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Prescription pattern, glycemic control status, and predictors of poor glycemic control among diabetic patients with comorbid chronic kidney disease in Ethiopia: a facility-based cross-sectional study

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Abstract

Background Achieving optimal glycemic control is vital for managing diabetes mellitus and preventing its complications, yet it is particularly challenging for individuals with diabetes and concurrent chronic kidney disease. Chronic kidney disease disrupts glucose metabolism and excretion, leading to pronounced and variable blood glucose fluctuations, thereby complicating diabetes management. So far, the intricate impact of chronic kidney disease on the glycemic control status of diabetic patients remains obscure, especially in Sub-Saharan Africa where both diseases pose an escalating burden.

Objective This study aimed to assess prescription patterns, glycemic control status, and the contributing factors to poor glycemic control among diabetic patients with comorbid chronic kidney disease at Tikur Anbessa Specialized Hospital, Ethiopia.

Methods A facility-based cross-sectional study was conducted from March 15 to May 15, 2024, from the electronic medical records of diabetic patients with comorbid chronic kidney disease who had received regular treatment and follow-up at the adult diabetes mellitus clinic of Tikur Anbessa Specialized Hospital. The sample size was calculated by using a single population proportion formula and accordingly, a total of 384 patients were recruited randomly and enrolled in this study. Descriptive statistics was employed for analyzing quantitative variables. Logistic regression analysis was performed to identify predictors of poor glycemic control status. Statistical significance was established at p-value < 0.05.

Results This study found that 98.2% of patients had type 2 diabetes, with a mean diabetes duration of 16.36 years. Only 4.4% achieved good glycemic control (glycated hemoglobin [HbA1c] < 7%), while 95.6% had poor glycemic control (HbA1c ≥ 7%). Insulin, metformin, and sodium glucose cotransporter-2 (SGLT-2) inhibitors were the most frequently prescribed anti-diabetic drug classes which accounted for 80.2%, 59.1%, and 41.4%, respectively. Presence

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of hypertension (AOR: 3.70, 95% CI: 1.08–12.71, $P=0.038$) and regimen change in the past 01year (AOR: 0.34, 95% CI: 0.11–1.01, $P=0.050$) were predictors of poor glycemic control status.

Conclusion This study reveals significant challenges in glycemic control among diabetic patients with comorbid chronic kidney disease (CKD). With only 4.4% of participants achieving optimal HbA1c levels, the findings underscore a critical public health concern regarding the management of diabetes in this vulnerable population.

Clinical trial number Not applicable.

Keywords Diabetes mellitus, Chronic kidney disease, Glycemic control, Prescription, Ethiopia

Introduction

Diabetes Mellitus (DM) is a prevalent chronic metabolic disorder that affects millions globally, and 'it is' marked by persistent hyperglycemia due to issues with insulin secretion or action [1]. In 2019, nearly 463 million adults aged 20–79 were diagnosed with diabetes, with around 4.2 million deaths attributed to the disease [2, 3]. Type 2 DM is the most common form, constituting about 90% of cases, while Type 1 and gestational DM account for the remaining 10%. The escalating prevalence of DM poses a significant economic burden on both individuals and societies worldwide [4].

In Africa, the International Diabetes Federation (IDF) reported that 19.4 million adults aged 20–79 had diabetes in 2019, equating to a 3.9% regional prevalence. Ethiopia, a densely populated country, has approximately 1.7 million people with diabetes, reflecting a prevalence rate of 3.2% among adults [3]. DM is associated with severe micro and macrovascular complications, including diabetic nephropathy, which is a leading cause of end-stage kidney disease [5]. In Sub-Saharan Africa, the prevalence of diabetes has been rising rapidly, and chronic kidney disease, a common complication, affects approximately 32% of diabetic patients [6]. This dual burden complicates disease management, particularly with respect to glycemic control.

Chronic Kidney Disease (CKD), characterized by a reduced glomerular filtration rate (GFR) of less than 60 ml/min/1.73 m^2 for at least three months, is an emerging global health issue. In 2017, there were 697.5 million CKD cases worldwide, with 1.2 million annual deaths due to its high treatment costs [7]. CKD is a highly prevalent microvascular complication of DM and evidence shows that roughly 40% of patients with diabetes develop CKD [8]. The increasing prevalence of CKD, exacerbated by diabetes, complicates glycemic control as advanced CKD impacts glucose and insulin metabolism, increasing risks of both hypoglycemia and hyperglycemia [9, 10].

Although glycemic control is considered the most effective means of preventing micro and macrovascular complications, systematic review and meta-analysis studies [11, 12] done in patients with type 2 DM unveiled that only a small proportion of patients reach their target blood sugar levels. The ideal glycated hemoglobin (HbA1C) target for type 2 DM patients set by the latest American Diabetes Association (ADA) [4] and Kidney Disease Improvement Global Outcome (KDIGO) guideline [13, 14] is below 7%. Various socio-demographic, disease, and treatment-related factors were pinpointed from different studies across the globe [15–18] affecting sub-optimal glycemic control in patients with type-2 DM. For instance, availability and access to primary care, knowledge level, health insurance, age, gender, duration of diabetes, type of treatment, body mass index (BMI), lipid profile, level of education, occupation, medication adherence, presence of comorbidities, self-care practice, and mental and psychosocial health problems [19–21].

The coexistence of DM and CKD creates significant hurdles in achieving effective glycemic control, which is essential for minimizing complications and enhancing patient health. The interplay between these critical conditions introduces multiple factors that complicate glucose metabolism, such as impaired renal function, altered insulin sensitivity, complex medication regimens, dietary restrictions, and additional comorbidities [22, 23]. These factors lead to unstable blood sugar levels, making it challenging to maintain optimal glycemic control and underscoring the need for a nuanced understanding of these dynamics. Nonetheless, the intricate impact of CKD on the glycemic control status of diabetic patients remains obscure, especially in Sub-Saharan Africa where both diseases pose an escalating burden [24].

Although numerous studies [1, 12, 25] have been carried out both internationally and nationally pertaining to glycemic control status and its predictors among patients with type-2 DM alone relying on FBG level and overseeing HbA1C which is a gold standard approach, no attempt was made so far in Africa to comprehensively address these issues along with the current prescription pattern in diabetic patients with concurrent CKD. Despite the critical role of glycemic control in managing patients with concurrent DM and CKD, research specifically addressing this subgroup is scarce. Understanding the unique barriers and challenges faced by this vulnerable population is vital for improving patient care and reducing the risk of adverse outcomes. This study aimed to bridge this research gap by comprehensively assessing the current prescription pattern, glycemic control status,

and its contributing factors among diabetic patients with comorbid CKD attending the adult DM clinic of TASH, the largest referral hospital in Ethiopia. By identifying and analyzing these challenges, the present study seeks to provide valuable deep insights that will assist healthcare providers in developing targeted pragmatic interventions, ultimately leading to enhanced care, better health outcomes, and improved quality of life for affected individuals.

Methods

Study setting, study design, and study period

A facility-based cross-sectional study was conducted from March 15 to May 15, 2024, at the adult DM clinic of Tikur Anbessa Specialized Hospital (TASH), one of the largest healthcare facilities in Addis Ababa, Ethiopia. Established in 1972, TASH is a premier training institution for a range of healthcare professionals, including undergraduate and postgraduate students in pharmacy, medicine, dentistry, nursing, midwifery, anesthesiology, laboratory technology, and radiology. The hospital employs approximately 465 physicians, 76 pharmacists, 992 nurses, and 115 other healthcare professionals, supported by a team of 950 administrative and support staff. With a capacity of 850 beds, TASH serves over 500,000 patients annually. TASH hosts its own dedicated DM clinic, which is one of several outpatient services offered by the hospital. Currently, the adult DM clinic provides care to approximately 5,000 diabetes patients, who visit the clinic every three to six months for ongoing management and treatment [26].

Population

Adult patients (≥ 18years) diagnosed with both DM and CKD, who have received regular treatment and follow-up care at the DM clinic were considered as source population. Adult patients with DM and CKD who had been under regular care within the past two years and met the posited inclusion criteria during the study period were regarded as the study population.

Eligibility criteria

Patients diagnosed with both DM and CKD and who had regular medical follow-ups in the adult DM clinic of TASH were included in the study. Conversely, patients with only one of the two conditions—either DM alone or CKD alone—and those with both conditions but incomplete medical records were excluded from this study.

Sample size calculation and sampling techniques

The sample size was calculated based on a single population proportion formula by using a 95% confidence level, 5% margin of error, and 50% proportion of glycemic control (since there is no prior study on the subject area in Ethiopia set-up). Accordingly, a total of 384 patients with diabetes and CKD were randomly selected from electronic medical records based on defined inclusion criteria. The nursing appointment logbook was used as a sampling framework.

Study variables

Dependent variables Glycemic Control Status.

Independent variables Sociodemographic characteristics like age, sex, diet control, smoking status; Disease-related characteristics like type of DM, duration of DM, stages of CKD, presence of proteinuria, presence, number, and type of co-morbidities; Treatment-related characteristics like type and total number of prescribed antidiabetic drugs, regimen change, adherence to medications.

Data collection procedures

The medical record number (MRN) of diabetic patients with comorbid CKD who had regular follow-ups at the DM clinic of TASH were retrieved from the nursing appointment logbook. By entering their MRN in the I-Care database, an electronic medical record database used in the study setting, necessary demographic, disease, and treatment-related data were rigorously reviewed. A comprehensive data abstraction checklist designed after reviewing different pertinent literature and updated guidelines were used to collect the data by two clinical pharmacists (MSc holders).

Data analysis

The data were entered into and cleaned in Epi Info version 4.6.0.2 and subsequently exported into and analyzed in Statistical Package for the Social Sciences (SPSS) version 27. Frequencies and percentages were deployed for all categorical variables, while mean ± standard deviation and/or median (IQR) for continuous variables, as appropriate. Initially, multicollinearity was assured to test correlation among the predictor variables using the variance inflation factor (VIF). A VIF < 10 was applied as a cut point for excluding collinearity. Binary logistic regression analysis was carried out to assess the association between glycemic control status and all the predictor variables and to identify candidates for multivariable analysis. Predictor variables with $p < 0.25$ in the univariable binary logistic regression analysis were re-entered into a multivariable binary logistic regression model to identify predictors of glycemic control status. A p-value of < 0.05 was implemented to declare statistical significance.

Operational definitions

As clearly outlined in the latest ADA guideline [4], good glycemic control is defined as an HbA1C of < 7% while poor glycemic control is delineated as an HbA1C of

Table 1 Socio-demographic and disease-related characteristics of diabetic patients with comorbid CKD attending adult DM clinic of TASH, from March 15 to May 15, 2024 ($n = 384$)

Variables	Category	Frequency	Percent
Sex	Male	250	65.1
	Female	134	34.9
Age	< 30 years	2	0.5
	31–50 years	88	22.9
	51–65 years	199	51.8
	> 65 years	95	24.7
Smoking Status	Current Smoker	28	7.3
	Former Smoker	108	28.1
	Non-Smoker	248	64.6
Type of DM	Type I	7	1.8
	Type II	377	98.2
Duration of DM	< 10 years	84	21.9
	11–20 years	198	51.6
	21–30 years	90	23.4
	> 31 years	12	3.1
Stages of CKD	Stage 1	1	0.3
	Stage 2	134	34.9
	Stage 3	179	46.6
	Stage 4	67	17.5
	Stage 5	3	0.7
Comorbidities Other Than CKD	Absent	33	8.3
	Present	352	91.7
Number of Comorbidities	≤ 2	301	78.4
	> 2	83	21.6
Specific Comorbidities	Hypertension	273	71.1
	Dyslipidemia	194	50.5
	Cardiovascular Disorders	181	47.1
Family History of DM	No	85	12.1
	Yes	299	77.9
Proteinuria	No	5	1.3
	Yes	379	98.7
Recent Hospitalization in Past 01 Year	No	273	71.1
	Yes	111	28.9

Table 2 Profiles of prescribed medications of diabetic patients with comorbid CKD attending adult DM clinic of TASH, from March 15 to May 15, 2024 ($n = 384$)

Variables	Category	Frequency	Percent
Antidiabetic Medications	Insulin	308	80.2
	Metformin	227	59.1
	Sulfonylureas	137	35.7
	DPP-4 Inhibitors	49	12.8
	SGLT-2 Inhibitors	159	41.4
Other Medications	ACEIs	317	82.6
	Statins	332	86.5
	Antihypertensive Other than ACEIs	277	72.1
	Aspirin	66	17.2
Any Change in Treatment Regimen in the Past 01 Year	No	209	54.4
	Yes	175	45.6
Total Number of Prescribed Medications	≤ 5	235	61.2
	> 5	149	38.8

≥ 7%. According to nascent KDIGO guideline [13], Stage 1 CKD: estimated glomerular filtration rate (eGFR) > 90 mL/min/m^2. Stage 2 CKD: eGFR 60–89 mL/min/m^2. Stage 3 CKD: eGFR 30–59 mL/min/m^2. Stage 4 CKD: eGFR 15–29 mL/min/m^2. Stage 5 CKD: eGFR < 15 mL/min/m^2. Comorbidities refer to those comorbidities other than CKD such as hypertension, dyslipidemia and cardiovascular diseases.

Results

Socio-demographic and disease-related characteristics of study participants

The study analyzed 384 diabetic patients with comorbid CKD. Of these, 65.1% were male, and 76.5% were aged 50 or older, with a mean age of 58.17 years. Notably, 64.3% were non-smokers. Of the 384 patients, 98.2% had type 2 diabetes, and 1.8% had type 1 diabetes. Majority of the patients had diabetes for over 11 years, with a mean duration of 16.36 years. According to the latest KDIGO guideline, about 46.6% of patients were classified as stage 3 CKD. Additionally, 91.7% of patients had other comorbid conditions, with hypertension, dyslipidemia, and cardiovascular disorders being most prevalent at 71.1%, 50.5%, and 47.1%, respectively (Table 1).

Prescription pattern among study participants

Analysis of the anti-diabetic medication patterns among study participants showed that insulin and metformin were the most commonly prescribed, accounting for 80.2% and 59.1%, respectively. This was followed by sodium-glucose cotransporter-2 (SGLT-2) inhibitors at 41.4%, sulfonylureas at 35.7%, and Dipeptidyl peptidase-4 (DPP-4) inhibitors at 12.8%. For medications beyond antidiabetic drugs, statins were the most frequently prescribed at 86.5%, followed by Angiotensin Converting Enzyme Inhibitors (ACEIs) at 82.6%, and other antihypertensives, including calcium channel blockers, thiazide diuretics, and beta-blockers, at 72.1% (Table 2).

Analysis of HbA1C and FBG among study participants in the study setting

Both HbA1c and FBG were effectively monitored in the study setting. The mean HbA1C and FBG at the time of diabetes diagnosis was 7.12 ± 2.27% and 158.01 ± 18.23 mg/dL, respectively. The average HbA1C and FBG value at the last follow-up visit was 9.45 ± 1.85%, and 168.07 ± 24.29 mg/dL, respectively (Table 3).

Table 3 Magnitude of glycemic control of diabetic patients with comorbid CKD attending adult DM clinic of TASH, from March 15 to May 15, 2024 ($n=384$)

Variables	Category	Frequency	Percent
HbA1C [mean ± SD: 9.45 ± 1.85%]	< 7%	17	4.4
	≥ 7%	367	95.6
Previous Hypoglycemic Episodes	No	137	35.7
	Yes	247	64.3
Average Fasting Blood Glucose [mean ± SD: 168.07 ± 24.29 mg/dL]	< 126 mg/dL	14	3.7
	126–150 mg/dL	92	23.9
	150–200 mg/dL	247	64.3
	> 200 mg/dL	31	8.1

Magnitude of glycemic control among study participants

Among the total studied study participants, 95.6% had an HbA1c level exceeding 7%, with an average of 9.45%, indicating a high prevalence of poor glycemic control. Additionally, 64.3% experienced at least one severe hypoglycemic episode. Most participants had an average fasting blood glucose (FBG) level above 150 mg/dL, with a mean value of 168.09 mg/dL (Table 3).

Factors contributing to poor glycemic control

Initially, univariable logistic regression analysis was performed on selected sociodemographic, clinical, and treatment-related characteristics to identify variables candidate for multivariable logistic regression, and a total of 5 variables were found to be candidates at a *P*-value of ≤ 0.25. These included presence of cardiovascular disease (COR: 0.47, 95% CI: 0.17–1.30), aspirin use (COR: 0.48, 95%CI: 0.16–1.41), total number of comorbidities (COR: 0.37, 95% CI: 0.14–1.01), regimen change (COR: 0.33, 95% CI: 0.12–0.96), and presence of hypertension (COR: 1.77, 95% CI: 0.66–4.78). In the multivariable logistic regression analysis, only two predictors were found statistically significant; presence of hypertension (AOR: 3.70, 95% CI: 1.08–12.71, $P=0.038$) and regimen change in the past 01year (AOR: 0.34, 95% CI: 0.11–1.01, $P=0.050$). Accordingly, patients with hypertension had four times higher odds of experiencing poor glycemic control as compared to patients without hypertension. Patients who encountered regimen change in the past 1 year were 66% less likely to develop poor glycemic control than those without regimen change (Table 4).

Discussion

This is a pioneer study in Sub-Saharan Africa, including Ethiopia, that meticulously investigates the current prescription pattern and glycemic control status of diabetic patients with comorbid CKD, one of the most vulnerable groups theoretically anticipated to have complex prescription patterns and inadequate glycemic control state. Moreover, it delves into a multitude of socio-demographic, disease, and treatment-related factors contributing to poor glycemic control in this set of populations. Unlike most previous studies [15, 18, 27, 28] that rely on average FBG levels to declare optimal glucose control, this study deployed HbA1C which is a gold-standard diagnostic approach.

Our finding indicated that only 4.4% of the patients achieved an HbA1c level of less than 7%, suggesting good glycemic control. In contrast, a significant majority, 95.6%, had an HbA1c level of 7% or higher, indicating poor glycemic control state. The observed high percentage of poor glycemic control in this study strongly aligns with findings from similar studies [8, 10, 16] and studies done in type 2 DM patients with or without comorbidities [15, 18, 27, 28], which highlight the challenges of

Table 4 Factors contributing to poor glycemic control status of diabetic patients with comorbid CKD attending adult DM clinic of TASH, from March 15 to May 15, 2024 ($n=384$)

Variables	Glycemic Control		COR (95% CI)	*P*-value	AOR (95% CI)	*P*-value
	Good, *n*(%)	Poor, *n*(%)				
Cardiovascular Disorders						
No	6 (35.3)	197 (53.7)	1	1	1	1
Yes	11 (64.7)	170 (46.3)	0.47 (0.17–1.30)	0.146	0.75 (0.21–2.66)	0.651
Hypertension						
No	7 (41.2)	104 (28.3)	1	1	1	1
Yes	10 (58.8)	263 (71.7)	1.77 (0.66–4.78)	0.250	3.70 (1.08–12.71)	**0.038**
Aspirin Use						
No	12 (70.6)	306 (83.4)	1	1	1	1
Yes	5 (29.4)	61 (16.6)	0.48 (0.16–1.41)	0.180	0.57 (0.18–1.87)	0.355
Number of Comorbidity						
≤ 2	10 (58.8)	291 (79.3)	1	1	1	1
> 2	7 (41.2)	76 (20.7)	0.37 (0.14–1.01)	0.053	0.36 (0.09–1.52)	0.164
Regimen Change in Past 1 Year						
No	5 (29.4)	204 (55.6)	1	1	1	1
Yes	12 (70.6)	163 (44.4)	0.33 (0.12–0.96)	0.043	0.34 (0.11–1.01)	**0.050**

managing diabetes in patients with CKD exhibiting an overall poor glycemic control prevalence ranging from 56.8 to 71.4%. Moreover, this result is consonant with systematic reviews and meta-analysis reports [12, 25, 29] that consistently show that individuals with both DM and CKD often struggle to maintain optimal glycemic levels due to the complex interplay between these conditions. The presence of factors such as altered glucose metabolism and insulin resistance in CKD patients further contribute to this difficulty [16, 30]. In light of this, nearly more than two-thirds of patients have an average FBG of greater than 150 mg/dl iterating the inadequacy of glycemic control in these relevant groups. This corroborating finding is against the recent ADA recommendation of attaining a target FBG goal between 80 and 130 mg/dl [4].

In our study, insulin and metformin were the most frequently prescribed antidiabetic medications, accounting for 80.2% and 59.1%, respectively. The fact that new oral antidiabetic drugs like SGLT-2 inhibitors and DPP-4 inhibitors being relatively common in this study conforms with recent reviews and guidelines [16, 31] advocation of using these newer agents due to their weight control and hypouricemic effects on top of profound glycemic control and reno-protective effect. Perhaps, this emphasizes clinician's stringent adherence to updated evidence-based guideline and improved availability of novel agents in the study setting. Additionally, medications prominently utilized for managing comorbid conditions were statins (86.5%), ACEIs (82.5%), and antihypertensives other than ACEIs (72.13%). These vivid prescription patterns reflect nascent clinical practices aimed at managing both diabetes and its associated comorbidities. These findings are in keeping with the recent clinical practice guidelines which highlight the importance of multifaceted therapeutic strategies in diabetic-CKD patients. For instance, the ADA [4] and the KDIGO [13, 14] guidelines advocate the use of ACEIs or ARBs to manage hypertension and/or protect kidney function by reducing proteinuria, statins to treat dyslipidemia and/or prevent the occurrence of macrovascular complications, and a tailored approach to glycemic control to avoid the risk of hypoglycemia. This comprehensive management is crucial in reducing the progression of both diseases (CKD and DM) and preventing cardiovascular events, which are common in this vulnerable population [7, 29].

According to this study, two variables were found predictors of poor glycemic control. The first one is the presence of hypertension which is positively associated with poor glycemic control status. This can be explained by a fast progression of the disease (DM) to its advanced state owing to the presence of other comorbidities that further impair renal function, alter insulin sensitivity, complicate the regimen selection, escalate pill burden, and compromise adherence toward their medications. Moreover, uncontrolled hypertension is characterized by a more rapid decline in kidney function exacerbating the instability of blood sugar levels and making it challenging to maintain optimal glycemic control [6, 32]. This worrying finding is consonant with studies from China [16] and Kenya [33] that reported deterioration of glycemic control in the presence of comorbidities such as hypertension, heart failure, and stroke, underscoring hypertension as one of the risk factors in glycemic control for DM with CKD patients. The second one is regimen change in the past 01 year which is negatively associated with poor glycemic control status. The possible reason could be as the patients failed to achieve the desired goals of therapy, clinicians often urge either to titrate the dose to the maximum tolerable dose or change the regimen to an alternative medication that best controls the elevated glycemic level eventually turning patients from poor to good glycemic control status. However, the inability to achieve the desired outcome is not the sole factor for regimen change as it could also be caused by intolerable adverse effects of the medications and adherence problems.

Even though some literature [5, 16, 24, 30] demonstrated a significant positive relationship between advanced age, male gender, longer duration of diabetes, dyslipidemia, and sub-optimal glycemic control in these relevant groups, our study did not find a statistically significant association. This discrepancy could be ascribed to differences in study population, sample size, nature of study design, quality of health care service provision, and health care context.

Nevertheless, this study has some limitations that should be acknowledged. First, some socio-demographic variables such as educational level, marital status, socioeconomic status, physical activity level, and sleep duration were omitted as these predictors were not properly documented in the electronic medical record database of the study setting. Second, this study does not provide sufficient evidence pertaining to the cause-effect relationship of poor glycemic control state and its contributing factors due to the inherent nature of a cross-sectional study design. Third, because it is a single-center study, it might not be generalized to the general population. Fourth, the findings of this study should be extrapolated to other countries with extreme caution as it may be affected by differences in study participants' characteristics, disease distribution, healthcare infrastructure, methods deployed, and quality of healthcare service provision.

Conclusion

This study reveals significant challenges in glycemic control among diabetic patients with comorbid chronic kidney disease (CKD). With only 4.4% of participants achieving optimal HbA1c levels, the findings underscore

a critical public health concern regarding the management of diabetes in this vulnerable population. The study highlights the complex interplay of socio-demographic factors, comorbidities, and treatment regimens, particularly the adverse impact of hypertension on glycemic control. Future guidelines should emphasize the integration of routine monitoring and tailored treatment regimens for this vulnerable population.

Abbreviations

ACEI	Angiotensin converting enzyme inhibitor
ADA	American diabetic association
AOR	Adjusted odds ratio
CKD	Chronic kidney disease
COR	Crude odds ratio
DM	Diabetes mellitus
DPP-4	Dipeptidyl peptidase-4
FBG	Fasting blood glucose
HbA1C	Glycated hemoglobin
KDIGO	Kidney disease improvement global outcome
MRN	Medical record number
SGLT-2	Sodium glucose cotransporter-2
VIF	Variance inflation factor
TASH	Tikur anbessa specialized hospital

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Author contributions
O.S.M, and M.H conceptualized and designed the study, wrote the original manuscript, and performed analysis and interpretation of data. S.M assisted in data analysis and manuscript evaluation. M.H. edited and wrote the final version of the manuscript. All authors have made an intellectual contribution to the work and have approved the final version of the manuscript for submission.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval
The study was approved by the Ethical Review Board (ERB) of Addis Ababa University, College of Health Sciences. The study protocol was done in accordance with the Declaration of Helsinki. Informed consent was obtained from all participants. All obtained data were treated confidentially.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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