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ORIGINAL STUDY

Quality of Life Among Type II Diabetes Mellitus Patients

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ABSTRACT

Background: Type 2 diabetes mellitus (T2DM) is a significant public health concern. Approximately 90% of people with diabetes worldwide have diabetes mellitus type 2.

Methods: A cross-sectional study was conducted from October 23, 2023, to March 2, 2025, in Al-Najaf Al-Ashraf City to assess the quality of life among individuals with T2DM. A non-probability sampling technique (purposive sampling) was used to select 167 T2DM patients. Data were collected through a questionnaire, which consisted of three parts: Part I covered sociodemographic information, Part II focused on clinical data, and Part III addressed the quality of life among T2DM patients by using the 26 items quality of life brief (WHOQOL-BREF).

Findings: A total of 167 patients are aged 50–59 years (44.31%) and the majority are females (59.88%). Most are married (83.83%) and live in urban areas (88.02%). The results indicated strong relationships between quality of life and factors such as marital status, residency, educational level, employment status, income, smoking, health education, and physical exercise among T2DM patients. Additionally, relationships were found between QoL and the duration of diabetes, body mass index, hemoglobin A1c levels, and the presence of chronic diseases.

Conclusion: The majority of T2DM patients report a moderate quality of life across various dimensions.

Keywords: Quality of Life, Type II Diabetes Mellitus, Patients, WHOQOL-BREF

1. Introduction

Type 2 diabetes mellitus (T2DM) is a significant public health concern. According to the latest 10th Edition International Diabetes Federation (IDF) Report, approximately 537 million people were living with diabetes worldwide in 2021, with over 90% being T2DM. T2DM has emerged as one of the fastest-growing global health crises of this century, with the projected prevalence rate expected to reach 7,079 individuals per 100,000 by 2030 [1].

Type 2 diabetes mellitus is a major type of diabetes affecting people worldwide. Ineffective insulin use can occur due to the gradual loss of pancreatic beta cells (β -cells). Over the past two decades, T2DM has been increasingly diagnosed in adults. The complications and unchecked progression of T2DM

pose a significant burden on individuals, families, and the community. People with T2DM need to engage in lifelong self-care to prevent or delay both short and long-term complications, thereby improving their overall quality of life (QoL) [2]. These complications are serious and can include blindness, kidney failure, heart attack, stroke, lower limb amputation, and even death [3]. Anyway, individuals with T2DM need to engage in lifelong self-care to prevent or delay diabetes-related complications and enhance their QoL. Self-care refers to the actions or activities that individuals take to care for themselves within their environmental context. Diabetes self-care involves a range of behaviors, including diet management, regular exercise, medication adherence (whether insulin or oral hypoglycemic agents), self-monitoring of blood glucose levels, and foot care

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[4]. Evidence indicates that higher self-care behaviors significantly improve glycemic control (GC), reduce complications, and enhance overall QoL [5].

Quality of life is a critical health outcome and represents the ultimate goal of all treatments and health-related interventions. It serves as a cornerstone for evaluating healthcare practices, modern medications, and other health interventions. Health-related quality of life (HRQoL) measures an individual's perceived mental, physical, and social well-being [6]. QoL is a complex concept due to its application in various situations and multiple scientific fields. It can encompass health, happiness, self-esteem, mental well-being, or overall life satisfaction [38]. Moreover, QoL to health plays a vital role in the health outcomes of individuals with diabetes and is considered a psychological indicator of disease management. It is essential because individuals make personal judgments regarding their health and well-being [7]. So the QoL is an important aspect of diabetes because poor QoL leads to diminished self-care, which in turn, exacerbates GC, increases the risk of complications, and worsens the burden of diabetes, both in the short-term and the long-term [8]. Furthermore, numerous studies on QoL in T2DM patients from both developed and developing countries have shown that poor QoL is associated with increased hospital visits, poor sleep, restricted social lives, and worsening GC [9].

A multidisciplinary team approach may enhance patients' QoL by alleviating emotional distress and potentially reducing the incidence of diabetes [10]. Healthcare professionals, particularly nurses, play a crucial role in meeting the educational needs of individuals with diabetes mellitus. The global significance of nurses in educating diabetes patients is well recognized, as most of the education and support are provided by specialized nurses [11].

Despite the significant advancements in diabetes treatment in recent years such as improved insulin therapy techniques, the use of insulin pumps, and innovations in medications and gene therapy many diabetic patients still experience serious complications that greatly affect their daily lives. Furthermore, diabetes continues to present major challenges to patients' QoL. Even with improved blood sugar control, many patients face psychological and social difficulties, including anxiety and depression. These challenges often stem from the constant need for self-monitoring, as well as the strict lifestyle requirements associated with managing their condition, such as monitoring food intake, maintaining physical activity, and adhering to medication schedules. Therefore, this study aims to evaluate the quality of life of diabetic patients by examining various aspects, including

physical, psychological, social, and environmental factors.

2. Patients and methods

Study Design: This study employs a cross-sectional design to assess the quality of life among individuals with T2DM. The research was conducted from October 23, 2023, to March 2, 2025, at Al-Najaf Al-Ashraf city.

Sample of the Study: A purposive non-probability sampling technique was used, consisting of 167 T2DM patients who visited the Al-Sadder Medical City in the Al-Najaf Center for Diabetes and Endocrine for treatment or follow-up. Inclusion criteria required participants to be of both genders, aged over 30 years, and diagnosed with T2DM at least six months prior. Exclusion criteria included patients with hearing or language defects, cognitive disorders, or severe health problems such as cancer and other serious medical conditions.

Study Instrument: The study questionnaire was adapted after reviewing existing literature. The final instrument comprises three sections: Sociodemographic Data This section consists of seven items: age, sex, education level, marital status, employment status, residence, and income. Clinical Data This section includes eight elements: duration of diabetes, body mass index (BMI), HbA1c levels, associated diseases, smoking status, type of medication, health education received about diabetes management and physical exercise. Quality of Life Assessment by the World Health Organization's Quality of Life Scale-Brief (WHOQOL-BREF) is used to evaluate the quality of life among T2DM patients [12]. This shorter version of the WHOQOL-100 includes 26 questions, with 24 items divided into four areas: physical (seven questions), psychological (six questions), social (three questions), and environmental (eight questions). The remaining two questions gauge the patients' overall perceptions of their quality of life and health. Responses are measured on a five-point Likert scale, ranging from 1 to 5, with higher scores indicating better quality of life. The total raw scores for the five dimensions are converted to a scale of 0 to 100, where lower scores denote poor quality of life. The score ranges are interpreted as follows: 0–33.33 for low QoL, 33.34–66.67 for moderate QoL, and 66.68 and above for good QoL.

Validity of the Questionnaire: Face validity will be evaluated by a panel of 17 experts from various fields to assess the questionnaire's appropriateness, relevance, and clarity. Based on

their recommendations, the researcher will revise the questionnaire by removing some items and adding others. Data collection is scheduled from April 16 to August 15, 2024, with interviews lasting 15–20 minutes for each patient.

Statistical Analysis: Data from the study will be analyzed using the Statistical Package for Social Sciences (SPSS) version 26 and Microsoft Excel (2019). The findings of the study will be assessed using various statistical analysis techniques. For Descriptive Data Analysis, frequencies, percentages, means, and standard deviations will be calculated. For Inferential Data Analysis, One-way ANOVA and independent t-tests will be employed for quantitative data, provided that the necessary conditions for each test are met. A p-value of ≤ 0.05 will be considered statistically significant.

Ethical Considerations: The researcher obtained permission from the Medical Ethical Committee of the University of Kufa's College of Medicine as the initial step before commencing data collection. This step is crucial for protecting the participants' rights and maintaining their dignity. Participants provided verbal consent after being informed about

the study's general objectives and significance, along with assurances that their information would remain confidential and used solely for scientific research.

3. Results

Table 1 summarizes the frequency distribution of Socio-demographic data. This table explains that the majority of participants are aged 50–59 years (44.31%) and predominantly females (59.88%). Most are married (83.83%) and live in urban areas (88.02%), see figure (1). Concerning the level of education, Education levels show a majority of participants don't read and write (25.15%), with only 1.80% having postgraduate qualifications. Regarding Employment, status reveals a high percentage of housewives (53.29%) and relatively low representation in formal employment categories, while income data indicates that 59.28% find their income insufficient.

According to the clinical profile of the present study showed that most participants have had diabetes for ≤ 5 years (36.53%), while nearly 85% are

Table 1. Distribution of Socio-Demographic data for the studied sample (N = 167).

Socio-Demographic Characteristics	Rating and Intervals	F.	%
Age Groups (Years)	≤ 49	40	23.95
	50–59	74	44.31
	60–69	47	28.14
	70 and More	6	3.59
	Mean $\pm$ SD (Min-Max)	54.56 $\pm$ 8.35 (36–78)	
Sex	Males	67	40.12
	Females	100	59.88
Marital status	Married	140	83.83
	Divorced	3	1.80
	Widowed	19	11.38
	Separated	5	2.99
Residence	Urban	147	88.02
	Rural	20	11.98
Education level	Unable to read and write	42	25.15
	Able to read and write	35	20.96
	Primary school graduate	26	15.57
	Intermediate school graduate	20	11.98
	Preparatory school graduate	11	6.59
	Institute & College graduate	30	17.96
Employment status	Postgraduate	3	1.80
	Governmental employed	16	9.58
	Private or self-employed	20	11.98
	Retired	18	10.78
	Disabled	20	11.98
	Jobless	4	2.40
	Housewife	89	53.29
Income/Month	Sufficient	19	11.38
	Sufficient to some extent	49	29.34
	Insufficient	99	59.28
Total		167	100%

% = percentage, F. = frequency, SD = Standard deviation, Min = Minimum, Max = Maximum.

Table 2. Statistical distribution of Quality of Life items about general health and satisfaction.

General health and satisfaction	F.	%	Mean $\pm$ SD	Asses.
How would you rate your quality of life?				
Very poor	1	.60	51.9 $\pm$ 21.52	Moderate
Poor	85	50.90		
Neither poor nor good	68	40.72		
Good	13	7.78		
Very good	0	0		
How satisfied are you with your health?				
Very dissatisfied	2	1.20	64.67 $\pm$ 33.07	Moderate
Dissatisfied	81	48.50		
Neither satisfied nor dissatisfied	9	5.39		
Satisfied	75	44.91		
Very satisfied	0	0		

% = percentage, F. = frequency, Mean and Standard deviation (SD)); Mean $\leq$ 33.33: Poor, 33.34–66.67: moderate, 66.68 and more: Good, Assess.: Assessment.

Table 3. Statistical distribution of Quality of Life domains.

Quality of Life Domains	F.	%	Mean $\pm$ SD	Asses.
General Health				
Poor	1	.60	51.9 $\pm$ 21.52	Moderate
Moderate	153	91.62		
Good	13	7.78		
General Satisfied				
Poor	2	1.20	64.67 $\pm$ 33.07	Moderate
Moderate	90	53.89		
Good	75	44.91		
1-Physical domain				
Poor	3	1.80	50.79 $\pm$ 10.5	Moderate
Moderate	152	91.02		
Good	12	7.19		
2-Psychological domain				
Poor	4	2.40	53.08 $\pm$ 9.4	Moderate
Moderate	146	87.43		
Good	17	10.18		
3-Social domain				
Poor	24	14.37	58.41 $\pm$ 16.79	Moderate
Moderate	65	38.92		
Good	78	46.71		
4-Environmental domain				
Poor	12	7.19	53.72 $\pm$ 13.45	Moderate
Moderate	119	71.26		
Good	36	21.56		
Overall Quality of Life				
Poor	1	0.60	54.00 $\pm$ 8.99	Moderate
Moderate	154	92.22		
Good	12	7.19		
Total	167	100%		

% = percentage, F. = frequency, Mean and Standard deviation (SD)); Mean $\leq$ 33.33: Poor, 33.34–66.67: moderate, 66.68 and more: Good, Assess.: Assessment.

classified as overweight (45.51%) or obese (38.92%). Smoking is relatively uncommon, with 86.83% being nonsmokers, though 9.58% are current smokers. The results also reveal that the elevated mean HbA1c level of 9.37% indicates that participants had poor glycemic control. Hypertension (68.2%) is the most frequent chronic condition associated with diabetes, followed by thyroid disease (17.8%). These findings underscore the burden of diabetes-related complications and highlight modifiable risk factors

like smoking and hypertension that warrant targeted preventive and management strategies. Regarding the type of medication, the results reveal that 72.46% of participants use antidiabetic agents, 8.38% use insulin only, and the remainder 19.16% use both antidiabetic agents and insulin. Diabetes education is embraced by 82.04% of participants, primarily through doctors (77.3%), while alternative sources like the internet (16.9%) are less utilized. Physical exercise is underutilized, with 55.69% reporting no

activity; among those exercising, walking (73.4%) is the most common.

This table shows that over half (50.90%) rate their quality of life as poor, with only 7.78% considering it good and none rating it very good, resulting in an overall mean score of 51.9 ± 21.52 , classified as “moderate” by the assessment criteria. Similarly, health satisfaction is low, with 48.50% dissatisfied and only 44.91% satisfied, yielding a mean score of 64.67 ± 33.07 , also categorized as “moderate”.

Most participants rate their QoL in each domain as “Moderate,” with some variation across domains. Concerning General Health: 91.62% rated it as moderate, with a mean of 51.9, indicating a moderate health perception. General Satisfaction: 44.91% rated it as good, with a mean of 64.67, suggesting moderate satisfaction. Physical Health: 91.02% rated it as moderate, with a mean of 50.79, indicating moderate physical health. Psychological Health: 87.43% rated it as moderate, with a mean of 53.08, reflecting moderate psychological health. Social Health: 46.71% rated it as good, with a mean of 58.41, suggesting relatively better social experiences. Environmental Health: 71.26% rated it as moderate, with a mean of 53.72, indicating a moderately positive environmental experience.

Furthermore, the majority of participants (92.22%) rated their overall QoL as “Moderate,” with only 0.60% rating it as “Poor” and 7.19% rating it as “Good.” The mean score of 54.00, with an SD of 8.99, places the overall QoL in the “Moderate” category.

Table 4 examines the relationship between socio-demographic characteristics and Overall QoL among the studied sample. Age showed no significant association with QoL ($p = .356$), although respondents aged 70 and above had the highest mean score (60.29 ± 7.27). Similarly, gender differences were not statistically significant ($p = .259$), with males reporting slightly higher QoL (54.96 ± 9.48) compared to females (53.36 ± 8.63). Marital status had a highly significant relationship with QoL ($p < 0.0001$), with married individuals reporting the highest mean score (55.28 ± 8.55), while divorced individuals had the lowest (43.92 ± 8.22). Urban residents reported significantly better QoL (54.98 ± 8.97) compared to rural residents (46.84 ± 5.06), with a highly significant p-value (< 0.0001).

Education level also showed a strong positive correlation with QoL ($p < 0.0001$), with higher educational attainment associated with higher QoL scores. Don’t read and write respondents reported the lowest mean score (48.80 ± 8.37), while those

Table 4. Relationship between Socio-Demographic Characteristics of the studied sample and Overall Quality of Life.

Socio-Demographic Characteristics	Rating and Intervals	Mean	SD	Statistical Test	P-Value
Age Groups (Years)	≤49	54.32	7.52	1.089 [#]	.356 (NS)
	50–59	53.53	9.50		
	60–69	53.66	9.42		
	70 and More	60.29	7.27		
Gender	Males	54.96	9.48	1.132 ^ψ	.259 (NS)
	Females	53.36	8.63		
Marital status	Married	55.28	8.55	6.623 [#]	<0.0001 (HS)
	Divorced	43.92	8.22		
	Widowed	47.86	8.33		
	Separated	47.60	9.96		
Residence	Urban	54.98	8.97	3.965 ^ψ	<0.0001 (HS)
	Rural	46.84	5.06		
Education level	Don’t read and write	48.80	8.37	7.15 [#]	<0.0001 (HS)
	Able to read and write	51.22	7.96		
	Primary school graduate	55.34	8.70		
	Intermediate school graduate	56.68	7.27		
	Preparatory school graduate	57.20	9.46		
	Institute & College graduate	59.92	7.21		
Employment status	Postgraduate	59.00	11.14	7.011 [#]	<0.0001 (HS)
	Governmental employed	60.59	7.88		
	Private or self-employed	55.33	9.16		
	Retired	59.60	8.11		
	Disabled	47.28	6.20		
	Jobless	48.19	7.85		
Income/Month	Housewife	53.16	8.56	28.377 [#]	<0.0001 (HS)
	Sufficient	63.93	9.19		
	Sufficient to some extent	56.99	6.21		
	Insufficient	50.62	8.20		

[#] Statistics was done using One Way ANOVA.; ^ψ Statistics was done using independent t-test.

Table 5. Relationship between Clinical data of the studied sample and Overall Quality of Life using One Way ANOVA.

Clinical data	Rating and Intervals	Mean	SD	Statistical Test	P-Value
Duration of diabetes (Years)	≤5	55.70	8.69	2.963	0.034 (S)
	6–10	51.69	8.37		
	11–15	55.96	9.08		
	16 and More	51.69	9.55		
Body Mass Index	Underweight	.	.	3.688	0.027 (S)
	Normal weight	49.67	10.07		
	Overweight	54.79	7.73		
	Obesity	54.82	9.54		
Smoking	Smoker	47.82	7.24	6.477 [#]	.002 (HS)
	Previously smoker	55.78	9.57		
	Nonsmoker	54.94	8.87		
Chronic diseases associated with diabetes	Hypertension	52.04	9.80	3.033 [#]	.027 (S)
	Cardiovascular diseases	47.27	8.38		
	Chronic kidney diseases	45.50	10.96		
	Thyroid disease	49.84	6.93		
Type of medications	Antidiabetic agents only	53.93	9.23	0.099 [#]	.905 (NS)
	Insulin only	53.36	8.81		
	Both	54.55	8.33		
Since your diagnosis with diabetes, have you worked on educating yourself	No	49.19	8.25	3.334 ^ψ	0.001 (HS)
	Yes	55.05	8.82		
Doing physical exercise	No	56.35	8.54	5.243 ^ψ	.001 (HS)
	Yes	57.80	8.30		

[#]: Statistics was done using One Way ANOVA, ^ψ Statistics was done using independent t-test.

with institute, college, or postgraduate education had the highest scores (59.92 ± 7.21 and 59.00 ± 11.14 , respectively). Employment status was another significant factor ($p < 0.0001$). Government employees (60.59 ± 7.88) and retirees (59.60 ± 8.11) reported the highest QoL scores, while disabled individuals (47.28 ± 6.20) and jobless participants (48.19 ± 7.85) had the lowest. Income levels had the most pronounced impact on QoL, with those reporting sufficient income showing a mean score of 63.93 ± 9.19 compared to 50.62 ± 8.20 for those with insufficient income ($p < 0.0001$).

The present study showed that the duration of diabetes showed a significant association with QoL ($p = .034$). Participants with diabetes for 11–15 years reported the highest QoL mean score (55.96 ± 9.08), while those with a duration of 6–10 years or 16 years and more had lower scores (51.69 ± 8.37 and 51.69 ± 9.55 , respectively). Body Mass Index (BMI) also showed a significant relationship with QoL ($p = .027$). Participants with overweight (54.79 ± 7.73) and obesity (54.82 ± 9.54) had higher QoL scores compared to those with normal weight (49.67 ± 10.07). This finding may reflect varying coping mechanisms or differences in health status among BMI categories.

Regarding smoking status demonstrated a highly significant association with QoL ($p = .002$). Nonsmokers (54.84 ± 8.82) and previous smokers

(55.78 ± 9.57) reported better QoL compared to current smokers (47.82 ± 7.24). Furthermore, chronic diseases associated with diabetes had a significant impact on QoL ($p = .027$). Participants with hypertension (52.04 ± 9.80) reported better QoL compared to those with cardiovascular diseases (47.27 ± 8.38) or chronic kidney disease (45.50 ± 10.96), which were associated with the lowest QoL scores. Since your diagnosis with diabetes, have you worked on educating yourself had a highly significant relationship with QoL ($P = 0.001$). Physical exercise was another significant factor ($P = 0.001$) which indicates physical exercise affects QoL for patients with diabetes. Also, there is a moderate negative correlation between Hemoglobin A1c and QoL ($r = -0.460$, $p = 0.031$), indicating poorer glycemic control is associated with lower QoL.

4. Discussion

More than a third of the sample in the present study has been suffering from T2DM for 5 years or less. The present findings are consistent with results in a previous study in India found most of the participants had diabetes for 5 years or less [13]. A randomized control trial conducted in Nepal found a large proportion of participants were living with T2DM for 5 or less [14]. Regarding the body mass index, less than

half of the present study sample complains of being overweight. A study conducted in Iraq mentioned that the majority of T2DM participants were overweight or obese [15]. Another previous study conducted in Iraq at the Diabetics Center in Al Sader Medical City reported that around (38.0%) of patients were overweight [16]. Obesity may be attributed to diets high in saturated fats and carbohydrates, along with low intake of dietary fiber, as the prevalence of obesity has sharply increased.

The study finding reveals that the majority of the patients are non-smokers. This may be due to the perception that smoking is socially unacceptable among female participants in the study, who represent a larger percentage than their male counterparts. These findings are consistent with another study in Thailand, reporting that 73.1% of T2DM participants are non-smokers of cigarettes [17]. On the other hand, a study done by Omar *et al.*, (2018) in eastern Sudan reported that only (3.7%) of T2DM participants were cigarette smokers [18].

The finding of the present study shows that an elevated mean HbA1c level indicates that participants had poor glycemic control. Poor and inadequate glycemic control among patients with T2DM constitutes a major public health problem and a major risk factor for the development of diabetes complications. Glycemic control is the optimal serum glucose concentration in diabetic patients. It is necessary to identify factors affecting the glycemic control of patients to prevent control and complications [19]. Osei-Yeboah *et al.*, (2019) in Ghana showed that poor glycaemic control is acknowledged as the major contributing factor to diabetes complications [20]. These results agree with another previous study conducted in Nepal by Karki *et al.*, (2025) reported that two-thirds of the participants had uncontrolled HbA1c [14]. Another study in eastern Sudan also reported that the rate of poor glycemic control was 71.9% [18].

Concerning comorbidities in the present study, hypertension is considered the most common chronic disease associated with diabetes. This is supported by a cross-sectional study conducted in India by Sharma, *et al.*, (2021) who mentioned that hypertension was found to be the most common comorbidity for patients with T2DM [21]. Along the same line, a previous study in a Specialized Hospital in Western Ethiopia that used a 36-item Short Form (SF-36) showed that (82.5%) of the study participants, have hypertension as a comorbid problem [22]. The majority of the sample used oral antidiabetic agents, while few used insulin. For newly diagnosed individuals with T2DM, oral antidiabetic therapy has been demonstrated to be just as successful in attaining

glycemic control as early insulin treatment. Regardless of their initial HbA1c levels. Results of a previous study conducted in Ghana reported that with the exception of 8.67% of patients with T2DM who were on insulin, and 2.66% of them were on both insulin and oral medications, all the rest of the participants were on oral medications [20]. A previous study conducted to assess QoL in T2DM patients mentioned that although oral hypoglycemic agents were mostly used for treatment, some patients were using both insulins and oral hypoglycemic agents [9].

Regarding education about diabetes, the current study reveals most of the participants are involved in disease education, and physicians are the first source of information for most patients. This outcome is compatible with a study in Al-Najaf City by Abd & Hamza, (2022) shows that more than half of the sample was educated about diabetes mellitus [23]. Regarding physical exercise in the present study, more than half of the patients with T2DM reported no physical activity; while those participants exercised, walking was the most common physical exercise. One significant factor contributing to a low QoL for many patients is their lack of adherence to exercise. This indicates that a considerable number of participants may not fully understand the importance of physical activity for managing blood sugar levels. Similarly, another study done to evaluate the QoL of Kuwaiti patients with T2DM reported that only 2% of participants practice regular exercise, which necessitates better health literacy in the management of diabetes, extending to different domains in patients' QoL [24]. A study in Ghana reported that the adoption and maintenance of physical activity are critical foci for blood glucose management and overall health in individuals with diabetes. Practice guidelines consistently recommend that people with diabetes obtain at least 150 minutes of moderate to vigorous aerobic exercise per week. An acute bout of exercise increases glucose disposal into the contracting muscles, leading to clinically significant decreases in blood glucose concentrations [20].

According to general health, most of the participants rated a moderate QoL in this domain. These results agreed with a study conducted by Nnachi *et al.*, (2023) who determined the QoL of T2DM patients and found that the QoL of patients was moderate in this domain [25]. These results disagree with the study conducted at the University of Gondar referral hospital by Aschalew *et al.*, (2020) who mentioned in their results that (41.91%) of the participants rated good QoL [26]. This is in contrast to the findings by Gebremedhin *et al.*, (2019) in a cross-sectional study in Southwest Ethiopia among adult patients with T2DM, where one-third of the study participants

rated good QoL [27]. Regarding general satisfaction, the majority of the participants in the current study have moderate self-satisfaction with health. This finding is reinforced by Aschalew *et al.*, (2020) who explain in their study that (40.2%) of patients have fair self-satisfaction with health in a study [26]. This finding is different from the findings of Oluwatuyi *et al.*, (2024) who found good self-satisfaction in the study in Nigeria [28].

According to physical status, the study results reveal that the overall level of the physical domain is moderate. These results are in agreement with a study done by Tamornpark *et al.*, (2022) who found that the majority of the participants had moderate levels of QoL in northern Thailand [29]. These results were inconsistent with Puspasari & Farera, (2021), who reported that the majority of the participants had poor QoL in Indonesia [30]. These patients' demands for different health services or their inability to engage in other activities may be the cause of these outcomes. Furthermore, the lower quality of life that the diabetic patients in this study experienced could be brought on by a lack of awareness about the condition, restricted access to healthcare facilities, or financial limitations.

Concerning psychological status, the findings of the study show that the overall level of psychological domain is moderate. This result is similar to a study assessing the QoL of T2DM patients which also found that the study group had moderate QoL in psychological health [8]. These findings are slightly different from the findings of Amin *et al.*, (2022) a study conducted in Bangladesh using the WHOQOL-BREF instrument, who mentioned that the QoL scores were below average for the physical health, psychological, social relationship, and environmental domains [31].

Regarding social relationships, the results of the study indicate that the overall level of the social domain was moderate. This is in contrast to the findings by Amelia *et al.*, (2018) in a cross-sectional study among T2DM patients of Indonesian, it was reported that the most of T2DM subjects (69.6–67.8%) have a good QoL in three domains of QoL but not in the psychological health domain which is around 78.0% of subjects had a reduced QoL in this domain [32]. Tamornpark *et al.*, (2022) also showed that the majority of the participants had a good level of QoL in the social and environmental domains [29]. Regarding environmental status, the result of the study shows that the overall level of environmental domain was moderate. Low income is a significant reason why these participants experience a moderate QoL, as it hinders their ability to access diabetic clinics, secure personal transportation, and afford necessary medications. Furthermore, some individuals reside in remote

areas, making it challenging for them to reach institutions that provide the appropriate services. This was supported by a study conducted in South Nigeria that reported that Nnachi *et al.*, (2023), who reported that (48.8%) of the study participants had fair QoL in the environmental domain [25].

The results also indicate that the overall results of the QoL domains are moderate. These results come on the same line with Yeole *et al.*, (2020) who mentioned that the QoL levels were moderate in the study conducted in India [33]. A study in Nigeria reported that the overall QoL was poor in (70.1%) of the participants [28]. The socioeconomic status of patients and regional cultural differences may contribute to the observed disparities. The variations in cultural, ethnic, and sociological backgrounds among patients in different study locations could explain the discrepancies in how quality indicators correlate with both subjective evaluations and objective measures.

The results of the present study reveal that there is marital status had a highly significant relationship with married individuals reporting the highest mean score, while divorced individuals had the lowest mean score. One possible explanation for the differences observed between married and single patients, married patients tend to have better social interactions and greater mental stability. Employment status was another highly significant factor, government employees and retirees reported the highest QoL scores, while disabled individuals and jobless participants had the lowest. This was supported by a study conducted by John, *et al.*, (2019) who stated that are statistically significant association was found between different domains of QoL and educational status, marital status, and income status [13].

The current study also showed that the urban residents reported significantly better QoL compared to rural residents, with a highly significant p-value (<0.0001). A study in Poland, done by Wróblewska *et al.*, (2023) stated that there is a relationship between QoL and place of residence and added that education and residing in cities were among the socio-demographic factors increasing the QoL of the participants [34]. Education level also showed a strong positive correlation with QoL, with higher educational attainment associated with higher QoL scores in the present study. Patients who don't read and write reported the lowest QoL. This finding was supported by a study conducted by Boonyathee *et al.*, (2022), who reported that education was significantly related to QoL [17]. Among adults with a chronic disease a higher proportion (40%) of patients having primary education or lower reported severe-extreme impaired HRQoL compared to patients having higher education. A study in Saudia Arabia also showed that

patients with higher levels of education possess a better QoL score [35].

The present study also indicates that income levels had the most pronounced impact on QoL, with those reporting sufficient income showing a high QoL compared to those with insufficient income. These results confirmed several previous studies conducted in Iraq that income was a significant parameter for both HRQoL and oral health-related quality of life (OHRQoL). A strong association between income and QoL has been documented both in high and low-income countries [15]. A study in Bangladesh added a higher monthly family income was associated with a higher QoL score [31]. Individuals with diabetes, particularly those from wealthy households, may experience an improved QoL due to a higher income, which allows them to afford necessary therapies. Additionally, they can access healthcare services without facing financial obstacles. The duration of diabetes showed a significant association with QoL, participants with diabetes for 11–15 years reported the highest QoL while those with a duration of 6–10 years or 16 years and more had lower scores. Abulhommos *et al.*, (2022) added the duration of disease was one of the main factors that significantly affected patients' QoL [36]. Mahajan & Muley, (2024) reported in a previous study in India who are mentioned that there was a significant association between the mean of QoL total score and the duration of diabetes [37]. Similarly, a study conducted in India, showed that there was a statistically significant correlation between various parameters such as duration of diabetes history versus QoL of diabetic patients [9]. The longer duration of illness may allow patients to become more familiar with the medications they are prescribed, leading to increased experience and self-confidence in managing their condition.

In this study smoking status demonstrated a highly significant association with QoL, nonsmokers and previous smokers reported better QoL compared to current smokers. A previous study in Western Ethiopia reported that patients who had a history of smoking had decreased HRQoL when compared with their counterparts [22]. According to the results of this study, body Mass Index (BMI) also showed a significant relationship with QoL, participants with overweight and obesity had higher QoL scores compared to those with normal weight. These findings were comparable with the study done in Poland, which mentioned that there was a relationship between QoL and body mass index [34]. Similarly, (Al-Matrouk & Al-Sharbati, 2022) reported that BMI levels were statistically significant predictors of poor QoL [24].

Concerning the glycemic profile, the finding shows that there are significant associations between HbA1c and QoL in T2DM. This was supported by a study conducted in the Western region of Saudi Arabia by Abualhamael *et al.*, (2023) who stated that there are association between HbA1c and QoL [35]. Moreover, a study conducted by Mahajan & Muley, (2024) in India reported that a negative correlation between QoL scores and HbA1c was observed, meaning that higher blood glucose levels are associated with lower QoL [37]. This underscores the importance of effective blood glucose management in enhancing the QoL for people with T2DM. This can be attributed to the fact that the majority of the study group had poor blood sugar control, as many patients were unaware of their glycated hemoglobin levels. Other significant factors included poor adherence to treatment, limited access to further medical care, and noncompliance with dietary and exercise recommendations. These issues negatively impacted their overall QoL. Previous literature has shown that disease control in diabetic patients is one of the most important issues in QoL. Additionally, regular glucose monitoring is beneficial for controlling blood glucose and may be a preventive factor for QoL [36].

As regard to chronic diseases associated with diabetes had a significant impact on QoL, participants with hypertension reported better QoL compared to those with cardiovascular diseases or chronic kidney disease, which were associated with the lowest QoL scores. This finding agreed with the results in India by John *et al.*, (2019) who found that there are statistically significant associations between different domains of QoL and hypertension [13]. Similarly, Feyisa *et al.*, (2020) in Western Ethiopia reported that the absence of comorbid conditions related to DM was found to increase HRQoL. Those who had not had the condition had about six units better HRQoL than their counterparts [22]. Physical exercise was another significant factor that indicates physical exercise affects QoL for patients with diabetes. This was confirmed by Mahmood *et al.*, (2024) who reported that physical activity, income, smoking status, and independently and significantly affected the HRQoL outcome in a study conducted in Iraq [15].

5. Conclusions

Most patients with T2DM have moderate quality of life in terms of their physical, psychological, social, and environmental well-being. There are significant correlations between QoL for patients with T2DM and factors such as marital status, place of residence, income, education, employment, smoking, and physical

activity. To improve the QoL for diabetic patients, it is recommended to develop comprehensive and ongoing awareness programs focused on disease management and the prevention of complications. These programs could include educational workshops on healthy nutrition, the importance of exercise, and methods for periodically monitoring blood sugar levels. Furthermore, access to specialized healthcare and essential medications should be enhanced in various regions, particularly in rural and remote areas, to bridge the gap between patients in urban centers and those in less accessible locations.

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