



COLLEGE OF MEDICINE AND HEALTH SCIENCE

DEPARTMENT OF NURSING

**MAGNITUDE OF GLYCEMIC CONTROL AND ITS ASSOCIATED FACTORS
AMONG ADULT DIABETIC MELLITUS PATIENTS IN GURAGE ZONE SELECTED
HEALTH FACILITIES, WOLKITE, ETHIOPIA, 2023**

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**TITLE: MAGNITUDE OF GLYCEMIC CONTROL AND ITS ASSOCIATED FACTORS
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ABSTRACT

Background: Diabetes is one of the non-communicable diseases with the highest prevalence worldwide, and Glycemic control is the most important predictor of diabetes related complications and death. Glycemic control for Diabetic individuals aims to reduce or delay Problems and improve Quality of life. Although glycemic control is crucial in managing diabetes, it is difficult to achieve in real-world clinical settings. Therefore, it is essential to determine the factors that affect glycemic outcomes to enhance the quality of diabetic care.

Objective: This study aimed to assess the Magnitude of Glycemic control and its associated factors among Diabetic out patient at Gurage Zone Selected health facilities.

Methods: An institution based, cross-sectional study was conducted among systematically selected 388 patients with DM who has attended on follow-up at selected health facilities. The study subjects were selected using systematic random sampling technique from May 25 to June 25, 2023. The data were entered and analyzed on SPSS V23. Logistic regression analysis was conducted to identify factor associated with outcome variable. the level of significance was declared at a p-value of <0.05.

Result: Among 388 participants attending in follow up visit, (225)57.9% had poor glycemic control. Age (44-54) (AOR: 5.41, 95% CI: 2.043-14.368 P = 0.001) and Age (55-65) (AOR: 3.150,95%CI: 1.063-9.334 P= 0.038), secondary education, (AOR: 3.51, 95% CI: 1.259-9.963, P = 0.017 follow up visit <3 times/year (AOR: 2.536, 95% CI:1.301-4.946, P = 0.006) being house wife, ,(AOR:0.287, 95% CI: 0.104-0.792, P = 0.016) and nephropathy, (AOR: 3.214, 95% CI: 1.127-9.160, P = 0.029), and were factors associated with poor glycemic control .

Conclusion: The Magnitude of poor glycemic control among diabetes patients at Selected Gurage zone Health Facilities was relatively high. Therefore, Appropriate attention shall be given for glycemic control especially for patients with Middle Age, Early Advanced age and Patients with DM Complication and also increasing health education programs for diabetes patients at each follow-up visit is Essential. Further studies are also recommended to identify important factors like dyslipidemia which were not identified by the current study.

Keyword: Associated factor, Diabetic patients, Fasting blood glucose level, Glycemic control Magnitude.

ACRONYM

ADA	American Diabetic Association
BMI	Body Mass Index
DM	Diabetes Mellitus
FBS	Fasting Blood Sugar
IDF	International Diabetes Federation
OGTT	Oral Glucose Tolerance Test
T1DM	Type 1 Diabetic Mellitus
T2DM	Type 2 Diabetic Mellitus
WHO	World Health Organization
WKUSTH	Wolkite University Specialized Teaching Hospital

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CHAPTER ONE

1. INTRODUCTION

1.1 BACKGROUND

Diabetes Mellitus [DM] is defined as a metabolic disease of inadequate control of blood glucose level and it is characterized by hyperglycemia due to absolute or relative insulin deficiency. It resulted from metabolic abnormalities of carbohydrate, fat, and protein to cause microvascular, macro vascular, and neuropathic complications(1).

Diabetes is one of the non-communicable diseases with the highest prevalence worldwide, and 80% of diabetic patients live in low- and middle-income countries(2). Glycemic control is the optimal serum glucose concentration in diabetic patients. It is necessary to identify factors affecting the glycemic control of patients to prevent control and complications(3).

The American Diabetes Association suggests frequent blood glucose monitoring for people with diabetes mellitus (DM), with an important goal of maintaining the blood glucose levels near the normal range of 70 to 126 mg/dl pre-meals and below 140 mg/dl at 2 hours of eating(4). Diabetes management is influenced by patient self-care practices include taking medications, adhering to a diet plan, exercising often, and monitoring blood sugar(5).

Additionally, normal blood glucose levels are expected to be below 100 mg/dl before meals or after fasting for six hours and below 140 mg/dl two hours after meals(6).

Diabetes Mellitus is primarily categorized as type 1 and type 2 diabetes. Type 1 diabetes arises in absolute insulin shortage from the autoimmune death of insulin-secreting beta 2 pancreatic cells(7) Type 2 diabetes mellitus (T2DM) is a metabolic disorder and typically results from excess of caloric intake over energy expenditure.(8) In order to check for indications of diabetic problems, screening blood tests such as OGTT, HbA1c, random blood glucose, fasting blood glucose, and microalbuminuria testing are employed(9).

People with DM are at increased risk of a number of disabling and life threatening health problems. Persistent higher blood glucose level can result in serious health condition affecting heart, blood vessel, kidney and nerves(10).

Blood glucose Maintenance at levels that prevent the diabetes related complication requires an appropriate balance between dietary intake, physical activity and drug therapy. To achieve this balance, diabetic patients must actively and effectively work with their healthcare providers, alter their medication and other treatment options in accordance with their daily blood glucose profiles, and participate in a variety of other healthcare-related activities(11).

1.2 STATEMENT OF THE PROBLEM

Diabetes and hyperglycemia are significant global causes of mortality and morbidity due to their mutually exclusive direct clinical effects. For all diabetic patients, controlling hyperglycemia is a key therapeutic goal in order to prevent diabetes-related complications(12).

Uncontrolled diabetes is frequently accompanied by hyperglycemia, or high blood sugar, which can seriously harm many different body systems, including the nerves and blood vessels(13). diabetes control is more than just taking medicine; other aspects of self-management such as self-monitoring of blood glucose, dietary restrictions, regular foot care and ophthalmic examination are there to markedly reduce the incidence and progression of diabetes complications(14).

According to study on Persistent poor Glycemic control in individuals with type 2 diabetes in developing countries in seven cross-sectional waves (2005–2017), the Glycemic control in developing countries has been persistently poor over the past 12 years and is growing steadily worse(15).

Glycemic control is especially important in low-income countries like Ethiopia for improving the quality of life of diabetes patients. A recent study in Ethiopia found that the economic burden of diabetes was significantly higher among the least privileged population(16).

Ethiopia, one of the top 5 countries in Africa, has 1.9 million diabetics, or 3.3% of the population.(17).Diabetes Mellitus has been a major public health challenge in the health care system with more than 5% of the population have undiagnosed DM and this is associated with poor glycemic control(18).

According to study published in 2023, a Systematic Review and Meta-analysis on the Prevalence of Glycemic Control and Factors Associated with Poor Glycemic Control was done. It revealed that there is a large regional variance in the glycemic control of DM patients in Ethiopia, with

62% having poor glycemic control and only one-third (32.6%) have good glycemic control. The percentage of patients with poor glycemic control is also significantly greater (47%) using HbA1C 7%. This study found no statistically significant difference in poor glycemic control between T1DM and T2DM patients(19). The magnitude of poor or good glycemic control, as well as potential factors associated with poor glycemic control, are scarce in Ethiopia(20).

The present study determines the magnitude of Glycemic control and factors associated with poor Glycemic control among DM patients.

1.3 SIGNIFICANCE OF THE STUDY

As it's known, currently non communicable disease are the most common problem in the world. diabetes is responsible for 6.7 million death in 2021 – 1 every 5 seconds(17). Diabetes Mellitus has been becoming among the few major public health challenge to the health service and economic development of low and middle income countries including Ethiopia, Ethiopia is one of the top five countries with the largest number of people affected by DM in the sub Saharan Africa.

In the study area the magnitude of glycemic control and its associated factor have not yet been studied so, by showing the existing gap the result will serve as base line data for program managers and decision makers and also for different researcher, and health care provider. Additionally, as the study will be conducted in the hospital, then it enables to modify the prevention guide line and to evaluate implementation way about life long caring method among patients comes to hospital.

2. LITERATURE REVIEW

2.1 MAGNITUDE OF THE PROBLEM

In 2021, there are 537 million individuals (20-79 years old) worldwide who have diabetes. By 2030, this figure is expected to reach 643 million, and by 2045, it will reach 783 million. More than 80% of diabetic individuals reside in low- and middle-income nations(17).Diabetes mellitus has been a major public health challenge in the health care system with more than 5% of the population have undiagnosed DM and this is associated with poor glyceimic control(18).

A Retrospective cross-sectional study on Glyceimic control in type 2 diabetes patients and its predictors at a tertiary care diabetes center in Ningbo, China was done in 2017.The prevalence of poor glyceimic control was 50.3% and 57.3%, respectively in terms of HbA1c and FBG(21).

A cross-sectional study on the prevalence and determinants of poor glyceimic control among adults with type 2 diabetes mellitus in Saudi Arabia examined 423 T2DM patients was done in 2017 and 74.9% of the patients had poor glyceimic control(22).

A retrospective, descriptive and inferential study on glyceimic control and its determinates among patients with type 2 Diabetes in a specialist hospital in Northeast, Nigeria was done in 2018. From the 385 patients ,50.1 % had poor glyceimic control(23).

Type 2 diabetes mellitus (T2DM) patients were studied cross-sectionally in Malaysia in 2019 to compare groups of patients with good glyceimic control and patients with poor glyceimic control. The prevalence of patients with poor glyceimic control in Pasir Puteh district was 79.6%%(24).

According to a study in France, Benin a cross-sectional descriptive and analytical study in 2019 on the prevalence and risk factors for hyperglycemia in a rural population was done. An estimated of 4.6% people had hyperglycemia(25).

A cross-sectional study on glyceimic control and its contributing factors among patients with diabetes mellitus in Bangladesh was carried out in 2020 among 732 diabetes patients. Approximately 87.6% of the patients had poor glyceimic control(26).

A cross-sectional study was conducted at the outpatient department of medicine, Aleena Hospital, Bahawalpur, Pakistan in 2021 on Factors Associated with Poor Glyceimic Control and they found that T2DM patients had 85.5% poor glyceimic control(27).

A study on the extent and factors related to glyceimic control among 412 type 2 diabetic patients at Tikur Anbessa Specialized hospital was done in Ethiopia, Addis Ababa, in 2015.This study

reveals that around 80% of participants had uncontrolled fasting blood sugar levels. Only five patients (1.2%) had FBS 70 mg/dl(28).

A cross sectional study on 2016 Nekemte Referral Hospital about Predictors of poor glyceimic control and level of glyceimic control among diabetic patients in west Ethiopia was conducted. The glyceimic rate control in the study was 40.5%. A finding of this study revealed that a glyceimic control of study participants was poor(29).

A hospital based cross-sectional study in Dessie Referral Hospital (DRH) on Factors associated with glyceimic control among diabetic adult out-patients in Northeast Ethiopia was conducted among randomly selected 384 patients in 2017.Of the total participants, 70.8% had poor status of glyceimic control(30).

An institution based cross sectional study on Level of glyceimic control and its associated factors among type II diabetic patients in Debre tabor general hospital, northwest Ethiopia was conducted in 2017. Among 398 type II DM patients, 284 (71.4%) had good glyceimic control(31).

At Menelik II Referral Hospital in Ethiopia, a cross-sectional study design was used to examine glyceimic control and its predictors among patients with type 2 diabetes mellitus in 2019.This study included 245 participants with type 2 diabetes mellitus.191 (80.3%) of diabetic patients had poor glyceimic control(32).

In West Shewa Zone, Oromia, Ethiopia, public hospitals for diabetic patients, a facility-based cross-sectional study on poor glyceimic control and its contributing factors was carried out in 2020.Glycated hemoglobin level was used to evaluate poor glyceimic management. According to the study's findings, 63.8% of people had inadequate glyceimic control(33).

A cross-sectional study of patients with diabetes mellitus who have poor glyceimic control was conducted in 2020 at the diabetic follow-up clinic at the University of Gondar Hospital. Patients with type 1 diabetes showed a somewhat greater percentage of cases of poor glyceimic control (61.4%) than patients with type 2 diabetes (59.8%). Users of just insulin or only pills had somewhat higher incidence of diabetic complications (72.5 and 64.5%, respectively)(34).

At Adama Hospital Medical College in East Ethiopia, 245 type 2 diabetes patients who were receiving follow-up participated in a cross-sectional research on Poor Glycemic Control and Its Contributing Factors Among Type 2 Diabetes Patients in 2020. In the study from 245 people involved, 157 (64.1%) of them had poor glycemic control. At AHMC, a high percentage of type 2 diabetes patients had poor glycemic control (35).

A cross-sectional study was conducted in 2022 on Magnitude of poor glycemic control and its predictors among adult diabetic patients on ambulatory chronic care follow-up at Jimma Medical Center, Southwest Ethiopia. From the total of 307 adult diabetic patients, 221 (72%), of patients had poor glycemic control (36).

An institutional based prospective cross-sectional survey was carried out among 122 patients with type 2 diabetes mellitus on the Incidence and Predictors of Poor Glycemic Control among Adults with Type 2 Diabetes Mellitus in Ambulatory Clinic of Mettu Karl Referral Hospital, South Western, Ethiopia. The overall incidence of poor glycemic control among type 2 diabetic patients was 60.7% (37).

A sample of 423 diabetic patients participated in the cross-sectional study in 2021 regarding the magnitude and determinants of poor glycemic control among diabetes patients attending public hospitals in Western Ethiopia. A method of systematic random sampling was used. Poor glycemic control affected 64.1% of people (38).

At the Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia, a hospital-based cross-sectional study in 2021 on Evaluation of glycemic control and related factors among outpatients with type 2 diabetes was undertaken among 325 systematically chosen patients. For glycemic control evaluation, HbA1c was employed. Participants had an 8.4% median HbA1c level. Inadequate and poor glycemic control (HbA1c $\geq 7\%$) affected nearly seven out of ten (73.8%) of the patients (39).

2.2 FACTORS ASSOCIATED WITH GLYCEMIC CONTROL

The recommended glycemic control target is very challenging to reach in clinical practice. To enhance the effectiveness of diabetic management, it is crucial to identify variables that affect glycemic outcomes. Glycemic control may be influenced by a variety of factors. Good and bad glycemic control may be caused by factors relating to the patient and the healthcare provider.

These variables could be divided into sociodemographic, clinical, and behavioral variables for easier comprehension(40).

2.2.1 SOCIO DEMOGRAPHIC FACTORS

Socio demographic variables like age, gender, marital status, level of education, occupation, monthly income, place of residence, and other related variables are frequently examined for statistical significance and correlation with glycemic control(40).

A retrospective study conducted in china 2017 on Glycemic control in type 2 diabetes patients and its predictors terms of HbA1c and FBG the odds of poor glycemic control were higher in patients residing in rural areas(21).

A cross sectional study conducted in Yemen 2017 on factors associated with poor glycemic control among type-2 diabetes mellitus patients was significantly higher among females, age 40 years and age 60 years and the illiterate(41).

According to study conducted in France, Benin cross-sectional descriptive and analytical study about the Prevalence and factors associated with hyperglycemia in a rural population was done in 2019. Advanced age , being male and monthly income > 105,000 FCFA are factor associated with poor glycemic control(25).

According to comparative cross sectional study conducted in 2019 Prevalence and Risk Factors for poor glycemic control Among Patients with Type 2 Diabetes Mellitus in Northeast State of Peninsular Malaysia, advanced age was significantly associated with poor glycemic control(24).

A cross sectional study conducted in Bangladesh in 2020 Glycemic control and its associated factors among patients with diabetes mellitus Variables that were significant to factors associated with poor glycemic control were patients aged 41–60 years(26).

A study conducted on Pakistan in 2021 factors Associated with Poor Glycemic Control, the residential status as urban , being illiterate were found to have significant association with poor glycemic control(27).

According to A study retrospective review of patient records, conducted at Gombe State Specialist Hospital, Northeast Nigeria, in 2019 Patients who were married and educated were more likely to have good glycemic control(23).

According to study at Tikur Anbessa hospital in 2015 Magnitude of glycemic control and its associated factors among patients with type 2 DM The factors which are significantly associated with poor glycemic control patients are longer duration of diabetes and being on insulin therapy (42).

An institutional based cross sectional study conducted in Debre tabor in 2017 Level of glycemic control and its associated factors among type II diabetic patients in Debre tabor general hospital, northwest Ethiopia, Patient's educational status (able to read and write, primary education and secondary education) are significantly associated with good glycemic control(31).

A hospital based cross-sectional study conducted at the out-patient diabetes clinic of Dessie Referral Hospital (DRH) in Northeast Ethiopia in 2017, the rural residence and low educational level was associated with poor glycemic control(30).

A cross sectional study conducted in Ethiopia at Gonder in 2017 glycemic control and diabetes complications among diabetes mellitus patients attending at University of Gondar hospital, Age ≥ 65 years and being divorced was associated with poor glycemic control(34).

An institutional based cross sectional study conducted in Ethiopia at Nekemte in 2018 Challenges and Factors Associated with Poor Glycemic Control Among Type 2 Diabetes Mellitus Patients at Nekemte Referral Hospital, Age 40–60years, being illiterate, having informal education are significantly associated with poor glycemic control(29).

A study conducted at Adama in 2020 Poor Glycemic Control and Its Contributing Factors Among Type 2 Diabetes Patients at Adama Hospital Medical College, being male, not attending formal education and monthly income of < 136 USD were found to have significant association with poor glycemic control(35).

A cross sectional study conducted on west Shewa zone Oromia in 2020 Poor glycemic control and its associated factors among diabetes patients attending public hospitals, Age of ≥ 50 years, being single and being female gender were found to have significant association with poor glycemic control(33).

An institutional based prospective cross-sectional study conducted on Mettu 2020 The Incidence and Predictors of Poor Glycemic Control among Adults with Type 2 Diabetes Mellitus in

Ambulatory Clinic of Mettu Karl Referral Hospital Poor glyceic control was significantly associated with older age and uneducated patients(37).

A cross sectional study conducted on western Ethiopia in 2021 on Magnitude and predictors of poor glyceic control among patients with diabetes attending public hospital, Being females were significantly association with poor glyceic control(38).

A cross sectional study conducted in jimma 2022 on Magnitude of poor glyceic control and its predictors among adult diabetic patients on ambulatory chronic care follow-up, no formal education were significantly association with poor glyceic control(36).

2.2.2 CLINICAL FACTORS

According to study In Saudi Arabia 2016 The prevalence and determinants of poor glyceic control among adults with type 2 diabetes mellitus in Saudi Arabia ,T2DM patients had an increased chance of poorly controlled diabetes if they had family histories of diabetes, longer diabetic durations 5–10 years and >10 years and being overweight were significantly associated with poor glyceic control(22).

A cross sectional study conducted in Yemen 2017 Factors associated with poor glyceic control among type-2 diabetes mellitus patients, the poor glyceic control was significantly correlated with disease duration ≥ 7 years and insulin usage(41).

A retrospective study conducted in china,2017 on Glyceic control in type 2 diabetes patients and its predictors terms of HbA1c and FBS,the duration of T2DM (>1 to 2 years),(>2 to 4 years) and(>4 years)and with hyperlipidemia were associated with poor glyceic control(21).

According to study conducted in France, Benin cross-sectional descriptive and analytical study about the Prevalence and factors associated with hyperglycemia in a rural population was done in 2019,abdominal obesity and being obese were associated with poor glyceic control(25).

According to comparative cross sectional study conducted in 2019 Prevalence and Risk Factors for poor glyceic control Among Patients with Type 2 Diabetes Mellitus in Northeast State of Peninsular Malaysia factors significantly associated to poor glyceic control are duration of diabetes, presence of hypertension and presence of dyslipidemia(24).

A cross sectional study conducted in Bangladesh,2020 on Glycemic control and its associated factors among patients with diabetes mellitus Variables that were significant to factors associated with poor glycemic control were patients aged 41–60 years, suffering from diabetes for > 7 years and using insulin(26).

A study conducted on Pakistan in 2021 on factors Associated with Poor Glycemic Control, Increasing BMI and increasing disease duration were found to have significant association with poor glycemic control(27).

According to Hospital-based cross sectional study conducted in Ethiopia on 2015, magnitude of glycemic control among type 2 diabetes patients at Tikur Anbessa Specialized Hospital Addis Ababa. The factors which are significantly associated with poor glycemic control were longer duration of diabetes and being on insulin therapy(42).

An institutional based cross sectional study conducted in Debre Tabor in 2017 on the Level of glycemic control and its associated factors among type II diabetic patients in debre tabor general hospital, northwest Ethiopia was done. The family history of DM and duration of DM since diagnosis was associated with good glycemic control(31).

A hospital based cross-sectional study Northeast Factors associated with glycemic control among diabetic adult out-patients in 2017 Northeast,Ethiopia,the longer duration of diabetes and patients receiving oral anti-diabetics were associated with poor glycemic control(30).

A comparative study conducted in Mekele 2017, Glycemic control and its associated factors among diabetes mellitus patients at Ayder comprehensive specialized hospital. The poor glycemic control was significantly higher in glucometer non-users compared to glucometer users (43).

An institutional based cross sectional study conducted in Ethiopia Nekemte in 2018 Challenges and Factors Associated with Poor Glycemic Control Among Type 2 Diabetes Mellitus Patients at Nekemte Referral Hospital, longer duration of diabetes treatment (>10 years) was significantly associated with poor glycemic control(29).

An institutional based cross sectional study conducted in Ethiopia in 2019 Glycemic control and its determinants among patients with type 2 diabetes mellitus at Menelik II Referral Hospital,

Poor glycemic control was found to be significantly associated with patients with duration of 5–10 years and duration of above 10 years. It was also found that compliance with a specific diet was significantly associated with good control of blood sugar level(32).

A cross sectional study conducted in Ethiopia at Dire Dawa in 2019 on Rate of glycemic control and associated factors among type two diabetes mellitus patients in Patients who were on oral anti-diabetic drug plus insulin and Patients who had poor level of practice were significantly associated with poor glycemic control(30).

A cross sectional study conducted on west Shewa zone Oromia in 2020 Poor glycemic control and its associated factors among diabetes patients attending public hospitals, having high low-density lipoprotein cholesterol, alcohol intake and presence of diabetic peripheral neuropathy were significantly associated with poor glycemic control(33).

An institutional based prospective cross-sectional study conducted on Mettu 2020 The Incidence and Predictors of Poor Glycemic Control among Adults with Type 2 Diabetes Mellitus in Ambulatory Clinic of Mettu Karl Referral Hospital Poor glycemic control was significantly associated with patients who had co morbidities and patients who had nephropathy complication of diabetes(37).

A study conducted at Adama in 2020 Poor Glycemic Control and Its Contributing Factors Among Type 2 Diabetes Patients at Adama Hospital Medical College in East Ethiopia being overweight was significantly associated with poor glycemic control (35).

An institutional based cross sectional study conducted at Addis Ababa in 2021 Glycemic control and associated factors among outpatients with Type 2 Diabetes at Tikur Anbessa Specialized Hospital, duration of >10 years and insulin therapy were significantly associated with poor glycemic control (39).

2.2.3 BEHAVIORAL FACTOR

According to study in Saudi Arabia 2016, The prevalence and determinants of poor glycemic control among adults with type 2 diabetes mellitus in Saudi Arabia, T2DM patients had an increased chance of poorly controlled diabetes if they have insufficient physical exercise(22).

A cross sectional study conducted in Yemen 2017 on Factors associated with poor glycemic control among type-2 diabetes mellitus patients, the poor glycemic control was significantly higher among khat chewers(41).

According to comparative cross sectional study conducted in 2019 Prevalence and Risk Factors for poor glycemic control Among Patients with Type 2 Diabetes Mellitus in Northeast State of Peninsular Malaysia factors significantly associated to poor glycemic control is cigarette smoking(24).

According to study on retrospective review of patient records, conducted at Gombe State Specialist Hospital, Northeast Nigeria, in 2019 ,Patients engaged in moderate physical activity were more likely to have good glycemic control(23).

An institutional cross sectional study conducted in Debre tabor in 2017 Level of glycemic control and its associated factors among type II diabetic patients in Debre tabor general hospital, northwest Ethiopia, dietary adherence were significantly associated with good glycemic control(31).

A study conducted in Ethiopia Nekemte on Challenges and Factors Associated with Poor Glycemic Control Among Type 2 Diabetes Mellitus Patients at Nekemte Referral Hospital in 2018, inadequate physical exercise and smoking were significantly associated with poor glycemic control (29).

A study conducted in 2019 on Glycemic control and its determinants among patients with type 2 diabetes mellitus at Menelik II Referral Hospital, compliance with a specific diet was significantly associated with good control(32).

A study conducted at Adama in 2020 Poor Glycemic Control and Its Contributing Factors Among Type 2 Diabetes Patients at Adama Hospital Medical College in East Ethiopia chewing khat and not adherence to exercise were significantly associated with poor glycemic control (35).

A study conducted at Addis Ababa in Glycemic control and associated factors among outpatients with Type 2 Diabetes at Tikur Anbessa Specialized Hospital, in 2021 poor diet compliance and failure to set targets for glycemic control were significantly associated with poor glycemic control (39).

Conceptual framework

The conceptual framework shows factors associated with glycemic control and its modified based on literature review of (28)(39)

Sociodemographic factor

- ✓ Age
- ✓ Gender
- ✓ Marital status
- ✓ Educational level
- ✓ Occupation
- ✓ Income level
- ✓ Residence
- ✓ Health care access

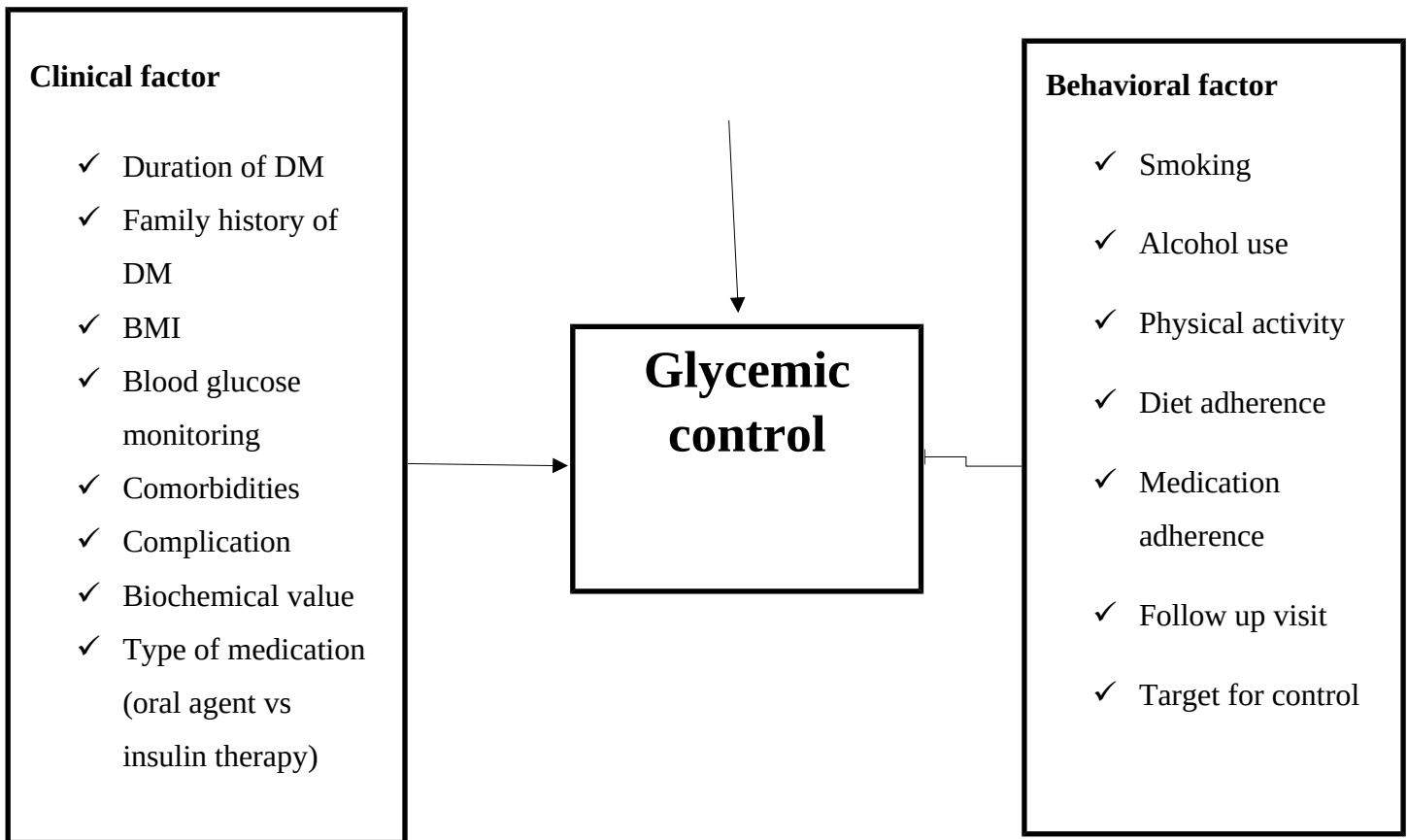


FIGURE 1:- CONCEPTUAL FRAME WORK FOR FACTOR AFFECTING GLYCEMIC CONTROL

3. OBJECTIVES

3.1 GENERAL OBJECTIVE

- To assess the magnitude of Glycemic control and its associated factor among adult DM patients in Gurage zone selected health facilities hospitals, Wolkite, Ethiopia, 2023.

3.2 SPECIFIC OBJECTIVE

- To determine the magnitude of Glycemic control among adult DM patients in Gurage zone selected health facilities, Wolkite, Ethiopia.
- To identify factor associated with Glycemic control among DM patients in Gurage zone selected health facilities, Wolkite, Ethiopia.

4. METHODS A MATERIALS

4.1. STUDY AREA

Gurage zone is in the southern nations, nationalities and people's region of Ethiopia the region is home to the Gurage people .it is located 158 km south of Addis Ababa capital city of Ethiopia. the zone has 13 districts and two town administrations (at Butajira and Wolkite) and it covers about 5932km².The Gurage zone has five primary hospitals and two general hospital and 72 health centers. All hospitals have chronic follow up clinic for diabetes mellitus disease. The two General hospitals are Butajira general hospital and WUSTH. the left primary hospitals are Attat, Bui and Mehal amba Gunchire, Agena.

4.2. STUDY PERIOD

The study was conducted from May 25/2023 - June 25/2023.

4.3. STUDY DESIGN

The study was conducted using institution based cross sectional study design.

4.4. POPULATION

4.4.1. SOURCE POPULATION

The source population are all diabetic patients Attending in the Gurage zone selected Hospital.

4.4.2. STUDY POPULATION

The study population was all adult Diabetic Patients who were registered and currently attending the outpatient chronic Follow up in the selected Health Facility during the study period.

4.4.3. INCLUSION CRITERIA

- ✓ All type one and type two diabetes patients ≥ 18 years old and who have follow-up at least for 6 months.
- ✓ Who had at least three months consecutive follow up in Gurage zone selected health facilities.

4.4.4. EXCLUSION CRITERIA

- ✓ Patients who are unwilling to participate
- ✓ Pregnant women who has chronic case
- ✓ Patients who are unconscious and mentally ill are excluded

4.5. SAMPLE SIZE DETERMINATION

The sample size was determined using single population proportion formula considering a 64.1% proportion (p) of had uncontrolled fasting glycemic level as reported from an earlier study in Adama 2020, on Poor Glycemic Control and Its Contributing Factors Among Type 2 Diabetes Patients at Adama Hospital Medical College assessed with FBS, (35) with a confidence interval (CI) of 95% and 5% marginal error (d).

$$n = Z^2 p (1-p) / w^2$$

$$n = ((Z_{\alpha/2})^2 P (1-p)) / d^2$$

Where

- n = sample size
- Z (a/2) = Z score at a 95% confidence interval = 1.96
- p = 0.641 (proportion of patients with poor glycemic control)
- q = 1 - p
- d = 0.05 (5% error margin)

Therefore, n becomes:

$$n = (1.96)^2 \times 0.641 \times 0.359 / (0.05)^2$$

$$n = 0.8832 / 0.0025$$

$$n = 353$$

After adding 10% non-response rate the final sample size will be

$$(353 + 353 \times 10\%) = 388$$

4.5.1 SAMPLING TECHNIQUE

A random sampling was done for selecting the participant hospital from seven hospitals in the study area. which is from general hospital WUSTH is selected, from primary hospital Attat primary private hospital is selected and from health center Wolkite health center is selected then, a systematic random sampling technique will be used to select study participants at each k^{th} interval. The actual sampling fraction (k^{th}) was determined by dividing the total number of source population attending in WKUSTH, Attat primary hospital and Wolkite health center during the study period (1733) by the corrected sample size (388) $k = 4.4$ Therefore, every fourth patient was approached and invited to participate in the study until the required sample size was reached in each hospitals. The corrected sample size was taken in each hospital proportionally. Diagrammatically described as follows.

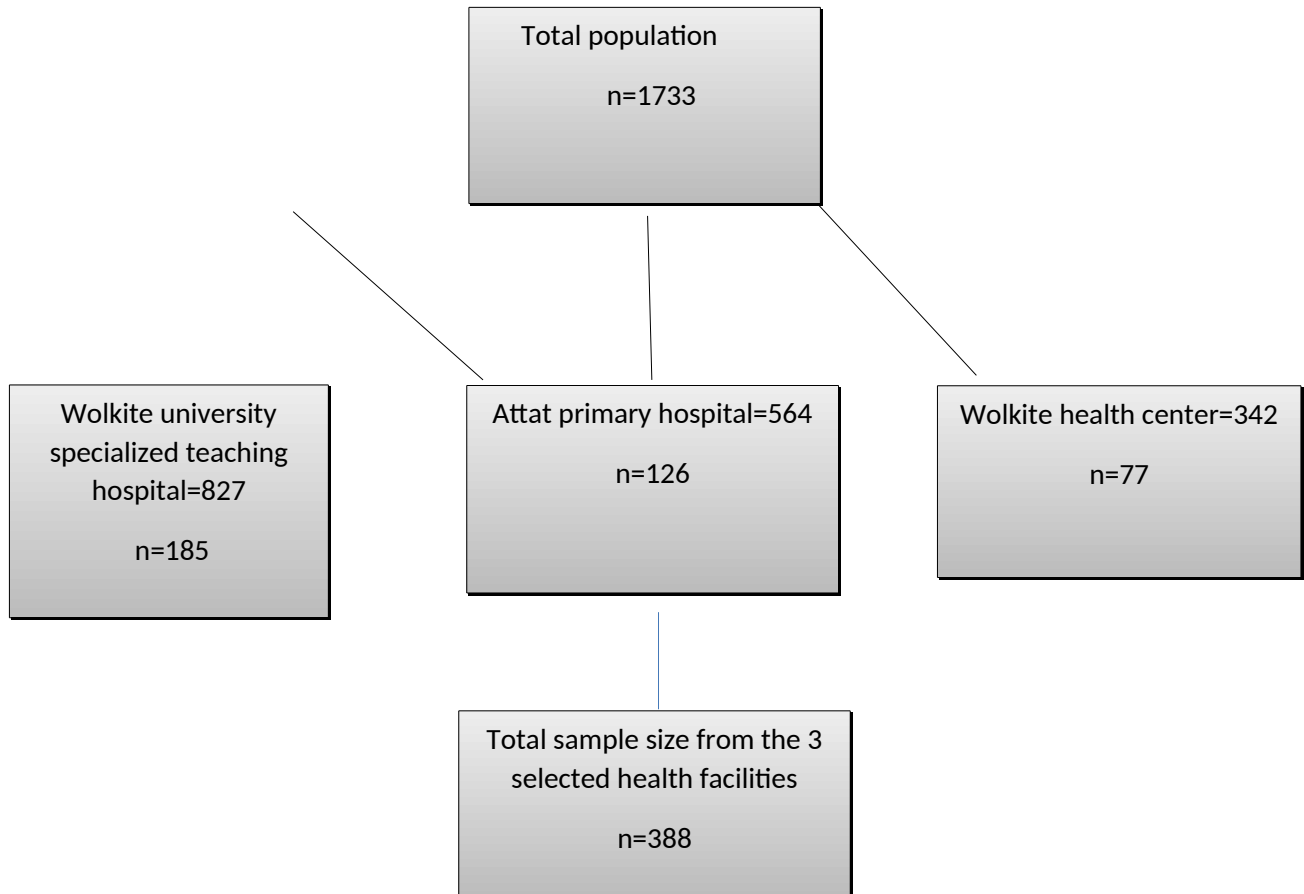


FIGURE 2:- SCHEMATIC PRESENTATION OF SAMPLING PROCEDURE, GURAGE ZONE SELECTED HEALTH FFACILITIES ,WOLKITE, ETHIOPIA

4.6. STUDY VARIABLE

4.6.1. DEPENDENT VARIABLES

- ✓ Glycemic control

4.6.2. INDEPENDENT VARIABLES

Independent variables are Sociodemographic, behavioral, and clinical factors. These include:

Sociodemographic variables:

- ✓ Age
- ✓ Gender
- ✓ Religion
- ✓ Marital status
- ✓ Educational level
- ✓ Occupation
- ✓ Income level
- ✓ Residence
- ✓ Health care access

Clinical Variable

- ✓ Duration of DM
- ✓ Family history of DM
- ✓ BMI
- ✓ Medication use
- ✓ Blood glucose monitoring
- ✓ Comorbidities
- ✓ Complication
- ✓ Biochemical value
- ✓ Type of Medication (oral agent vs insulin therapy)

Behavioral Variable

- ✓ Smoking

- ✓ Alcohol use
- ✓ Physical activity
- ✓ Diet adherence
- ✓ Medication adherence
- ✓ Follow up visit
- ✓ Target for control

4.7. DATA COLLECTION INSTRUMENT AND TECHNIQUE

Data was collected using a standardized structured questionnaire which was by both Amharic and English version and by using relevant recorded medical information about the patients. Data was collected using a standardized structured questionnaire which contains information about socio demographic characteristics of the patient, clinical, behavioral, and tools to review patients medical record. The data collection tools first prepared in English and translated to Amharic, finally back translated to English to ensure validity of translation.

4.9. DATA QUALITY ASSURANCE

Attention was given to check all questionnaires for completeness and accuracy. Pretest of the questionnaire was carried out among some DM patients in Emdebr Health center. During the pretest, the questions which are frequently asked were documented for further consideration. the interviewers were planned to assess for clarity, understandability and completeness of questions. After the result of the pretest, some correction and changes was done made as necessary.

4.10. DATA PROCESSING AND ANALYSIS

Data entry and analysis was performed by using SPSS version 23. Descriptive statistics like frequency, proportion, mean, median and standard deviation was employed to describe socio demographic, clinical and behavioral characteristics of patients. Chi square test was used to assess association of the difference in the percentages of good and poor glycemic control according to independent categorical variables. Bivariable Logistic regression and multivariable analysis was conducted to look for any association between predictors and outcome variables.

4.11 ETHICAL CONSIDERATION

First permission letter was obtained from Wolkite University, college of health science and medicine. At the time of data collection, a verbal consent was asked and from the participant was given the right to do so. Confidentiality and privacy of responses was ensured (the names of respondents were not be included and ensuring to participants that their identification were not public. also clearly putting the objective of this study to respondents help to keep the confidentiality of the respondents) throughout the research process.

4.12 OPERATIONAL DEFINITION

Glycemic control: for purpose of this study we categorized patients based on American Diabetic.(44)

Association (ADA) recommendation in to two groups:

- **Good Glycemic control:** fasting blood glucose of 70-130 mg/dl
- **Poor Glycemic control:** fasting blood glucose of <70mg/dl and >130mg/dl(45).

Fasting blood sugar: if the patients blood glucose measured from venous blood after at least 8 hours of overnight fasting.(46)

Adherence to medication: if the patients took all his/her anti diabetic medication in last seven days (46).

Adherence to blood glucose testing: if the patient measured his blood glucose for more than 3 days in last seven days(46).

Adherence to diet: If the patient follows recommended diet for more than 3 days in last seven days(46).

Adherence to exercise: If the patient follows recommended level of exercise for more than 3 days in last seven days(46).

Alcohol consumption- if reported consumption of alcohol twelve month prior to the survey(46).

5.RESULT

5.1 SOCIODEMOGRAPHY CHARACTERISTICS OF THE PARTICIPANT

A total of 388 patients with T1DM and T2DM were involved in the study. Among them, men comprised 203 (52.3%) of the respondents. The mean age of the participants was 54.43 and the range was 50. (74.5%) of the participants were married. 164(42.3%) are illiterate & 133 (34.3%) had attended in primary school. 112(28.9%) were Farmers. Among the respondents 312 (80.4%) were rural dwellers. 149 (51.2%) were making from 1500-5000 ETB a month. and a number of study participants 267 (68.8%) had free access to hospital services.

TABLE 1.SOCIODEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS (OUT PATIENT WITH T1 AND T2 DM,N=388) AT SELECTED GURAGE ZONE HEALTH FACILITIES ETHIOPIA,2023

Variable	Category	Frequency
Age	18-44	102(26.2%)
	45-54	117(30.1%)
	55-64	74(19%)
	>65	95(24.4%)
Sex	Male	203(52.3%)
	Female	185(47.6%)
Level of education	Unable to read and write	164(42.2%)
	Grade1-8	133(34.2%)
	Grade9-12	58(14.9%)
	Collage and above	33((8.5%)
Religion	Orthodox	190(48.9%)
	Muslim	174(44.8%)
	Protestant	8(2%)
	Catholic	16(4.12%)
Marital status	Never married	29(7.4%)
	married	289(74%)
	widowed	23(5.9%)
	divorced	47(12.1%)
Occupation	unemployed	97(25%)
	House wife	89(22.9%)
	Government/private employee	32(8.24%)
	farmer	112(28.8%)
Monthly income	<1500	102(26.2%)
	1500-5000	149(38.4%)
	>5000	40(10.3%)
Residence	Rular	312(80.4%)
	Urban	76(19.5%)
Health care Access	Free	267(68.8%)
	paid	121(31.1%)

5.2 CLINICAL CHARACTERISTICS OF THE RESPONDENTS

The median duration of diabetes since diagnosis was 10 years. One hundred and fifty-three (47.1%) of the respondents implied that they have been living with diabetes for more than eleventh year. A family history of diabetes mellitus have on 66% of the participants. Comorbidities were present in almost 32.7% of the study participants. The most prevalent comorbidity was hypertension, which represented almost 21.1% of comorbidities, and congestive heart failure (12.6%). Hyperglycemia was the most commonly shared diabetes complication among the study participants which is 86 (22.2%). Only 7(1.8%) of the participants were in a non-pharmacological mode of therapy. Most of the study participants (58.5%) used oral hypoglycemic agent, 80(20.6%) were on insulin, and the rest 74 (19.1%) used combinations of insulin and oral hypoglycemic agents (.85.1%) monitor their blood glucose level less than three days per week.

TABLE 2. CLINICAL CHARACTERSTICS OF THE STUDY PARTICIPANTS (OUT PATEINT WITH T1 AND T2 DM, N=388) AT SELECTED GURAGE ZONE HEALTH FACILITIES ETHIOPIA,2023.

Variables	Category	Frequency
Duration of DM science diagnosis	6M-5 year	48(12.4%)
	6-10 year	174(44.8%)
	>11 year	166(42.8%)
Family history of DM	Yes	256(66%)
	No	132(34%)
Type of DM	Type 1	80(20.6%)
	Type 2	308(79.4%)
Drug regimen	Oral hypoglycemic agent	227(58.5%)
	Insulin	80(20.6%)

	Combination of insulin &oral hypoglycemic agent	74(19.1%)
	Diet modification /exercise alone	7(1.8%)
Access of self-monitor blood glucose level	Yes	20(5.2%)
	No	368(94.8%)
Monitoring blood glucose per week	<3 days per week	330(85.1%)
	≥3 days per week	58(14.9%)
Presence of complication	Yes	211(54.4%)
	No	177(45.6%)
Types of complication	Hypoglycemia/Hyperglycemia	108(28.1%)
	Diabetic keto acidosis	52(13.4%)
	Hyperglycemic hyperosmolar non Ketotic comma	26(6.7%)
	Retinopathy	53(13.7%)
	Neuropathy	53(13.7%)
	Nephropathy	32(8.2%)
	Coronary artery disease	11(2.8%)
	Diabetic foot ulcer	47(12.1%)
Presence of co-morbidity	Yes	127(32.7%)
	No	200(51.5%)
Types of co-morbidity	Hypertension	82(21.1%)
	Congestive heart failure	49(12.6%)

5.3 BEHAVIORAL CHARACTERISTICS OF THE RESPONDENTS

A little less than half of the respondents 167 (43%) were visit for follow up greater than 3 times per year, only 10 (2.6%) consume alcohol for the past 12 month among this half of respondents consume 1-4 times per week and half of the respondents consume alcohol 1-3 times per month . 9(2.3%) smoke cigarette for the past 12 month among this 8(2.1%) smoke cigarette on average

less than one packet a day. About 276(71.1%) adhered fully to their prescribed medications during the previous week before the study. A little more than half of the respondents 62 (16%) were following the recommended healthy eating plan adequately. And 54 (13.9%) participated in at least 30 minutes of physical activity for more than 3 days a week. around 147(37.9%) of the respondents indicated that they have set a glycemic target goal for management, 316 (81.4%) had a body mass index value between (18.5-24.9kg/m²), normal weight, while 53(13.7%) appeared to be overweight (25-29.9kg/m²). Twelve (3.7%) were obese (≥ 30 kg/m²) and the remaining 19(4.9%) fell within the underweight range (<18.5kg/m²).

TABLE 3 BEHAVIROUL CHARACTERSTICS OF THE RESPONDANTS AMONG PATIENTS WITH DM AT SELECTED GURAGE ZONE HEALTH FACILITES WOLKITE,ETHIOPIA,2023

Variable	Category	Frequency
No of follow up visit per year	≤ 3 times/year	221(57%)
	> 3 times/year	167(43%)
Alcohol consumption within 12 month	Yes	10(2.6%)
	No	378(97.4%)
Consumption of alcohol	1-4/week	5(1.3%)
	1-3/month	5(1.3%)
Smoking status within 12 month	Yes	9(2.3%)
	No	379(97.7%)
Average Cigarette consumption per day	<1 packet a day	8(2.1%)
	≥ 1 packet a day	1(0.3%)
Medication adherence	7 days / week	276(71.1%)
	< days/week	112(28.9%)
Diet adherence	>3 days /week	62(16%)
	0-3 days /week	326(84%)
Physical activity	>3 days/week	54(13.9%)
	0-3 days /week	334(86.1%)
Glycemic target goal	Yes	147(37.9%)
	No	241(62.1%)
Body mass index	< 18.5	19(4.9%)
	18.5-24.9	316(81.4%)
	≥25	53(13.7%)

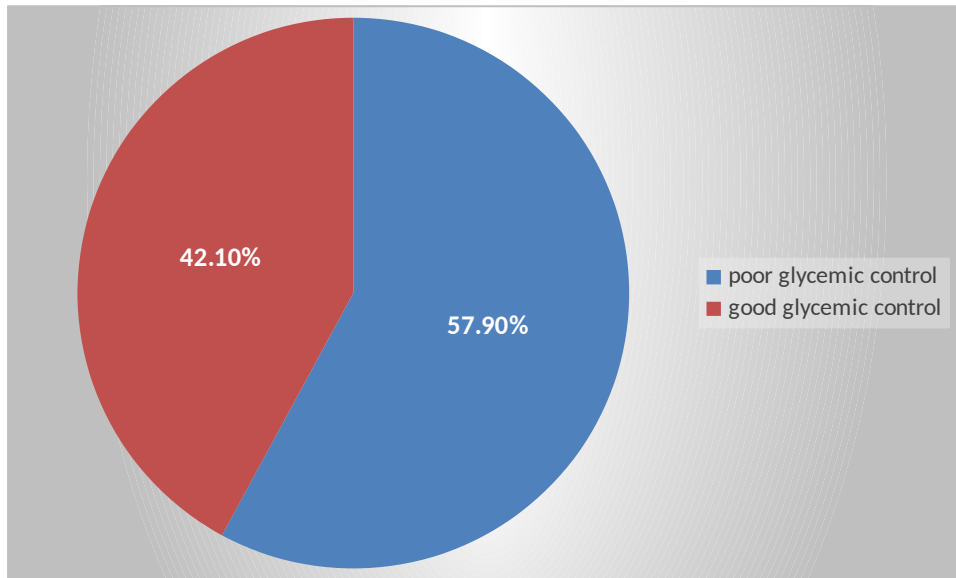


FIGURE 3:- MAGNITUDE OF GLYCEMIC CONTROL AMONG PATIENT WITH DM AT SELECTED HEALTH FACILITIES, WOLKITE ETHIOPIA

5.4. FACTORS ASSOCIATED WITH GLYCEMIC CONTROL

In the bivariate logistic regression 13 variables are exported in to Multivariate logistic regression model: Age, Education, Marital Status, Occupation, diagnosis, Drug Regimen, SMBG, Hypoglycemia, DKA, Retinopathy, Nephropathy, follow up visit and BMI were associated with glycemic control.

The results of the stepwise logistic regression analysis to identify factors associated with poor glycemic control showed that older Age (44-54) (AOR: 5.41, 95% CI: 2.043-14.368, P = 0.001), and Age (55-65) (AOR: 3.150, 95% CI: 1.063-9.334, P = 0.038), secondary education (AOR: 3.51, 95% CI: 1.259-9.963, P = 0.017), follow up visit <3 times/year (AOR: 2.536, 95% CI: 1.301-4.946, P = 0.006) and being house wife (AOR: 0.287, 95% CI: 0.104-0.792, P = 0.016) nephropathy (AOR: 3.214, 95% CI: 1.127-9.160, P = 0.029) were factors associated with poor glycemic control.

The study showed that older age individuals with diabetes, specifically in the age category of (44-54) years (AOR: 5.41, 95% CI: 2.043-14.368, P = 0.001) and age (55-64) (AOR: 3.150, 95% CI: 1.063-9.334, P = 0.038) tend to have poor glycemic control over their blood sugar levels

compared to their younger counterparts. Patients who are house wife are less likely to poor glycemic control. patients who attend secondary school found to be 3.51 times more likely to have poor glycemic control than those with illiterate and primary school. Study participants who visits for follow up fewer than 3 times /year were 2.53 times more likely to have poor glycemic control to those having follow up visit greater than 3 times/year

TABLE 4 .BIVARIATE AND MULTIVARIATE LOGISTIC REGRESSION ANALYSIS OF FACTORS ASSOCIATED WITH GLYCEMIC CONTROL AMONG OUT PATEINT WITH DM AT GURAGE ZONE SELECTED HEALTH FACILITIES ,WOLKITE ,2023

		Good (70-130 mg/dl) n=163	Poor <70mg/dl, >130mg/d l n=225	COR(95% CI)	P- Value	AOR(95% CI)	P- Value
Age	18-44	28	74	1		1	1
	44-54	65	51	3.420(1.938-6.036)	0.000	5.419(2.043-14.368)	0.001*
	55-65	33	41	2.127(1.13-4.001)	0.019	3.150(1.063-9.334)	0.038*
	>65	36	58	1.61(0.88-2.94)	0.119	1.563(0.580-4.214)	0.377
Level of educatio n	illiterate	61	103	1		1	
	Primary education	56	77	1.228(0.76-1.96)	0.38	1.308(0.561-3.049)	0.534
	secondary	33	25	2.229(1.21-4.09)	0.010	3.541(1.259-9.963)	0.017*
	Collage and above	13	20	1.09(0.51-2.36)	0.812	0.905(0.120-6.813)	0.923
Occupati on	Unemploye d	51	46				
	Governmen t/private employ	15	17	0.79(0.35-1.772)	0.576	2.044(0.224-18.691)	0.527
	Merchant	23	34	0.61(0.31-1.18)	0.144	0.606(0.173-2.119)	0.433
	Housewife	35	56	0.56(0.31-1.008)	0.053	0.287(0.104-0.792)	0.016*
	farmer	39	72	0.48(0.28-0.85)	0.012	0.328(0.125-0.859)	0.123

Follow up visit	>3 times/year	94	73	1		1	
	<3times/year	69	152	2.837(1.868-4.307)	0.000	2.536(1.301-4.946)	0.006*
Types of complication(Nephropathy)	Yes	8	24	2.480(1.05-5.81)	0.037	3.214(1.127-9.160)	0.029*
	No	81	98	1		1	

*P<0.05 statistically significant, COR crude odd ratio, OR adjusted odd ratio, CI confidence interval

6. DISCUSSION

In this study 225(57.9%) CI (52.9%-63%) of the study subject had poor glycemic control which is comparable study with Jimma shanan gibe, Ethiopia (59.2%), Mettu, Ethiopia (60.7%), Mekelle, Ethiopia (61.9%)and china (57.3%) and peninsular Malaysia (59.2%)(47)(20)(48)(21)(24).However, the current study was lower than other studies conducted in from Ethiopia Dessie (70.8%), Debre Tabor (71.4%)(49),Saudi Arabia(74.9%)(50),Malaysia(79.6%)(51),Pakistan(85.5%)(27),Bangladesh(87.6%)(26)and The difference in variation our study from others might be explained by, characteristics of the population and difference in sample size for example in Mettu study the sample size is lower than our study which is 122,and also the jimma study sample size is lower than our study which is 174 this may have effect on magnitude of glycemic control. Additionally they use glycated hemoglobin test to assess the glycemic control like study in peninsular Malaysia this have also effect in magnitude of glycemic control . The present study the mean fasting blood glucose level is 132.7±28.7 mg/dl which is higher than the study of Shanan Gibe, Ethiopia 130.3± 30.7mg/dl(47),France Benin 93.5±33.8 mg/dl(52)and lower than Debretabor 174.25±57.14mg/dl(49), 175.2 ±69.34mg/dl Dessie,Ethiopia(30) and Gonder ,Ethiopia 184.72± 89 mg/dl.In this study age 44-54 is significantly associated with poor

glycemic control AOR:(5.41, 95% CI:, 2.043-14.368, P = 0.001), than who are lower age which is similar study with Yemen(41).and Age (55-65) has 3.15 times likely to have poor glycemic control which is similar study with West Shewa(33).In this study secondary education has 3.15 times likely to have poor glycemic control AOR: (3.51, 95% CI: 1.259-9.963 P=0.017)but, in other studies illiterates are significantly associated with poor glycemic control Adama, Nekemte, Mettu and Pakistan(35)(29)(37)(27).The results are inconsistency with this study and it might be as a result of differ in study participants character. in addition, patients with house wife's are 72% less likely to develop poor glycemic control .DM participant who visit for follow up fewer than 3 times a year had poor glycemic control AOR:(2.536, 95% CI:(1.301-4.946)and participant having nephropathy complication of diabetes were 3.214 more likely had poor glycemic control than who had other complication (AOR: 3.214, 95% CI: 1.127-9.160, P = 0.029),this finding is also shared with Mettu Karl study (AOR:6.4CI 3.017-17.632,P=0.005)(37).

7.CONCLUSION AND RECOMMENDATION

7.1 CONCLUSION

The Magnitude of poor glycemic control among diabetes patients at Selected Gurage zone Health Facilities was relatively high. Therefore, Appropriate attention shall be given for glycemic control especially for patients with Middle Age and Patients with DM Complication and also increasing health education programs for diabetes patients at each follow-up visit is Essential. Further studies are also recommended to identify important factors which were not identified by the current study.

7.2 RECOMMENDATION

Based on our study finding we would like to recommend

For the health professionals and health facilities

- To improve their relations with their patients in order to increase the follow up visit and addressing the essential information for better diabetic management.
- Health Facilities Would Check their patient's status routinely and provide Health Education.
- Patients with Advanced Age would be given Special attention.

For Patients

- Early Screening of the Patients should be Essential to prevent Complications.
- Patients would have regular Follow-up Behavior.

For Researchers

- Further Studies would conduct to assess the Glycemic control and its associated factors by using glycated HbA1c Test.

8. LIMITATION OF THE STUDY

The use of fasting blood glucose over HbA1c is one limitation since it is standardizing method for HbA1c was not available and this may lead to underestimation of magnitude of poor glycemic control.

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APPENDICES

Annex A: English version Study subject consent form

Structured questionnaire for assessing magnitude of glycemic control and its associated factor among diabetic patients at Gurage zone public Hospital.

Greeting:

My name is _____ I am currently under graduate student in Wolkite University, College of Health Science, Department of Nursing. Objective of the study is to assess the magnitude of glycemic control and its associated factor among patients with diabetes mellitus at Gurage zone public health hospital

The information you provide will help us to contribute to improvement of quality health service for diabetes patients. You will be asked to fill a questionnaire that could help in investigating the issues. And also we request your willingness. Your co-operation was very helpful. Your name would not be written on the questionnaire and all the information you provided will be kept strictly confidential. As part of the study we would first like to ask you socio demographic and self-care behaviors and we would like to access your medical record to abstract your fasting blood sugar.

You would not be facing no harm by participating and you will also not be obliged to answer any question you didn't wish to answer. To fill the questionnaire 15-20 minutes was required.

Consent Form

Considering the information, you got from the general information sheet, we would be Thankful if you spent some time with us solving questions related to the issues. Do you agree to participate in this study?

1. If yes, continue to next page
2. If no, skip to other participant

Informed consent certified by

Questionnaire collector: Code_____ Name_____ Signature_____ Date_____

Checked by: Supervisor Signature_____

Questionnaire identification number_____

Address: city/Sub city _____ Woreda _____ Medical Card Number_____

ANNEX 1 ENGLISH VERSION

Socio demographic

	Questions	Alternatives/choices of response	
1.	How old are you?	age in completed years_____	
2.	Sex of the respondent	1, Male 2, Female	
3.	What is your last level of education?	1, illiterate 2, Grade 1-8 3, Grade 9-12 4, College and above	
4.	What is your religion?	1, Orthodox 2, Muslim 3, Catholic 4, Protestant	
5.	What is your marital status now?	1, Never married 2,Married 3,Widowed 4,Divorced 5,Separated	

6.	What is your occupation	1, Unemployed 2, Government/private employee 3, merchant 4, housewife 5, farmer	
7.	How much income you earn monthly? (Ethiopian Birr)	-----Ethiopian birr	
8.	Where is your place of residence?	1, Urban <input type="checkbox"/> 2, Ruler <input type="checkbox"/>	
9.	Healthcare access	1, Free <input type="checkbox"/> 2, Paid <input type="checkbox"/>	

Clinical factor related

1.	How many years back were you diagnosed by health professional to have diabetes? years	
2.	Is there anyone who is diagnosed for diabetes mellitus in your family?	1, Yes 2, No	
3.	Types of diabetes Mellitus	1, Type 1 2, Type 2	
4.	Which drug regimen patient following is following currently?	1, Oral hypoglycemic agents <input type="checkbox"/> 2, Insulin <input type="checkbox"/> 3, Combination of both <input type="checkbox"/> 4, Diet modification/Exercise alone <input type="checkbox"/>	
5.	Do you've access to a device to self-monitor your blood glucose level (SMBG)?	1, yes 2, No If Yes, proceed to question no.6 else, skip	

6.	How many times a week did you monitor your blood glucose?	1, <3 days per week 2, ≥3 days per week	
6.	Presence of complication?	1, yes 2, No If yes tick types of complication 1. Hypoglycemia/hyperglycemia 2. Diabetic Keto-Acidosis/DKA/ 3. Hyperglycemic Hyperosmolar Non Ketotic coma/HHNK/ 4. Retinopathy 5. Neuropathy 6. Nephropathy 7. Coronary Heart Disease 8. Diabetic Foot Ulcer	
7.	Presence of co-morbidity?	1, Yes 2, No If yes tick types of co-morbidity 1. Hypertension 2. Congestive Heart Failure/CHF/	

Behavioral factor related question

1.	How many times a year do you show up to your follow-up clinic visit	≤ 3 times/year <input type="text"/>	
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	appointments? _____ times/yr.	> 3 times/year <input type="text"/>	
2.	Have you consumed alcohol (within the last 12 months)?	1, Yes 2, No If yes, proceed to next else, skip the next	
3.	In the past 12 months , how frequently have you had at least one drink?	1, Daily 2, 5-6 days per week 3, 1-4 days per week 4, 1-3 days per month 5, Less than once a Month	
4.	Have you smoked a cigarette even one puff during the past 12 months?	1, Yes 2, No	
5.	If yes, how many cigarettes did you smoke on an average day?	1 packet cigarette a day <input type="text"/> >1 packet cigarette a day <input type="text"/>	
6.	Do you take your prescribed medications at the right time & dosage without ever forgetting?	1, Yes, 7 days/week 2, No, < 7 days/ week	
7.	Do you strictly adhere to your recommended diet program? (Avoiding fatty foods, Carbohydrate & consuming more vegetables & fruits).	1, Yes, > 3 days/week 2, No, 0 – 3 days/week	
8.	How many times a week do you participate in physical activities?	1, Yes, > 3 days/week 2, No, 0 - 3 days/week	
9.	Have you set glycemic target goals for management? (/FBS/RBS)	1, Yes 2, No	

checklist to review patient's medical record

1	Had HbA1c value in last four months?	1, Yes 2, No	
2	fasting blood sugarmg/dl	
3	WeightKg	
4	HeightMeter	
5	Body Mass IndexKg/m ²	

Annex 2: -አማርኛ መጠይቅ

የመረጃና የስምምነት ቅጽ

የወልቂጤ ዩኒቨርሲቲ ህክምናና ጤና ሳይንስ ኮሌጅ

የነርቲንግ ትምህርት ክፍል

በጉራጌ ዞን የሚገኙ

ጤና ተቋማት የሚገኙ የስኳር ህመም ተኞች የስኳር ቁጥጥርን መጠን እና ተጓዥኛ የሆኑ ችግሮችን ለመዳሰስ የተዋቀረ መጠይቅ

ለጥናቱ ተሳታፊዎች የሚሰጥ መረጃ

ጤና ይስጣልኝ

ስሜ ይባላል፡

በአሁኑ ሰዓት በወልቂጤ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ በነርቲንግ ትምህርት ክፍል ቅድመ ምረቃ ተማሪ ነኝ፡፡

ችግሮችን ለመመርመር የሚረዳ መጠይቅ እንዲሞሉ የሚጠየቁ ይሆናል፡፡

የእርሶን ተሳትፎ በጣም እና በረታታ ለን፡፡

ትብብር ያለው ለጥናቱ በጣም አስፈላጊ ነው፡፡ ስምዎ በመጠይቁ ላይ አይጻፍም እና ያቀረቡት ሁሉም መረጃዎች

በጥብቅ የሚሰጡ ይሆናሉ፡፡ እንደ ጥናቱ አካል የእርሶን ህብረ-ዊ እና ኢኮኖሚያዊ መረጃ እንዲሁም የስኳር ህመም

ስታዎችን ግብራቶችን ወስኖ ለጥናቱ የሚያደርጉትን እንክብካቤ በተመለከተ አንድ አንድ ጥያቄዎችን እጠይቅዎታለሁ

፡፡ እንዲሁም የህክምና መዝገብ

ላይ ሌሎችን መረጃ ለጥናቱ መጠቀም እንፈልጋለን፡፡

ማንኛውም የሚሰጡትን መረጃ በሚስጥር የተጠበቀው።

እርስዎ በዚህ ጥናት በመሳተፍ ጉዳት የሚያጋጠመዎት አይደለም እና ከእኛ ጋር ሊወያዩ ገደብ የሌለው ለሌሎች ገደብ የሌለው ሆኖ ይታወቃል።

በቃል ምልልሱ ሂደት ላለ መሳተፍ በማንኛውም ጊዜ ሊወሰኑ ማቋረጥ የሚችሉ ጉዳዮችን ለማስወገድ ገልጸው ይገባል።

በጥናቱ ላይ ለመሳተፍ ቆይታዎን በመሆነዎ የሚያገኙት የተለየ ጥቅም የለም።

ባለ መሳተፍ ዎ ወይም አቋርጠው በመውጣት ዎ ያገኙት የሚገባዎትን የጤና ገልግሎት አያጡም።

መጠይቁን ለመሙላት ከ 10-15 ደቂቃ ሊፈጅ ይችላል።

ከአጠቃላይ የመረጃ ወረቀት ያገኙትን መረጃ ግምት ውስጥ በማስገባት ከጉዳዮች ጋር የተያያዙ ጥያቄዎችን ለመፍታት ከ እኛ ጋር የተወሰነ ጊዜ ቢያሳልፉ እና መሰጠት ለእርስዎ በዚህ ጥናት ውስጥ ለመሳተፍ ተስማምተዋል።

አሁን ቃለ መጠይቁን መጀመር እችላለሁ? አዎ አይደለም

የቃለ መጠይቁ ጠያቂ ስም ፊርማ ቀን _ / _ / _

ክፍል 1: ማህበረሰባዊ እና ግሊ ጥያቄዎች

ተ.ቁ	ጥያቄ	መልስ	
1,	ዕድሜ	_____ ዓመት (በቁጥር ይጻፍ)	
2,	ፆታ	1, ወንድ 2, ሴት	
3,	የትምህርት ደረጃ	1, መሠረታዊት/ት ያልተማረ/ች 2, 1ኛ ደረጃ ያጠናቀቀ/ች (1 - 8) 3, 2ኛ ደረጃ ያጠናቀቀ/ች (9 - 12) 4, ኮሌጅ/ዩኒቨርሲቲ ያጠናቀቀ/ች	
4,	ሃይማኖት ዎ ምን ይሆናል?	1, ፕሮቴስታንት 2, ኦርቶዶክስ 3, ሙስሊም 4, ካቶሊክ	
5,	የጋብቻሁ ነታ	1, ያላገባ/ች 2, ያገባ/ች	

		3, የፈታ/ች 4, የሞተበት/ባት	
6,	የስራሁኔታ	1, ስራ የሌለው/ለት 2, የመንግስት ሰራተኛ, / የግል ሰራተኛ 3, የቤት እመቤት 4, ነጋዴ 5. አርሶ አደር	
7,	በየወሩ ምን ያህል ገቢ ያገኛሉ? (በኢትዮጵያ ብር)	
8,	የመኖር ያስፍራ	1, ከተማ 2, ገጠር	
9,	የጤና አገልግሎት ሁኔታ	1, በነፃ 2, በክፍያ	

ክፍል 2: -ከስኳር በሽታ ጋር ተያያዥ ጥያ

1	የስኳር በሽታ ታማሚ ከሆኑ ምን ያህል ጊዜ ሆነዎት? , _____ ዓመት (በቁጥር ይጻፍ)		
2	በቤተሰብ ውስጥ ከእርሶ ልላ የስኳር ታማሚ , አለ? (እናት/አባት...)	1, አዎ 2, የለም	
3	የስኳር በሽታ አይነት	1, 1ኛ ደረጃ የስኳር ዓይነት 2, 2ኛ ደረጃ የስኳር ዓይነት	
4	የሚወስዱት የመድሃኒት (ህክምና) አይነት	1, የሚዋጥክኒን 2, በመርፈ የሚወሰድ ኢንሱሊን 3, የሁለቱም ድብልቅ 4, የአመጋገብ ስርዓት ለውጥ/ ስፖርታዊ እንቅስቃሴ ማድረግ ብቻ	
5	ተንቀሳቃሽና በቀላሉ የደም ስኳር መጠንን ገለጻል የሚያስችል መሳ , ርያ (Glucometer) ተጠቃሚ ነዎት?	1, አዎ፣ የራሴ አለኝ 2, የለኝም	
6	በሳምንት ለምን ያህል ጊዜ የስኳር መጠን ይቆጣጠራሉ	1, በሳምንት ከ 3 ጊዜ በታች 2, በሳምንት 3 እና ከዚያ በላይ	

7 ,	የስኳርበሽታታማሚበመሆኖያስከተለብዎትሌላየጤናችግርአለ?	1,አዎ 2, የለም መልሱ አዎ ከሆነ ከተዘረዘሩት ምልክት አድርጉ 1, የአይንችግር 2, የኩላሊትችግር 3, ልብናከልብጋርየተያያዙችግር ች 4, የገረብችግር (መጠዝጠዝ/መደንዘዝ) 5, የእግርቁስለት 6> ከፍተኛ/ዝቅተኛ የደም የስ መጠን 7 8	
8 ,	ከስኳርህመምሌላተጓዳኝየጤናአክልአለብዎት?	1,አዎ 2, የለብኝም መልሱ አዎ ከሆነ ከተዘረዘሩት ምልክት አድርጉ 1, የደም ግፊት 2, የልብ ችግር	

ክፍል 3:- የባህሪ ተያያዥ ጥያቄዎች

1 ,	በዓመትስንትጊዜየስኳርህመምንክትትልወደሚደረገውጤናተቋምይሄዳሉወይምበዓመትስ ንትጊዜወደዚህክሊኒክክትትልያደርጋሉ?	በዓመት ከ 3 እና 3 ጊዜ በታች
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		<input type="checkbox"/> በዓመት ከ 3 ጊዜ በላይ <input type="checkbox"/>	
2	ባለፉት 12 ወራት ወስን የአልኮል መጠጥጥ ተሳታፊ ነህ/ሽ?	1. አዎ 2. አላቅም መልሱ አዎ ከሆነ ወደ ቀጣይ ይለፉ	
3	ባለፉት 12 ወራት ወስን የምንጥላለን ሌሊት ስንደገፍ የአልኮል መጠጥጥ ነህ/ሽ	1, በየቀኑ 2, በሦስት ከ 5-6 ጊዜ 3, በሦስት ከ 1-4 ጊዜ 4, በወር ከ 1-3 ጊዜ 5, በወር ከ 1 ጊዜ በታች	
4	ባለፉት 7 ቀን ውስጥ ሲጋራ አጭሰዋል	1, አዎ አጭሰዋለሁ 2, በፊት አጭሰዋለሁ	

		ሰነበር 3, አላጨስም 4, አቁምያለ ሁ	
5	መልሱአዎከሆነበአማካኝበቀንስንትጊዜሲጋራያጨሳሉ ,	1,በቀን 1 ሲጋራ 2,በቀን ከ 1 ሲጋራ በታች	
6	የታዘዘሎትንመድሃኒትሳይረሱበአግባቡናበሰዐቱየመውሰድልምዶእንዴትነው? ,	1, ጥሩነው (በሳምንት 7 ጊዜ) 2, ጥሩአይደ ለም (በሳምንት ከ 7 ጊዜ ያነሰ)	
7	ጤናማናየተስተካከለአትክልትናፍራፍሬንያማከለየአመጋገብሰርዐትምንያህልይተገብራሉ? ,	1,በሳምን ትከ 3 ቀንበላይ 2, በሳምንትከ 0 - 3 ቀን	
8	የአካልብቃትእንቅስቃሴበሳምንትምንያህልጊዜያደርጋሉ? _____ :: ,	1, ከ 3 ቀንበላይ 2, ከ 0 - 3 ቀን	
9	የደምወስጥስኳርመጠንዎንለመቆጣጠርያስችሎዘንድያስቀመጡትየስኳርመጠንዎቅድ	1,አዎአለ	

,	(በቁጥር) አለ? "Glycemic targets goals (FBS/RBS)"	2, የለም	
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