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Knowledge, Attitude, Practices, and Associated Factors Towards Glycemic Control Among Diabetes Mellitus Patients in Debre Tabor Comprehensive Specialized Hospital, Debre Tabor, Ethiopia

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Abstract

Background: Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia due to absolute or relative insulin deficiency and is among the leading causes of death worldwide. Good knowledge, attitude, and practices regarding glycemic control are essential to improve care, enhance therapeutic outcomes, and prevent diabetes-related complications.

Methods: An institution-based cross-sectional study was conducted among 422 diabetes mellitus patients attending Debre Tabor Comprehensive Specialized Hospital from October 1 to November 30, 2025. Participants were selected using systematic random sampling and interviewed using a structured questionnaire. Data were entered into Epi Data version 4.6 and analyzed using SPSS version 25. Bivariable and multivariable logistic regression analyses were performed, and associations were reported using odds ratios with 95% confidence intervals.

Results: A total of 422 patients participated, yielding a 100% response rate. Only 127 (30.1%) had good knowledge, while 245 (58.1%) and 235 (55.7%) demonstrated good attitude and good practice towards glycemic control, respectively. Residence in Debre Tabor (AOR = 6.978; 95% CI: 3.264–14.918), family history of diabetes (AOR = 11.136; 95% CI: 4.829–25.677), and diabetes association membership (AOR = 4.499; 95% CI: 1.604–12.619) were positively associated with good practice. Widowed participants were less likely to have good practice than separated participants (AOR = 0.089; 95% CI: 0.028–0.281).

Conclusion: More than half of the participants had good attitude and practice towards glycemic control, but the overall knowledge level was low. Strengthening structured diabetes education and community or peer-support mechanisms is essential to improve patients' knowledge, attitude, and self-care practice.

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

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1 Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by hyperglycemia due to absolute or relative insulin deficiency. It results from abnormalities in carbohydrate, fat, and protein metabolism and can lead to microvascular, macrovascular, and neuropathic complications [1, 8]. Normal blood glucose is generally expected to be below 100 mg/dl before meals or after fasting and below 140 mg/dl two hours after meals [1]. Persistent hyperglycemia is a common sign of uncontrolled diabetes and can cause severe damage to major body systems, especially nerves and blood vessels [14].

The prevalence of DM has increased substantially worldwide, particularly in low- and middle-income countries, where urbanization, population aging, lifestyle change, physical inactivity, and obesity contribute to the burden [9, 12, 15]. Ethiopia is not exempt from this increase. A systematic review and meta-analysis reported an important burden of type 2 diabetes in Ethiopia [13]. Poor understanding of diabetes and its management can affect glycemic control and contribute to preventable complications [16].

Knowledge, attitude, and practice (KAP) are key dimensions of diabetes self-care. Previous studies have shown that diabetes-related KAP influences medication adherence, self-monitoring of blood glucose, dietary practices, physical activity, and prevention of complications [17, 20, 22, 24]. Therefore, evaluating KAP and associated factors among patients is important for designing targeted diabetes education and support interventions. This study assessed knowledge, attitude, practices, and associated factors towards glycemic control among DM patients attending Debre Tabor Comprehensive Specialized Hospital (DTCSH), Debre Tabor, Ethiopia.

2 Objectives

2.1 General Objective

To assess knowledge, attitude, practices, and associated factors towards glycemic control among diabetes mellitus patients in DTCSH, Debre Tabor, Ethiopia.

2.2 Specific Objectives

The specific objectives were to determine the level of knowledge towards glycemic control, evaluate attitude towards glycemic control, measure glycemic-control practice, and identify factors associated with knowledge, attitude, and practice among diabetic patients.

3 Methods and Materials

3.1 Study Area, Design, and Period

An institution-based cross-sectional study was conducted at Debre Tabor Comprehensive Specialized Hospital, the only comprehensive specialized hospital in South Gondar Zone, Amhara Region, Ethiopia. The hospital is located in Debre Tabor town, Northwest Ethiopia, approximately 667 km from Addis Ababa and 97 km from Bahir Dar. The study was conducted at the chronic care clinic, where adult patients receive regular diabetes follow-up, from October 1 to November 30, 2025.

3.2 Population and Sampling

The source population included all diabetic patients attending DTCSH, while the study population included eligible diabetic patients attending the chronic care clinic during the data collection period. A total sample size of 422 was used. Participants were selected using systematic random sampling.

3.3 Operational Definitions

Good knowledge was defined as a response score equal to or above the mean knowledge score, while poor knowledge was defined as a score below the mean. Good attitude and good practice were similarly categorized using their respective mean scores. Regular exercise was considered as 20–30 minutes of aerobic exercise, such as walking or swimming, for 3–4 days per week [23].

3.4 Data Collection Tools and Procedures

Data were collected using an interviewer-administered standardized questionnaire adapted from prior literature. The questionnaire included socio-demographic

characteristics, knowledge, attitude, and practice questions, with scoring systems established for each domain. Two BSc nurses collected data after orientation by the principal investigator. Informed verbal consent was obtained from each participant before data collection.

3.5 Data Quality Control

The questionnaire was pretested among 21 diabetic patients at Tibebe Ghion Specialized Hospital, and important modifications were made before actual data collection. Completed questionnaires were checked daily for completeness, accuracy, and clarity by a supervisor. The principal investigator monitored the data collection process, and errors were corrected promptly.

3.6 Data Processing and Analysis

Data were coded, entered into Epi Data version 4.6, and exported to SPSS version 25 for analysis. Descriptive statistics were presented using frequencies, percentages, tables, and figures. Binary logistic regression was used to measure associations between independent variables and outcome variables. Variables with $p < 0.25$ in bivariable analysis were entered into multivariable logistic regression. Adjusted odds ratios (AORs), 95% confidence intervals (CIs), and p-values were used to report results, and statistical significance was declared at $p < 0.05$.

Model fitness was assessed using the Hosmer–Lemeshow goodness-of-fit test, and multicollinearity was assessed using tolerance and variance inflation factor (VIF). Tolerance values ranged from 0.514 to 0.888 and VIF values ranged from 1.126 to 1.945, indicating no significant multicollinearity. Normality of KAP scores was assessed using histograms, Q–Q plots, detrended Q–Q plots, and the Shapiro–Wilk test; non-normal distributions supported the use of Spearman's rank correlation.

4 Results

4.1 Socio-demographic and Clinical Characteristics

A total of 422 DM patients participated in the study, yielding a response rate of 100%. Of the participants, 188 (44.5%) were male and 234 (55.5%) were female. The largest age group was 46 years and above (45.3%), followed by 36–45 years (28.9%). Most participants were residents of Debre Tabor (64.2%) and married (60.0%). Regarding occupation, 34.1% were housewives, 19.9% were government employees, and 11.8% were farmers. About 20.4% had a family history of diabetes, and 57.3% had been on DM therapy for more than five years. Medical staff were the main source of diabetes information for 82.9% of participants, and 14.5% were members of a diabetes association (Table 1).

Table 1. Socio-demographic and clinical characteristics of diabetes patients attending Debre Tabor Comprehensive Specialized Hospital, October 1 to November 30, 2025

Variable	Category	*N* (%)
Sex	Male	188 (44.5)
	Female	234 (55.5)
Age (years)	18–25	36 (8.5)
	26–35	73 (17.3)
	36–45	122 (28.9)
	≥46	191 (45.3)
Residence	Debre Tabor	271 (64.2)
	Outside Debre Tabor	151 (35.8)
Marital status	Single	43 (10.2)
	Married	253 (60.0)
	Widowed	72 (17.1)
	Separated	54 (12.8)
Occupation	Student	35 (8.3)
	Farmer	50 (11.8)
	Merchant	25 (5.9)
	Government employee	84 (19.9)
	Private enterprise employee	19 (4.5)
	Housewife	144 (34.1)
	Daily laborer	18 (4.3)
	Non-employed	47 (11.1)
Religion	Orthodox	417 (98.8)
	Muslim	4 (0.9)
	Protestant	1 (0.3)
Educational status	Unable to read and write	101 (23.9)
	Able to read and write	115 (27.3)
	Elementary (1–8)	57 (13.5)
	High school/preparatory (9–12)	54 (12.8)
	College and above	95 (22.5)
Monthly income (ETB)	<500	17 (4.0)
	500–5000	281 (66.6)
	5000–10000	51 (12.1)
	>10000	73 (17.3)
Family history of diabetes	Yes	86 (20.4)
	No	336 (79.6)
Duration of DM therapy	<2 years	90 (21.3)
	2–5 years	90 (21.3)
	>5 years	242 (57.3)
Diabetes association member	Yes	61 (14.5)
	No	361 (85.5)
Source of DM therapy information	Medical staff	350 (82.9)
	Media and self-reading	72 (17.1)

Note: DM, diabetes mellitus; ETB, Ethiopian Birr.

4.2 Knowledge Towards Glycemic Control

The mean knowledge score was 10.99 (±2.887) out of 17. Only 127 (30.1%) participants had good knowledge, while 295 (69.9%) had poor knowledge. Most participants knew what diabetes is (72.7%) and recognized that diabetes can be detected through blood or urine examination (98.3%). However, 57.1% did not know their specific type of diabetes. Obesity and family history were frequently recognized as risk factors, whereas cigarette smoking was not recognized as a risk factor by participants. Awareness of long-term complications was variable: eye and kidney problems were each identified by 68.5%, while neurological problems and heart diseases were less frequently identified (Table 3).

Table 3. Knowledge assessment towards glycemic control among diabetic patients attending Debre Tabor Comprehensive Specialized Hospital, October 1 to November 30, 2025

Question	Response item	Yes, *N* (%)	No, *N* (%)
Do you know what diabetes is?	Yes	307 (72.7)	115 (27.3)
Do you know what type of diabetes you have?	Yes	181 (42.9)	241 (57.1)
What are the risk factors of diabetes?*	Obesity	379 (89.8)	43 (10.2)
	Family history of diabetes	353 (83.6)	69 (16.4)
	Eating too much fat and sugar	18 (4.3)	404 (95.7)
	Cigarette smoking	0 (0.0)	422 (100.0)
	I do not know	18 (4.3)	404 (95.7)
Can diabetes be detected through blood or urine examination?	Yes	415 (98.3)	7 (1.7)
What symptoms of hyperglycemic conditions do you know?*	Passing lots of urine	354 (83.9)	68 (16.1)
	Excess thirst	397 (94.1)	25 (5.9)
	Tiredness	162 (38.4)	260 (61.6)
	Excess hunger	55 (13.0)	367 (87.0)
	Weight loss	0 (0.0)	422 (100.0)
	I do not know	7 (1.7)	415 (98.3)
What symptoms of hypoglycemic condition do you know?*	Nervousness	84 (19.9)	338 (80.1)
	Shakiness	156 (37.0)	266 (63.0)
	Light-headedness	32 (7.6)	390 (92.4)
	Blurred vision	50 (11.8)	372 (88.2)
	Weakness	50 (11.8)	372 (88.2)
	I do not know	209 (49.5)	213 (50.5)
What long-term complications of DM do you know if not treated well?*	Eye problems	289 (68.5)	133 (31.5)
	Kidney diseases	289 (68.5)	133 (31.5)
	Neurological problems	19 (4.5)	403 (95.5)
	Heart diseases	61 (14.5)	361 (85.5)
	I do not know	54 (12.8)	368 (87.2)
Which lifestyle modification is important for diabetes control?*	Exercise	137 (32.5)	285 (67.5)
	Dietary modification	383 (90.8)	39 (9.2)
	Weight reduction	25 (5.9)	397 (94.1)
	I do not know	0 (0.0)	422 (100.0)
Is monitoring blood glucose vital for reducing DM complications?	Yes	397 (94.1)	25 (5.9)
Do you know the site of injections for insulin?	Yes	278 (65.9)	144 (34.1)

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Note: *N*, number of patients; DM, diabetes mellitus; *one or more answers were possible.

4.3 Attitude Towards Glycemic Control

Of the participants, 245 (58.1%) had a good attitude towards glycemic control, with a mean attitude score of 40.88 (±4.46). Many participants agreed or strongly agreed that dietary modification helps to control blood glucose (59.7%), diabetes education is important (58.1%), and taking medications as prescribed can prevent diabetes complications (61.4%). Participants also agreed that alcohol drinking and smoking increase diabetes complications (49.5% and 53.8%, respectively).

Table 4. Attitude assessment towards glycemic control among diabetic patients attending Debre Tabor Comprehensive Specialized Hospital, October 1 to November 30, 2025

Variables	Strongly disagree	Disagree	Somewhat agree	Agree	Strongly agree
Regular exercise helps to control blood glucose levels	–	–	210 (49.8)	169 (40.0)	43 (10.2)
A planned diet or dietary modification helps to control blood glucose levels	–	–	33 (7.8)	137 (32.5)	252 (59.7)
Diabetes education is important for diabetic patients	–	7 (1.7)	91 (21.6)	79 (18.7)	245 (58.1)
Having an HbA1c test might bring a positive effect on diabetic patients	–	18 (4.3)	212 (50.2)	162 (38.4)	30 (7.1)
Blood sugar close to normal helps to prevent diabetes complications	–	–	32 (7.6)	299 (70.9)	91 (21.6)
Having a regular blood glucose test brings a positive effect on diabetic patients	–	–	97 (23.0)	180 (42.7)	145 (34.4)
Maintaining a healthy weight is important for glucose control	–	29 (6.9)	212 (50.2)	119 (28.2)	62 (14.7)
Diabetic complications can be prevented if medications are taken as prescribed	–	–	1 (0.2)	162 (38.4)	259 (61.4)
Alcohol drinking increases diabetes complications	–	18 (4.3)	40 (9.5)	155 (36.7)	209 (49.5)
Smoking increases diabetes complications	18 (4.3)	7 (1.7)	33 (7.8)	137 (32.5)	227 (53.8)

Note: Values are *N* (%); blank cells shown as – were not reported in the source table.

4.4 Practice Towards Glycemic Control

Of 422 participants, 235 (55.7%) had good practice towards glycemic control, with a mean practice score of 4.99 (±1.729). Most participants took medication as prescribed (94.1%) and attended regular diabetes education programs (78.0%). However, 66.6% did not eat vegetables or fruits daily, 57.3% did not exercise regularly, 87.2% did not try to reduce or maintain weight, 64.0% missed blood glucose testing, 79.4% did not check HbA1c level, and 78.4% did not use a self-blood glucose monitoring machine (Table 5).

Table 5. Practice assessment towards glycemic control among diabetic patients

Practice item	Yes, *N* (%)	No, *N* (%)
Eat vegetables or fruits daily	141 (33.4)	281 (66.6)
Exercise daily to control blood glucose	180 (42.7)	242 (57.3)
Take medication as prescribed	397 (94.1)	25 (5.9)
Try to reduce or maintain weight	54 (12.8)	368 (87.2)
Add extra salt to regular diet	93 (22.0)	329 (78.0)
Drink alcohol	75 (17.8)	347 (82.2)
Miss blood glucose test	270 (64.0)	152 (36.0)
Check HbA1c level	87 (20.6)	335 (79.4)
Use self-blood glucose monitoring machine	91 (21.6)	331 (78.4)
Attend regular diabetes education program	329 (78.0)	93 (22.0)

Note: HbA1c, hemoglobin A1c.

4.5 Factors Associated with Knowledge, Attitude, and Practice

In bivariable logistic regression, sex, age group, marital status, educational status, monthly income,

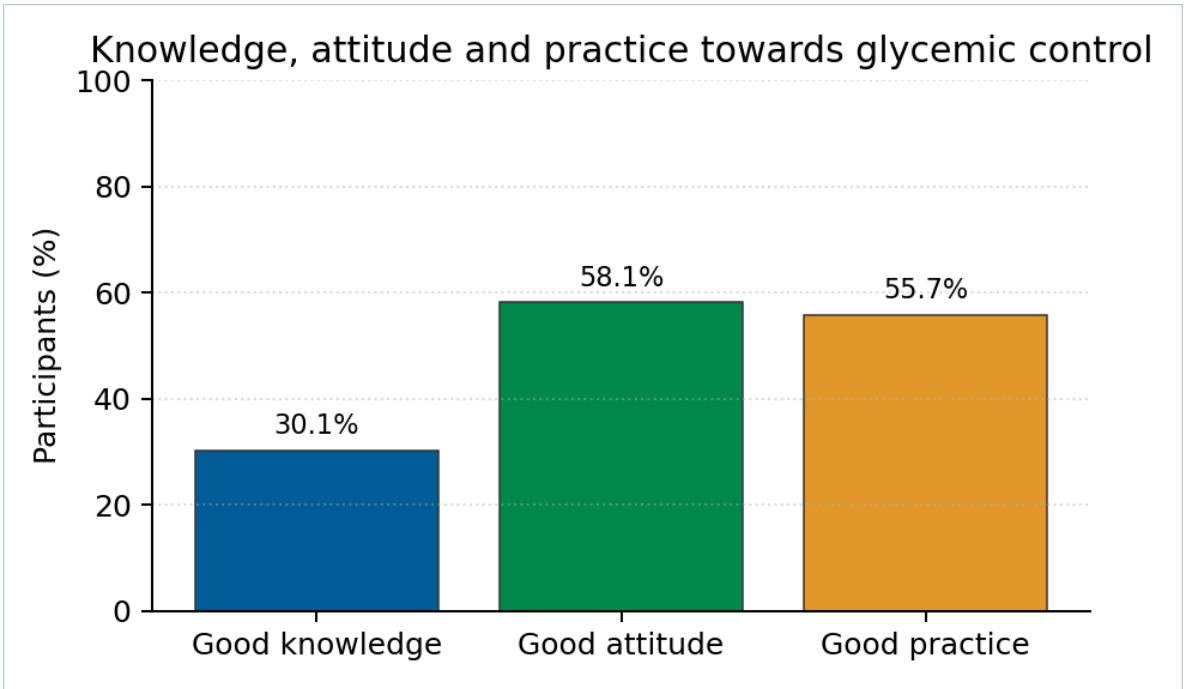

Figure 1. Level of knowledge, attitude, and practice towards glycemic control among diabetic patients attending Debre Tabor Comprehensive Specialized Hospital from October 1 to November 30, 2025.

family history of diabetes, and diabetes association membership were associated with knowledge at $p < 0.25$ and considered for multivariable analysis. For attitude, sex, residence, marital status, educational status, duration of diabetes therapy, diabetes association membership, source of information about diabetes, and knowledge level were candidate variables.

For practice, residence, marital status, family history of diabetes, and diabetes association membership remained important predictors. Patients residing in Debre Tabor were nearly seven times more likely to have good practice compared with patients living outside Debre Tabor (AOR = 6.978; 95% CI: 3.264–14.918). Participants with a family history of diabetes were more likely to have good practice (AOR = 11.136; 95% CI: 4.829–25.677), and diabetes association members had higher odds of good practice (AOR = 4.499; 95% CI: 1.604–12.619). Widowed participants were less likely to have good practice compared with separated participants (AOR = 0.089; 95% CI: 0.028–0.281) (Table 6).

Table 6. Bivariable and multivariable analysis of factors associated with practices towards glycemic control among diabetic patients attending Debre Tabor Comprehensive Specialized Hospital, October 1 to November 30, 2025

Variable	Category	Good *N* (%)	Poor *N* (%)	COR (95% CI)	AOR (95% CI)	*P*-value
Residence	Debre Tabor	181 (42.9)	90 (21.3)	3.613 (2.379–5.487)	6.978 (3.264–14.918)	0.000*
	Outside Debre Tabor	54 (12.8)	97 (23.0)	Ref	Ref	–
Marital status	Single	18 (4.3)	25 (5.9)	0.360 (0.157–0.825)	1.537 (0.345–6.857)	0.573
	Married	163 (38.6)	90 (21.3)	0.906 (0.486–1.686)	2.741 (0.844–8.904)	0.093
	Widowed	18 (4.3)	54 (12.8)	0.167 (0.077–0.363)	0.089 (0.028–0.281)	0.000*
	Separated	36 (8.5)	18 (4.3)	Ref	Ref	–
Monthly income (ETB)	<500	0 (0.0)	17 (4.0)	0.000	0.000	0.998
	500–5000	137 (32.5)	144 (34.1)	0.311 (0.174–0.557)	1.104 (0.475–2.567)	0.817
	5000–10000	43 (10.2)	8 (1.9)	1.759 (0.699–4.429)	1.945 (0.716–5.282)	0.192
	>10000	55 (13.0)	18 (4.3)	Ref	Ref	–
Family history of diabetes	Yes	61 (14.5)	25 (5.9)	2.272 (1.361–3.792)	11.136 (4.829–25.677)	0.000*
	No	174 (41.2)	162 (38.4)	Ref	Ref	–
Duration of DM therapy	<2 years	65 (15.4)	25 (5.9)	2.096 (1.238–3.547)	1.753 (0.788–3.901)	0.169
	2–5 years	36 (8.5)	54 (12.8)	0.537 (0.329–0.879)	1.371 (0.650–2.893)	0.408
	>5 years	134 (31.8)	108 (25.6)	Ref	Ref	–
DM association membership	Yes	43 (10.2)	18 (4.3)	2.103 (1.168–3.785)	4.499 (1.604–12.619)	0.004*
	No	192 (45.5)	169 (40.0)	Ref	Ref	–
Attitude level	Poor	80 (19.0)	97 (23.0)	0.479 (0.323–0.710)	1.484 (0.746–2.953)	0.261
	Good	155 (36.7)	90 (21.3)	Ref	Ref	–

Note: COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval; Ref, reference category; *significant at $p < 0.05$.

5 Discussion

This study assessed knowledge, attitude, practice, and associated factors towards glycemic control among DM patients attending DTCSH. The findings showed that only 30.1% of participants had good knowledge, while 58.1% had good attitude and 55.7% had good practice. These findings indicate that, despite relatively favorable attitude and practice levels, knowledge gaps remain substantial among diabetes patients.

The low level of good knowledge is concerning because knowledge is a foundation for effective self-care, medication adherence, diet modification, physical activity, and prevention of complications. Although most participants understood that diabetes can be detected through blood or urine examination and recognized dietary modification as important, many did not know their diabetes type, did not recognize hypoglycemic symptoms, and had limited awareness of some long-term complications. Similar studies in Ethiopia and other settings have emphasized that inadequate diabetes-related knowledge can undermine self-care and glycemic control [17, 20, 22, 24].

More than half of the participants had a good attitude towards glycemic control. The majority agreed that medication adherence, diabetes education, dietary modification, and avoidance of smoking and alcohol are important for preventing diabetes complications. This positive attitude is encouraging and may support behavior change if strengthened through structured education and counseling.

Practice findings were mixed. Medication adherence and participation in diabetes education were high, but lifestyle and monitoring practices were weaker. Many participants did not consume fruits or vegetables daily, did not exercise regularly, did not focus on weight management, missed blood glucose tests, and did not check HbA1c. These gaps are important because lifestyle modification, self-monitoring, and regular follow-up are core components of diabetes self-management [5, 11].

Residence, family history of diabetes, and di-

abetes association membership were positively associated with good practice. Urban residents may have better access to health information, diabetes services, and follow-up care. Participants with a family history of diabetes may have prior exposure to diabetes management and complications, which could improve self-care behavior. Diabetes association membership may increase peer support, education, and motivation. Conversely, widowed participants had lower odds of good practice, suggesting that social support may be important for diabetes self-care.

6 Conclusion

More than half of the participants demonstrated good attitude and good practice towards glycemic control, but the overall level of knowledge was notably low. Urban residence, family history of diabetes, and diabetes association membership were associated with better glycemic-control practice, while widowed marital status was associated with poorer practice. Strengthening structured diabetes education, promoting peer-support mechanisms, and improving access to regular monitoring may help improve knowledge, attitude, and self-care practices among diabetes patients.

Abbreviations

ADA: American Diabetes Association; AOR: Adjusted Odds Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; DKA: Diabetic Ketoacidosis; DM: Diabetes Mellitus; DTCSH: Debre Tabor Comprehensive Specialized Hospital; ETB: Ethiopian Birr; GFR: Glomerular Filtration Rate; HbA1c: Hemoglobin A1c; HHS: Hyperglycemic Hyperosmolar State; IDF: International Diabetes Federation; KAP: Knowledge, Attitude, and Practice; LSM: Lifestyle Modification; OGTT: Oral Glycemic Tolerance Test; SMBG: Self-Monitoring Blood Glucose; SPSS: Statistical Package for Social Sciences; TASH: Tikur Anbessa Specialized Hospital; UAE: United Arab Emirates; WHO: World Health Organization.

Acknowledgments

Not applicable.

Declarations

Ethics Approval and Consent to Participate

Permission and approval to conduct the research were obtained from Debre Tabor University, Community-Based Education Coordinating Office, with letter number CHS/713. The research purpose, benefits, and procedures were explained to each respondent. Verbal consent was obtained from all study participants. Confidentiality and privacy were strictly maintained, and completed questionnaires were kept in a locked place inaccessible to unauthorized persons.

Consent for Publication

Not applicable.

Availability of Data

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

D.A.T. designed the study, developed the research proposal, supervised data collection, and performed data analysis. B.A.H. contributed to the study design, data collection, data entry, and interpretation of results. B.D.K. contributed to statistical analysis, interpretation of findings, drafting of the manuscript, critical revision for intellectual content, and reviewing and editing. All authors read and approved the final manuscript.

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