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Health-Related Quality of Life and Associated Factors among Adults with Type 2 Diabetes Attending Public Hospitals in Puntland, Somalia

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Abstract

Background: Type 2 diabetes mellitus is a growing global public health challenge, particularly in low- and middle-income countries. Beyond its clinical consequences, diabetes can affect health-related quality of life (HRQoL). However, evidence from fragile health systems, including Somalia, remains limited. This study assessed HRQoL and its associated factors among adults with type 2 diabetes mellitus attending public hospitals in Puntland, Somalia.

Methods: An institution-based cross-sectional study was conducted among adults with type 2 diabetes mellitus receiving follow-up care at three public hospitals in Puntland between July and August 2024. Participants were selected using systematic random sampling. HRQoL was assessed using the World Health Organization Quality of Life–Brief (WHOQOL-BREF) questionnaire. Data were analyzed using descriptive statistics and multivariable linear regression to identify factors independently associated with HRQoL.

Results: Of 411 eligible participants, 403 completed the study (98.1%). The mean overall HRQoL score was 52.9 (standard deviation, 6.9). Higher educational attainment, absence of diabetes-related complications and comorbidities, shorter waiting times, stronger social support, better self-care, greater empowerment, and lower diabetes-related stigma and distress were independently associated with higher HRQoL.

Conclusions: Adults with type 2 diabetes mellitus attending public hospitals in Puntland had moderate HRQoL, which was associated with clinical, psychosocial, educational, and health-system factors. These findings underscore the importance of comprehensive, patient-centred diabetes care that extends beyond clinical management. Integrating diabetes education, psychosocial support, and improvements in service delivery into routine care may help address the diverse needs of people living with diabetes in resource-limited settings.

Keywords: Health-related quality of life; Type 2 diabetes mellitus; WHOQOL-BREF; global health; Somalia.

Introduction

Diabetes mellitus is a chronic metabolic disease characterized by elevated blood glucose levels that can cause long-term damage to organs, including the heart, kidneys, and eyes.⁽¹⁾ It is a major global public health challenge, affecting an estimated 537 million people worldwide, with type 2 diabetes mellitus (T2DM) increasingly affecting populations in low- and middle-income countries.⁽²⁾

In Somalia, the prevalence of T2DM was reported to have reached 6.5% in 2021.⁽³⁾ The growing burden of T2DM highlights the need to address not only its clinical consequences but also its effects on individuals' daily lives and well-being.

Health-related quality of life (HRQoL) is a multidimensional concept encompassing physical, psychological, and social well-being and reflecting how disease and its management affect an individual's life.^{(4), (5)} Previous research has shown that people with T2DM experience poorer HRQoL and greater depressive symptom burdens than individuals without diabetes.⁽⁶⁾ Diabetes-related complications and the demands of managing a chronic condition may further affect patients' well-being and contribute to the broader burden of disability.⁽⁷⁾

Evidence from different settings indicates that HRQoL among people with T2DM varies and may be associated with clinical, sociodemographic, and psychosocial factors.^(7, 8) Studies from neighboring Ethiopia have identified diabetes-related complications, age, and educational attainment as factors associated with HRQoL.^(9, 10)

These findings suggest that the experience of living with diabetes extends beyond glycemic control and that factors associated with HRQoL may differ across populations and healthcare settings.

Despite growing international evidence on HRQoL among people with T2DM, locally relevant evidence from Somalia, particularly Puntland, remains limited.⁽¹¹⁻¹³⁾

This gap is important because findings from other countries may not fully reflect the circumstances of people receiving diabetes care in Puntland. Understanding their HRQoL and its associated factors could help identify patient needs and inform more comprehensive, contextually appropriate diabetes services.

Therefore, this study aimed to assess HRQoL and identify factors associated with it among adults with T2DM attending follow-up care at public hospitals in Puntland, Somalia. By providing evidence from this understudied setting, the study seeks to contribute to the understanding of HRQoL in adults with T2DM and inform efforts to strengthen patient-centred diabetes care.

Materials and methods

Study design and setting

An institution-based cross-sectional study was conducted from 28 July to 28 August 2024 among adults with type 2 diabetes mellitus (T2DM) attending follow-up care at three healthcare facilities in Puntland, Somalia: Gardo General Hospital in Gardo, Caafi Diabetes Specialty Clinic in Bosaso, and Dalab Hospital in Garoowe.

Study population and eligibility criteria

The study population comprised adults diagnosed with T2DM who attended follow-up care at the selected facilities. Participants were eligible if they had attended diabetes follow-up for at least six months and were permanent residents of Puntland. Critically ill patients, individuals with gestational diabetes, and patients with both diabetes and human immunodeficiency virus (HIV) infection were excluded.

Sample size and sampling procedure

The sample size was calculated using a single population mean formula, assuming a mean HRQoL score of 51.50, a standard deviation of 15.78, a margin of error of 1.6, and a 95% confidence level. The initial sample size was 374; after adding a 10% allowance for non-response, the planned sample size was 411. Additional sample-size estimates were calculated for selected factors associated with HRQoL, but the sample size determined for the primary objective was retained.

The planned sample was proportionally allocated across the facilities according to monthly T2DM patient flow: 208 participants at Caafi Diabetes Specialty Clinic, 121 at Dalab Hospital, and 82 at Gardo General Hospital. The reported combined patient flow was 766. Systematic random sampling

was used, with an approximate sampling interval of two. The first participant at each facility was selected by lottery, followed by recruitment of every second eligible patient attending follow-up until the allocated sample was reached.

Table 1 Sample size determination for factors associated with health-related quality of life among Adults with Type 2 Diabetes Attending Public Hospitals in Puntland, Somalia, 2024

Factors	Category	$z\alpha/2$	SD	E	Final sample size	References
Age		1.96	13.3	1.6	292	(12)
	0	1.96	6.67	1.6	74	(13)
	1	1.96	6.7	1.6	75	
Number of complications	2	1.96	7.74	1.6	99	
	≥ 3	1.96	15.56	1.6	398	
	≤ 5	1.96	7.03	1.6	83	
Duration of T2DM (years)	6–10	1.96	6.88	1.6	78	(13)
	11–15	1.96	7.97	1.6	106	

Data collection and measurements

Data were collected through face-to-face interviews using a structured questionnaire administered through Open Data Kit (ODK) Collect. The questionnaire included sociodemographic and clinical characteristics and measures of health-related quality of life (HRQoL), diabetes self-care, diabetes knowledge, empowerment, depression, diabetes-related distress, and social support. Relevant clinical information was obtained from participants' medical records.

HRQoL was measured using the 26-item World Health Organization Quality of Life–Brief (WHOQOL-BREF) questionnaire, which assesses physical health, psychological health, social relationships, and environmental health. Items were scored on a five-point response scale, with negatively worded items reverse-coded as appropriate. Domain scores were calculated and transformed to a 0–100 scale according to the instrument's scoring guidelines, with higher scores indicating better HRQoL. The questionnaire was translated from English into Somali and back-translated into English to assess translation consistency.

Additional instruments included the Diabetes Self-Care Activities Scale, Diabetes Knowledge Scale, Diabetes Empowerment Scale, Patient Health Questionnaire-9 (PHQ-9), Diabetes Distress Scale

(DDS-17), and Oslo Social Support Scale (OSSS-3). Body mass index was calculated as weight in kilograms divided by height in metres squared. Glycemic control was classified as good for HbA1c values $\leq 7\%$ and poor for values $> 7\%$. Diabetes duration was categorized as 1–5, 6–10, 11–15, and more than 15 years since diagnosis. Diabetes-related complications and comorbidities were identified from clinical records.

Data quality assurance

The questionnaire was translated into Somali and back-translated into English. Four nurses (two diploma-level and two bachelor's-level nurses) collected the data under the supervision of two public health officers. Data collectors received two days of training on the study objectives, interview procedures, ODK Collect, and research ethics. The questionnaire was pretested on 21 adults with T2DM at Gutale Primary Hospital. Supervisors and the principal investigator reviewed completed questionnaires daily for completeness and consistency.

Statistical analysis

Data were collected using ODK Collect, exported to Stata/MP version 17, and checked for inconsistencies and missing values before analysis. Descriptive statistics were used to summarize participant characteristics and HRQoL scores. Independent-samples t-tests and one-way analysis of variance (ANOVA) were used to compare mean HRQoL scores across groups.

Simple linear regression was used to examine unadjusted associations between explanatory variables and HRQoL. Variables with p-values < 0.25 in bivariable analyses were considered for inclusion in the multiple linear regression model. Multivariable linear regression was used to identify factors independently associated with HRQoL. Regression coefficients (β) and 95% confidence intervals were reported, and statistical significance was defined as $p < 0.05$.

Regression assumptions were assessed, including linearity, normality of residuals, homoscedasticity, outliers, and multicollinearity. Linearity was examined using scatterplots; residual normality was assessed using probability plots; homoscedasticity was evaluated using standardized residuals plotted against standardized predicted values; and multicollinearity was assessed using variance

inflation factors and tolerance statistics. Cook's distance was examined to identify potentially influential observations.

Operational definitions

Health-related quality of life (HRQoL): Patients with higher scores (scores approaching 100) indicate better HRQoL, while lower scores (approaching 0) indicate worse HRQoL.⁽¹⁴⁾

HbA1c level: patients with an HbA1c level of $\leq 7\%$ was considered to have good glycemic control. Conversely, patients with an HbA1c level $> 7\%$ is considered to have poor glycemic control.^(ADA15)

Duration of diabetes mellitus: Patients with type 2 diabetes categorized into four groups based on the duration of living with diabetes since diagnosis: 1-5 years, 6-10 years, 11-15 years, and more than 15 years.⁽¹⁶⁾

Diabetes self-care activity: It is the practice of activities that individual diabetics was initiated and perform on their behalf to control their disease, and maintain life, health, and well-being.⁽¹⁷⁾

Empowerment: It is a process whereby patients have the knowledge, skills, attitudes, and self-awareness necessary to influence their own behavior and that of others to improve their quality of life.⁽¹⁸⁾

Ethical Considerations

Ethical approval was obtained from the Institutional Health Research Ethical Review Committee of the College of Health and Medical Sciences, Haramaya University, on 22 May 2024 (reference number IHRERC/121/2024). The study was conducted in accordance with the Declaration of Helsinki. Formal permission was obtained from the relevant regional health authorities and participating facilities. Written informed consent was obtained from participants before data collection. Participation was voluntary, and confidentiality was maintained by using participant codes instead of personal identifiers.

Results

Socio-demographic characteristics of respondents

From a total sample of 411 study participants, 403 completed the study, yielding a response rate of 98.1%. Participants were predominantly under the age of 40 (41.2%), followed by those aged 40–60 years (40.2%) and those over 60 years (18.6%). A significant majority (79.4%) resided in urban areas, with a nearly equal distribution of males (50.9%) and females (49.1%). Most participants were married (59.3%), and the largest occupational group comprised employees (38.2%). Approximately 35.9% had no formal education, while 44.7% reported earning less than \$200 per month (Table 2).

Table 2 Sociodemographic characteristics of adults with type 2 diabetes attending public hospitals in Puntland, Somalia, 2024

Variables	Category	N	%
Age (years)	<40	166	41.2
	40-60	162	40.2
	>60	75	18.6
Sex	Male	205	50.9
	Female	198	49.1
Residence	Urban	320	79.4
	Rural	83	20.6
Marital status	Married	239	59.3
	Unmarried	164	40.7
Occupation	Housewife	65	16.1
	Employee	154	38.2
	Merchant	58	14.4
	Other*	126	31.3
Education	No formal education	145	36
	Primary education	128	31.8
	Secondary education or higher	130	32.3
Monthly income (US\$)	<200\$	180	44.7

	200\$-400\$	189	46.9
	>400\$	34	8.4
182	Other* (Farmer, Laborer, Student)		

183 Behavioral and psycho-social characteristics

184 A total of 57.82% of participants demonstrated good self-care, while 61.5% had good knowledge of
185 diabetes. Empowerment levels were balanced, with 51.6% reporting good empowerment. Depression
186 was prevalent, with 51.4% experiencing moderate to severe symptoms. Additionally, 98.8% of
187 participants reported diabetes-related distress, and 57.3% perceived good social support (Table 3).

188 **Table 3 Behavioral and psychosocial characteristics of adults with type 2 diabetes attending**
189 **public hospitals in Puntland, Somalia, 2024 (N=403)**

Characteristic	Category	N	%
Self-care practice	Poor (= $\leq$ 2 domains)	170	42.2
	Good ($\geq$ 3 domains)	233	57.8
Diabetes knowledge	Poor	155	38.5
	Good	248	61.5
Patient empowerment	Poor	195	48.4
	Good	208	51.6
Depression	Not depressed /mildly Depressed	196	48.6
	Moderately /Severely depressed	207	51.4
Diabetes related distress	Not distressed	5	1.2
	Distressed	396	98.8
Social support	Poor	172	42.7
	Good	231	57.3
Perceived stigma	Yes	87	21.6
	No	316	78.4

190 Clinical and health-care related characteristics

191 A majority of participants (83.4%) had been living with T2DM for five years or less, and 27.8% reported
192 complications such as depression and foot ulcer. Oral medication was the most common form of
193 treatment (80.9%), and 25.31% had comorbid conditions (Table 4).

194 **Table 4 Clinical characteristics of Adults with type 2 diabetes attending public hospitals in**
195 **Puntland, Somalia, 2024**

Variables	Category	N	%
Diabetes duration	≤5 years	336	83.4
	>5 years	67	16.6
Complication	Yes	112	27.8
	No	291	72.2
	CVD	16	14.3
	Neuropathy	23	20.5
Type of Complications	Nephropathy	7	6.3
	Retinopathy	8	7.1
	Depression	32	28.6
	Foot Damage	26	23.2
	None	291	72.2
Number of complications	One	98	24.3
	Two	10	2.5
	Three	4	1.0
Presence of non-T2DM illness on admission	Yes	102	25.3
	No	301	74.7
Treatment modality	Injection	77	19.1
	Oral medication	326	80.9
BMI	Underweight	48	11.9
	Normal weight	224	55.6
	Overweight	83	20.6
	Obesity	48	11.9
HbA1c	Good glycemic control	69	17.1
	Poor glycemic control	334	82.9
Dyslipidemia	Optimal	165	41.0
	Borderline	41	10.2
	High	193	47.9
	very high	4	1.0
Travel time	Mean ± SD	28.6 ±13.6	
Waiting time	≤15 minutes per visit	373	92.6
	>15 minutes per visit	30	7.4

CVD= cardiovascular disease, **T2DM=** type 2 diabetes mellitus, **BMI=** body mass index, **HbA1c=**

glycated hemoglobin, **SD=** standard deviation.

Health-related quality of life and its domains

The overall mean HRQoL score was 52.9 (SD = 6.9), with physical health 54.9 (SD = 12.4) and psychological health 53.9 (SD =12.53) being the highest scoring domains. The social relations 51.4 (SD = 16.7) and environmental 50.91 (SD = 11.72) domains were lower, reflecting moderate challenges in these areas (Figure 1).

Quality of life was self-rated as good by 38.7% of participants, while 36.2% were dissatisfied with their health.

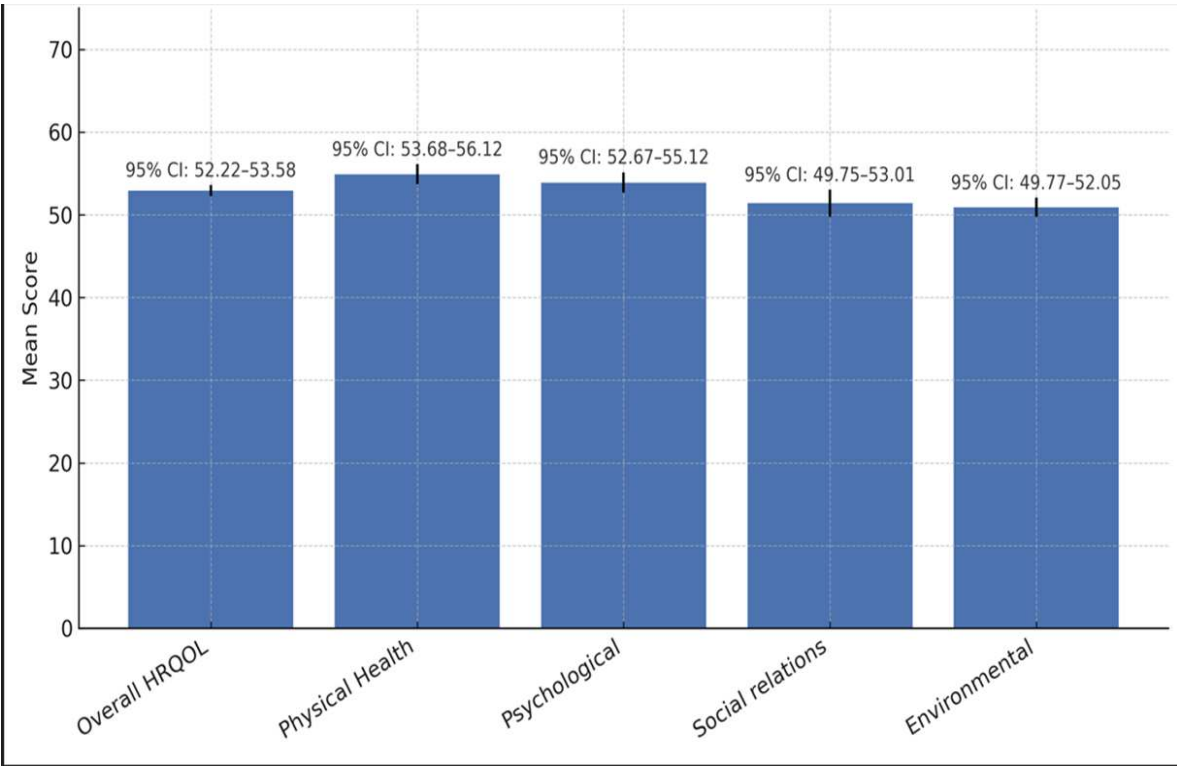


Figure 1: Mean HRQoL scores and 95% confidence intervals across HRQoL domains among Adults with Type 2 Diabetes Attending Public Hospitals in Puntland, Somalia, 2024.

Factors associated with HRQoL

Bivariate analysis identified several candidate variables for multivariable analysis, including education, income, BMI, T2DM complications, self-care practices, and social support (Table 5).

Table 5 Bivariate analysis of factors associated with Health-Related Quality of Life, among adults with type 2 diabetes attending follow-up care at public Hospitals, in Puntland, Somalia, 2024

Variable	Category	B	95% CI	P-value
Age (year)	<40	Ref		
	40-60	-.813	-2.31 to .68	0.286
	>60	-1.54	-3.43 to .35	0.109*
Sex	Male	-.457	-1.81 to .89	0.507
	Female	Ref		

Residence	Urban	.696	-.977 to 2.37		0.410
	Rural	Ref			
Health facility	Dalab Hospital	-2.92	-4.47 to -1.37		0.000*
	Gardo General Hospital	.33	-1.41 to 2.08		0.704
Marital status	Caafi Hospital	Ref			
	Married	.35	-1.02 to 1.72		0.619
Education	Unmarried	Ref			
	No formal education	Ref			
Occupation	Primary education	.01	-1.62 to 1.64		0.990
	Secondary and above	2.05	.430 to 3.68		0.013*
Income	Housewife	Ref			
	Employee	-.380	-2.39 to 1.63		0.710
Family size	Merchant	.09	-2.36 to 2.54		0.945
	Other	-1.20	-3.28 to .87		0.254
BMI	<200\$	Ref			
	200\$-400\$	.900	-.511 to 2.31		0.211*
Treatment modality	>400\$	2.19	-.34 to 4.72		0.090*
	=<7	-.279	-1.75 to 1.19		0.709
Duration of T2DM	>7	Ref			
	Underweight	Ref			
Complication of T2DM	Normal weight	1.71	-.448 to 3.87		0.120*
	Overweight	1.24	-1.20 to 3.70		0.318
Comorbidity	Obesity	3.70	.92 to 6.47		0.009*
	Injection	Ref			
Duration of T2DM	Oral	.48	-1.24 to 2.19		0.588
	<5 Years	1.97	.162 to 3.78		0.033*
Complication of T2DM	>=5 Years	Ref			
	Yes	Ref			
Comorbidity	No	3.23	1.76 to 4.71		0.000*
	No	2.44	.91 to 3.98		0.002*
HbA1c	At least one comorbidity	Ref			
	Good glycemic control	.910	-.961 to 2.78		0.340
	Poor glycemic control	Ref			

Table 5 continued....

Variables	Categories	B	95% CI		P-value
			Lower	Upper	
Dyslipidemia	Optimal	Ref			
	Borderline	-2.17	-9. to 4.92		0.547
	High	.368	-6.5 to 7.2		0.916
	Very high	.165	-6.7 to 7.0		0.962
Perceived stigma	No	1.42	-.22 to 3.1		0.089*
	Yes	Ref			
Travel time		-.081	-.130 to -.032		0.001*
Waiting time	>15 minutes per visit	-2.66	-5.23 to -.101		0.042*
	≤15 minutes per visit	Ref			
Self-care practice	Poor	Ref			
	Good	2.21	.86 to 3.57		0.001*
Knowledge about T2DM	Poor	Ref			
	Good	4.79	3.47 to 6.10		0.000*
Empowerment	Poor	Ref			
	Good	4.09	2.8 to 5.4		0.000*

Depression	None/ mildly Depressed	Ref		
	Moderately/Severely depressed	-1.74	-3.09 to -.40	0.011*
Distress status	Not distressed	Ref		
	Distressed	-7.4	-13.47 to -1.30	0.017*
Social support	Poor	Ref		
	Good	1.24	-.120 to 2.60	0.074*

215 Dependent variable = Overall Health-Related Quality of Life *P-value <0.25.

216 The multivariable regression analysis revealed significant associations between HRQoL and factors
217 such as education, T2DM complications, comorbidity, waiting time, perceived stigma, self-care,
218 knowledge, empowerment, distress, and social support (Table 6).

219 **Table 6 Factors associated with Health-Related Quality of Life of Adults with Type 2 Diabetes**
220 **Attending Public Hospitals in Puntland, Somalia, 2024**

Variables	Categories	B	P-value	95% CI for β	
Education	No formal education	Ref			
	Primary education	-.192	0.810	-1.8 to	1.4
	Secondary and above	1.75	0.040*	.084 to	3.4
Complication of T2DM	Yes				
	No	2.62	0.000*	1.2 to	4.1
	At least one comorbidity	Ref			
Comorbidity	No comorbidity at admission	1.6	0.037*	.098 to	3.1
	>15 minutes per visit	-2.32	0.049*	-4.7 to	-.01
Waiting time	≤15 minutes per visit	Ref			
	Yes	Ref			
Perceived stigma	No	1.571	0.041*	.07 to	3.1
	Poor	Ref			
Self-care practice	Good	1.877	0.003*	.7 to	3.10
	Poor	Ref			
Knowledge about T2DM	Good	3.620	0.000*	2.4 to	4.9
	Poor	Ref			
Empowerment	Good	3.992	0.000*	2.7 to	5.3
	Not distressed	Ref			
Distress	Distressed	-5.56	0.041*	-10.90 to	-.20
	Poor	Ref			
Social support	Good	1.460	0.017*	.26 to	2.7

221 Dependent variable: Overall HRQoL, Mean VIF= 1.64

222 Discussion

223 This study explores the health-related quality of life (HRQoL) of patients with type 2 diabetes mellitus
224 (T2DM) receiving follow-up care at public hospitals in Puntland, Somalia. The findings reveal a mean

overall HRQoL score of 52.9 ± 6.90 , consistent with previous studies using the WHOQOL-BREF scale in similar populations. Studies from countries such as Thailand, Ethiopia, and Somalia have reported comparable HRQoL scores^(2, 19, 20), indicating a shared global challenge in managing the quality of life of T2DM patients.

In contrast, our results are lower than those reported in settings with better healthcare infrastructure, such as the University of Nigeria Teaching Hospital and institutions in the UAE and Brazil, where HRQoL scores ranged from 60.3 to 75.6.⁽²¹⁻²³⁾ this difference may be attributed to limited access to specialized care, health education, and socioeconomic barriers in Puntland.

On the other hand, our findings showed a better HRQoL compared to studies from Bangladesh, northern Thailand, and India, where HRQoL scores ranged from 40.65 to 49.72.⁽²⁴⁻²⁶⁾ this suggests that improved follow-up care and community support in Puntland may be positively influencing patients' HRQoL.

Our study found that patients with secondary education or higher exhibited significantly better HRQoL compared to those with less education. This is consistent with studies from Ethiopia, Saudi Arabia, Iran, and Mexico, which suggest that higher education equips patients with the knowledge needed for effective self-care.^(20, 27-29)

Diabetes-related complications were strongly associated with poorer HRQoL, aligning with findings from Saudi Arabia, Ethiopia, and India.^(1, 30, 31) the presence of complications imposes significant burdens, diminishing patients' quality of life. This underscores the importance of early intervention and comprehensive diabetes management to prevent complications and improve HRQoL.

Patients without comorbidities had better HRQoL than those with at least one comorbidity, corroborating research from Ethiopia, Nigeria, and Singapore.^(2, 32, 33) the interaction of multiple chronic conditions can negatively affect overall health and quality of life, especially when combined with the challenges of managing diabetes.

We identified waiting time as a significant negative predictor of HRQoL. Prolonged waiting times, particularly over 15 minutes, were associated with lower HRQoL, aligning with findings from

Nigeria.⁽³⁴⁾ This suggests that inefficiencies in healthcare systems, such as inadequate follow-up care and poor patient management, may contribute to diminished quality of life.

Perceived social stigma was another important factor impacting HRQoL. Patients who experienced stigma reported lower HRQoL, particularly in their psychological and social well-being. This is consistent with studies in Ethiopia and Switzerland.^(35, 36) Diabetes-related stigma often arises from dietary restrictions and the need for insulin, leading to social isolation and emotional distress.

Our study demonstrated that good self-care behaviors, adequate diabetes knowledge, and empowerment were associated with better HRQoL. Patients with higher levels of knowledge and empowerment exhibited improved HRQoL, a finding consistent with studies in Bangladesh and Iran.^(37, 38) these results highlight the critical role of self-management, education, and patient empowerment in improving the health outcomes of T2DM patients. The positive impact of diabetes knowledge on HRQoL in our study contrasts with some findings^(39, 40), which suggest that knowledge alone may not directly improve HRQoL. However, it can influence other factors, such as self-care behaviors, that significantly affect quality of life.

We also found that diabetes-related distress negatively impacted HRQoL, a finding supported by research from Malaysia and the USA.^(41, 42) Emotional distress associated with managing diabetes can significantly diminish HRQoL, underscoring the importance of psychological support for diabetes patients.

Finally, social support was positively correlated with HRQoL, reinforcing findings from a study in East China.⁽⁴³⁾ Support from family, friends, and healthcare providers enhances patients' ability to manage their condition and improves their overall quality of life.

Conclusion

Health-related quality of life (HRQoL) among adults with type 2 diabetes mellitus (T2DM) attending public hospitals in Puntland, Somalia, was moderate and associated with educational, clinical, psychosocial, and health system factors. These findings highlight the importance of addressing the broader needs of people living with diabetes beyond glycemic management alone. Integrating

structured diabetes education, psychosocial support, and improvements in diabetes care delivery into routine services may help promote more comprehensive, patient-centred care. This study provides locally relevant evidence to inform efforts to improve the quality of life of adults with T2DM in Puntland and other resource-limited settings.

Abbreviations: ADA, American Diabetes Association; BMI, Body Mass Index; DM, Diabetes Mellitus; GDM, Gestational Diabetes Mellitus; HRQoL, Health-Related Quality of Life; IDF, International Diabetes Federation; IHRERC, Institutional Health Research Ethics Review Committee; ODK, Open Data Kit; SD, Standard Deviation; T2DM, Type 2 Diabetes Mellitus; VIF, Variance Inflation Factor; WHO, World Health Organization; WHOQOL-BREF, World Health Organization Quality of Life-BREF.

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Institutional Health Research Ethical Review Committee of the College of Health and Medical Sciences, Haramaya University, on 22 May 2024 (Ref. No. IHRERC/121/2024). The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and relevant ethical guidelines and regulations. Formal permission was obtained from the relevant Regional Health Bureaus and participating hospitals. Written informed consent was obtained from all participants before data collection. Interviews were conducted in a separate room, and participants were assured that their information would be kept confidential.

Consent for publication

Not applicable. The manuscript does not contain identifiable individual information, images, or other personal details requiring consent for publication.

Availability of data and materials

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable ethical and confidentiality requirements.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

BK, SL, and HA contributed to the conception and design of the study, data acquisition, and data analysis and interpretation. MM, SL, and HA contributed to data curation and manuscript revision. All authors read and approved the final manuscript.

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