

Knowledge, attitude, practices, and associated factors about glycemic control among Diabetes Mellitus patients at Tikur Anbessa Specialized Hospital

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Abstract

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Background: Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to absolute or relative insulin deficiency, and it remains the fourth leading cause of death worldwide. Poor understanding of the disease could affect glycemic control, and result in preventable diabetic complications. Good knowledge, attitude, and practice of glycemic control are vital to increasing the quality of life and reducing complications and death.

Methods and Materials: A cross-sectional study was conducted to assess the knowledge, attitude, and practices of diabetic patients regarding glycemic control. Three hundred sixty-one patients were enrolled using a systematic random sampling in a teaching hospital in Addis Ababa, Ethiopia. Epi-data 3.2 was used for data entry and SPSS 26 used for data analysis, using descriptive and analytic statistics. Binary logistic regression was used to identify associations between dependent and independent variables, with p-values <0.25 and <0.05 indicating statistical significance in bivariate and multivariable analysis, respectively.

Results: Nearly half (48.8%) of the respondents were male. Good practice was independently associated with male gender, who were 1.62 times more likely to have good practice. However, those participants aged 18–35 years (72%) were less likely to have good practice towards glycemic control, followed by the age group of 51–65 years (51%).

Conclusion: More than half of the respondents' glycemic control knowledge, attitude, and practice were associated with good practice. The young and middle-aged groups showed poor practice. These findings corroborate the need to improve diabetic patients' glycemic control awareness, with a focus on females and young age groups.

Keywords: Knowledge, Attitude, Practice, Glycemic control, Diabetes Mellitus

Background

Diabetes Mellitus (DM) is a metabolic disorder characterized by hyperglycemia due to absolute or relative insulin deficiency. 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 (1). High blood sugar is a common sign of uncontrolled diabetes and leads to severe damage to the body's systems (2).

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 is projected to be 578.4 million, and 700.2 million by 2030 and 2045 respectively. As it is one of the fastest-growing global health emergencies of the 21st century, it has been expected to increase in low-income countries (92%) followed by middle-income countries with (57%) (3).

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 (4). Ethiopia is placed fourth among the top five IDF Africa members (32 countries), with 1.7 million people with diabetes aged 18-99 (3). According to the systematic review of different studies, the prevalence of DM in Ethiopia was (2-6.5%) (5).

Ethiopia is a low-income country that is not shielded from the increase in the prevalence and complications of diabetes mellitus. According to a study done in Gondar, educational, occupational, and marital status were significantly associated with the level of attitude of respondents towards glycemic control (7).

Diabetes requires continuous medical care, patient self-management, health education, and adherence to prescribed medication to reduce the risk of short and long-term complications (8).

Therefore, this study will provide information on glycemic control, and treatment strategies, to prevent diabetes-related complications and death, as there is a paucity of information on knowledge, attitude, and practice (KAP) of glycemic control among diabetes mellitus patients in Ethiopia. This identifies diabetic patients' knowledge, attitude, and practice gaps in glycemic control at Tikur Anbesa Specialized Hospital diabetes follow-up clinic.

Methods

Study setting and period

The study was conducted from March 21, 2021, to April 21, 2021, at Tikur Anbesa Specialized Hospital (TASH), found in the capital city of Ethiopia-Addis Ababa, and gives specialized clinical services for around 370,000 to 400,000 patients per year, with around 102 diabetic patient visits per day for fixed working days of Monday and

Wednesday.

Study Design

An institutional-based cross-sectional study was applied.

Source Population

All diabetes mellitus (DM) patients who visited Tikur Anbesa Specialized Hospital.

Study population

All (type 1 and 2) DM Patients who visited the TASH diabetes clinic for follow-up and met the inclusion criteria during the study period.

Eligibility Criteria

All consented patients who were physically and mentally fit to participate in the study were included.

Sample size and sampling techniques

The sample size was calculated using a single population proportion formula, assuming a 95% confidence interval, 5% margin of error (d), and 62% proportion of good glycemic control knowledge from a study conducted in Gondar (7). The overall sample size including a 10% non-response rate was 398 patients.

Study participants were selected using a systematic random sampling technique ($k = N/nf$; $816/398 = 2$, k is the sampling fraction). The first study participant was selected using the lottery method from the sampling frame arranged in order, while the subsequent study participants were identified by successively adding the constant 2 to the starting random number until the total sample size was reached.

Operational definition

Good knowledge: When patients respond $\geq 50\%$ score on knowledge questions.

Poor knowledge: When patients respond less than a 50% score on knowledge.

Positive attitude: When patients respond \geq the mean score on attitude questions.

Negative attitude: When patients respond $<$ the mean score on attitude.

Good practice: When patients respond \geq to the mean score on practice.

Poor practice: When patients respond $<$ the mean score on practice questions.

Data collection tools and procedure

Data was collected using an interviewer provided with an adapted and

structured questionnaire with different items. A scoring system was developed for each knowledge, attitude, and practice question. Each correct answer was given a score of one and each wrong answer was given a score of zero. Five BSc nurses who were not part of the diabetic clinic follow-up team were involved in data collection. The principal investigator gave orientation before the data collection.

Data quality assurance

A pretest was carried out on 5% of the sample size on randomly selected individuals with diabetes mellitus who were on follow-up at St. Paul's Hospital Millennium Medical College before the actual data collection time. 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.

Data processing and analysis

Data were cleaned, coded, entered into Epi-data 3.2, and exported into SPSS version 26 for analysis. Descriptive and analytic statistics were used. Binary logistic regression was used to identify the association between dependent and independent variables. Crude Odds Ratio (COR) with 95% CI was estimated in the bivariate analysis to assess the association between each independent and the outcome variables. Variables with a p-value <0.25 on binary logistic regression analysis were subjected to multivariable 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.

Results

Socio-demographic and clinical characteristics of the respondents

Three hundred sixty-one (361) diabetic patients participated in the study with a response rate of (90.7%). Nearly half 176(48.8%) of the respondents were males and the age mean (SD) was 51.6(13.73) years. Hundred seven (29.6%) had a family history of diabetes. Moreover, 215(59.6%) had > 5 years duration of diabetes therapy (Table 1).

Table 1: Socio-demographic and clinical characteristics of diabetes patients at Tikur Anbesa Specialized Hospital from March 21, 2021, to April 21, 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)
Diabetes Mellitus Association member (yes)	142 (39.3)
Source of information for DM therapy	
Medical staff	303 (83.9)
Media and self-reading	58 (16.1)

*Number of patients, DM- diabetes mellitus, ETB- Ethiopian Birr

Knowledge about glycemic control

In this study, 322 (89.2%) had good knowledge, while 39(10.8%) respondents had poor knowledge about glycemic control. The majority, 317 (87.8%) define diabetes as a raised blood sugar. Most of the study respondents had good knowledge of the complications of DM. However, only 86 (23.8%) knew about chronic complications of DM like renal failure. Only 157(43.5%) knew their type of diabetes (Table 2).

Table 2: Knowledge about glycemic control among diabetes patients at Tikur Anbesa Specialized Hospital from March 21 to April 21, 2021. (*N=361)

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 for 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 the symptoms of high blood sugar levels? (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 are the symptoms of low blood sugar levels?		
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?		
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 is important for the control of Diabetics?		
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 blood glucose levels is vital for reducingComplications of DM	358 (99.2)	3 (0.8)

*Number of patients, DM-Diabetes Mellitus

Factors associated with knowledge of glycemic control

In bivariate logistic regression analysis, the factors found to be significantly associated with knowledge of glycemic control with a p-value<0.25 were age, place of residency, educational status, occupation, monthly income, and duration of therapy. To control the effect of confounding variables, those variables with a p-value<0.25 were entered into multivariable logistic regression. A statistically significant association was declared at p-value< 0.05, and no significantly associated variable was found with the level of knowledge.

Attitude results in 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. The mean (±SD) attitude score for the respondents was 43.87±4.74 (range: 29-50). The level of attitude of diabetic patients 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. More than half, 227(62.9%), and 210 (58.2%) of participants strongly agreed that regular exercise and a planned diet could help to control blood

glucose levels respectively. Only 68(18.8%) strongly agree that having an HbA1c test might have a positive effect on DM patients (Table 3).

Factors associated with attitude towards glycemic control

In bivariate logistic regression analysis, the factors found to be significantly associated with a level of attitudes with a 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.

Practice of optimal glycemic control

More than half, 213 (59 %) of respondents had good practice towards glycemic control. While 148 (41 %) of respondents had poor practice. The mean ±SD of the practice score was 4.96 ±1.48 (range: 2-9). The level of practice 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.

In this study, 189 (52.4%) attend regular diabetes patient health education programs. However, only 125 (34.6%) and 159 (44%) of respondents had a practice of eating vegetables and doing daily exercise respectively. The majority, 279 (77.3%) had not checked their HbA1c level on their appointment, and 245 (67.9%) did not use a self-blood glucose monitoring machine (Table 4).

Table 4: Practice results toward glycemic control among diabetes patients at Tikur Anbesa Specialized Hospital from March 21 to April 21, 2021. (*N=361).

Variables	Response	
	Yes: *N (%)	No: *N (%)
Do you eat vegetables or fruits daily?	125 (34.6)	236 (65.4)
Do you do daily exercise to control 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)
Do you 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)
Do you 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)

*Number of patients

Factors associated with level of practice

In bivariate logistic regression analysis, the factors found to be significantly associated with the level of practice with a p-value<0.25, were sex, age, educational status, occupations, and monthly income. 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. However, only sex and age were found to be

Table 3: Attitude results about glycemic control among diabetes patients at Tikur Anbesa specialized hospital from March 21, 2021, to April 21, 2021. (*N=361).

Variables	Response *N (%)				
	Strongly disagree	Disagree	Somewhat agree	Agree	Strongly agree
Regular exercise helps to control blood glucose levels.	-	-	22 (6.1)	112 (31)	227 (62.9)
Planned diet or Dietary modification helps 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 an HbA1c Test might have 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 helps 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 has a positive effect on diabetic patients.	0.0(0)	0.0(0)	16(4.4)	175(48.5)	170(47.1)
Maintaining a healthy weight is important for glucose control.	0.0(0%)	0.0(0)	24(6.6)	145(40.2)	192(53.2)
A diabetic complication can be prevented if medication is taken as prescribed.	0.0(0)	0.0(0)	19(5.3)	130(36)	212(58.7)
Alcohol drinking increases the complications of diabetes.	0.0(0)	4(1.1)	47(13)	109(30.2)	201(55.7)
Smoking increases the complications of diabetes.	0.0(0)	0.0(0)	7(1.9)	113(31.3)	241(66.8)

*Number of patients, HbA1c- glyated hemoglobin A1C

statistically significant predictors of the level of practice toward glycemic control ($p < 0.05$). Males were 1.6 times more likely to have good practice compared to their female counterparts (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 as 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 (Table 5).

Discussion

This study showed significant information on the level of knowledge, attitude, practice, and associated factors toward glycemic control among diabetes patients in TASH, Addis Ababa, Ethiopia.

Good knowledge of glycemic control was observed in 322(89.2%) of respondents, which was higher than the study conducted in Adama Hospital (77.59%), Felege-Hiwot Hospital (49.8%), and Mekelle University Comprehensive Specialized Hospital (70.4%), (9-11). This may be due to differences in the level of education, urbanization, or the ease of access to information about diabetes mellitus.

A good attitude was found in 228(63.2%) of respondents, which was nearly similar to the study done in Addis-zemen Hospital (65.2%), and Jimma Medical College (59.6%), (15, 16). However, this study showed a lower attitude as compared with the study conducted at Gondar University Hospital, (67.2%), and Mekelle University Hospital (70.4%), (7, 11). Even though our study participants had prolonged experience with diabetic therapy, their attitude level was found to be lower as compared with other similar studies, which needs more attention, and it might be related to the gaps in the health care system or due to diverse factors from health care providers.

More than half, 213(59%) of respondents had good practice towards glycemic control. This finding was higher compared to the study done in Jimma Hospital (54.2%) (16).

However, it was lower as compared to that of a similar study conducted in Gondar University Hospital (74.4%) (7). This discrepancy might be due to socio-demographic factors, poor patient attendance at health clinics, or it might be due to lack of access.

On multivariable logistic regression, sex, and age were found to be statistically significant predictors of level of practice towards glycemic control ($p < 0.05$). This result was in line with a study done at TASH, which showed a significant association between age, gender, and self-care practices (19). However, marital status and Occupational status had significant associations with practice toward diabetes according to a study done at Gondar (7). This might be due to differences in sample size, socio-demography of respondents, and institutional factors.

Due emphasis should be given to diabetic patients about practicing glycemic control focusing on females, young age, and middle age groups. Multicenter and large studies are necessary for a full description of the KAP of diabetic patients toward glycemic control.

This study was done in TASH, DM Clinic, and the response rate was 90.7 percent. However, the cross-sectional nature of our study design does not allow studying cause, and effect associations, in addition, the data were obtained only from a single tertiary hospital.

Conclusion

Males were more likely to have good practice. Whereas young and middle age diabetic patients were less likely to have good practices of glycemic control.

Declarations

Ethical consideration Permission and approval to carry out the research was obtained from Addis Ababa University College Health Science Ethical Clearance Committee through the

Table 5: Factors associated with a level of practice towards glycemic controls among diabetes patients at Tikur Anbesa Specialized Hospital from March 21, 2021, to April 21, 2021. (*N=361).

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

*Number of patients, p-value: AOR- adjusted odds ratio, CI- confidence interval, COR- crude odds ratio, p-value- probability value. **p < 0.05, 1.00: reference

Department of Emergency Medicine and Critical Care. The research purpose, its benefits, and the procedures were explained and informed written consent was obtained from all participants. Confidentiality and privacy were strictly maintained. The authors declare that all the methods included in the study are in accordance with the declaration of Helsinki.

Consent for publication

Not applicable

Availability of data and materials

Datasets used or analyzed during the current study are available without restriction upon request from the corresponding author.

Competing interests

The authors declare that they have no competing interests.

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Author's contributions

All authors made substantial contributions to the conception, design, acquisition of data, analysis, interpretation of data, drafting of the manuscript, and critical review of the draft manuscripts. All authors read and approved the final draft of the manuscript.

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