ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE

KNOWLEDGE, ATTITUDE, PRACTICES, AND ASSOCIATED FACTORS TOWARDS GLYCEMIC CONTROL AMONG DIABETES MELLITES PATIENTS IN TIKUR ANBESSA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA,2021.

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Declaration:

I the undersigned declared that this thesis is my original work, has not been presented for a degree in this or any other university, and that all sources of material used for the thesis have been fully acknowledged.

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LIST OF ACRONYMS and ABBREVIATIONS

AOR: Adjusted Odds Ratio IX

BSc: Bachelor Of Science 12

CI: Confidence Interval 13

COR: Crude Odds Ratio 13

DKA: Diabetes Ketosis Acidosis 1

DM: Diabetes Mellitus VIII

Dr.: Doctor II

EMCC: Emergency Medicine And Critical Care I

Epi-data: Epidemiological Data 13

ETB: Ethiopian Birr I

GFR: Glomerular Filtration Test 2

HbA1c: Hemoglobin A1c 2

HHS: Hyperglycemic Hyperosmolar State 1

IDF: International Diabetes Federation 3

KAP: Knowledge Attitude Practice VIII

LSM: Lifestyle Modification 7

MD: Medical Doctor I

MSc: Master Of Science I

OGTT: Oral Glycemic Tolerance Test 2

Ph.D.: Doctor Of Philosophy I

p-value: Probability Value 13

SD: Standard Deviation IX

SMBG: Self-Monitoring Blood Glucose VIII

SPSS: Software Package For Social Sciences 13

TASH: Tikur Anbessa Specialized Hospital VIII

UAE: United Arab Emirates 5

WHO: World Health Organization 1

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ABSTRACT

Background: Diabetes mellitus, (DM) is a metabolic disorder characterized by hyperglycemia due to absolute or relative insulin deficiency and it remained the fourth leading cause of death worldwide. Hyperglycemia or high blood sugar is a common sign of uncontrolled diabetes and leads to severe damage. Poor understanding of the disease could affect glycemic control and result in preventable Diabetic complications. Accordingly, good knowledge, attitude, and practice of glycemic control are important to increased quality of life,minimize diabetes complications,and lower the incidence of death.

Objectives: -This paper detailed the cross-sectional study that measures knowledge, attitudes, and practices, and associated factors of diabetic patients about glycemic control.

Methods and Materials: A total of 361 were enrolled in the study, the recruitment tool place by using systematic random sampling techniques in one academic teaching hospital, Addis Ababa, Ethiopia. The knowledge, attitude, and practices were measured using standard structured questionnaires.

Result: Nearly half (48.8%) of the respondents were males. Good practice was independently associated with gender; accordingly, the male was 1.62 more likely to have good practice compare to their counterpart female gender (AOR=1.62, 95%CI: 1.005-2.62, p= 0.04). However, those participants between 18-35 age groups were 72 % less likely to have good practice verse to reference group followed by participants between the age group of 51-65 who were 51% less likely to have good practice towards glycemic control

Conclusion: -Despite they have experienced the event of the hyperglycemic and routine visit of a diabetic patientto a diabetes clinic; the knowledge, attitude, and practice about glycemic were found to be good.

Key words: -Knowledge, attitude, Practice, glycemic control, diabetes patients

1. INTRODUCTION

1.1. Background

Diabetes Mellitus (DM) is a metabolic disorder characterized by hyperglycemia due to absolute or relative insulin deficiency. It is resulted from metabolic abnormalities of carbohydrate, fat, and protein to cause microvascular, macrovascular, and neuropathic complications(1).

According to 2016 data from the world health organization (WHO) an estimated 422 million adults were living with diabetes worldwide, an increase in the overall prevalence of diabetes is largely due to an increase in risk factors of being overweight or obese, and with the above number, it willproject to double by 2030(2).

In Africa, an estimated 12.1 million people were living with diabetes in 2010, which is expected to increase by 2030 to 23.9 million(3). According to the systematic review of different studies conducted from 2000 up to 2016 the prevalence of diabetes in Ethiopia was (2-6.5%)(4).

TheAmerican Diabetes Association recommends routine self-monitoring blood glucose for DM patients, with an important goal of maintaining the blood glucose levels near the normal range of 70 to 120 mg/dl pre-meals and below 140 mg/dl at 2 hours of eating. Patient self-care actionsliketaking medication following a meal plan, regular exercise, and testing blood glucose influence diabetes control (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).

DM is classified mainly as type 1 and type 2 diabetes mellitus. Type 1 DM results from autoimmune destruction of insulin-secreting beta 2 pancreatic cells which cause absolute insulin deficiency and type 2 diabetes results in relative insulin deficiency or insulin resistance. Symptoms associated with hyperglycemia (high blood sugar) mainly include frequent urination, increased thirst, and increased hunger for which if left untreated, can lead to life-threatening complications like diabetic ketoacidosis (DKA), hyperglycemic state (HHS), cardiovascular disease, chronic kidney disease, foot ulcers, eyes damage, or death(6).

Laboratory tests are used both toscreen for diabetes, and to monitor ongoing management in those with diabetes. Screening bloodtests include random blood glucose, fasting blood glucose, OGTT, HbA1c, and urine testing for microalbuminuria is used to look for signs of diabetes complications. Different laboratory investigationsare available for checking blood glucose control over the short, long, and intermediate term tohelp the success of a management plan. Routinefootand eye exams, along withblood pressure, microalbuminuria, lipids, and creatinine/GFR testing are recommended to identify theonset and monitor the progress of these complications(7).

Diabetes is a chronic illness it requires a sound knowledge of glycemic control from the patients and it can provide appropriate self-care management commonly in the tight schedule of blood glucose motoring, proper use of medication, and adjustment to dietary and physical activity conditions(8).

In general, diabetes is becoming a serious public health problem it requires continuous medical care, patients' self-management, education, and adherence to prescribed medication to reduce the risk of long-term complications (9).

1.2. S**tatement of the problem**

Diabetes has remained the fourth leading cause of death worldwide, which attributes to about 3.8 million deaths(10).It is one of the fastest-growing global health emergencies of the 21st century(11). According to the International Diabetes Federation (IDF) report in 2019, an estimated 463 million adults aged 20-79 years worldwide have diabetes and this figure will project to be 578.4 million, and 700.2 million by 2030 and 2045 respectively(12). Ethiopia is placed fourth among the top five countries of IDF Africa members (32 countries), having 1.7 million people with diabetes (age 18-99) (12).

Hyperglycemia or high blood sugar is a common sign of uncontrolled diabetes and leads to severe damage to many of the body systems, mainly to nerves and blood vessels (13). As reported by the previse scholars the prevalence of DM has increased dramatically in most countries in the world, especially in low and middle-income countries which have been associated with an increase in age, urbanization, lifestyle change, physical inactivity, and obesity (14).It has been reported that the rate of diabetes increase in number is expected in low-income countries(92%) followed by middle-income countries with(57%)(11). Ethiopia is a low-income country that is not shielded from the increase in the prevalence and complications of DM.Poor understanding of the disease could affect glycemic control and result in preventable DM complications(15).

As reported from the previousrelevant study donein Gondar,educational status, occupational status, and marital status were significantly associated with the level of attitude of respondents towards glycemic controls(16). Formal education, adequate information, and good knowledge of DM shows positively associated with dietary therapy, and glycemic control(17). Similarly, there was a positive correlation between diabetes knowledge and glycemic control(18). Better glycemiccontrol is associated with disease control and decreased health care resource utilization in patients with diabetes mellitus(19).

The status of DM patients at TASH hospital needs to be evaluated. Additionally, the lengthy patients' visit time tothe hospital every three or six month’sinterval for their medication refills,usually, their knowledge, attitude, and practice of glycemic controls are not being addressed properly. Furthermore, assessment of the current knowledge, attitude, and practice, levels among participants living with diabetes will aid in the future development of glycemic control programs. Therefore, this study aims to assess the level of knowledge, attitude, practice, and associated factors towards glycemic control among diabetes patients inTikur Anbessa specialized hospital, Addis Ababa, Ethiopia.

1.3. Significance of the study

The study on knowledge, attitude, practices, and associated factors towards glycemic control among diabetes patients having follow-ups at the diabetic clinic of TASH provides information on up to date glycemic control which is important for the assessment of treatment strategies and lifestyle modifications to achieve optimal blood sugar control, and to prevent diabetes-related complications.

Diabetes mellitus needs competent self-care, which can be established from the understanding of the disease progression, and the management challenges by the patient or family members. This study will help in identifying diabetic patient's knowledge attitude and practice gaps in checking blood glucose levels. It assesses the importance of good glycemic control to lower health care costs, lower hospitalization rates, minimize diabetes-related complications, increased quality of life, and lower incidence of death.

This study will help to see the gaps that lead to the possible reasons for poor glycemic control of diabetics patients, likelack of adequate human power, lack of awareness, and poor adherence.And itwill also help the patients to practice good glycemic control by addressing the knowledge, attitude, and practice gaps towards glycemic control.

This study will help policymakers at the federal ministry of health in Ethiopia to develop guidelines and protocols. It willhelp physicians to look into regular follow-up schedules andto know the practice states of a diabetic patient. Finally, this study will serve as a reference for local, regional, and international researchers and health care providers in diabetes-related mainly in the assessment of KAP of glycemic control among diabetic patients. Tikur Anbesa Specialized Hospital will use this result for improving its service provision and arrange appropriate diabetic follow-up, care centers, developing guidelines and protocols for improving the care for diabetic patients.

2. LITERATURE REVIEW

2.1. KNOWLEDGE OF GLYCEMIC CONTROL

A study was done on 575 types 2 diabetes patients in the United Arab Emirates (UAE) revealed good knowledge of diabetes in 33% of respondents (20). A study was done in Sri Lanka out of 277 participants, a majority (77%) knowledge about diabetes(21). Another study was done in Pakistan showed 45 % of the respondents had good knowledge of diabetic complications and monitoring(22).

According to the study conducted in south-Africa(90%) of study, participants had knowledgeable on the common signs symptoms ofhigh blood glucose(23).

A cross-sectionalstudy had done amongdiabeticpatients who visited Jimma medical center and from the total study respondent (63.3%) hade showed good knowledge towards diabetes self-care. (24)Another study was done in Mekelle ayder comprehensive specialized hospital about self-care related knowledge assessment among the diabetes patients nearly 238(70.4%)of respondents had good knowledge(25).

A similar study wasdone at the University of Gondar hospital (62%) of respondents had good knowledge regarding glycemic control(16).In addition to that, there was a study done in Gondar university hospital about lifestyle modification among diabetes patients, and the study showed(59%) of the respondents were knowledgeable(26).

In Felege-Hiwot hospital, an institutional-based cross-sectional study was conducted among 410 diabetic patients, only (49.8%) of them had good knowledge about diabetes(8). Another cross-sectional similar study was done in Adama medical college regarding lifestylemodification management among diabetespatients and from the total respondents, most of the respondents were knowledgeable by scored around (77.59%) of had good knowledge (27).And according to the study conducted among diabetes patients in Ambo University Referral Hospital, the result showed (55.2%) of respondents had good knowledge about diabetes(28).

2.2. ATTITUDE OF GLYCEMIC CONTROL

A study was done among diabetes patients in the United Arab Emirates (UAE) it showed about (28 %) of respondents had positive attitudes towards diabetes(20) A similar study was done in Mekelle ayder Referral hospital among diabetes patients and from the total participants(70.4%) of respondents had a good attitude towards diabetes self-care(25).

A cross-sectional study was done among diabetic patients who visited Jimma medical center and from the total study participants(59.6%) of respondents had a positive attitude towards diabetes self-care(29).According to a similar study conducted in Gondar Hospital from 403 diabetes patients, above half (67.2%)of respondents had a good attitude, towards glycemic control (16). Another study was done in Gondar teaching hospital among diabetes patientsregarding insulin therapy (78%) of the participants had a positive attitude towards insulin therapy(30).

A similar study was done in Adama medical college regarding lifestyle modification among diabetes patients and from the total participants (81.89%), and (18.11%) of respondents had a positive and negative attitude towards diabetes self-care respectively(27). A recent cross-sectional study was done among 248 diabetes patients who visited Ambo University Referral Hospital and the study stated nearly half (47.2%) of respondents had shown a poor attitude towards diabetes(28). Another study was conducted among diabetic patients in Addis Zemen hospital from the total participants, above half (65.2%), of respondents, had a good attitude towards diabetes(31).

2.3. PRACTICE OF GLYCEMIC CONTROL

A study was conducted in Sri-lanka in 277 diabetes patients, and the study showed half (50%)of diabetes patients never practice blood sugar measurements,(65%) of respondents used to refined sugar,(80%) of respondents no regular exercise, and only (30%) had a constant screening for DM with yearly blood glucose measurements(21).A cross-sectional study was done in the Endocrinology center in Nepal among diabetes patients, and the study showed,only(16 %)of respondents had a good practice, however(9.8 %),(16 %), and (17.6 %)of respondents were smoker, alcoholicand no practice of physical activity respectively(32).

A study was conducted in Kenyan among diabetes patients regarding the practice of the HbA1C test, from the total participants, only (20.2%)of respondents had done it only at one point while (79.8%) had never make HbA1C test(7).

A similar study was done at the University of Gondar Hospital in 403 diabetes patients from the total respondents more than half (74.4%)of respondents had good practice towards glycemic control (16). Another study was done in Gondar teaching hospital among diabetes patients regarding insulin therapy (54.7%) of respondents had monitored their blood glucose every month, and (30.7%) of the respondents had missed their insulin therapy at a different time(30).

A cross-sectional study was conducted in Addis Zemen hospital from the total study participants only (48.8%) of respondents hadgood practice towards diabetes (31).Another study was done in Adama medical college regarding lifestyle modification management among diabetes patients merely(49.1%)of respondents had good practice towards LSM(27).

A study was done in Ambo Referral Hospital among diabetes patients, andabove half 157 (63.3%) and 167(67.3%) of respondents had a practice of eating fruit or vegetable and checking blood glucose regularly (28).According to the study conductedin west Ethiopia regarding diabetes self-care practice among diabetes patients above half (69.4%) and (63.5%) of the study, respondents had sufficient dietary plans and daily regular exercise practice respectively. However, from the total respondents only (15.1%) had reported sufficient blood glucose monitoring or testing practices(33). Another study was done regarding self-care practice among diabetes patients in TASH,and the study showed (78.8%) of respondents had not followed diet modification practices(34).

2.4. **FACTORSASSOCIATED KAP OF GLYCEMIC CONTROL**

According to the study conducted in Sri Lanka among diabetes patients, level of education had shown positive, and significant association to knowledge, (P=0.001), but the association in sex and age had showed not significant(21).

A similar study was done at Gondar hospital in 403 participants, the resultshowed marital status, and Occupational status had significantly associated with knowledge, attitude, and practice towards diabetes(16). Another study was conducted in Felege-hiwot hospital, in 410 patients, from the total study respondents, the lower age group had shown significantly associated with good practice and knowledge on diabetes when it compares with the age of 50 years and above(8).A study was done among diabetes patients in Ambo referral hospital, and it showed sex, occupational status, level of education, income, and duration of diabetes therapy were the common factors affecting knowledge, attitude, and practice of diabetespatients (27).

Another study was done inTASH among diabetes patients, and it showed a significant association between age, marital status, having glucometer, monthly income, educations, gender, and self-care practices. However, the study had not shown a significant association between occupation, family history of diabetes, duration of diabetes, and self-care practices(34).

3. OBJECTIVES

3.1. General objective

- ✓ To assess knowledge, attitude, practices, and associated factors towards glycemic control among diabetes mellitus patients inTikurAnbessa Specialized hospital, Addis-Ababa, Ethiopia 2021.

3.2. Specific objectives

- ✓ To assess the level of knowledge towards glycemic control amongdiabetes patients in TASH, Addis-Ababa, Ethiopia 2021.
- ✓ To assess thelevel ofattitude towards glycemic control amongdiabetes patients inTASH, Addis-Ababa, Ethiopia 2021.
- ✓ To assess the level of practice towards glycemic control amongdiabetes patients in TASH, Addis-Ababa, Ethiopia 2021.
- ✓ To assess factors associated with knowledge, attitude, and practice of glycemic control among diabetes patients in TASH, Addis-Ababa, Ethiopia 2021.

4. METHODS AND MATERIALS

4.1. Studyarea

This study was conducted at Tikur Anbesa Specialized hospital. The hospital is found in the capital city of Ethiopia-Addis Ababa, Lideta sub-city. The hospital was inaugurated in 1972 and it is a referral hospital. It becomes a university hospital in 1998 which gives specialized clinical services for around 370,000 to 400,000 patients per year. The hospital contains the largest outpatient diabetes center and itgives service for around 102 diabetic patients per day for a fixed working day of Monday and Wednesday. It has 6 Nurses and some residents, specialists, and subspecialists who provide service and receive training in the DM center.

The study site was selected because Tikur Anbessa specializedhospital is the largest referral hospital in Ethiopia and it provides clinical services for a large number of diabetes patients who come from different places of our country so, that the study is considered representative.

4.2. Study period

The study was conducted from March21/03/ 2021 to April21/04/ 2021 EC.

4.3. Study Design

An institutional-based cross-sectional study was applied.

4.4. Population

4.4.1. Source Population

All diabetes patients who visitedTikur AnbesaSpecialized hospital were the source population.

4.4.2. Study population

Patients with type 1 and type 2 diabetes mellitus who visited Tikur Anbessa specialized hospital diabetes center for follow-up and met the inclusion criteria during the study period.

4.5. Inclusion and exclusion criteria

4.5.1 Inclusion

All type one and type twodiabetes patients'≥18years oldand who volunteered to participate in the study were included.

4.5.1. Exclusion

Participants with the following conditions were excluded:

- ✓ Those patients who were unable to provide the appropriate information
- ✓ Gestational DM
- ✓ Patients who had follow-ups using telephone/other social medias

4.6. Study Variable

4.6.1. Dependent variables

- ✓ Knowledge
- ✓ Attitude
- ✓ The practice of diabetes patients towards glycemic control.

4.6.2. Independent variables

- ✓ Socio-demographic variables: Age, Sex, occupational status, monthly income, marital status, place of residency, andeducational level.
- ✓ Health profile related variable: -family history of diabetes,duration of diabetes mellitus therapy, member of diabetes association, and source of information for theirtherapy.

4.7. Sample size and sampling techniques

4.7.1. Sample size

The sample size was calculated using a single population proportion formula, assuming a 95% confidence interval, 5% margin of error (d), and the 62% proportion of good glycemic control knowledge of 62% from a study conducted in Gondar (16),comes to a total of 362. By adding a 10% nonresponse rate finally yielded a sample of 398.

- ✓ Confidence interval= 95%
- ✓ Margin of error (d) = 5%
- ✓ Non-response rate = 10%
- ✓ The formula for calculating the sample size (n) is:

$$n = \frac{(Za/2)^2 P \times (1-P)}{d^2}$$

- ✓ Where:
- ✓ n= sample size
- ✓ Z (a/2) = Z-score at 95% confidence interval = 1.96
- ✓ P (proportion 62%, 67.2%, and 74.4%)
- ✓ 1-P=Q
- ✓ d= marginal error=0.05 (5%)
- ✓ Therefore, n becomes:
- ✓ n= (1.96)2 x (0.62 x 0.38)/ (0.05)2 or n=(1.96)2 × (0.672× 0.328)/(0.05)2 or n= (1.96)2 × (0.744 ×0.256)/(0.05)2
- ✓ n=362, or 339 or 293 respectively with knowledge, attitude, and practice.
- ✓ With the above assumptions and taking the largest number calculated, the overall sample size was = 362 + 36 (10 % non-response rate) = 398 (diabetic patients).
- ✓ The study wastaking the maximum sample size with the highest number of study participants =**398.**

NB: The Sample size was calculated using a similar formula for both the attitude (336) and practice (312, but I took the maximum sample size **(398)** using knowledge to ensure maximum representation of DM patients who hadfollow-ups visit in TASH.

4.7.2. Sampling Technique

Study participants were selected using a systematic random sampling technique with the use of a list of record orders in the follow-up logbooks. With systematic sampling k=N/nf =816/398= 2 Where k is samplingfraction. The first study participant was selected using the lottery method from the sampling frame arranged in order, while the subsequent study participant was identified by successively adding the constant 2 to the starting random number until the total sample size was reached.

4.8. Operational definition

Good knowledge: when patients respond ≥50% score on knowledge questions.

Poor knowledge: when patients respond less than 50% score on knowledge questions.

Positive attitude: when patients respond to the mean or above the mean score on attitude respond questions.

Negative attitude: when patients respond below the mean score on attitude respond questions.

Good practice: when patients respondto the mean or above the mean score on practicerespond questions.

Poor practice: when patients respond below the mean scoreon practice respond questions.

4.9. Data collection tools and procedure

Data was collected using an interviewer administering a standardized structured questionnaire. The Questionnaire was adapted from previous relevant literatureKAP of glycemic control with some modifications(16). The questionnaire contains different items like socio-demographic variables in the first part. The next parts include knowledge, attitude, and practice questions. A scoring system was developed for each knowledge, attitude, and practice question. The knowledge part has 10 general questions on diabetes with a maximum of 24correct responses. The attitude part of the questionnairehas 10questions,with a five-point Likert scale.Each response was given a specific weight which ranges from one (for strongly disagree) to five-point (for strongly agree) with a maximum score of 50.And the practical part of the questionnaire contains 10questions with a maximum of 10 correct responses. Each correct answer was given a score of one and each wrong answer was given a score of zero. The different categories weredefined based on their scores for each participant. Good knowledge (a score of 50% and above), poor knowledge (a score of less than 50%) of knowledge questions(16).Positive attitude (≥the mean score on attitude respond questions), negative attitude (< the mean score on attitude respond questions)(29).Good practice (≥ the mean scoreof practice respond questions), and poor practice (<the mean score of practice respond questions) (29). Five BSc nurses were involved in data collection and The principal investigator wasproviding orientation before the data collection begins to the data collectors. Informed verbal consent was taken from study participants before the actual data collection starts.

4.10. Data Quality Assurance

A Pretest was carried out on 5% of the sample size on randomly selected individuals on patients with diabetes mellitus who were on follow-up at Saint Paul hospital before the actual data collection wasstarted. And necessary modifications were done accordingly. Training for data collectors & supervisors was given before the data collection period. The Supervisor was closely observing data collectors during the data collection period. All questionnaires were checked daily for completeness according to predesigned specifications by the supervisor and principal investigator and errors were corrected instantly.

4.11. Data processing and Analysis

The data were cleaned, coded, entered into Epi-data 3.2, and exported into SPSS 26 version for analysis. Descriptive statistics including (mean, standard deviation, percentage, and frequency)and analytic statistics were used. Binary logistic regression was used to identify any association between the dependent and independent variables. The Crude Odds Ratio (COR) with 95% CI was estimated in the bivariate analysis to assess the association between each independent variable and the outcome variables. Variables with a p-value<0.25 on binary logistic regression analysis were subjected to multivariate logistic regression analysis. Adjusted Odds Ratio (AOR) with a 95% CI was estimated to assess the strong association with KAP of glycemic control. A p-value less than 0.05 was considered significant.

4.12. Ethical consideration

Permission and approval to carry out the research was sought from Addis Ababa University College Health Science ethical clearance committee through the department of Emergency Medicine. The research purpose, its benefits, and the procedures were explained for each respondent. In addition to that, verbal consent was obtained from all study subjects. Confidentiality and privacy were strictly maintained and the filled questionnaire was kept on a lockable shelf not to be accessed by an unauthorized person.

4.13. Dissemination of result

The final research thesis was submitted to the department of emergency medicine, diabetes,and the college of health science, Addis-Ababa University. The results will be used as an important source of further research, for policymaking, and guideline development. Finally, the results will be published in renowned local and international journals.

5. RESULTS

5.1:-Socio-demographic characteristics of the respondent.

Three hundred sixty-one (361) diabetic patientshad participated in the study with a response rateof (90.7%).Nearly half 176(48.8%)of the respondents were males. The mean age was 51.64(±13.73) (±SD)year.Nearly three-fourths of the respondents264(73.1%) reside in Addis Ababa and the majorities 277(76.9%) of them were married. Concerning their educational status154(42.7%),of study respondents werediploma and above. And 152(42.1%) of the respondents had< 500 birr monthly incomes. In addition, 129(35.7%) of study respondents had Non-employee. Hundred seven (29.6%) of respondents had a family history of diabetes.More than half 215(59.6%) of respondents had> 5 years duration of diabetes therapy. In this study, only 142 (39.3%) of respondents had a membership in a diabetic society. The majority of the respondenthas got betterinformation about diabetes therapy from medical staff 303(83.9%)(**See Table1)**

Table 1: Socio-demographic characteristics of diabetes patientsat Tikur Anbesa specialized hospital 2021 (n=361)

Variables	**=N (%)**
Sex	
Male	176 (48.8)
Female	185(51.2)
Age (years)	
18-35	52(14.4)
36-50	111(30.7)
51-65	133(36.8)
>66	65(18)
Marital status	
Never married	84(23.3)
Ever Married	277(76.7)
Place of residency	
Addis Ababa	264(73.1)
Outside Addis Ababa	97(26.9)
Educational status	
No-formal education	98(27.2)

Primary	49(13.6)
Secondary	60(16.6)
Diploma and above	154(42.7)
Occupation status	
Student	22(6.1)
Government employee	61(16.9)
Private enterprise employee	73(20.2)
Daily laborer	26(7.2)
Merchant	50(13.9)
Non-employed	129(35.7)
Monthly income ETB	
<500	152(42.1)
500 – 1000	28(7.8)
1001 – 5000	121(33.5)
>5000	60(16.6)
Family history of diabetes(yes)	107(29.6)
Duration of DM therapy (years)	
<2 years	28(7.8)
2- 5years	118(32.7)
>5years	215(59.6)
DM association member(yes)	142(39.3)
Source of information for DM therapy	
Medical staff	303(83.9)
Media and self-reading	58(16.1)

5.2. Level of knowledge toward glycemic control

This study showed the majority, 322(89.2%) of respondents had good knowledge about glycemic control, while, 39(10.8%) of respondents had poor knowledge about glycemic control (**See figure 1**).

The majority, 317 (87.8%) of study participants define diabetes as a raised blood sugar. Eating too much fat or sugar, and family history of DM was mentioned as a risk factor of DM by 319(88.4%), and223(61.8%) respectively. In addition majority of respondents had good knowledge of signs and symptoms of hyperglycemia hypoglycemia. Most of the study respondents had good knowledge of the complication of DM.However, only 86(23.8%) of study respondents knew about chronic complications of DM like renal failure. And only157(43.5%) of study respondents knew their type of diabetes**(see Table 2).**

Table 2: knowledge questions about glycemic control among diabetes patients at Tikur Anbesa specialized hospital (n=361) 2021.

Variables	Yes=n (%)	No=n (%)
Do you know what diabetes is?		
Diabetes is a raised blood sugar.	317(87.8)	44(12.2)
Diabetes is a disease that affects any part of the body.	29(8.0)	332(92)
Don't know	15(4.2)	346(95.8)
Do you know what type of diabetes you have?	157(43.5)	204(56.5)
What are the risk factors of Diabetics? One or more answers?		
Obesity	151(41.8)	210(58.2)
Family history of diabetes	223(61.8)	138(38.2)
Eating too much fat and sugar	319(88.4)	42(11.6)
Cigarette smoking	77(21.3)	284(78.3)
Don't know	23(6.4)	338(93.6)
Diabetic can be detected through?		
Through blood examination or urine examination.	352(97.5)	9(2.5)
What are hyperglycemic conditions? (One or more answers.)		
Passing lots of urine	346(95.8)	15(4.2)
Excess thirst	324(89.8)	37(10.2)
Tiredness	255(70.6)	106(29.4)

Excess hunger	278(77)	83(23)
Do not know	7(1.9)	354(98.1)
Do you know the site of injections for insulin?	346(98.8)	15(4.2)
What is a hypoglycemic condition? (One or more answers).		
Nervousness	210(58.2)	151(41.8)
shakiness	305(84.5)	56(15.5)
light-headedness	308(85.3)	53(14.7)
blurred vision	308(85.3)	53(14.7)
Weakness	268(74.2)	93(25.8)
Don't know	10(2.8)	351(97.2)
Do you know the complications of DM if not treated well?		
One or more		
It causes eye problems	288(79.8)	73(20.2)
It causes renal problems	86(23.8)	275(76.2)
It causes neurological problems	186(51.5)	175(48.5)
Don't know	70(19.4)	291(80.6)
Which lifestyle modification do you think important for the control of Diabetics? (One or more answers)		
Exercise	236(65.4)	125(34.6)
Dietary modification	345(95.6)	16(4.4)
Weight reduction	185(51.2)	146(48.8)
Don't know	2(0.6)	359(99.4)
Monitoring of blood glucose level is vital for reducing Complication of DM	358(99.2)	3(0.8)

Level of knowledge toward glycemic control

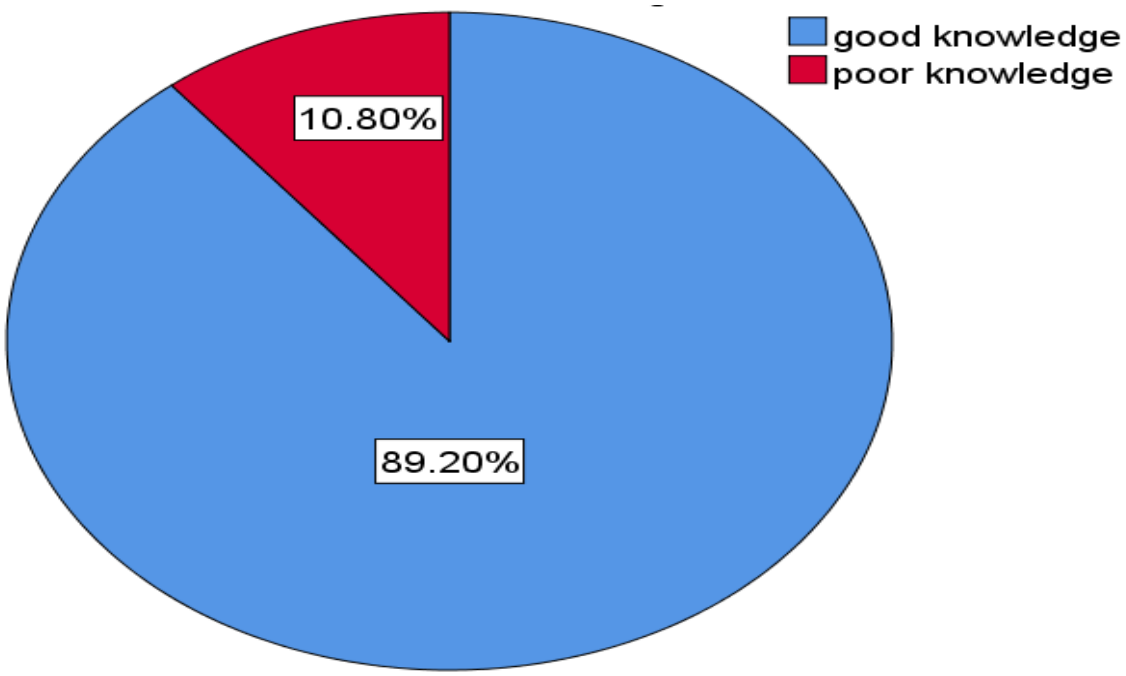

Figure 1: knowledge of diabetes patients towards glycemic control in TASH, Addis Ababa Ethiopia, 2021 (n=361).

5.2.1 Factors Associated with a level of Knowledge:

In bivariate logistic regression analysis, the factors found to be significantly associated with knowledge ofglycemic control with a p-value<0.25 were age, place of residency, educational status, occupation, monthly income, and duration of therapy. On the other hand, to control the effect of confounding variables, those variables with a p-value<0.25 were entered into multivariable logistic regression. Finally, a statistically significant association was declared at p-value< 0.05, and no significantly associated variable was found with the level of knowledge (**See Table 3).**

Table 3: Factors associated with a level of knowledge towards glycemic controls among DM patients at Tikur Anbesa specialized hospital, n=361, 2021.

Variables	Knowledge				
	good	Poor	COR 95%CI	AOR95% CI	p-value
Age group					
18-35	46	6	0.47(0.16,1.33)	0.38(0.06,2.26)	0.29
36-50	105	6	0.20(0.07,0.57)	0.44(0.11,1.73)	0.24
51-65	120	13	0.39(0.17,0.89)	0.55(0.18,1.41)	0.21
>66	51	14	1.00	1.00	
Place of residency					
Addis Ababa	231	33	1.00	1.00	
Out of Addis Ababa	91	6	0.46(0.18,1.13)	0.51(0.18,1.44)	0.21
Education status					
No-formal education	81	17	1.00	1.00	
Primary	43	6	0.66(0.24,1.81)	0.72(0.25,2.06)	0.59
Secondary	50	10	0.95(0.40,2.24)	1.23(0.38,3.99)	0.72
Diploma and above	148	6	0.19(0.07,0.50)	0.22(0.03,1.57)	0.13
Occupations					
Student	19	3	0.76(0.20,2.82)	0.98(0.13,6.932)	0.98
Government employee	57	4	0.34(0.11,1.03)	20.98(0.57,768.26)	0.09
Private enterprise employee	70	3	0.20(0.06,0.72)	12.10(0.31,468.33)	0.18
Daily laborer	24	2	0.34(0.08,1.84)	2.21(.08,59.59.86)	0.63
Merchant	45	5	0.54(0.19,1.51)	8.31(0.30,229.68)	0.21
Non-employee	107	22	1.00	1.00	
Monthly income					
<500	126	26	1.00	1.00	
500-100	24	4	0.80(0.10,0.63)	0.35(0.01.10..34)	0.54
1001-500	115	6	0.25(0.10,0.63)	0.067(0.002,1.926)	0.115
>500	57	3	0.25(0.7,0.87)	0.06(0.002,1.92)	0.11
Duration of therapy					
<2 year	23	5	1.58(0.55,4.51)	1.60(.36,6.99)	0.52
2-5 year	110	8	0.52(0.21,1.20)	0.55(0.21,1.47)	0.23
>5 year	189	26	1.00	1.00	

***: p < 0.05, 1.00=reference**

5.3:- Attitude results toward glycemic control

More than half, 228(63.16%) of respondents had a positive attitude towards glycemic control. While 133 (36.84 %) of respondents had a negative attitude towards glycemic control. The mean (±SD) of attitude score for the respondents was 43.87±4.74 (rang: 29-50). The level of attitude of diabetic patientstowards glycemic control was dichotomized as positive with an attitude score of greater than or equal to the mean, and negative with an attitude score of less than the mean(**see figure 2**).

More than half227(62.9%), and 210(58.2%) of participants stronglyagreed that regular exercise and planned diet could help to control blood glucose levels respectively. In addition, Most of the respondents also strongly agreed thatsmoking and alcoholcould increase the complication of DM. However, only 68(18.8%) of study participants had responded stronglyagree for having HbA1c test might bring a positive effect on DM patients (**See Table 4).**

Table 4: Attitude questions about glycemic control among diabetes patient at Tikur Anbesa specialized hospital (n=361) 2021.

Variables	Response				
	Strongly disagree = n (%)	Disagree =n (%)	Somewhat agree=n (%)	Agree =n (%)	Strongly agree=n (%)
Regular exercise help to control blood glucose level	0.0(0)	0(0)	22(6.1)	112(31)	227(62.9)
Planed diet or Dietary modification help to Control Blood Glucose Levels	0.0(0)	0.0(0)	22(6.1)	129(35.7)	210(58.2)
Diabetes education is important to diabetic patients	0.0(0)	2(0.6)	16(4.4)	139(38.5)	204(56.5)
Having HbA1c Test might bring a positive effect on diabetic patients	2(0.6)	59(16.3)	160(44.3)	72(19.9)	68(18.8)
Blood sugar close to normal help to prevent the complications of diabetes	0.0(0)	1(0.3)	22(6.1)	170(47.1)	168(46.5)
Having a regular Blood Glucose Test bring a positive effect on diabetic patients	0.0(0)	0.0(0)	16(4.4)	175(48.5)	170(47.1)
Maintaining health Wight is important					

for glucose control	0.0(0%)	0.0(0)	24(6.6)	145(40.2)	192(53.2)
A diabetic complication can prevent if medication takes as prescribed.	0.0(0)	0.0(0)	19(5.3)	130(36)	212(58.7)
Alcohol drinking increases the complication of diabetes	0.0(0)	4(1.1)	47(13)	109(30.2)	201(55.7)
Smocking increase complication of diabetes	0.0(0)	0.0(0)	7(1.9)	113(31.3)	241(66.8)

Level of attitude toward glycemic control

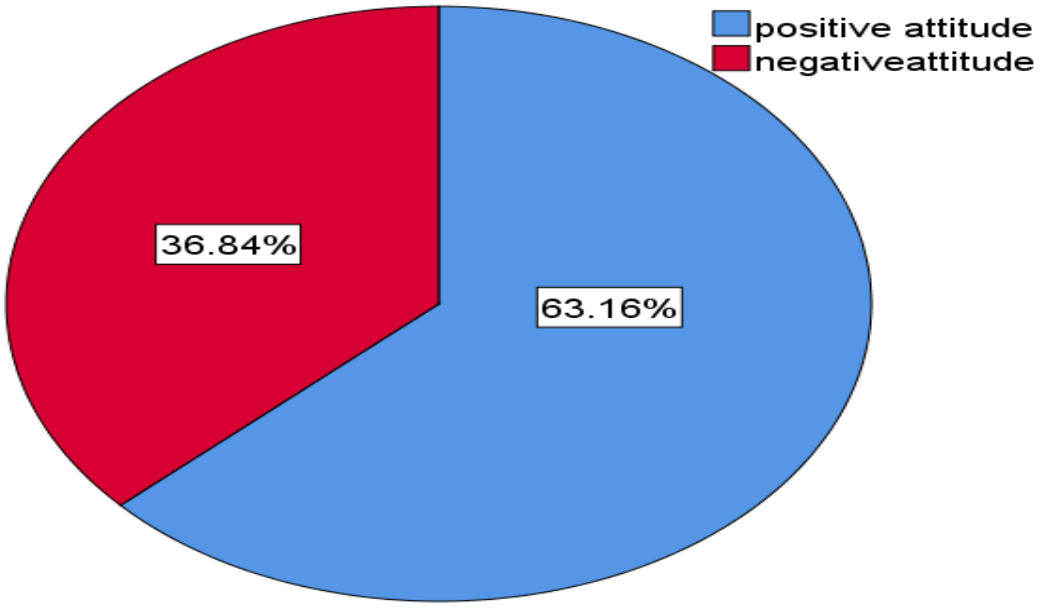

Figure 2: attitude of diabetes patients towards glycemic control in TASH, Addis Ababa Ethiopia, 2021 (n=361).

5.3.1 Factors Associated with a level of attitude

In bivariate logistic regression analysis, the factors found to be significantly associated with a level of attitudes towards glycemic control with p-value<0.25, were age, place of residency, educational status, occupations, monthly income, and duration of therapy. On the other hand, to control the effect of confounding variables, those variables with a p-value <0.25, were entered into multivariable logistic

regression. Finally, a statistically significant association was declared at p-value < 0.05, and no significantly associated variable was found with the level of attitude **(See Table 5).**

Table 5: Factors associated with a level of attitude towards glycemic controls among diabetes patients at Tikur Anbesa specialized hospital, n=361, 2021.

Variables	Attitude				
	Good	Poor	COR 95%CI	AOR95% CI	p-value
Age group					
18-35	28	24	0.78(0.37,1.62)	0.42(0.11,1.60)	0.20
36-50	78	33	0.38(0.20,0.72)	0.52(0.21,1.27)	0.15
51-65	91	42	0.42(0.22,0.77)	0.59(0.29,1.18)	0.14
>66	31	34	1.00	1.00	
marital status					
Never married	48	36	1.00	1.00	
Ever married	189	97	0.71(0.43,1.18)	0.83(0.33,2.09)	0.14
Place of residency					
Addis Ababa	174	90	1.00	1.00	
Out of Addis Ababa	54	43	1.54(0.95,2.47)	1.52(0.86,2.70)	0.147
Education level					
No-formal education	51	47	1.00	1.00	
Primary	21	28	1.44(0.72,2.88)	1.41(0.67,2.96)	0.35
Secondary	32	28	0.94(0.49,1.80)	1.26(0.53,2.99)	0.59
Diploma and above	124	30	0.26(0.15,0.46)	0.40(0.14,1.13)	0.08
Occupations					
Student	12	10	0.77(0.31,1.91)	0.71(0.19,2.68)	0.71
Government employee	50	11	0.20(0.09,0.42)	2.29(0.13,40.02)	0.57
Private-employee	57	16	0.26(0.13,0.49)	2.80(0.16, 47.88.)	0.47
Daily laborer	9	17	1.74(0.72,4.20)	2.75(0.17,44.66)	0.47
Merchant	38	12	0.29(0.14,0.61)	1.07(0.07,16.14)	0.95
Non–employee	**62**	**67**	1.00	1.00	
Monthly income					
<500	**74**	**78**	1.00	1.00	
500-1000	**10**	**18**	1.70(0.74,3.93)	0.47(0.28,8.12)	0.60
1001-5000	98	23	0.22(0.12,0.38)	0.23(0.01,3.47)	0.29
>5000	46	14	0.28(0.14,0.56)	0.29(0.01,4.64)	0.38
Duration of therapy					
<2 year	**10**	**18**	3.72(1.63,8.49)	2.12(0.76,5.87)	0.14
2-5 year	73	45	1.27(0.79,2.04)	1.03(0.59,1.92)	0.82
>5 year	145	70	1.00	1.00	

***: p < 0.05, 1.00=reference**

5.4:- practice results toward glycemic control.

More than half, 213 (59 %) of respondents had good practice towards glycemic control. While 148 (41 %) of respondents had poor practice towards glycemic control.The mean ±SD of the practice score for the respondents was 4.96 ±1.48 (range: 2-9).The level of practice of diabetic patients towards glycemic control was dichotomized as positive with a practice score of greater than or equal to the mean, and negative with a practice score of less than the mean (**see figure 3**).

This studyshowed 212(58.7%) of study participant takes their medication at the proper time as prescribed. In addition,189(52.4%) of study respondents attend regular diabetes patient education programs.However, this study showed, only125 (34.6%) and159(44%) of respondents had a practice of eating vegetables and doing daily exercise respectively. Plus a majority of 279(77.3%) of respondents had not checked their HbA1c level according to their appointment, and also 245(67.9%) of respondents had not used a self-blood glucose monitoring machine(**See Table 6).**

Table 6: practice result toward glycemic control among diabetes patient at Tikur Anbesa specialized hospital (n=361) 2021.

Variables	**Response**	
	Yes n (%)	**No n (%)**
Do you eat vegetables or fruits daily?	125(34.6)	236(65.4)
Do you do daily exercise for controlling your blood glucose level?	159(44)	202(56)
Do you take your medication as prescribed?	212(58.7)	149(41.3)
Are you trying to reduce/maintain your weight?	167(46.3)	194(53.7)
Doyou add extra salt to your regular diet?	95(26.3)	266(73.7)
Do you drink alcohol?	145(40.2)	216(59.8)
Do you miss your blood glucose test	102(28.3)	259(71.7)
Doyou check your HbA1c level	82(22.7)	279(77.3)
Do you use a self- blood glucose Monitoring machine?	116(32.1)	245(67.9)
Do you attend a regular diabetes patient education program for your self–care monitoring?	189(52.4)	172(47.6)

Level of practice toward glycemic control

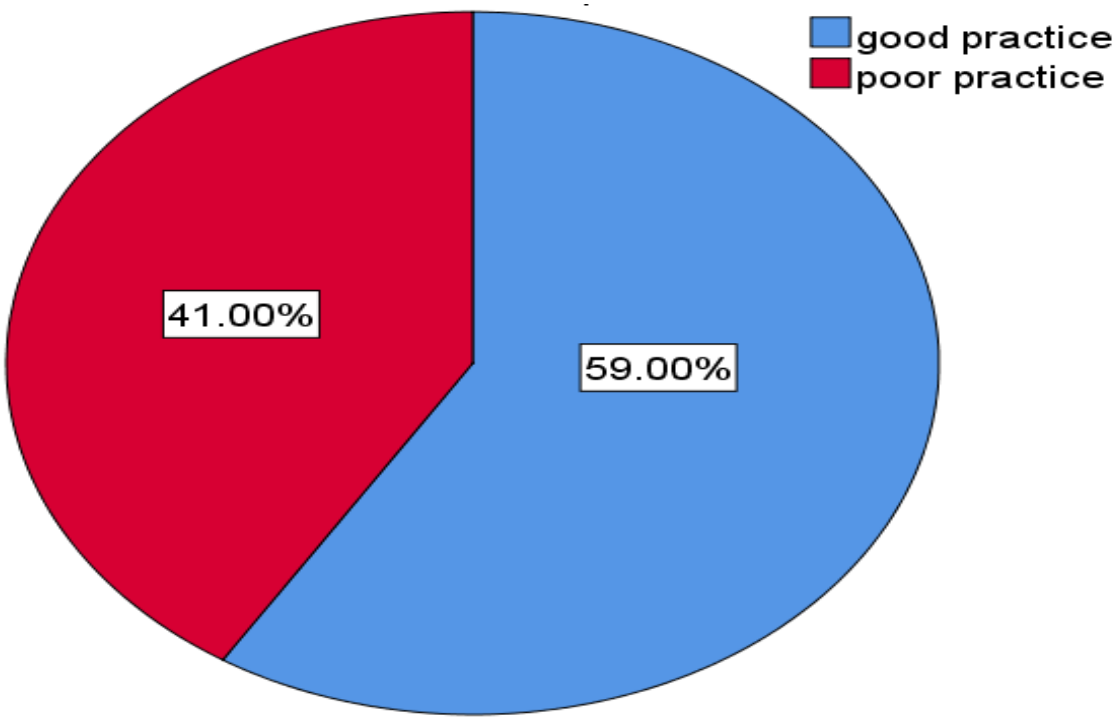

Figure 3: the practice of diabetes patients towards glycemic control in TASH, Addis Ababa Ethiopia, 2021 (n=361).

5.4.1 Factors Associated with a level of practice:

In bivariate logistic regression analysis, the factors found to be significantly associated with a level of practice towards glycemic control with a p-value<0.25, weresex, age,educational status, occupations, and monthly income. On the other hand, to control the effect of confounding variables, those variables with ap-value <0.25, were entered into multivariable logistic regression. However, onmultivariable logistic regression, only sex and age were found to be statistically significant predictors of level of practice towards glycemic control (p<0.05).Where, maleswere 1.6 times more likely to have good practice compared to their female counterparty(AOR=1.62, 95%CI: 1.005-2.62, p= 0.04), while respondents in the age groups of 18-35 and 51-65 were 72% and 51% less likely to have good practices towards glycemic control compared to the age groups of greater than 65 years(AOR=0.28, 95%CI: 0.09-0.87, p= 0.02) and (AOR=0.49, 95%CI: 0.24-0.99, p= 0.04) respectively (**See Table 7)**

Table 7: Factors associated with a level of practice towards glycemic controls among diabetes patients at Tikur Anbesa specialized hospital, n=361, 2021.

Variables	Practice		COR 95%CI	AOR95% CI	p-value
	good	Poor			
Sex					
Male	114	62	1.59(1.04,2.43)	**1.62(1.005,2.62)**	**0.04***
Female	99	86	1.00	1.00	
age group					
18-35	32	20	0.41(0.19,0.88)	**0.28(0.09,0.87)**	**0.02***
36-50	69	42	0.40(0.21,0.76)	0.66(0.29,1.52)	0.33
51-65	86	47	0.36(0.19,0.67)	**0.49(0.24,0.99)**	**0.04***
>66	**26**	**39**	1.00	1.00	
Education					
No-formal education	**41**	**57**	1.00	1.00	
Primary	26	23	0.63(0.31,1.26)	0.62(0.30,1.28)	0.19
Secondary	30	30	0.71(0.37,1.37)	1.00(0.43,2.31)	0.98
Diploma and above	116	38	0.23(0.13,0.40)	0.53(0.21,1.34)	0.18
Occupations					
Student	11	11	0.76(0.31,1.89)	1.49(0.40,5.46)	0.54
Government employee	48	13	0.20(0.10,0.42)	0.31(0.02,4.40)	0.38
Private-employee	56	17	0.23(0.12,0.44)	0.36(0.02,5.04)	0.44
Daily laborer	13	13	0.76(0.33,1.78)	0.48(0.03,6.93)	0.59
Merchant	29	21	0.55(0.28,1.07)	0.49(0.03,6.24)	0.58
Non-employee	**56**	**73**	1.00	1.00	
Monthly income					
<500	**68**	**84**	1.00	1.00	
500-1000	14	14	0.81(0.36,1.81)	2.79(0.19,40.91)	0.45
1001-5000	85	36	0.34(0.20,0.56)	1.31(0.10,16.37)	0.82
>5000	46	14	0.24(0.12,0.48)	0.89(0.06,11.88)	0.93

***: p < 0.05, 1.00=reference**

6. DISCUSSION

The current study showed significant information on the level of knowledge,attitude, and practice, and associated factorstowards glycemic controls among diabetes patients in TASH, Addis Ababa, Ethiopia.

This study showed a good knowledge of glycemic controlin 322 (89.2%) of respondents. It demonstrated a higher level of knowledge as compared with the study conducted in Adama hospital(77.59%)(27).In addition, it was higher than the study conducted in Felege-Hiwot hospital (49.8%), Sri-lanka (77%), Mekelle ayder specialized hospital (70.4%), and Gondar university hospital(59%),(8,21,25,26). This difference might be due to a difference in the level of education and access to information or health educations.The additional explanation can be due to prolong the experience withdiabetes mellitus.

The majority (87.8%) of study respondentsdefined diabetes mellitus as a raised blood sugar. Which was nearly similar to the study conducted in Ambo university hospital (85.1 %)(28). But higher than the study done in Pakistan (70%)(22). And in Felge–hiwot hospital(33.4%)(8).It might be due to the experience with diabetes mellitus.

In this study, Only 157 (43.5%) ofrespondents knew what type of DM they have. Which was lower than the study done in Gondar hospital (62.5%)(16).This signals paucity in information about their disease and which has a significant effect on their management.

This study showed knowledge of diabetes patients regarding risk factors of DM likeobesity, and cigarette smoking was 15l (41.8%) and 77 (21.3%) respectively. Itdemonstrated a higher level of knowledge ascompared to the study done in Felge-hiwot hospital which was (3.4%) for cigarette smoking,and (5.6%)for obesity (8). This difference might be due to a difference in the level of education or lack of awareness about the risk factors of DM.

This study established a higher level ofknowledge regarding signs and symptoms of hyperglycemia conditions like excessthirst 324(89.8%), It was nearly similar to the study conducted in south-Africa (90%)(23). This might be due to similarity in level of educations or access to information about DM and experience of hyperglycemic status.

The majority 308(85.3%)of respondents knew hypoglycemia conditions like blurred vision. It was supported bythe study donein Ambo university hospital(70.9%)(28).Regarding knowledge on DM-related complications, our study participants showedknowledge level of like vision problem, 288(79.8%),

neurological problem 185 (51.5%), and renal failure 86(23.8%). It demonstrated a higher level of knowledge as compared with the study done in Felge-hiwote hospital with the result of nephropathy, (20.2%), retinopathy(54.4%), and neurologic (37.0 %)(8). This might be due to differences in the level of educations or inadequate information about the disease condition especially about complicationsof diabetes.

This study establishes good knowledge on types of lifestyle modification for diabetes likedietary modification, 345 (95.6 %,), and weight reduction185(51.2%). It demonstrates a higher level of knowledge about lifestyle modification as we compared with the similar study done in Felge-hiwote hospital with the result ofdietary modification(47.6%) and weight reduction< (10%)(8). This might be due to the different levels of education or it might be due to inadequate information or knowledge of diabetic patients about lifestyle modification.

Generally, this study scored a higher level of knowledge as we compared with different studies. In this study, most of the respondent's place of residence was in Addis Ababa and the majority of them hadexposure toformal learning programs from lower grade until diploma and above levels. So the difference might be due to the different levels of educations, and lack of information about DM from health care workers, or different technology-based Media. And it might be due to their prolonged experience with hyperglycemia or DM.

This study found 228(63.2%) of respondents had a good attitude towards glycemic controls, which was nearly similar to the study conducted in Addis-zemen Hospital(65.2%)(31).and Jimma Medical College(59.6%)(29).Conversely, this study showed a lower attitude as compared with the other similar study conducted in Gondar University Hospital it was (67.2%)(16).And Mekelle University Hospital (70.4%)(25).Even though ourstudy participants had prolonged experience with diabetic therapy, their attitude level was found to be lower as compared with other similar studies, which needs more attrition it might be related to the gaps in the health care system or due to different factors from health care providers. In addition, it might be due to differences in beliefs and understanding of the disease

In this study, 227(62.9%)of participantsrespond strongly agree onregular exercise can control blood glucose levels. This finding was lower as compared witha similar study done in Gondar University Hospital(86.4)(16).This difference might be related to the socio-demographic conditions or lack of understanding about the value of exercise for diabetic patients.

More than half 210(58.2%) of participantsrespond strongly agree on the planned diet can help to control blood glucose levels. This result was nearly similar to the study result done in Pakistan(55%)(22).

Most of theparticipants respond strongly agree on smoking and alcohol can increase the complication of diabetes with the result of 241 (66.8%) and 201(55.7%) respectively. This study scored lower attitude as compared with the similar study conducted in Gondar university hospital, it was(89.8%)(16). This difference might be due to a lack of understanding about the effect of alcohol on glycemic control.

In general, this difference result of attitude can be due to different levels of education,socio-demographic states of study participants, belief and understanding of the disease condition, which can help to advance or to change their attitude.

More than half 213(59%) of respondents had good practice towards glycemic control. It demonstrates a higher level of practice as compared with the study conducted in Jimma hospital(54.2%)(29). However, it showed a lower level of practice as compared to that of a similar study conducted in Gondar university hospital(74.4%)(16). This difference might be due to socio-demographic factors,poor patient attendance at a health clinic, and it might be due to shortage of difference access that can help to improve the practice of glycemic control.

This study showed 125 (34.6%) study participants had practice levels on eating vegetables for monitoring blood glucose levels. It demonstrates a higher level of practice as we compared with the study done in Jimmauniversity hospital(31.5%)(29). However, it waslower than the similar studyconducted in Gondar university hospital (45.4%)(16). This difference can be due to socio-economicproblems like lack of job, lack of income, and additional explanation it might be due to inadequate access, and lack of understanding the effect of planned diet for glycemic control.

In This study, 159(44%) of respondents had a practice of doing daily exercise for controlling their blood glucose level. It was lower than the study result conducted in Gondar referral hospital (48.9%)(16). This might be due to differences in socio-demographic factors and inadequate understanding of the effect of exercise on blood glucose control.

In this study more than half 212(58.7%) of study respondents took their medication at the proper time as prescribed. Which revealed a lower valueas compared with the study conducted in Jimma university hospital(82.2%)(29). This difference can be due to socio-demographic problems and lack of access or availably of medication not only in the public hospital even in the private market.

From the total respondent, only 167(46.3%) were trying to reduce/maintain their weight. It was nearly similar to the study done in Jimma university hospital (45%)(29). However, it was lower than the study done in Gondar university hospital (56.6%)(16).This might be related to socio-demographic factors or inadequate understanding of the effect of weight maintenance on glycemic control.

From the total study respondent, 216(59.2%) of participants had no practice of alcohol exposure. It was higher than the study done in Gondar hospital (50.6%)(16). However, it was lower than the study conducted in Nepal (84%) (32).Jimma university hospital (68.2%) (29). This can be due to a lack of understanding or misunderstand of the effect of alcohol on the disease process.

In this study 82(22.7%) of respondents had checked their HbA1c level.However, 279(77.3%) of the respondentshad not checked their HbA1c level according to their appointment. Which was supported by the study done in Kenyan tertiary hospital only (20.2%) of respondents had done a test at one time, however, (79.8%) of respondents had never done the test(7).This can be related to the lack of access to the HbA1c testing services, lack of knowledge, or affordability of the test. In addition, it might be due to poor blood glucose testing behaviors from the patients or health care providers.

In this study,259(71.7%) of the respondent had notmissed their blood glucose test on checking time. This study demonstrated a lower result as compared with the similar study done in Gondar university hospital(97.5%).(16). In this study only,116(32.1%) were used a self-blood glucose monitoring machine. This study reported the lower result as we compared with the study done in Pakistan (50%). (21). This difference might be due to lack of health care access nearest to their home, socio-economic condition, andpoor patient attendance at a health clinic,additional explanation might be due to missed their laboratory test date or due to shortage of glucometer and different laboratory testing items like strip.

On multivariate logistic regression, sex and age were found to be statistically significant predictors of level of practice towards glycemic control ($p<0.05$). Were males were 1.6 times more likely to have good practice compared to their female counterparts.Whereas respondents in the age groups of 18-35 and 51-65 were 72% and 51% less likely to have good practices towards glycemic control compared to the age groups of greater than 65 years. Thisresult is in line with a study done in TASH it showed a significant association between age, gender, and self-care practices(34). However, this finding differed from a similar study done at Gondar hospital in 403 participants, the result showed marital status and Occupational status had significantly associated with practice towards diabetes(16). This difference might be due to differences in sample size and socio-demographic of respondents.

7. Limitations

This study has certain limitations:

- ✓ The cross-sectional nature of our study design does not allow studying cause and effect associations.
- ✓ The data were obtained only from a single tertiary hospital.

8. Conclusions and Recommendations

8.1. Conclusions

Toconclude, the knowledge, attitude, and practice about glycemic control of diabetic patients is good. In addition, males are more likely associated to have good practice. Whereas respondents in the age groups of young, and middle ages are negativelyassociated withgood practices of glycemic control.

8.2. Recommendations

To TASH:

- ✓ A due emphasis should be given to diabetic patients about practicing glycemic control focusing on females, young age, and middle age groups.

To patients:

- ✓ Should do regular daily exercise as recommended by health caregivers
- ✓ Should try to reduce/maintain their weight
- ✓ Should eat daily vegetables
- ✓ Should check their HA1c according to their appointment

To diabetic society:

- ✓ should try to increase the membership of diabetic patients.
- ✓ Should try to apply regular monitoring and evaluation programs for the diabetic patient's service

To stakeholders:

- ✓ Should also try to deliver glucometers and strips to diabetic patients

To researchers:

- ✓ Further cohort or interventional study should be done to address the predictors of glycemic controls

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