking</b>									
619	Have you smoked a cigarette, even a puff in the past SEVEN DAYS?								

**Part VII: - Social-support of participants:**

<b>No</b>	<b>Questions</b>	None of the time <b>(1)</b>	A little of the time <b>(2)</b>	Some of the time <b>(3)</b>	Most of the time <b>(4)</b>	All of the time <b>(5)</b>
701	Is there someone available to whom you can count on to listen to you when you need to talk?					
702	Is there someone available to you to give you good advice about a problem?					
703	Is there someone available to you who show you love and affection?					

704	Is there someone available to help with daily chores?					
705	Can you count on anyone to provide you with emotional support (talking over problems or helping you make a difficult decision)?					
706	Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide in?					
707	Are you currently married or living with a partner?					
708	How easy is it to get practical help from neighbors if you should need it?					

## Annex 8: Questionnaire (Afan Oromo Version):

### Kutaa I; Ragaa hawasummaa

Lakk.	Gaaffilee	Filannoo Deebii
101	Umrii (waggaadhaan)	_____
102	Saala	1. Dhira 2. Dubra
103	Amantaa	1. Muslima 2. Ortodoksii 3. Protestaantii 4. Katoolikii 5. Kan biro_____
104	Haala Ga'ilaa	1. Kan fuudhe/te 2. Kan addaan bahan 3. Kan irraa du'e 4. Kan hin fudhin/hin heerumin

105	Sadarkaa barumsaa	<ol style="list-style-type: none"> <li>1. Barumsa kan hin qabne</li> <li>2. Sadarkaa tokkoffaa</li> <li>3. Sadarkaa Lammaffaa</li> <li>4. Kolleejii/universitii irraa kan eebifame/te</li> </ol>
106	Galii ji'aa tilmaaman (birria Etophiyaatiin)	_____
107	Haala hojii	<ol style="list-style-type: none"> <li>1. Hojii kaan hin qabne</li> <li>2. Mindefamaa</li> <li>3. NGO keessan hojadha</li> <li>4. Daldaalaa</li> <li>5. Hojata mana nama</li> <li>6. Hojata guyyaa</li> </ol>
108	Badiya moo magalaa jirataa	<ol style="list-style-type: none"> <li>1. Badiya</li> <li>2. Magaala</li> </ol>

## **Kutaa II, Gaaffillee Haala dhukubsataa illaaltan**

<b>Lakk.</b>	<b>Gaaffillee</b>	<b>Deebii</b>
201	Umrii dhiben sukkaara itti argame (umriidhaan)?	_____
202	Turtii dhukkubichaa waliin qabdu?	_____
203	Maatii keessaa namni dhibee sukkaaraan hubame ni jira?	Eyyee Lakkii
204	Qorichi ittin yaalamtan (insuliinii/qoricha lilmoon kenamu, qoricha afaanin kenamu, nyaata qofaan eegachuu)?	Qorichoota afaanin liqimfaman Insuliinii/koricha lilmoon kenamu Lammanu
205	Rakkowwan dhibee sukaara waliin wal-qabatanii jiran jiru?	

### Kutaa III; Dandeettii odeeffannoo fi haala qabeenya waliin walqabatu

Lakk	Gaaffillee	Filannoo
301	Karaale Odeeffannoo itti argatu?	1. Meediyaa 2. Hojjettoota fayyaa 3. Hiriyoota/maatii 4. Kanneen biroo (barsiisaa, hoogganaa amantaa, Kitaabota...)
302	Yeroo amaan kana meshaa hanga sukkaaraa ittin ilaaltan (glukometrii) kan ofii keessan qabdu?	1. Eeyyee 2. Lakkii

### Kutaa IV; Beekumsaa dhukkubsata waaye dhukkuba sukkaaraa illaalatu

Lakk.	Gaaffilee	Filannoo Deebii
401	Nyaata dhukkuba sukkaaraa jechuun maali?	a. haala nyaata yeroo baay'ee akka nama Itoophiyaatti nyaatamu b. Nyaata fayyaa qaabessa, namoota baay'eef c. dhangaa isaa keessatti Baayinan carbohydireeti qabu d. dhangaa isaa keessatti baayinan pirotinii qabu
402	Kan armaan gadii keessaa kan carbohydrates caalatti qabu kami?	a. foonii b. baadu c. Daabboo bitooteetti d. Butira garbuu
403	Kan armaan gadii keessaa kan dhangaa isaa keessatti cooma caalatti qabu eenyu?	a. cooma gadi ana(2%) qabu, aannan b. Daakuu burtukaanii c. Qamadii bishaaniin qophaa'ee d. Damma

404	A1C maaliif oolchama?	<p>a. Guyyaa tokkoof gulaalii glukooosi keessan agarsiisa</p> <p>b. Torban tokkoof gulaalii glukooosi keessan agarsiisa</p> <p>c. Torban 6-12 keessatti gulaalii glukooosi keessan agarsiisa</p> <p>d. Ji'a 6 keessatti gulaalii glukooosi keessan agarsiisa</p>
405	Mala gaarii glukooosi mana keessatti madaaluuf fayyadamu qabnu?	<p>a. Fincaan kenyaatin</p> <p>b. Qaama dhiigaattin madaalu</p> <p>c. Lamaanu gaarii dha</p>
406	Daakuu burtukaanii sukkarii hin qabne gulaalii dhiiga irratti maal fida?	<p>a. Isa gadi fageessa</p> <p>b. Isa olkaasa</p> <p>c. Wanti fidu hin jiru</p>
407	Kanneen keessa gulaalii dhiiga gadi bu'uuf fayyadamuu hin qabne?	<p>a. Qaaxxii jabaasadii</p> <p>b. daakuu burtukaanii 1/2 kubaayaa</p> <p>c. dhugaati lalafaa kubaaya 1</p> <p>d. dhadhaa aannaan keessa bahee kub.1</p>
408	Nama of to'achuu danda'eef, hojiin dandeetti gulaalii dhiiga irratti maal fida?	<p>a. Isa gadi fageessa</p> <p>b. Isa olkaasa</p> <p>c. Wanti hin jiru</p>
409	Dhukkubni kara ifeekshidhan nu mudatu gulaalii dhiiga irratti maal fida?	<p>a. Isa gadi fageessa</p> <p>b. Isa olkaasa</p> <p>c. Wanti hin jiru</p>
410	Mila kee akka gaarii eeguuf maal godhuu qabda?	<p>a. Guyyaa hunda ilaalu fi dhiquu</p> <p>b. Guyyaa hunda alkoolii waliin massaasuu</p> <p>c. Sa'ati tokko guutuu bishaan keessa kaa'uu</p> <p>d. Kophee mila isa dura irraa dachaa ta'e kaawachuu</p>
411	Nyaata dhangaa isaa keessatti cooma baay'ee hin qabne nyaachuun maal irraa si eega?	<p>a. Dhukkuba dhiibbaa dhiiga irraa ka'uu</p> <p>b. Dhukkuba kalee irraa</p> <p>c. Dhukkuba onnee irraa</p> <p>d. Dhukkuba ijaa irraa</p>
412	Dha'ima fi mila kuta'uu maal ibsa?	<p>a. Dhukkuba kalee</p> <p>b. Dhukkuba dhiibbaa dhiiga irraa ka'uu</p> <p>c. Dhukkuba ijaa</p> <p>d. Dhukkuba tiruu</p>

413	Dhukkuba sukkaaraa waliin walitti bu'iinsaa hin qabne kan armaan gadii keessaa kami?	a.Rakkoo argu b. Rakkoo kal'e c. Rakkoo narvii d. Rakkoo hargansuu
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### **Kutaa V: Afaayaa fayyaa dhukkuba sukkaaraa (Diabetes Health Literacy):**

Gaaffilee armaan gadii fayyummaa dhukkuba sukkaaraa kee ilaalchisee gahumsa kee madaaluuf gaafataman. Filannoo si ibsu caalaa filadhu.

<b>Lakk.</b>	<b>Gaaffiilee</b>	Gongumma Itti wal-hin galu (1)	Itti wal- hin galu	Nan Shakaa (3)	Na gale jira(4)	Baay'ee na galee jira (5)
	<b>Dandeetti Odeeffannoo illaalatu</b>					
501	Sababa nyaata sukkaaraa qabaachuu ibsuun danda'a.					
502	Odeeffannoo dhukkuba sukkaaraa isaa ilaalchisee kan dhugaa ta'e ilaalu danda'a.					
503	Meeshaalee dhukkuba sukkaaraa sirriitti eeguuf mala barbaachisaa beekuun nan danda'a					
504	Odeeffannoo meeshaalee dhukkuba sukkaaraa ilaalchisee sirriitti nan hubadha					
505	Odeeffannoo dhukkuba sukkaaraa ilaalchisee kan barbaade sirriitti nan hubadha					
506	Guyyaa fi sa'a erga yaala eebbifame osoo hin didin jijjiiruun danda'a					

507	Haala dhukkuba sukkaaraa kootti fayyaa ilaalchisee ogeessa fayyaa ibsuun danda'a					
508	Ogeessa fayyaa gaafii nan gaafadha					
509	Ogeessa fayyaa irraa odeeffannoo ogummaa fayyaa sirriitti hubadha					
<b>Dandeettii Lakkoofsa (Numeracy/Functional Skills)</b>						
510	Meeshaalee barnoota fayyaa fi kitaabota hubachuun danda'a					
511	Odeeffannoo barreeffamaa yeroo yaalii hubachuun danda'a					
512	Odeeffannoo sukkaaraa ilaalchisee garaafota ykn fakkii irratti dhiyaate sirriitti hubachuun danda'a					
513	Dhaabbata nyaataa tokko keessatti carbohydrate qabiyyee lakkoofsuu nan danda'a					
514	Yeroo meeshaa sukkaaraa fudhachuuf itti aanu lakkoofsuu baay'ee sirriitti nan danda'a					
515	Qorannoo sukkaaraa dhiiga keessaa tokko jechuun isaa keessatti jiru sirriitti ibsuun danda'a					

**Kutaa VI; Gaaffiwwan wali galaa haala yaala of-eegannoo dhibe sukkaara:**

Gaaffiwwan armaan gadii jiran haala yaala of-eegannoo dhibee sukkaaraf guyyota turban darban keessa isin gotan gafata. Guyyoota 7 darban keessa isin dhukkubee beeka? Malloo guyyoota osoo isin hin dhukkuubin oltan duubati debi'aa yaada

SN	Soraata nyaata	Lakkofsa guyyaa							
		0	1	2	3	4	5	6	7
601	Guyyotan 7 darban kessati, sirna nyaata fayyaa qabeessa ta'e guyya meqaaf soratan?								
602	Gidduu -gallessan, Ji'oota darban kessati yeroo hangamiif haala sangantaa nyaata karorfataniin soratan?								
603	Guyyota 7 darban keessaa, guyyaa meqaaf nyaata kuduraaf muduraa shaniif isaa ol nyaatan?								
604	Guyyotan 7 darban kessati guyyaa meqaaf nyaata cooma qaban kanneen akka dimina ykn aannaan soratan?								
605	Guyyota 7 darban kessati guyyoota meqaaf nyaata karbohayidireetii qabu haala walfakatuun guyyaa kessati soratan?								
<b>Sochii qama</b>									
606	Guyyota 7 darban keessaa guyyaa meqaaf sosochii qaama daqiiqaa 30 irraati hirmatan (waligala sa'aatii walii galaa sochii irraa turtan, lukkaan deemu dabalate)								
607	Guyyoota 7 darban kessati sosochii qaama murta'e tokko irraati hangam hirmatan (Kaneen akka bishaan daaka, lukkaan deemu, sayikilii oofuu)?								
<b>Hanga sukkaara ofii beeku</b>									
608	Guyyoota 7 darban guddutti guyyaa meqaa hanga sukaraa dhiiga kesanii addan baastan?								
609	Guyyoota 7 darban kana guddutti akkata oggeessi fayyaa isin hordofu isiinif ka'een yeroo hamamif hanga sukaraa dhiiga keessan safaratan?								

<b>Kununsa Mila</b>									
610	Guyyota 7 darban kessati yeroo meqaaf mila keessan sakatatan?								
611	Guyyota 7 darban kessati yeroo meqaaf keessa kophee kessanii sakatatan?								
612	Guyyota 7 darban keessa guyyaa meeqaf miila keessan dhiqatan?								
613	Guyyota 7 darban keessa guyyaa meeqaf cubdaniitursitan?								
614	Guyyota 7 darban keessa guyyaa meeqaaf miila erga dhiqatan booda keessa quba keessanii sirriti qoorsitan?								
<b>Qorrichaa yookiin Dawaa</b>									
615	Guyyoota 7 darban keessa guyyaa meeqaaf qoricha isiniif ajajame seeran fudhatan?								
616	Guyyoota 7 darban keessa guyyaa meeqaaf qorichaa sukaara waranamu (insuliinii) haala ajajameen waraanatan?								
617	Guyyota 7 darban keessa guyyaa meeqaaf qorichaa sukaara afaanin kenamu haala ajajameen fudhata?								
<b>Tanboo xuuxxuu</b>									
618	Guyyota 7 darban keessa taboo xuuxxanii beektu, yoo yeroo tokko illeee xuuxxuu tates?								

## Kutaa VII; Gaaffii Gargaarsa Hawasumaa ilaalatu

<b>Lakk.</b>	<b>Gaaffilee</b>	<b>Fillanno deebii</b>
701	Walitti dhufenyaa hawasaa walin qabdu maal fakkataa?	<ol style="list-style-type: none"> <li>1. Homaa</li> <li>2. Gidduugalessa</li> <li>3. Cimaa</li> </ol>
702	Namoota yeroo rakkoo keetii waamuu danddeessu meeqa qabda?	<ol style="list-style-type: none"> <li>1. Homaa</li> <li>2. 1-2</li> <li>3. 3-5</li> <li>4. 5 oli</li> </ol>
703	Namootni si cinaa sigaggaaruf fedha hamammii agarsisu?	<ol style="list-style-type: none"> <li>1. Homaa</li> <li>2. Xiqqoo</li> <li>3. Hin tilmamu</li> <li>4. hangaa ta'e 5. Baayee</li> </ol>
704	Gargaarsa qabatamaa ta'ee ollaa kee dhihoo irraa yeroo ati barbaade hamam argachuu danddeesa?	<ol style="list-style-type: none"> <li>1. Bay'ee rakissaadha</li> <li>2. Rakissaadha</li> <li>3. Ni danda'ama</li> <li>4. Baay'eeni danda'ama</li> </ol>

**Annex 9: Questionnaire (Amharic Version):**

**ክፍል I: - የተሳታፊዎች ስነ-ምግራፊ ባህሪያት;**

ተ.ቁጥር	ጥያቄዎች	ምላሽ
101	እድሜዎ ስንት ነው?	_____
102	ጾታ	1. ወንድ 2. ሴት
103	ሃይማኖት	1. ኦርቶዶክስ 2. እስልምና 3. ፕሮቴስታንት 4. ካቶሊክ 5. ሌላ
104	የጋብቻ ሁኔታዎ?	1. ያለገባ 2. ያገባ 3. የተፋታ 4. የሞተበት/ባት
105	የትምህርት ደረጃዎ?	1. ማንበብ እና መጻፍ የማይችል 2. ማንበብ እና መጻፍ የሚችል 3. የመጀመሪያ ደረጃ ትምህርት 4. የሁለተኛ ደረጃ ትምህርት 5. ኮሌጅ እና ከዚያ በላይ
106	ሥራዎች ምንድን ነው?	1. ተማሪ 2. የመንግስት ተቀጣሪ 3. መንግስታዊ ያልሆኑ ድርጅቶች ሰራተኛ 4. የቤት እመቤት 5. የግል ስራ 6. ገበሬ 7. ጡረታ 8. ሌላ
107	አማካኝ ወርሃዊ ገቢዎ ስንት ነው?	_____
108	ከየት አካባቢ ነው የመጡት?	1. ከተማ 2. ከገጠር

**ክፍል II; የስኪር በሽታን የተመለከቱ መረጃዎች:**

ተ.ቁጥር	ጥያቄዎች	ምላሽ
201	የስኪር ህመም እንዳለብዎት ከታወቀ ምን ያህል ጊዜ ሆኖታል??	_____
202	ሕክምናውን ከጀመሩ ምን ያህል ጊዜ ሆኖታል?	_____
203	ምን አይነት ህክምና ነው የሚወስዱት?	<ol style="list-style-type: none"> <li>1. አመጋገብ እና የአካል ብቃት እንቅስቃሴ ብቻ</li> <li>2. በአፍ ውስጥ የሚወሰድ ኪኒን</li> <li>3. በመርፌ የሚሰጥ</li> <li>4. የአፍ ውስጥ የሚወሰድ ኪኒን እና በመርፌ የሚሰጥ</li> </ol>
204	የስኪር ህመም ያለበት የቤተሰብ አባል አለ?	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>2. አይ</li> </ol>
205	በስኪር በሽታ ዙሪያ ላይ ትምህርቶችን ተሳትፈው ያውቃሉ?(በሆስፒታል ወይም ሌሎች ቦታዎች ላይ)	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>2. አይ</li> </ol>

**ክፍል III: የመረጃ ምንጭ እና ከንብረት ጋር የተያያዘ:**

ተ.ቁጥር	ጥያቄዎች	ምርጫ
301	የመረጃዎች ምንጭ ምንድን ነው?	<ol style="list-style-type: none"> <li>1. ሚዲያዎች</li> <li>2. የጤና እንክብካቤ ሰራተኞች</li> <li>3. ጓደኞች/ወላጆች</li> <li>4. አለመለያ (መምህር, መንፈሳዊ መሪ, መፅሀፍ...)</li> </ol>
302	አሁን በቤትዎ የራስዎ የ ስ ኪ ር መለ ኪያ ማሽን አለ ወት አለ?	<ol style="list-style-type: none"> <li>1. አዎን</li> <li>2. የለኝም</li> </ol>

**ክፍል IV: - ስለ ስኬር በሽታ ያለዎትን እውቀት:**

ተ.ቁጥር	ጥያቄዎች	ምርጫ
401	የስኬር ምግብ ጠቃሚነት	ሀ. አብዛኛው የኢትዮጵያ ህዝብ የሚመገብበት ለ. ጤና ማምገብ ብቻ ህዝብ የሚጠቀመው ሐ. በጣም ከፍተኛ ሃይል ለመቀነስ ስሜም ግብ ማ. በጣም ከፍተኛ ገንቢና ጠጋኝ
402	ከሚከተሉት ውስጥ ከፍተኛ ሃይል ለመቀነስ ስሜም ግብ የቱነው	ሀ. የደሮ ወጥ ለ. አይብ ሐ. የተቀለ ድንች ማ. የለወዝ ቅ
403	ከሚከተሉት ውስጥ ከፍተኛ የቅባት ምግብ የቱነው	ሀ. ወተት ለ. ብርቱካን ጭማ ሐ. በቆሎ ማ. ማር
404	በደም ውስጥ ለብዙ ጊዜ የተለያዩ ዘንዶች ስኬር መጠን የሚሳካው መቼ መቼ ነው	ሀ. በየቀኑ ለ. በየሳምንቱ ሐ. በየ6-12 ሳምንት ማ. በየ6 ወሩ
405	ከሚከተሉት ውስጥ በጣም ጥሩ የሆኑት ውስጥ የስኬር መጠን መለኪያ የቱነው	ሀ. የሽንት ለ. የደም ሐ. ሁሉም እኩል ነቸው
406	ጣፋጭነታቸው ደግሞ ለየፍራፍሬ ጭማቂ በደም ውስጥ ያለው ጤንነት የቱነው	ሀ. የስኬርን መጠን ይቀንሳል ለ. የስኬርን መጠን ይጨምራል ሐ. ምንም አይነት ውጤት የለውም
407	ከሚከተሉት ውስጥ ዝቅተኛ የደም ስኬር ገንቢ ማከም የሚያገለግል የቱነው	ሀ. ንከረሚላ ለ. ግማሽ ስኬር ብርቱካን ጭማቂ ሐ. አንድ ስኬር ስሳሳ መጠጥ ማ. አንድ ስኬር ወተት
408	የስፖርት ልምድ መስራት የደም ስኬር ገንቢ ያደርገዎ	ሀ. ይቀንሳል ለ. ይጨምራል ሐ. ምንም አይነት ውጤት የለውም
409	የውስጥ ሰውነት መቆጣት የደም ስኬር ገንቢ ያደርገዎ	ሀ. ይቀንሳል ለ. ይጨምራል ሐ. ምንም አይነት የለውም

410	የተሸለፉ ጸግ ርጅን ክብካቤ የሚባለው የቱነው	ሀ.በ የቀኑ ማየትና መታጠብ ለ.በ አልኮል መታሸት ሐ.በ አንድሳ አት መዘፍዘፍ መ.ከ ፍያ ለ ጫማማድረግ
411	ዝቅተኛ የቅባት ምግቦች ለምን የመጋለጥ አቅምን ይቀንሳሉ	ሀ.የነረሽ ለ.የኩላሊት ሐ.የልብ መ.የአይ
412	የመደንዘዝና የመጠዘጠዝ የመምን ምልክትነው	ሀ.የኩላሊት ለ.የነረሽ ሐ.የአይን መ.የጉቦት
413	ከሚከተሉት ውስጥ ከስኳር በሽታ ጋር የሚያያዝ የቱነው	ሀ.የእይታችግር ለ.የኩላሊት ሐ.የነረሽ መ.የሳንባችግር
	<b>አጠቃላይ ድምር</b>	

**ክፍል V: -የስኳር የጤና ትምህርትን የተመለከቱ ጥያቄዎች:**

ከዚህ በታች የተዘረዘሩት ጥያቄዎች በስኳር ህመም ላይ ያለዎትን የጤና ዕውቀት ደረጃ ለማወቅ የሚረዱ ናቸው። የመስማማት እና ያለመስማማት ደረጃዎን ይገልጽልኛል ብለው የሚያስቡትን አማራጭ ይምረጡ።

ተ.ቁጥር	ጥያቄዎች	ምላሽ				
		በጣም አልሰማም (1)	አልሰማምም (2)	እርግጠኛ አይደለም (3)	እስማማለሁ (4)	በጣም እስማማለሁ (5)
	<b>የመረጃ ችሎታ</b>					
501	ለምን የስኳር በሽታ አመጋገብ ስርአትን ተከትሎ መመገብ እንዳለብኝ ምክንያቱን መግለፅ እችላለሁ።					
502	ስለስኳር በሽታ የምሰማውን መረጃ ልክ ነው ወይም አይደለም ማለት እችላለሁ።					
503	የስኳር በሽታ መድከኒቶች እንዴት እና የት እንደሚቀመጡ አውቃለሁ/አተገብራለሁ					
504	የስኳር ህመም መድኃኒቶችን የተመለከቱ ሁሉንም መረጃዎች ተረድቻለሁ።					

505	የሰከር በሽታ ዙሪያ ላይ የፈለኩትን መረጃ ተረድቻለሁ።					
506	ለሰከር ህክምና ክትትል ስል የሌሎች ቀጠሮዎችን ቀን ወይም ሰዓት እለውጣለሁ።					
<b>የመግባባት ችሎታ</b>						
507	የሰከር በሽታዬን ሁኔታ በተመለከተ ለጤና ባለሙያዎች ማስረዳት እችላለሁ።					
508	የጤና ባለሙያዎችን ጥያቄ እጠይቃለሁ።					
509	ለሰከር በሽታ ሕክምና ከጤና ባለሙያ የሚሰጠኝን መረጃ እረዳለሁ።					
<b>የንባብ፣ የጽሁፍ እና የቁጥር ችሎታ</b>						
510	የትምህርት ቁሳቁሶችን እና መረጃዎችን አንብቤ እገነዘባለሁ።					
511	በቀጠሮው ቀን የሚሰጠውን የጽሁፍ መረጃ አንብቤ እረዳለሁ።					
512	በሰከር በሽታ መልክ የሚቀርቡ የሰከር በሽታ መረጃዎች መረዳት 51 አችላለሁ።					
513	አንዴ የምመገበው ምግብ ምን ያህል ሀይል ሰጪ ንጥረ ነገር እንደያዘ ማወቅ እችላለሁ።					
514	የሰከር በሽታ መድሃኒት ከወሰድኩ በኋላ ቀጣይ የምወሰድበትን ጊዜ ማሰላት እችላለሁ።					
515	የደሜ የሰከር መጠን በጤናማ ክልል ውስጥ መሆን አለመሆኑን አይቼ መተርጎም እችላለሁ።					

**ክፍል VI: የስኳር ህመም የግል እንክብካቤ ተግባራት መጠይቅ:**

ከዚህ በታች የተዘረዘሩት ጥያቄዎች ባለፈት ሰባት ቀናት ውስጥ ስለ ስኳር ህመም የግል እንክብካቤ ተግባራትን በተመለከተ ምን እንደሚመስል የሚጠይቁ ናቸው። ሆኖም ግን ባለፈት 7 ቀናት ውስጥ ታመው ከነበሩና እራስዎ በራስዎ መንከባከብ ካልቻሉ ተጨማሪ 7 ቀናት ወደኋላ በመሄድ ጤነኛ በነበሩበት ጊዜ ያደረጉት እንክብካቤ ሁኔታ መውሰድ ይችላሉ።

ተ.ቁጥር	ጥያቄዎች አመጋገብን በተመለከተ	የቀናት ብዛት አማራጭ መልሶች							
		0	1	2	3	4	5	6	7
601	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ነው ጤነኛ አመጋገብ እቅድ የነበርዎት?								
602	በአማካኝ ባለለው ወር ምን ያህል ቀን/ናት በሳምንት ውስጥ ይህን የአመጋገብ እቅድዎን ይከተላሉ?								
603	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት 5 እና ከዚያ በሊይ ጊዜ አትክልትና ፌራፌሬ ይመገባሉ?								
604	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ከፌተኛ የስብ መጠን ያለው ምግብ ይመገባሉ? /ለምሳሌ ቀይ ሥጋ ወይም በስብ የተሞላ የእንስሳት ተዋጾ? / (የም ከመጀመሩ በፊት ያለው ጊዜ ይውሰዱ)								
605	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ቀናት ነው ሀይል ሰጪ ምግብ በአንድ ቀን ውስጥ በእኩል በማመጣጠን የወሰዱት?								
<b>የአካል እንቅስቃሴ ማድረግ በተመለከተ</b>									
606	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ለ30 ደቂቃ ያክል የአካል እንቅስቃሴ ተሳትፎ (ሁለም እንቅስቃሴ፣ ወክን ጨምሮ፣ ጠቅሊሊ ደቂቃ)?								
607	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት በተወሰኑ የአካል እንቅስቃሴ ተሳትፎ? ይህም ቤት ውስጥና ስራ ቦታ ከሚያረጉት እንቅስቃሴ ውጭ								
<b>በደም የስኳር መጠን ምርመራን ማድረግ በተመለከተ</b>									
608	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት የስኳር መጠን ምርመራ አካሂደዋል (ቤትም ከቤት ውጭም)?								
609	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት የጤና ባለሙያዎ/ሀኪም በነገርዎት ብዛት ልክ የስኳር መጠን ምርመራ ያካሂዱ?								
<b>እግርና የእግር ጣቶች እንክብካቤን በተመለከተ</b>									
610	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት እግሮችዎና የእግሮችዎ ጣቶች መሀል ፌተኛ ያረጋሉ?								

611	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት የጫማዎ ውስጥ ክፍል ምልክታ /ፊተሻ ያረጋለ? /								
612	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ነው እግርዎተን የታጠቡት?								
613	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ነው እግሮችዎን የዘፈዘፈት?								
614	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ነው ከታጠቡ በኋላ እግሮችዎን የእግሮችዎን ጣቶች መሃል በለስለሳ ፍጣ እንዲደርቅ የሚያደርጉት?								
<b>መድኃኒትን በተመለከተ</b>									
615	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ነው የተዘዘለዎትን መድኃኒት በትክክል የወሰዱት?								
616	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ነው የታዘዘለዎትን መርፌ በትክክል (መጠን፣ ጊዜ፣ ሰአት) የወሰዱት?								
617	ባለፈት 7 ቀናት ውስጥ ምን ያህል ቀን/ናት ነው የታዘዘለዎትን ክኒን በትክክል (መጠን፣ ጊዜ፣ ሰአት) የወሰዱት?								
<b>ሲጋራ ማጨስን በተመለከተ</b>									
618	ባለፈት 7 ቀናት ውስጥ ሲጋራ አጭሰዋል? ለአንድ ጊዜም ቢሆን?								

**ክፍል VII: - ከማህበራዊ ድጋፍ ጋር የተያያዙ ጥያቄዎች:**

ተ.ቁጥር	ጥያቄዎች	ምላሽ
701	የግል ችግር ቢያጋጥምዎ መተማመን የሚችሉባቸው ምን ያህል የቅርብ ሰዎች አለዎት?	<ol style="list-style-type: none"> <li>1. ምንም</li> <li>2. 1-2</li> <li>3. 3-5</li> <li>4. 5+</li> </ol>
702	ከጎረቤቶች እርዳታ ማግኘት ሲፈልጉ ማግኘት ምን ያህል ቀላል ነው?	<ol style="list-style-type: none"> <li>1. በጣም አስቸጋሪ</li> <li>2. አስቸጋሪ</li> <li>3. ይቻላል</li> <li>4. ቀላል</li> <li>5. በጣም ቀላል</li> </ol>
703	ሰዎች በምታደርገው ነገር ምን ያህል አሳቢነትን እና ድጋፍን ያሳያሉ?	<ol style="list-style-type: none"> <li>1. ምንም</li> <li>2. ትንሽ</li> <li>3. እርግጠኛ አደለሁም</li> <li>4. መጠነኛ</li> <li>5. ብዙ</li> </ol>
704	በተጨማሪም አጋዥ ከቅርብ ጎረቤት ምን ያክል ማግኘት ትችላላህ?	<ol style="list-style-type: none"> <li>1. በጣም አስቸጋሪ ነው</li> <li>2. አስቸጋሪ</li> <li>3. ይቻላል</li> </ol>

## Annex 10: Declaration

I, the undersigned, hereby declare that the research titled "Diabetes Health Literacy, Self-Care Behaviors, and Associated Factors Among Adult Diabetes Patients Attending Follow-Up Care at Selected Public Hospitals in East Arsi Zone, Oromia Region, Ethiopia, 2024" is an original contribution to the field of diabetes health literacy and self-care behaviors. This work has not been presented or submitted to any other university or institution for academic credit or publication.


I affirm that all sources of information and ideas utilized in the development of this thesis have been properly cited and referenced, ensuring due acknowledgment of the contributions of others. This thesis reflects my independent efforts and commitment to advancing knowledge in the area of diabetes care and health literacy. I take full responsibility for the content of this thesis and assert that it is a product of my own intellectual endeavor.

1. <u>Abebe Baha Biru</u>	_____	_____
Name of Investigator	Signature	Date

Approved by:

Name of Principal Advisor	Signature	Date
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2. <u>Dr. Fekadu Aga (PhD, Associate Professor).</u>	_____	_____
Name of Co-Advisor	Signature	Date

3. <u>Sr. Sosina Workineh, (MSc, Lecturer).</u>		_____
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Examined by:

4. Mr. Abdissa Boka (Assistant Professor).	_____	_____
	Signature	Date

5. Department head:	_____	_____
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