



Review Article

Quality of life of Iranian patients with type 2 diabetes: A systematic review and meta-analysisFazel Dehvan¹, Dler Mohammed Saeed², Ali Hasanpour Dehkordi³, Reza Ghanei Gheshlagh^{1*}¹Department of Nursing, Faculty of Nursing and Midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran²Department of Nursing, Shaqlawa Technical Institute, Hawler Polytechnic University, Erbil, Iraq³Department of Nursing, School of Nursing and Midwifery, Shahrekord University of Medical Sciences, Shahrekord, Iran

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ABSTRACT

Background & Aim: Diabetes is one of the most common chronic metabolic disorders, and one of the essential health-related challenges in today's world. In addition to different kind of disabilities, diabetes complications can severely impact the quality of life of patients. The present systematic review and meta-analysis are aimed at examining the quality of life of Iranian patients who have type 2 diabetes based on the World Health Organization Quality of Life-BREF.

Methods & Materials: A total of 16 articles published in Persian and English were reviewed without any time limitation. The search was conducted in Iranian databases, including Scientific Information Database, Magiran, and IranMedex; and international databases, including Google Scholar, Web of Science, Pub Med, and Scopus. The data was examined using the meta-analysis method and the random-effects model. Heterogeneity was assessed using the I² statistic. The analyses were conducted in Stata, version 11.

Results: The mean quality of life score for patients with type 2 diabetes was 61.90 (95% confidence interval: 54.40-69.40). The highest and lowest quality of life scores were for social support (49.19) and mental health (42.96) dimensions, respectively. No significant association was found between the mean quality of life score and year of publication, methodological quality, and mean age of participants (P>0.05).

Conclusion: Given that patients with type 2 diabetes have a lower quality of life, especially in terms of mental health, it seems necessary to better understand psychological problems common in this group of patients and design strategies to overcome them.

Introduction

Diabetes is a common chronic metabolic disorder and one of the most critical health, financial, and social challenges in today's world (1). The prevalence of diabetes is rising due to different factors, including population increase and aging, obesity, and poor nutrition (2). According to the WHO, the number of people with diabetes has increased from 422 million in 2014 to 108

million in 1980 (3) and is expected to rise to 4.4% of the world's population by 2030 (4). In Iran, the number of people with diabetes is projected to rise to more than 6 million by 2030 (5). Among different type of diabetes, the prevalence of type 2 diabetes (T2D) is increasing. This type of diabetes is due to insufficient insulin production or low insulin sensitivity of body cells and has the highest incidence rate among different types of diabetes (6).

Diabetes can lead to cardiovascular disease, kidney failure, stroke, eye disorders, neuropathy, and cognitive disorders (7). Not only diabetes

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complications can lead to early or delayed impairments, but also they can significantly reduce the quality of life (QOL) of patients (8).

QOL is a subjective, multifaceted, and utterly personal concept that is defined as one's overall perception of life, values, goals, standards, and interests (9). It refers to one's perception of their existing and ideal conditions (10). Reduced QOL in patients with T2D can influence different aspects of their lives, including their social performance, self-care abilities, and adherence to treatment (8). Therefore, improving the QOL of these patients is one of the main objectives of controlling diabetes (5). Considering that chronic disorders have no absolute cures, the examination of QOL of patients with chronic disorders is regarded as one of the most important goals of therapeutic interventions (11).

Various instruments have been designed to assess QOL, and one of the best instruments in this domain is the WHO Quality of Life-BREF (WHOQOL-BREF). It has been validated in more than 15 countries and translated into 40 languages. It is easily administered because it does not have too many items, and each item has been designed based on the statements of patients suffering from disorders with different severity levels, healthy people, and health-care experts. Therefore, the WHOQOL-BREF can be used in different cultures and to compare different groups of people (12). It is worth to note that the QOL of diabetic patients using the SF-36 has previously been published in a systematic review and meta-analysis (13).

Given that the control of chronic disorders is of high importance, and because patients with T2D often experience

reduced QOL, it is necessary to understand the effects of T2D on the life of patients and assess their QOL (14). On the other hand, not paying attention to QOL can lead to hopelessness, lack of motivation, and reduced financial, social, and health activities, especially in patients with T2D. Based on what was mentioned, it seems necessary to provide accurate and reliable findings of this issue. Therefore the goal of the present study is to examine the QOL of Iranian patients with T2D using the WHOQOL-BREF.

Methods

Search strategy

This is a systematic review and meta-analysis aimed at examining the QOL of patients with T2D by reviewing Iranian articles published in Persian or English. Search for articles was conducted in Iranian databases (SID), Magiran, and IranMedex and international databases (Google Scholar, Web of Science, Pub Med, and Scopus), without time limitation.

The following keywords were used in the search process: Health-Related Quality of Life, Quality of life, HRQOL, Diabetes, Diabetes Mellitus, T2DM, WHOQOL-BREF, and Iran. The keywords used in the Persian databases were equivalents of the English keywords. Search in Pub Med was as follows:

("Health-Related Quality of Life"[All Fields] OR "Quality of Life"[All Fields] OR ("quality of life"[MeSH Terms] OR ("quality"[All Fields] AND "life"[All Fields]) OR "quality of life"[All Fields] OR "HRQOL"[All Fields])) AND "Diabetes Mellitus"[All Fields] AND WHOQOL-BREF [All Fields] AND ("Iran"[MeSH Terms] OR "Iran"[All Fields]). It is worth

to note that the reference lists were examined to find more related articles.

Study selection and data extraction

In the first step, two researchers independently examined the titles and abstracts and selected articles based on the inclusion criteria. The inclusion criteria were observational studies, published in Persian and English, focused on an Iranian statistical population, and available full text. The exclusion criteria were qualitative studies, interventional studies, review studies, and letters to the editor. Because Iranian databases do not save and provide grey literature, dissertations and conference papers were excluded. Two independent researchers examined the articles included in the meta-analysis, and their data was extracted. A five-item instrument was used to examine the methodological quality of the articles. This instrument assessed the following aspects: study design, comparison groups, participants' characteristics, sample size, and psychometric properties (15, 16). Also, a researcher-made sheet was used to extract the following information for each article: name of the first author, year of publication, sample size, place of study, participants' age and gender, methodological quality, and reported means and standard deviations for QOL and its dimensions.

Statistical analysis

Because QOL and its dimensions had quantitative scores, the mean and standard deviation of QOL was extracted from each study. The variance of means was calculated using the normal distribution. The Cochran's Q test and the I^2 statistic were used to assess heterogeneity.

According to the Higgins et al.'s recommendation (2009), when I^2 is higher than 50% or when a p-value of less than 0.05 is obtained for the Cochran's Q Test, the random-effects model should be used to estimate the pooled variance of QOL scores, otherwise the fixed effects model should be used (17). The sensitivity analysis was used to examine the stability of results. The meta-regression model was used to explore the relationship of the overall QOL score with mean age of participants, year of publication, sample size, and methodological quality. Publication bias was assessed using the Egger's funnel plot. The analyses were performed using Stata software, version 11, and using the “,” commands.

Results

In the first search, 534 articles were found, of which 461 articles were excluded due to unrelated subjects. Among the remaining 73 articles, another 57 articles were excluded for the following reasons: use of other instruments to gather data (45 articles), use of unspecified instruments (5 articles), problems about the validation of the instruments used (4 articles), and use of researcher-made instruments (3 articles). Finally, a total of 16 articles consisting of 18 groups of patients with T2D were included in the analysis (Figure 1).

The highest had the smallest sample sizes for the studies by EydiBaygi et al. (14) and Gholami et al. (18), with sample sizes of 50 and 1847, respectively. In terms of methodological quality, two studies by Derakhshanpoor et al. (19, 20) and the study by EydiBaygi et al. (14) had high methodological quality, and the rest of the articles had average methodological quality.

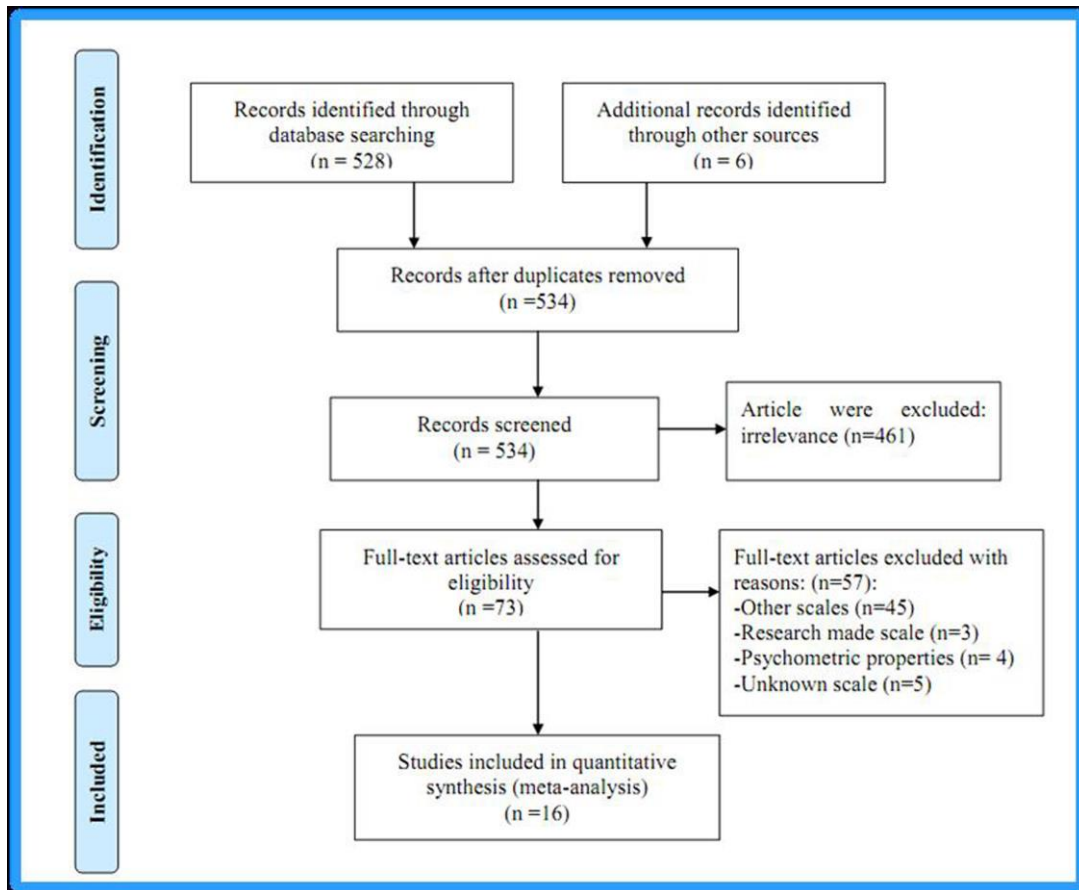


Figure 1. Flow diagram of the study selection process based on PRISMA guidelines

Overall, 16 articles (18 groups of patients with T2D) with a total sample size of 4826 (302 participants per study) were systematically reviewed. The detailed description of articles is presented in Table 1.

The mean QOL of patients with T2D was 61.90 (95% confidence interval: 54.40-69.40). Using the linear transformation method, the estimated score was transformed to a standard score based on 100; this showed that the patients with T2D obtained 34.5 of the overall score of QOL (100).

The subgroup analysis by Iran's regions showed that the highest (72.67 with 95% confidence interval: 58.73-86.62) and lowest (54.14 with 95% confidence interval: 49.93-56.35) QOL scores among patients with T2D were for the regions 2 and the regions 3 and 5, respectively.

Also, the mean QOL score was lower in the articles published in English (55.13 with 95% confidence interval: 51.58-56.70) than in those published in Persian (61.89 with 95% confidence interval: 54.39-69.39). Also, the subgroup analysis by QOL dimensions showed that the highest scores were for social support (49.19 with 95% confidence interval: 29.84-68.55) and the lowest scores were for mental health (42.96 with 95% confidence interval: 31.86-54.06) (Table 2).

Results of meta-regression analysis indicated no significant relationship between the mean QOL score and year of publication ($p=0.273$), sample size ($p=0.223$), methodological quality ($p=0.786$), and mean age of participants ($p=0.495$). Also, the publication bias was significant ($p=0.016$) (Figure 3).

Table 1. Description of the selected articles

First author	Year	Sample size	Women (n)	Age (Mean)	Location	Language	Quality	Total QOL	Quality Of Life Dimensions			
									Environment	Social Support	Mental Health	Physical Health
Mamaghanian (21)	2017	394	260	56.67	Tabriz	English	8	52.11±11.53	58.48±10.48	38.32±16.74	60.38±14.54	51.24±13.36
Arbabi (8)	2017	100	63	57.92	Zabol	Persian	8	232.21±43.65	56.15±16.22	71.58±18.57	59.21±13.58	53.79±12.96
Parsa (22)	2017	112	56	-	Hamedan	English	7	51.7±22.5	54.8±18.3	60.1±22.2	54.5±20.7	50.9±20.0
Tavakkoli (23)	2017	200	157	54.91	Kerman	English	8	-	56.47±11.03	54.63±18.78	53.94±12.59	54.61±11.98
Babazadeh (24)	2017	120	56	46.30	West Azerbaijan	English	8	49.30±12.20	-	-	-	-
Aghayousefi (5)	2017	234	147	44.8	Lamerd	Persian	9	79.77±14.33	24.6±5.22	9.43±2.34	18.94±4.15	20.56±5.09
Didarloo (25)	2016	352	352	43.00	Khoy	English	8	58.02±17.63	-	65.08±14.87	-	53.84±17.09
Shahbazi (26)	2016	145	82	56.77	Khoram shahr	Persian	7	74.44±1.65	21.81±5.73	8.52±2.44	18.48±4.07	19.29±5.49
Shamshirgaran (27)	2016	300	217	54.13	Ardabil	English	8	53.07±17.09	57.10±10.52	45.68±17.25	54.96±12.73	55.48±11.97
Derakhshanpour(20)	2015	138	74	49.9	Golestan	English	13	60.5±13.3	52.7±19.1	90.2±15.9	46.0±22.5	64.8±21.3
Derakhshanpour(20)	2015	192	118	51.0	Golestan	English	13	50.7±14.0	43.4±21.5	90.5±14.4	36.8±21.1	58.3±22.8
Eydebaygi (14)	2014	50	22	46.42	Ahvaz	Persian	10	73.91±14.85	24.28±4.93	9.15±2.49	19.39±4.32	21.06±4.83
Ramezankhani (28)	2014	330	197	53.22	Bandar Abbas	Persian	9	229.52±41.67	53.65±14.52	68.27±16.89	56.41±11.66	51.18±10.81
Ghassemzadeh (29)	2013	93	59	74.2	Tehran	English	10	10.95±2.01	10.75±1.94	9.77±2.63	10.97±2.47	11.89±2.19
Ghassemzadeh (29)	2013	93	39	67.17	Tehran	English	10	12.43±1.84	11.35±2.29	11.66±2.89	12.73±2.33	14.06±2.71
Gholami (18)	2013	1847	1289	59.65	Neyshabur	English	9	12.18±2.13	12.44±2.19	12.66±2.94	11.73±2.50	11.87±2.69
Mehrabizadeh Honarmand (30)	2013	50	22	47.7	Ahvaz	Persian	11	73.91±14.85	-	-	-	-
Shahab Jahanlou (31)	2011	76	46	47	Bandar Abbas	English	9	65.54±10.52	62.87	69.37±1.88	66.52±12.25	65.45±9.81

Table 2. Mean QOL score for patients with T2D by different variables.

Variable		Average Score	Confidence Interval95%		Heterogeneity		
			Upper	Lower	I ²	Q	P
QOL Dimensions	Environment	47.31	55.53	31.90	99.9	6255.62	0.001
	Social Support	49.19	68.55	29.84	100	69140.89	0.001
	Mental Health	42.96	54.06	31.86	100	7207.60	0.001
	Physical Health	46.83	58	35.65	99.9	6809.81	0.001
Regions	Region 1	55.58	65.19	45.98	97.6	41.71	0.001
	Region 2	72.67	86.62	58.73	98.8	86.78	0.001
	Region 3 and 5	53.14	56.35	49.93	92.8	41.92	0.001
	Region 4	68.57	77.67	59.47	97.4	114.01	0.001
Publishing language	English	55.13	58.70	51.56	96.2	182.46	0.001
	Persian	61.89	69.39	54.39	90.6	31.88	0.001

Region 1: Tehran, Alborz, Mazandaran, Semnan, Golestan, and Qom; **Region 2:** Isfahan, Fars, Bushehr, Chahar Mahaal and Bakhtiari, Hormozgan, and Kohgiluyeh and Boyer-Ahmad; **Region 3:** East Azarbaijan, West Azarbaijan, Ardabil, Zanjan, Gilan, and Kurdistan; **Region 4:** Kermanshah, Ilam, Lorestan, Hamedan, Markazi, and Khuzestan; **Region 5:** Razavi Khorasan, South Khorasan, North Khorasan, Kerman, Yazd and Sistan & Baluchestan.

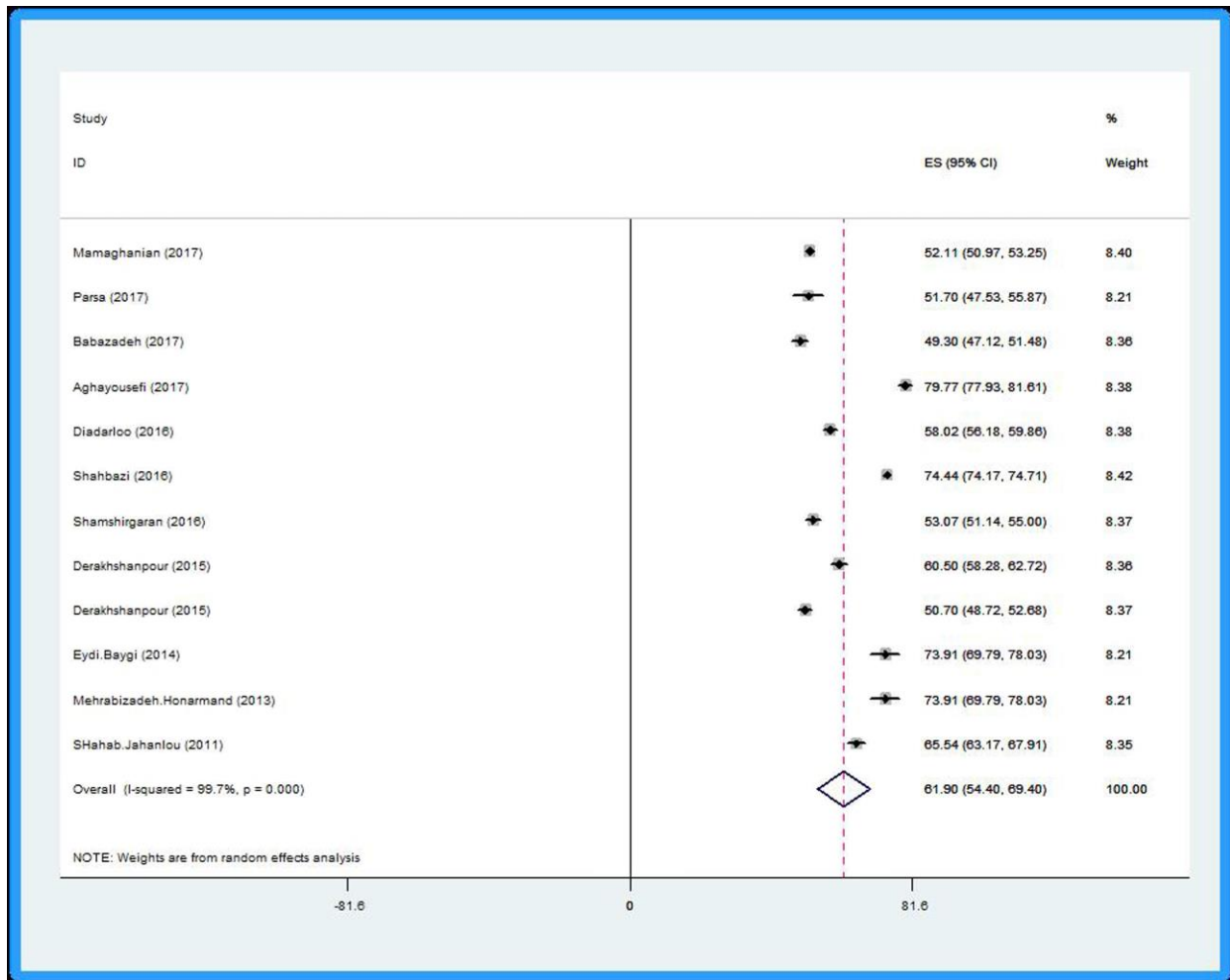


Figure 2. Mean QOL of patients with T2D based on the random-effects model. The middle point of each line segment shows the mean QOL of patients with T2D, and the diamond shows the mean of QOL for all the studies.

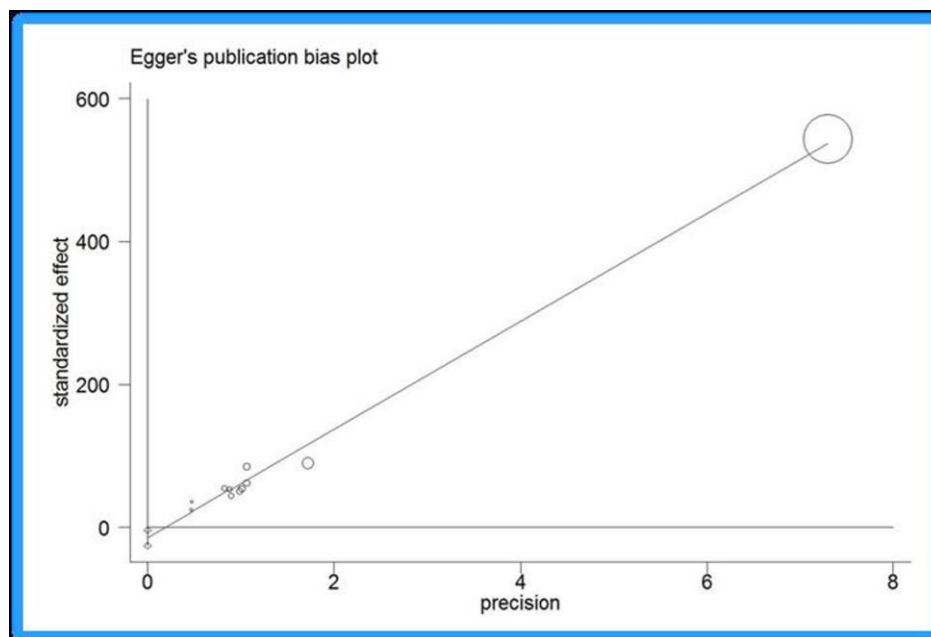


Figure 3. Publication bias

Discussion

The present systematic review and meta-analysis was aimed at assessing the QOL of Iranian patients suffering from type 2 diabetes (T2D) based on the WHOQOL-BREF. A total of 16 articles with a total sample size of 4826 were analyzed. The mean score of QOL was 61.90, that is 34.5 points lower than the overall score (100). Obtaining two-third of the overall score shows that Iranian patients with T2D experience low to average levels of QOL. In line with this finding, a previous systematic review and meta-analysis by Mokhtari et al. (2019) showed that patients with T2D had average levels of QOL (13).

The highest and lowest QOL scores were for social support and mental health dimensions. Shao et al. (2017) showed that blood sugar control was better in patients with higher social support than those with lower social support (32). Given that social support can encourage healthy behavior and treatment-seeking behavior, it is expected that patients with higher social support experience better QOL (33). Miller and Davis (2005) referred to social support as a critical element of managing diabetes (34). It appears that the more a diabetic patient receive social support from people around them, especially from family members, the more they are motivated to engage in self-care behavior, including adherence to treatment and adherence to diet and exercise; this gives them more ability to manage their illness.

By breaking the patient and impairing their abilities, a chronic disorder like diabetes gradually lead to behavioral, emotional, and social problems in the patient (35). The unpleasant symptoms of diabetes together with the labeling by the society, can threaten the patient's identity

and cause them to experience negative emotions (30). Severe career limitations, taking diabetes medication and injecting insulin on a daily basis, long-term complications of diabetes, such as nephropathy, neuropathy, cardiovascular disease, and brain problems can reduce the QOL of patients, and threaten their mental health (36). Daily challenges, side effects of medications, and high costs of treatment may lead to psychological distress in patients with diabetes. In their qualitative study, Rezaei et al. (2019) found that some Iranian couples still believed that diabetes was contagious; they pointed out that this incorrect belief had negative impacts on the psychological wellbeing of patients with diabetes (37). Overall, due to struggling with their illness and trying to manage it, patients with diabetes often feel hopeless; this can have adverse effects on their psychological and social feeling of wellness. Therefore, they may experience significantly lower levels of QOL than people without diabetes (30).

The results by region showed that patients living in the regions 3 and 5 of Iran had lower levels of QOL than those living in the other regions. This can be attributed to differences between Iran's regions in people's knowledge on diabetes, their attitude toward it, and available self-care training for patients with diabetes; these can lead to differences in factors determining the QOL of patients with diabetes (38). Another explanation for this finding could be the lack of access to proper health facilities and the lower socioeconomic status of the regions 3 and 5 compared to other regions.

The study results indicated that patients with T2D experience relatively low levels of QOL. Given that the lowest scores were for mental health, it seems necessary to

better understand their psychological problems, and provide them with preventive programs focused on increasing social support, physical activities, controlling the metabolic indicators, etc.

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

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