



Research article

Health-related quality of life and associated factors among type 2 diabetic adult patients in Debre Markos Referral Hospital, Northwest Ethiopia

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ABSTRACT

Health-related quality of life (HRQOL) is a multifaceted concept that is strongly impacted by Type II diabetes in developing countries. The majority of studies indicate diabetes mellitus prevalence without looking at people's quality of life.

This study was conducted using an Institution-based cross-sectional design in Debre Markos Referral Hospital from March 03 to March 31, 2020. We evaluated HRQOL using the WHO quality of life BREF and data were obtained through face-to-face interviews. We used a systematic random sampling technique to select study participants. Data were entered into Epi data version 3.1 and exported to STATA version 14.0. Candidates for multivariable analysis were variables with a P-value less than 0.25 in the bivariable analysis and P-value less than 0.05 were considered to declare a statistically significant association. The final model was tested for its goodness of fit using Hosmer and Lemeshow's statistics.

The analysis included a total of 368 adult individuals with type II diabetes and 206 (56%) had a good HRQOL. Being male (AOR = 4.28, 95%CI:2.36, 7.78), having duration of disease of more than 59 months (AOR = 2.93, 95%CI:1.61, 5.34), doing a physical exercise (AOR = 2.33, 95%CI:1.34, 4.05) and got counseling (AOR = 3.33; 95%CI:1.82, 5.94) were directly associated with good HRQOL whereas the presence of diabetic complications (AOR = 0.46, 95%CI:0.26, 0.80), comorbidity (AOR = 0.45; 95%CI:0.25, 0.84) and drinking alcohol (AOR = 0.27, 95%CI:0.16, 0.48) had an inverse relationship with good HRQOL.

More than half of type 2 diabetic adult patients had a good HRQOL. Being male, drinking alcohol, getting counseling, doing physical exercise, absence of diabetic complications, and comorbidity and long duration of disease were predictors of good HRQOL. Therefore, avoiding drinking alcohol and promoting physical exercise and counseling should be encouraged.

1. Introduction

The International Diabetes Federation reported that the estimated global prevalence of diabetes in 2019 was 9.3 percent, with about 463 million adults living with diabetes whose health-related quality of life (HRQOL) is not well quantified, and two out of every three adult diabetic patients living in urban, accounting for 310.3 million of people [1, 2]. The impact of many phenomena on HRQOL is a major concern worldwide [3, 4]. According to the World Health Organization (1998), HRQOL refers to "an individual's perception of his/her position within the culture and value system in which they live with the individual's expectations, concerns, goals, and standards." Even though diabetic patients cannot

obtain a complete cure for chronic type II diabetes mellitus, the outcome of diabetes care is to make the patient's HRQOL better [5]. HRQOL is a multifaceted concept incorporating an individual's subjective perception of physical and emotional function and social well-being; looking for HRQOL after a diagnosis of type II diabetes is used to detect problems [4, 6]. Health-related quality of life has evolved to include aspects of life that affect perceived physical or mental health and is used as a response variable to follow the burden of type 2 diabetes mellitus (DM) [7]. HRQOL is an intellectual concept consisting of positive and negative aspects of an individual's life [8], and it is one of the key metrics that really should be utilized to evaluate the success of the prevention and control of non-communicable chronic illnesses [9]. Health-related

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quality of life indicates the physical, psychological, social, and environmental domains of the health state and is impacted by the person's expectations, beliefs, experiences, and perceptions [10, 11].

Healthcare professionals and researchers utilize HRQOL to pinpoint elements and components of type 2 DM patients' disease outcomes [12]. Physical factors, such as the difficulty to carry out physical activities due to type 2 DM-related complications, and psychological aspects, such as frustration due to high blood glucose levels, have all been part of HRQOL in diabetic patients. An individual with type 2 DM typically has a worse HRQOL than a person of a comparable age without type 2 DM, and a rise in complications is associated with lower HRQOL. Therefore, a measure of HRQOL is needed to evaluate patients' health states and add to the clinical data to obtain better diabetic outcomes [13, 14]. The Sub-Saharan African region is one of the regions also suffering from the global epidemic of HRQOL where minimal studies are conducted; for instance, a study conducted in Jimma, Ethiopia, investigated good HRQOL to be around sixty-seven percent, and plenty of work recommended to be conducted [16]. Due to predictors such older age, illness duration, high fasting blood sugar, and poor physical health domain, every elements of HRQOL of individuals with type 2 DM are impaired [16, 17]. In addition, various factors, such as comorbidity and low socioeconomic status, have consistently deteriorated type 2 diabetic patients' HRQOL. Furthermore, chronic and acute complications that may arise in the future impact the patients' HRQOL [18, 19].

Despite the fact that initiatives for diabetes mellitus management, prevention, screening, diagnosis, treatment, and care have been implemented in Ethiopia, little emphasis has been placed on factors affecting diabetic patients' HRQOL [20, 21]. Diabetes-related HRQOL deficiencies are commonly linked to the disease itself, its stringent treatment regimens, including food, and its associated comorbidities. Living with DM has financial, social, and psychological impedes. However, the patient is encouraged to have an everyday life [15, 22]. The patient's HRQOL is directly influenced by type II DM and has significant public health dimensions that can collectively or individually be deteriorated, including physical, environmental, psychological, and social health domains [23]. Like other chronic diseases, diabetes can reduce the HRQOL of patients, and they need lifesaving and lifelong treatments, daily monitoring of blood glucose levels, and careful eating habit to improve their HRQOL [24, 25].

Studies done in United Arab Emirates and India indicated that all over the four HRQOL domains among type II diabetic patients were mean values greater than 50 percent [15, 26]. However, the mean value of HRQOL is different among the four domains (physical, environmental, psychological, and social health domains). For example, a study in India found the maximum mean value of HRQOL in the physical health domain (55.26 ± 9.09) and the minimum mean value in the social health domain (40.64 ± 13.49) [27]. In another study conducted in Kenya, the minimum mean of HRQOL was estimated in the environmental health domain and the maximum mean in the social health domain [7, 28].

In Ethiopia, a study conducted at Jimma indicated that the highest percentage (57%) of poor HRQOL was found in the general health domain, followed by the physical health domain (36%), and the highest good quality of life was found in bodily pain dimensions [16]. Studies conducted in Mizan Tepi, Ethiopia, showed that, respondents scored highest (53.68 ± 17.50) in the social domain of the four HRQOL domains and in other studies conducted in Bahir Dar and Mizan Tepi, the minimum and maximum mean scores of HRQOL was found in the physical and social domain, respectively [17, 29]. Besides that, according to a study conducted in Nekemte, Ethiopia, the mean score of the HRQOL was found to be highest (63.19 ± 34.36) in the physical health domain and lowest in the general health domain [30]. Furthermore, a much higher HRQOL magnitude was reported among urban residents than in the rural population in Ethiopia [20]. This finding suggests that lifestyle change among the urban population is fueling the observed rise in DM deterioration of HRQOL [2, 31].

Findings in Greece, Nordic countries (Denmark, Norway, Sweden, Finland, and Iceland), Turkey, China, and Bangladesh indicated that assessing HRQOL in Type 2 diabetes mellitus is an important thing that needs to be assessed and was associated with age, marital status and education [32, 33, 34, 35, 36]. The study conducted in Saudi indicated the existence of a significant association between HRQOL, gender, and economic status, and both factors were found to be significantly associated with the majority of the domains of HRQOL [37]. The finding in India also showed that gender being female negatively affected all of the domains of the WHOQOL-BREF [23]. Findings in Rwanda showed that residence was a significant predictor of HRQOL [38]. The study previously carried out in Mizan Tepi, Ethiopia, recommended a variety of factors that are likely to have an impact on the participants' HRQOL. For instance: trauma, loss of relatives due to death, and other factors may contribute to impaired HRQOL" [17]. Studies conducted previously assessed that the pattern of relationships between socio-demographic and diabetes mellitus-related medical characteristics of patients had affected several dimensions of HRQOL such as physical function, daily activities, overall health, and satisfaction with diabetes treatment [39, 40].

Studies conducted in Botswana, India, and the Arab Emirates indicated that increased physical exercise had contributed to better HRQOL for diabetic patients [41, 42, 43]. Findings in Nigeria and Uganda showed that depression due to smoking was a significant predictor of poor quality of life [44, 45]. Findings from studies conducted in Bahir Dar, Gondar, and Nekemte, indicated that smoking, alcohol drinking, and feeling stigmatized were statistically significant variables for HRQOL, respectively [29, 30, 46]. Findings in Addis Ababa showed that the living status of diabetic patients who engaged in drinking was an essential predictor of HRQOL [47]. According to a Canadian study, insulin use, the duration of diabetes and complications from the disease are all factors that affect HRQOL ratings. The duration of diabetes is also linked to worse HRQOL scores [48]. Scientific studies in Asia revealed an association between HRQOL and fasting blood sugar. It negatively affected all of the domains of the WHOQOL-BREF; however, the impact was most substantial for the physical health domain and psychological domain and weaker for the domain of social relationships and environment domain [23]. Prevention or delay of onset of multiple clinical symptoms was carried out through better management of diabetes and may help improve the HRQOL [49]. According to the 7th edition of the Summary international journal of non-communicable diseases and diabetes research and clinical practice issued by the International Diabetic Federation (IDF), Type 2 diabetes is one of the world's most significant health threats and is attributed to changes in lifestyle that result in reduced physical activity and obesity, and it can lead to an increase in cardiovascular risk, lowering HRQOL and life expectancy over time [50, 51, 52]. According to the study conducted in Jimma, Ethiopia found the presence of substantial impairments in respondents' general health and has concluded that having several comorbid conditions have a significant role in the prediction of impaired HRQOL [16]. The HRQOL was also found significantly related to fasting blood sugar and body mass index [16, 29, 39].

Most studies so far conducted on type 2 diabetes mellitus investigated the magnitude of the disease and its distribution throughout the world. Studies conducted in Ethiopia are mainly targeted at the prevalence of diabetes mellitus which estimates the burden of disease on type 2 diabetic adult patients incomplete unless their HRQOL is quantified. Health professionals still mostly focus on treatment only without specific guidelines on HRQOL and are unaware of the social, physical, psychological, and environmental impact on individuals with type 2 diabetes' life quality in terms of health. In chronic diabetic patients, a complete cure cannot be obtained without holistic intervention with the ultimate objective of increasing the patient's QOL. Therefore, knowing the predictors and detecting risk factors of QOL among type 2-diabetic patients is crucial and these variables may then be targeted for prevention.

Furthermore, identifying factors that influence HRQOL would provide data for health professionals, policymakers, program planning bodies, and other governmental and non-governmental organizations to make informed decisions in maximizing efforts to improve the life quality of diabetic patients in the country and study area. Thus, this study aimed to assess the HRQOL and its determinants among type 2 diabetic adult patients attending Debre Markos Referral Hospital, Northwest Ethiopia.

2. Methods and materials

2.1. Study design and period

An institutional-based cross-sectional research was conducted from March 03, 2020, to March 31st, 2020 in Debre Markos Referral Hospital (DMRH) among type 2 diabetic adult patients.

2.2. Study area and population

Debre Markos Referral Hospital (DMRH) is located in East Gojjam Administrative Zone, Amhara National Regional State, which is 300 km (Km) far from Addis Ababa, the capital of Ethiopia. There are about 798 type 2 diabetic adult patients currently on follow-up in the chronic diseases outpatient department (OPD) in Debre Markos Referral Hospital. All of the diabetic patients have a follow-up period of once per month.

2.3. Sample size determination

The required sample size for the first objective was determined by using single population proportion formula with basic assumptions of 95% confidence interval, 5% margin of error, and 67% estimated proportion of good health-related quality of life from a previous study [16]. Hence, the following formula was used for sample size calculation for the first objective:

$$n = \frac{z_{\alpha/2}^2 \times P \times (1 - P)}{d^2} = \frac{(1.96)^2 \times 0.67(1 - 0.67)}{(1.05)^2} = 340$$

Assumptions:

n = number of participants to be interviewed

Z = 95% confidence interval, whose Z score value is 1.96

P = Proportion of good health-related quality of life which was (67%)

[16]

d = the margin of error taken as 5%

For the second objective, the sample size was calculated by considering independent variables, which were found to be significantly associated with HRQOL in studies conducted in different areas. The sample size was computed by using EPI Info version 7.2 with the assumptions of a 95% confidence interval and power to be 80%. Finally, the first objective was preferable, considering the non-response rate to be 10% and adding $340 + 34 = 374$ participants. We chose study participants using a systematic random sampling technique.

2.4. Data collection instruments, procedure, and data quality control

An interviewer-administered structured questionnaire was used to collect primary data, and medical record registration was used to take secondary data variables like comorbidity, fasting blood sugar, duration of patients with DM, and diabetic complications were collected from the secondary source. Socio-demographic variables were used by adapting the questionnaire from other studies conducted before. The wealth index was measured using adopted questionnaires from the Ethiopian Demographic Health Survey (EDHS 2016) by assuming the income level of participants in urban and rural differently [53]. The questionnaire for assessing HRQOL of type 2 diabetic adult patients was adopted from a validated instrument of the short form of the World health organization quality of life questionnaire, whose Amharic version has been validated

and cross-culturally checked to be used in Ethiopia with four domains and 26 items [54]. The four domain scores represent a person's perception of their quality of life in each of the domains. WHOQOL-BREF is a 26-items instrument consisting of four domains: physical health domain (seven items), psychological health domain (six items), social relationships domain (three items), and environmental health domain (eight items). Two questions measure the perception of the overall life quality and general health of individual participants [55]. Four BSC nurse interviewers and two health professional supervisors were trained before the data collection date, collected the data using the structured questionnaire, and interviewed the patients as soon as they exited the diabetic room. The interviewing process took in a ventilated place to make the safety of participants more comfortable.

The WHOQOL-BREF questionnaire was utilized, and its reliability and validity was evaluated in Ethiopia [17, 54]. Hence, the questionnaire (found as a supplementary file) was adapted from these sources. Prior to the actual data collection, pretest of the questionnaire was conducted on 5% of the sample size at Dejen Primary Hospital, and the reliability of the questionnaire was checked by calculating Cronbach's alpha to be 0.95. The principal investigator provided training for data collectors and supervisors for two days. Supervisors double-checked questionnaires for completeness at the completion of every data collection day. The principal investigator regularly met with data collectors and supervisors to discuss the procedure.

2.5. Data management and analysis strategy

After coding and checking for completeness, data were entered into the computer using Epidata version 3.1 and were exported to STATA version 14.0. The data were re-coded and cleaned for missing. WHOQOL-BREF scores on a Likert scale of 1–5 were scaled in a positive direction. The scoring of three negatively phrased questions was reversed (Q3, Q4, and Q26), thus transforming them into positively phrased questions. Then, the mean was calculated for each specific domain and multiplied by 4, and transformed to 0–100 to make it comparable with the WHOQOL-100 tool where the WHOQOL-BREF tool has been extracted. HRQOL was assessed by adding the mean score of the respondents and dividing the total sum of the score by the number of items in the tool. Categorization was done using the mean score. Mean scores of more than 3 were categorized as good and Poor HRQOL was defined as having a score of less than or equal to three [56].

The data were statistically described using tables, graphs, and median with interquartile range (IQR) for the skewed distribution of variables. Binary logistic regression analysis was performed to get the association between the outcome variable and various independent variables. The wealth index was analyzed by taking 15 questions from EDHS 2016.

Participants in the study were from both urban and rural areas. The determination of their household wealth index took this difference into account as the variables (assets) used to measure wealth may vary for urban and rural dwellers. A separate analysis of participants from the urban and rural residence was done. Finally, merging them, a wealth index with five quintiles was generated using principal component analysis. Bivariable binary logistic regression analysis was first conducted for each potentially explanatory variable. Those variables whose p-value was less than 0.25 in the bivariable binary logistic regression analysis were then analyzed further using multivariable binary logistic regression analysis. Stepwise backward elimination was used for variable selection. Statistical significance of association was decided using a P-value of less than 0.05 and Strength of association was interpreted using the adjusted odds ratio, 95% confidence intervals (95% CI), and P-value. Data were checked for multicollinearity with the Variance Inflation Factor. Hosmer and Lemeshow goodness of fit test was checked for model fitness of the model and finally, a receiver operating characteristic curve (ROC), the area under the curve was computed.

2.6. Ethical approval and consent to participate

This work has been approved by the Ethical Review Committee (ERC) of Debre Markos University College of Health Sciences with (HSCS/R/C/S/PG/18/03/12). Permission was received from the Debre Markos Referral Hospital administration and the study participants provided their written consent. Throughout the data collection procedure, the confidentiality of the data was protected. In this study, participation was entirely voluntary and participants had the option to stop participating at any time, even after the interview had begun. They also had a right to choose not to answer any individual question or all of the questions in the questionnaire provided.

3. Results

3.1. Socio-demographic characteristics of patients with type 2 diabetic mellitus

Among 374 interviewed type 2 diabetic adult patients, 368 were included in the final analysis with a 98.4% response rate. The study finding showed that two hundred thirty-six (64.1%) of the study participants were females and from the study participants, about 310 (84.2%) were aged above forty years with median and interquartile range (IQR) of 58 (45–68). Most study participants 336 (91.3%) were followers of orthodox Christianity. The majority 254 (69%) of the participants were married and about 274 (74.5%) were living in urban. Likewise, 118 (32.1%) of the study participants were richer when they were categorized in five quintiles of wealth index, and a few 74 (20.1%), were poorest (Table 1).

3.2. Medically related factors of type 2 diabetic adult patients

Among the participants, 155 (42.1%) experienced complications from diabetes, and 127 (34.5%) also had other known chronic diseases. Among all the respondents assessed, most patients 221 (60.1%) had been with DM for 59 months or less with a median duration and interquartile range (IQR) of 47 (24–72) months. The majority, 240 (65.2%), of the respondents were overweight and most of the study participants 261 (70.9%) had no family history of diabetes mellitus (Table 2).

3.3. Mean score of HRQOL's domain among type 2 diabetic adult patients

Among the respondents involved, about 206 (56%) had the mean above 50% with good HRQOL. The mean score (mean \pm SD) of the overall perception of HRQOL and general health status of type 2 diabetic adult patients in Debre Markos Referral Hospital was obtained to be 44.8 ± 13.5 and 43.8 ± 14.6 respectively. From the four domains, the highest mean was scored in the environmental domain (53.6 ± 16.9) and the lowest was in the psychological domain (50.1 ± 13.0). Physical and social domains of HRQOL scored the mean of 52.3 ± 11.5 and 51.6 ± 20.3 respectively. Overall reliability of the whole WHOQOL-BREF tool was computed with Cronbach's alpha of 0.89 (Table 3).

3.4. Factors associated with HRQOL of type 2 diabetic adult patients

The study showed that sex, educational status, occupational status, loss of family, physical exercise, alcohol drinking, counseling, diabetic complications, comorbidity, family history, fasting blood sugar, residence, religion, BMI, and duration of DM were significantly associated with HRQOL at p-value less than 0.25 and were candidates for multi-variable logistic regression analysis. However, variables like trauma, marital status, living status, enrollment of CBHI, wealth index, and drug regimen were just not found to be significantly associated to quality of

Table 1. Socio demographic characteristics of type 2 diabetic adult patients in DMRH, 2020 (N = 368).

Variable	Number	Percentage (%)
Sex		
Female	236	64.1
Male	132	35.9
Age group		
≥ 40 years	310	84.2
29–39 years	50	13.6
18–28 years	8	2.2
Educational status		
No formal education	140	38.1
Primary School	91	24.7
Secondary School	39	10.6
College and above	98	26.6
Religion		
Orthodox	336	91.3
Muslim	30	8.2
Protestant	2	0.5
Marital Status		
Married	254	69.0
Widowed	49	13.3
Single	36	9.8
Divorced	20	5.4
Separated	9	2.5
Residence		
Urban	274	74.5
Rural	94	25.5
Occupation		
Merchant	134	36.4
Farmer	89	24.2
Government employer	88	23.9
House wife	53	14.4
Daily labor	4	1.1
Physical exercise		
No	195	52.9
Yes	173	47.1
Alcohol drinking		
No	188	51.1
Yes	180	48.9
Counseling		
No	231	62.8
Yes	137	37.2
Wealth index		
Poorest	74	20.1
Poor	74	20.1
Medium	77	20.9
Richer	118	32.1
Richest	25	6.8
Living status		
With family	306	83.2
Alone	62	16.8
Smoking cigarettes		
Not at all	341	92.7
Every day	14	3.8
Some days	13	3.5
Enrollment of CBHI		
No	320	87.0
Yes	48	13.0

Table 2. Medical characteristics of type 2 diabetic adult patients in DMRH, 2020 (N = 368).

Variable	Number	Percentage (%)
Diabetic Complications		
No	213	57.9
Yes	155	42.1
Confirmed co morbidity		
No	241	65.5
Yes	127	34.5
Duration of diabetes mellitus since diagnosis		
59 months or less	221	60.1
Greater than 59 months	147	39.9
Body Mass Index		
Underweight	2	0.6
Normal	87	23.6
Overweight	240	65.2
Obese	39	10.6
Fasting blood sugar		
126–199 mg/dl	187	50.8
≥200 mg/dl	181	49.2
Physical trauma		
No	196	53.3
Yes	172	46.7
Family history		
No	261	70.9
Yes	107	29.1
Drug regimen		
Oral anti diabetic medication	257	69.8
Injection and oral anti-diabetic	111	30.2

life in terms of health. Finally, those variables which were not significantly associated with HRQOL at a p-value less than 0.05 have automatically been removed in backward elimination from the model. Multivariable logistic regression of study participants showed that sex, physical exercise, drinking alcohol, counseling, diabetic complications; comorbidity, and duration of disease were significantly associated with HRQOL of type 2 diabetic adult patients at p-value less than 0.05 and 95% confidence interval. Hosmer and Lemeshow goodness of fit test was checked for model fitness of a logistic regression and probability chi-square value was found to be greater than 0.05, indicating the fitted logistic model. Finally, a receiver operating characteristic curve (ROC) to assess the accuracy of prediction, an area under the curve was computed to be 87%, which indicates an excellent test.

Those patients who did physical exercise are 2.3 times more likely to have a good HRQOL than patients who did not perform the physical exercise (AOR = 2.33, 95%CI: 1.34, 4.05). Patients who got counseling had 3.3 times more likely to have a HRQOL as compared to those patients who did not get counseling (AOR = 3.33; 95% CI: 1.82, 5.94). Comorbid patients had 55% less likely to have a good HRQOL as compared to those patients who had no comorbidity (AOR = 0.45; 95% CI: 0.25, 0.84). Those patients who had been with the disease for more than 59 months had 2.9 times more likely to have a good quality of life as compared to patients who had been with the disease for less than or equal to 59 months (AOR = 2.93, 95%CI: 1.61, 5.34). Patients who developed

diabetic complications had 54% less likely to have a good health-related quality of life as compared to patients who did not develop diabetic complications (AOR = 0.46, 95%CI: 0.26, 0.80). Being male was 4.3 times more likely to have a good health-related quality of life as compared to female respondents (AOR = 4.28, 95%CI: 2.36, 7.78). Those patients who were engaged in drinking alcohol had 73% less likely to have a good HRQOL than patients who were not engaged in drinking alcohol (AOR = 0.27, 95%CI: 0.16, 0.48) (Table 4).

4. Discussion

In this study, 56% of respondents had a good HRQOL mean scores (95%CI: 50.9, 61.1). This result agrees with other studies conducted in Ethiopia [17, 29, 57]. However, the study conducted in Jimma had 67% of good HRQOL, which is higher than the result of this study [16]. This difference might be because of variation in study time and the difference in the composition of study subjects. Most of the study subjects were males in the study conducted in Jimma, whereas in this study, females were high in the number whose HRQOL had been more deteriorated as compared to males, and this might have contributed to the reduction of overall HRQOL of this study compared to the study conducted in Jimma. In contrast to this, a study conducted in Botswana showed that 42.5% of the study participants had a good HRQOL which is lower than the result of this study [41]. This discrepancy of findings might be due to the study area and the variation of tool used to measure the outcome variable, the measurement tool used in the study conducted in Botswana was Short Form-12 (SF-12).

Being male was directly associated with good HRQOL and had a better HRQOL. This finding is align with studies conducted at Jimma, Greece, Saudi Arabia, and India [16, 23, 37, 58]. This may be due to the worse situation of female patients concerning the disease and the extra responsibility of females related to pregnancy and lactating. However, the studies conducted in Botswana and Bangladesh showed that the HRQOL of males was lower than the HRQOL of females, which may be due to variation in the study area.

Drinking alcohol was inversely associated with good HRQOL and significantly diminished quality of life. This finding is agrees with studies conducted in Switzerland, Gondar, and Thailand [46, 59, 60]. This may be due to the economic impact on those respondents who drank alcohol and the possibility of exposure to different concurrent diseases related to drinking alcohol [61].

Likewise, doing physical exercise was a significant factor that improved the HRQOL of diabetic adult patients in this study area. This study is congruent with the studies conducted in Nigeria, Gondar-Ethiopia, San Diego-California, and Canada [46, 62, 63, 64]. This could be because physical activity activates numerous brain chemicals which leave someone happier, more relaxed, less anxious, feel better, boost confidence and improve self-esteem, improve energy levels, and promotes better sleep and exercise can make muscles more relaxed making the patient happy [31, 61]. In addition, counseling was directly related to good HRQOL. This may be because those patients who got counseling can easily follow the procedures and pieces of advice provided by the health care providers accordingly and attain a better physical, emotional and mental satisfaction leading to the betterment of all dimensions of HRQOL of type 2 diabetic adult patients [61].

The presence of diabetic complications decreased good HRQOL. This result is consistent with the studies conducted in Nekemte, Mizan Tepi,

Table 3. Mean scores of domains of HRQOL of type 2 diabetic adult patients in DMRH, 2020 (N = 368).

Domain of HRQOL	Number of observations	Cronbach's alpha	Mean	Standard deviation	Minimum	Maximum
Physical domain	368	0.75	52.3	11.5	28.6	89.3
Psychological domain	368	0.66	50.1	13.0	20.8	91.7
Social domain	368	0.72	51.6	20.3	0	100
Environmental domain	368	0.82	53.6	16.9	21.9	93.8

Table 4. Factors associated with HRQOL of type 2 diabetic adult patients in DMRH, 2020 (N = 368).

Variables	HRQOL		COR (95% CI)	AOR (95% CI)	P- value
	Good	Poor			
Exercise					
Yes	125	48	3.67 (2.37, 5.68)	2.33 (1.34, 4.05)	0.003
No	81	114	1	1	
Counseling					
Yes	106	31	4.48 (2.78, 7.22)	3.33 (1.82, 5.94)	<0.001
No	100	131	1	1	
Co morbidity					
Yes	42	85	0.23 (0.15, 0.37)	0.45 (0.25, 0.84)	0.011
No	164	77	1	1	
Duration of DM					
>59 months	105	42	2.97 (1.90, 4.64)	2.93 (1.61, 5.34)	<0.001
≤59 months	101	120	1	1	
DM complication					
Yes	66	89	0.39 (0.25, 0.59)	0.46 (0.26, 0.80)	0.006
No	140	73	1	1	
Sex					
Male	106	26	5.54 (3.36, 9.15)	4.28 (2.36, 7.78)	<0.001
Female	100	136	1	1	
Alcohol drinking					
Yes	58	122	0.13 (0.08, 0.21)	0.27 (0.16, 0.48)	<0.001
No	148	40	1	1	

Addis Ababa, Gondar, Singapore, and Palestine [17, 30, 46, 47, 65, 66]. This may be due to an increase in renal, eye, neural and other complications of diabetes mellitus, which impose additional pain and negative load on those patients who developed any diabetic complications and make them dependent on multiple drugs for an extended period which might have negative consequences that lower diabetes individuals' HRQOL [67].

The presence of comorbidity was negatively related with good HRQOL. This result is compatible with studies undertaken at Jimma, Nekemte, Mizan Tepi, Mexico, Iran, Malaysia, and Bahir Dar [16, 17, 29, 30, 68, 69, 70]. This might be because of the reason that those comorbid patients had an additional disease for which they were being treated and which might push them to invest extra money needed and to afford these drugs, pain, and worry reducing their overall HRQOL. This may also be brought on by many chronic conditions that affect diabetic patients, as well as potential drug interactions and side effects from various medications that might negatively impact every element of life's quality in terms of health [67].

Moreover, the duration of months in which patients stayed with DM for more than 59 months was found to be a significant factor that improves the quality of life. This result is consistent with the studies conducted in Nigeria and Nepal [44, 71]. This could be because patients who have had the disease for a long time have had more opportunities to learn how to manage it, which helps them live an improved HRQOL. In addition, longer disease duration may have allowed patients to learn more about the medications used for therapy and gained encouragement from their family members to change their lifestyles. This is in contrast to patients with shorter disease duration. However, the study conducted in Singapore showed a contrast to this result [23]. This might be related to disparities in study areas and lifestyles.

Medical-related factors like BMI, drug regimen, and fasting blood sugar were just not found to be significantly associated to quality of life in terms of health. However, these variables were significantly associated with studies conducted in Nekemte [30]. This discrepancy might be related to the small sample size (only 215 participants) included in the Nekemte study and the difference in the measurement tool used. Using a standardized and cross-culturally validated WHOQOL-BREF questionnaire, which was validated in Ethiopia, was one of our study's strengths.

This study's limitation is being a cross-sectional design that might be prone to the chicken-egg dilemma. Besides, no comparison was made between types 1 and 2 diabetes mellitus.

5. Conclusion

More than half (56%) of adult type 2 diabetic patients had a good health-related quality of life scores in this study. Being male, avoiding drinking alcohol, getting counseling, and doing physical exercises are significantly associated with good health related quality of life. Furthermore, absence of diabetic complications, absence of comorbidity, and duration of disease for more than 59 months were also found to be predictors of good health-related quality of life among type 2 diabetic adult patients.

Declarations

Author contribution statement

Tewodros Eshete Wonde: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Tessema Reta Ayene: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Nurilign Abebe Moges and Yibelu Bazewew: Analyzed and interpreted the data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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