



# Assessment of Quality of Life and Self-care Behaviors in Patients with Type 2 Diabetes Mellitus in Mashhad, Iran

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## Abstract

**Background:** Diabetes is a highly prevalent metabolic disorder in the world. Complications of diabetes mellitus can have an extreme effect on the quality of life in terms of physical and mental health, as well as social and environmental well-being.

**Objectives:** The current study aimed to measure the quality of life, its determinants, and self-care behaviors in patients with type 2 diabetes.

**Methods:** A descriptive cross-sectional study was conducted in the diabetes clinic of Imam Reza hospital in Mashhad on 140 patients with type 2 diabetes from October to December 2019. The Summary of Diabetes Self-care Activities (SDSCA) questionnaire and the World Health Organization Quality of Life-Brief (WHOQOL-BREF-26 items) were used for data collection. Data analysis was carried out with the Mann-Whitney test and ANCOVA.

**Results:** The mean age of study participants was  $58.41 \pm 8.91$  years, and the majority of them (67.14%) were female. The overall self-care score was  $43.32 \pm 10.93$  in males and  $39.93 \pm 9.94$  in females. The mean scores of the dimensions of quality of life were  $61.29 \pm 15.66$  for physical health,  $60.62 \pm 13.70$  for mental health,  $68.67 \pm 11.63$  for social health, and  $61.54 \pm 14.88$  for environmental health. Among self-care behaviors, physical activity ( $P = 0.006$ ) was a stronger predictor of quality of life. Demographic characteristics (except for the duration of disease, family history, and age) showed significant correlations with the overall aspects of quality of life.

**Conclusions:** The quality of life of people with diabetes was correlated with some demographic variables. However, the duration of disease, family history, and age did not have any effect on the quality of life. We found that the self-care behavior of physical activity was a significant predictor of quality of life in adults with diabetes. Therefore, it is important to implement programs to improve self-care behaviors.

**Keywords:** Quality of Life, Self-care Activities, Type 2 Diabetes

## 1. Background

Diabetes is a common persistent disease and a severe health-related problem in the world (1). The Middle East and North Africa are known as regions with the highest age-adjusted prevalence of diabetes in adults in 2019, 2030, and 2045 (12.2%, 13.3%, and 13.9%, respectively). In 2019, China, India, and the United States of America were countries with the largest numbers of adults with diabetes. Globally, 463 million people had DM in 2019. A decade ago, in 2010, the global projection for diabetic cases in 2025 was 438 million. With over five years still to go, that prediction has already been surpassed by 25 million (2). The spread of diabetes mellitus in Iran is about 7.7%, accounting for about two million people, which is predicted to be 5.2 million cases in 2025 (3).

Diabetes has the potential to cause numerous debil-

itating health complications that can lower the quality of life and lead to an early death. Most often, complications are the results of unmanaged or poorly managed diabetes (4). Therefore, a healthy diet, regular physical activity, medicines, and blood sugar control are needed to prevent the complications accompanied by diabetes mellitus (5, 6). The quality of life (QoL) is a highly subjective measure of happiness and shows how much an individual is healthy, comfortable, and can participate in or enjoy life events (7). Type 2 diabetes can be managed with diabetes self-management skills. Self-care is the ability of the patient with the family, and the community to promote health, prevent illness, maintain health, and deal with the disease and disability with or without the help of health care providers (8). Diabetic patients have to change their behaviors and perform self-care activities. The aspects of

life with diabetes that may affect the quality of life include the never-ending demands of diabetes care, such as eating carefully, exercising, monitoring blood glucose, and scheduling and planning. (9, 10). In recent years, controlling diabetes has been shown to improve the overall quality of life of patients with diabetes (11). For performing beneficial interventions to improve the quality of life, it is necessary to identify many factors that can increase the risk of complications and affect the quality of life. Studies show that the quality of life could rise with higher self-care behaviors among patients with type 2 diabetes mellitus (12, 13).

## 2. Objectives

The results of other similar studies have shown the impact of diabetes management on the quality of life of patients with diabetes. The current study aimed to survey the quality of life and self-care behavior among patients with type 2 diabetes mellitus (T2DM) in Mashhad in 2019.

## 3. Methods

A cross-sectional study was conducted on 140 patients with T2DM. The sample size was estimated using G\*power software with a power of 0.95 and an SD of 1% at a two-tailed significance level. The sample was obtained from the diabetic clinic of Imam Reza hospital in Mashhad, Iran. From October to December 2019, a trained research assistant visited the outpatient diabetic clinic weekly on days scheduled by the hospital for providing care to outpatient diabetic patients to recruit patients for the study. The research assistant approached the patients while they were waiting for their medical consultation or after their consultation to introduce the study and seek their consent to participate. The Ethics Committee of Mashhad University of Medical Sciences (IR.MUMS.RES.1398.176) approved the study. The inclusion criteria were as follows: Age of 35 years or more, having medical records at the health center, T2DM diagnosed via the WHO criteria, known diabetes for one year, and ability to communicate in Farsi. The exclusion criteria included having other types of diabetes and unwillingness to participate in the study.

The applied tools in the study included two self-reporting questionnaires. The first questionnaire consisted of sociodemographic information and self-care behaviors (SDSCA) associated with diabetes (BG monitoring, dietary control, physical activity, foot care, and smoking). The reliability and validity of SDSCA were confirmed by Toobert et al. (14). The validity and reliability of the Persian version were obtained by Didarloo et al. (15) with  $\alpha = 0.83$ .

The second questionnaire was a standardized Persian version of the World Health Organization questionnaire for quality of life (WHOQOL-BREF-26). This tool assesses the quality of life in four aspects: Physical health (seven items), mental health (six items), social health (three items), and environmental health (eight items), along with two questions related to the overall quality of life. The reliability and validity of this questionnaire were approved by Nejat et al. (16) that reported Cronbach's alpha values of 0.70, 0.73, 0.55, and 0.84 for physical health, mental health, social health, and environmental health, respectively (16). The researchers were trained on moral issues such as informing the participants of the purpose of the study and obtaining consent forms.

Descriptive statistics such as central tendencies (mean and standard deviation) and frequency distributions were carried out for quantitative variables. To compare the equality of two mean values in qualitative variables, the Mann-Whitney test was adopted. The ANCOVA test was used to assess the relationship between the demographic variables and self-care behaviors towards the quality of life of patients. It was performed by the Backward elimination (or backward deletion) method in which all the independent variables were first entered into the equation, and then they were deleted one at a time if they did not contribute to the regression equation. Data were analyzed by SPSS ver. 22.

## 4. Results

In our study, 140 patients with diabetes were attended. The mean age of them was  $58.41 \pm 8.91$  years, and 67.14% of them were female. The education level of all patients was below a high school diploma. In addition, most participants were married (87.1%). No significant difference was seen between males and females in terms of demographic data (Table 1). The mean scores of patients' overall self-care were  $43.32 \pm 10.93$  in males and  $39.93 \pm 9.94$  in females ( $P$ -value = 0.069). The mean scores of self-care behaviors were not statistically different between male and female patients, although, a statistically significant difference was observed in physical activity ( $P = 0.005$ ) (Table 2). The mean scores of the dimensions of quality of life were  $61.29 \pm 15.66$  for physical health,  $60.62 \pm 13.70$  for mental health,  $68.67 \pm 11.63$  for social health, and  $61.54 \pm 14.88$  for environmental health. The demographic characteristic (except for the duration of disease, family history, and age) had significant relationships with all dimensions of the quality of life (Table 3). Furthermore, younger patients had better physical health among the dimensions of quality of life ( $P = 0.03$ ). To predict the patients' quality of life, ANCOVA was performed (Table 4), which showed physical

activity was a predictor of the quality of life. There was a positive relationship between the quality of life and self-care behaviors but was not linear ( $P = 0.005$ ,  $R_s = 0.44$ ).

**Table 1.** Distribution of Demographic Characteristics Among Patients with Type 2 Diabetes Mellitus

Variables	Male	Female	P-Value
<b>Age group</b>			0.002
35 - 55	11 (23.9)	49 (52.1)	
> 55	35 (76.1)	45 (47.9)	
<b>Education level</b>			< 0.001
Illiterate	8 (17.4)	26 (27.7)	
Under diploma	20 (43.5)	55 (58.5)	
Diploma	18 (39.1)	13 (13.8)	
<b>Marital status</b>			0.008
Single	1 (97.8)	17 (18.1)	
Married	45 (2.2)	77 (81.9)	
<b>Occupational status</b>			< 0.001
Employed	38 (82.6)	3 (3.2)	
Unemployed	8 (17.4)	91 (96.8)	
<b>Duration of disease, y</b>			0.796
< 5	11 (23.9)	22 (23.4)	
5 - 10	16 (34.4)	28 (29.8)	
≥ 10	19 (41.3)	44 (46.8)	
<b>Medical condition</b>			0.310
Tablet	17 (37.0)	43 (45.7)	
Tablet and insulin	2 (4.3)	8 (8.5)	
Insulin	27 (58.7)	43 (45.7)	
<b>Family history</b>			0.232
Yes	23 (50.0)	57 (60.6)	
No	23 (50)	37 (39.4)	

**Table 2.** Gender and Self-care Behaviors in Diabetic Patients

Variables	Male	Female	P-Value
<b>Dietary control</b>	21.52 ± 4.07	21.01 ± 4.59	0.719
<b>Physical activity</b>	8.10 ± 4.96	5.32 ± 5.12	0.005
<b>SMBG</b>	3.08 ± 3.00	2.65 ± 2.54	0.291
<b>Foot caring</b>	10.60 ± 3.24	11.04 ± 2.92	0.413

## 5. Discussion

This study aimed to measure the quality of life, its determinants, and self-care behaviors in patients with type 2

diabetes. In the present study, gender, education, marital status, occupational status, and medical condition had significant relationships with all dimensions of the quality of life. The findings showed that age had a significant association with patients' physical health. In the dimensions of quality of life, mental health had a lower score than other dimensions. In a similar study, Mohammad pour et al. (17) reported that demographic characteristics had significant associations with the patients' quality of life. In addition, the result of the study by Wang in China showed that the lowest score belonged to emotional functioning and the highest mean score belonged to physical functioning (18).

In the current study, evidence implied that older patients generally had undesirable physical health. In this regard, a study conducted by Tang et al. reported a poor level of physical health among patients who were older (19). Our findings indicated that four dimensions of the quality of life were associated with a higher education level. This result was in line with reported results by Zagozdzon et al. (20) that showed a direct relationship between patients' higher education and the level of quality of life. It confirms that a higher education level is useful for health.

Marital status has a positive effect on the quality of life. Indeed, patients who are married have a better quality of life. Arslantas et al. reported that marriage improved the patient's quality of life (21). Our result showed a significant association between the quality of life and employment status. This finding is in agreement with Genga et al., who showed the impact of having a job on the physical and social health of males and females with diabetes (22). The quality of life score was independently related to gender. Therefore, men had a higher quality of life than had women. Similar to the findings of the present study, Alrub et al. confirmed that males had a significantly higher score than had females, indicating a better health-related quality of life in them (23).

Based on the results of this study, the self-care among participants in this study was moderate in all dimensions. Males had better self-care behaviors than females. Among self-care dimensions, physical activity was positively correlated with gender ( $P = 0.005$ ). Participants reported practicing self-care nutrition as the most common behavior and blood glucose testing as the least frequent behavior. These findings were comparable to those of Tharek et al. (10), which found similar a level of self-care behavior, and blood glucose testing was also found to be the least frequently reported self-care behavior in their participants.

In this study, we found that the self-care behavior of physical activity was a significant predictor of the quality of life in adults with diabetes. In a study conducted by Saleh et al. (9), exercise had a significant relationship with all domains of QoL. Lukacs et al. showed that increas-

**Table 3.** Association of the Dimensions of Quality of Life with Sociodemographic Characteristics of Study Participants

Characteristics	Physical Health		Mental Health		Environmental Health		Social Health	
	Mean $\pm$ SD	P-Value	Mean $\pm$ SD	P-Value	Mean $\pm$ SD	P-Value	Mean $\pm$ SD	P-Value
<b>Gender</b>		0.011		0.015		0.019		0.021
Female	59.18 $\pm$ 15.70		58.82 $\pm$ 13.91		67.17 $\pm$ 11.35		59.79 $\pm$ 14.96	
Male	65.60 $\pm$ 14.83		64.28 $\pm$ 12.64		71.73 $\pm$ 11.72		65.08 $\pm$ 14.23	
<b>Age group, y</b>		0.037		0.141		0.276		0.145
30 - 55	64.58 $\pm$ 15.95		62.53 $\pm$ 14.75		69.98 $\pm$ 11.45		63.25 $\pm$ 15.49	
> 55	58.82 $\pm$ 15.07		59.18 $\pm$ 12.77		67.68 $\pm$ 11.73		60.28 $\pm$ 14.39	
<b>Education level</b>		0.007		<0.001		0.006		0.006
Illiterate	56.17 $\pm$ 14.47		55.20 $\pm$ 12.11		63.91 $\pm$ 11.38		56.11 $\pm$ 13.25	
Under diploma	60.84 $\pm$ 16.30		60.21 $\pm$ 14.15		68.81 $\pm$ 11.23		61.86 $\pm$ 14.78	
Diploma	68.00 $\pm$ 13.17		67.54 $\pm$ 11.47		73.54 $\pm$ 11.06		66.74 $\pm$ 15.27	
<b>Marital status</b>		< 0.001		0.003		0.043		0.011
Single	48.83 $\pm$ 12.27		51.83 $\pm$ 11.28		63.00 $\pm$ 11.74		54.55 $\pm$ 9.32	
Married	63.13 $\pm$ 15.30		61.91 $\pm$ 13.59		69.50 $\pm$ 11.42		62.58 $\pm$ 15.30	
<b>Occupation</b>		0.001		0.001		0.006		0.002
Employed	67.63 $\pm$ 13.34		66.17 $\pm$ 11.83		72.53 $\pm$ 11.19		66.92 $\pm$ 13.60	
Unemployed	58.66 $\pm$ 15.85		58.32 $\pm$ 13.82		67.07 $\pm$ 11.48		59.29 $\pm$ 14.88	
<b>Duration of disease, y</b>		0.085		0.194		0.383		0.766
< 5	65.12 $\pm$ 16.80		63.30 $\pm$ 15.65		70.63 $\pm$ 14.06		63.06 $\pm$ 16.65	
5 - 10	62.59 $\pm$ 13.87		61.84 $\pm$ 12.64		68.86 $\pm$ 10.43		62.00 $\pm$ 13.25	
$\geq$ 10	58.38 $\pm$ 15.91		58.36 $\pm$ 13.18		67.50 $\pm$ 11.05		60.44 $\pm$ 15.11	
<b>Medical condition</b>		0.001		0.006		0.006		0.004
Tablet	65.53 $\pm$ 14.66		62.93 $\pm$ 13.45		70.40 $\pm$ 11.00		64.44 $\pm$ 14.77	
Tablet and insulin	46.40 $\pm$ 12.30		47.60 $\pm$ 13.34		56.40 $\pm$ 10.96		45.00 $\pm$ 17.46	
Insulin	59.78 $\pm$ 15.51		60.50 $\pm$ 13.08		68.94 $\pm$ 11.35		61.47 $\pm$ 13.15	
<b>Family history</b>		0.942		0.449		0.290		0.599
Yes	61.28 $\pm$ 16.84		61.11 $\pm$ 13.89		69.60 $\pm$ 11.42		61.90 $\pm$ 15.31	
No	61.27 $\pm$ 14.20		59.61 $\pm$ 13.36		67.20 $\pm$ 11.84		61.06 $\pm$ 14.41	

ing physical activity could improve the quality of life (24). Due to the direct connection between them, it is necessary to promote physical activity among T2DM patients. The strength of the present study is utilizing the interview method instead of self-reporting. However, the limitations of this study included potential confounding factors that were not controlled for in the study, such as social support and diabetes knowledge.

### 5.1. Conclusion

Diabetes is one of the fast-growing health challenges of the 21st century. Diabetes and its complications, if not well managed, can lead to frequent hospital admissions and decrease the patients' quality of life. In the present study, we

concluded that the quality of life of patients was not satisfactory. Thus, it should be a priority for health care managers to train self-care behaviors in people with T2DM. Our findings showed that the physical dimension of self-care assessment was most affected by the predictor. However, the physical activity of patients was not satisfactory. Furthermore, regular exercise programs are necessary for patients with diabetes. However, the physical activity of patients was not satisfactory. Furthermore, regular exercise programs are necessary for patients with diabetes.

**Table 4.** Factors Identified as Predictors of Quality of Life among Patients

Variables	Beta	SE	P-Value <sup>a</sup>
<b>Age group, y</b>			
30–55	10.25	7.93	0.199
> 55	Reference		
<b>Education level</b>			
Illiterate	-14.18	11.74	0.230
Under diploma	-9.27	9.77	0.344
Diploma	Reference		
<b>Marital status</b>			
Single	Reference		
Married	9.87	11.63	0.397
<b>Occupational status</b>			
Employed	Reference		
Unemployed	16.11	9.00	0.076
<b>Self-care 1</b>	1.13	0.76	0.138
<b>Self-care 2</b>	2.42	0.82	0.006
<b>Self-care 3</b>	3.05	1.42	0.034
<b>Self-care 4</b>	0.56	0.73	0.444

<sup>a</sup>P-value was calculated based on ANCOVA.

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## Footnotes

**Authors' Contribution:** Mahya Bazpour contributed to study design, drafting of the manuscript, and supervision. Sahar Rostampour contributed to data collection and implementing the project. Atiye Kamel-khodabandeh contributed to data analysis and supervision.

**Conflict of Interests:** The authors declare that there is no conflict of interest in this study.

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