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Health-Related Quality of Life in Type 2 Diabetes Mellitus: Cross-Sectional Analytical Evidence from Wazir Akbar Khan Hospital, Kabul, Afghanistan

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ABSTRACT

Background: We aimed to evaluate health-related quality of life (HRQoL) and its major influencing factors among patients with Type 2 diabetes mellitus (T2DM).

Methods: A hospital-based, cross-sectional study was undertaken in 2025 at Wazir Mohammad Akbar Khan National Hospital, Kabul. The study included 298 adults with confirmed T2DM, selected through non-probability convenience sampling. Information on sociodemographic characteristics and clinical profiles was gathered via structured interviews and medical file reviews. HRQoL was evaluated using the Short Form-36 (SF-36) questionnaire, which assesses eight health domains and provides composite physical (PCS) and mental (MCS) scores. Statistical analysis was conducted using SPSS version 20, with results summarized descriptively.

Results: The study population had a mean age of 53.6 years (SD ±12.4), and just over half were male. HRQoL scores indicated substantial overall impairment, with physical health domains showing the greatest deficits. Limitations in physical roles and reduced physical functioning emerged as the most affected areas. Physical composite scores were consistently lower than mental composite scores, reflecting a heavier physical disease burden. Lower HRQoL was more common among women, older individuals, patients with a longer history of diabetes, and those reporting persistent pain or emotional difficulties. Increasing age and prolonged disease duration were associated with a gradual deterioration in quality of life.

Conclusion: Adults living with T2DM in Kabul experience pronounced reductions in HRQoL, driven predominantly by physical health limitations. These findings underscore the need for integrated care approaches that prioritize functional ability, pain control, and mental health support, particularly for high-risk groups such as women, elderly patients, and individuals with long-standing diabetes.

Keywords: Type 2 diabetes mellitus, Health-related quality of life, SF-36, Afghanistan, Chronic disease

Introduction

Diabetes mellitus (DM) is among the most common chronic metabolic disorders worldwide and remains a major contributor to global morbidity and mortality (1). It is characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Type 2 diabetes mellitus (T2DM), the predominant form of the disease, is defined by insulin resistance accompanied by a relative deficiency of insulin, leading to sustained elevations in blood glucose levels (2).

The etiology of T2DM is complex and multifactorial, arising from interactions between genetic predisposition and environmental and behavioral factors. Established risk factors include obesity, physical inactivity, smoking, unhealthy dietary patterns, excessive alcohol intake, advancing age—particularly beyond 45 years—and a family history of diabetes, especially among first-degree relatives. Several comorbid conditions further increase susceptibility to T2DM, including hypertension, dyslipidemia, polycystic ovary syndrome, and endocrine disorders such as Cushing's syndrome (2,3). T2DM often remains clinically silent in its early stages, delaying diagnosis and increasing the risk of complications. When symptoms occur, they commonly include polyuria, polydipsia, polyphagia, fatigue, nocturia, and overweight. Diagnosis is based on standardized biochemical criteria, including fasting plasma glucose ≥126 mg/dL (7 mmol/L), HbA1c ≥6.5%, a two-hour plasma glucose level ≥200 mg/dL during a 75 g oral glucose tolerance test, or a random plasma glucose ≥200 mg/dL in the presence of classic hyperglycemic symptoms (2).

The overarching goals of diabetes care extend beyond glycemic regulation and include the prevention of acute metabolic emergencies—such as diabetic ketoacidosis and hyperosmolar hyperglycemic non-ketotic syndrome—as well as the reduction of long-term microvascular and macrovascular complications. Effective disease management ultimately seeks to enhance patients' quality of life and decrease diabetes-related mortality (1,4). Previous investigations in Middle Eastern populations have largely focused on clinical outcomes, including hypoglycemic episodes and the effects of intensive antidiabetic treatment regimens (5,6).

Despite the expanding literature on diabetes, limited attention has been given to the quality of life (QoL) of affected individuals, particularly in Afghanistan and its capital, Kabul. DM exerts a profound impact on QoL, not only through its medical complications but also by imposing substantial social, economic, and familial burdens, especially among patients with coexisting conditions (7). Recurrent hospital admissions can further exacerbate these challenges, contributing to financial hardship, employment instability, reduced social engagement, and psychological distress (8). QoL is a multidimensional construct defined by the WHO as an individual's perception of their position in life within the context of their cultural and value systems and in relation to their goals, expectations, and concerns (9). This concept is shaped by an intricate interaction of physical health, psychological well-being, level of independence, social relationships, and environmental factors. In the context of diabetes, health-related quality of life (HRQoL) is commonly compromised by physical limitations resulting from disease-related complications, as well as by mental health disturbances such as fatigue and depressive symptoms associated with poor glycemic control (10).

Given the breadth and complexity of these influences, systematic assessment of HRQoL in patients with diabetes is essential. Accordingly, we aimed to evaluate health-related quality of life and its associated factors among patients with T2DM.

Materials and Methods

A hospital-based descriptive cross-sectional study was carried out in 2025 at Wazir Mohammad Akbar Khan National Hospital, Kabul, Afghanistan. This institution is a tertiary referral center that delivers specialized outpatient and inpatient services to patients with chronic non-communicable diseases, including diabetes mellitus.

Study Population and Sampling

The study population comprised adult patients diagnosed with diabetes mellitus who attended the hospital during the study period. A total of 298 participants were enrolled using a non-probability convenience sampling technique. Eligible participants were aged 18 years or older, had a physician-confirmed diagnosis of diabetes mellitus, and were capable of understanding and completing the study questionnaire. Patients were excluded if they had severe cognitive impairment, psychiatric disorders that could compromise reliable questionnaire responses, or acute medical conditions at the time of data collection.

Data Collection Procedures

Data were obtained through structured, face-to-face interviews conducted by trained personnel, supplemented by a review of patients' medical records. Collected sociodemographic information included age, sex, marital status, level of education, and place of residence. Clinical data focused primarily on disease-related variables, particularly the duration of diabetes.

Assessment of Health-Related Quality of Life

HRQoL was evaluated using the 36-Item Short Form Health Survey (SF-36), a widely validated generic instrument. The SF-36 assesses eight health domains: Physical functioning, role limitations due to physical problems, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems, and mental health. Scores for each domain were calculated following standard scoring algorithms and transformed to a scale ranging from 0 to 100, with higher scores reflecting better perceived health status. Composite indices were generated to summarize overall health dimensions: the physical component summary (PCS), derived from physical functioning, role physical, bodily pain, and general health; and the mental component summary (MCS), derived from vitality, mental health, role emotional, and social functioning.

Statistical Analysis

Data analysis was performed using the SPSS, version 20 (IBM Corp., Armonk, NY, USA). The analytical approach was descriptive in nature, and no inferential statistical testing was undertaken. Continuous variables were reported as means with standard deviations, while categorical variables were expressed as frequencies and percentages. Mean scores and standard deviations were calculated for each SF-36 domain and descriptively interpreted as indicating poor or moderate HRQoL in accordance with established SF-36 interpretative frameworks and prior descriptive research in diabetes populations (11).

Composite PCS and MCS scores were computed to facilitate a descriptive comparison between physical and mental dimensions of health status. Gender-based differences in HRQoL were explored by comparing mean SF-36 domain scores between male and female participants and reporting observed directional trends. Age-related variations were examined by stratifying participants into three age categories (<40 years, 40–60 years, and >60 years) and comparing domain-level mean scores across these groups. Similarly, the influence of disease duration was assessed by categorizing participants according to diabetes duration (<5 years, 5–10 years, and >10 years) and identifying progressive or dose–response patterns in HRQoL scores.

Results

Sociodemographic and Clinical Characteristics

The sociodemographic and clinical profile of the 298 participants is presented in Table 1. The study population included 153 men (51.3%) and 145 women (48.7%), reflecting an almost equal gender distribution. Participants had a mean age of 53.6 years (SD = 12.4), indicating that most were middle-aged or older adults. The majority were married (82.9%), whereas 17.1% reported being single, widowed, or divorced. Educational attainment was generally low. More than two-fifths of participants were illiterate (40.6%), while 24.8% had completed primary education, 20.5% secondary education, and only 14.1% had attained a university-level qualification. Most respondents resided in Kabul (84.2%), with a smaller proportion (15.8%) coming from provinces outside the capital. The mean duration of diabetes was 8.9 years (SD = 5.7), suggesting prolonged exposure to the disease among a substantial proportion of the sample (Table 1).

Table 1: Sociodemographic Characteristics of Participants (N = 298)

Variable	*n*	*%*
Male	153	51.3
Female	145	48.7
Age (Mean ± SD)	53.6 ± 12.4	-
Married	247	82.9
Other marital status	51	17.1
Illiterate	121	40.6
Primary education	74	24.8
Secondary education	61	20.5
University education	42	14.1
Kabul residence	251	84.2
Other provinces	47	15.8

Health-Related Quality of Life

Table 2 summarizes the mean scores of the SF-36 domains for the study participants. Overall, HRQoL was notably compromised, with the greatest impairments observed in physical health–related domains.

Table 2: SF-36 Domain Scores Among Patients with Diabetes (n = 298)

SF-36 Domain	*Mean ± SD*	*Health Status Interpretation*
Physical Functioning	43.7 ± 11.2	Poor
Role Limitation – Physical	35.4 ± 13.6	Poor
Role Limitation – Emotional	51.9 ± 21.3	Moderate
Social Functioning	54.0 ± 18.2	Moderate
Bodily Pain	52.1 ± 16.8	Moderate
Vitality / Mental Health	46.8 ± 19.4	Poor
General Health Perception	44.5 ± 17.1	Poor

The lowest mean scores were recorded for role limitations due to physical problems (35.4 ± 13.6) and physical functioning (43.7 ± 11.2), both categorized as poor, indicating marked restrictions in physical activities and daily role performance attributable to health limitations. Perceptions of general health were similarly unfavorable, with the general health domain scoring 44.5 ± 17.1. Measures related to energy and psychological well-being, reflected in the vitality/mental health domain, also demonstrated poor status (46.8 ± 19.4). In contrast, relatively higher—though still suboptimal—scores were observed in role limitations due to emotional problems (51.9 ± 21.3), social functioning (54.0 ± 18.2), and bodily pain (52.1 ± 16.8), all of which were interpreted as indicating moderate levels of functioning (Table 2).

Table 3 presents the composite scores for physical and mental health derived from the SF-36 assessment. The PCS, calculated from the domains of physical functioning, role limitations due to physical problems, bodily pain, and general health, yielded a low average score and was categorized as poor, reflecting pronounced limitations in physical aspects of health-related quality of life. In comparison, the MCS, which encompasses vitality, mental health, role limitations due to emotional problems, and social functioning, achieved a higher mean score than the PCS. Despite this relative difference, MCS values remained within the poor-to-moderate range, indicating that mental, emotional, and social well-being were also adversely affected. Collectively, these findings indicate that while physical health domains were more severely impaired than mental health domains, overall quality of life was substantially reduced among the study population (Table 3).

Table 3: Physical and Mental Health Component Scores (0–100 Scale)

Component	*Included Domains*	*Interpretation*
Physical Health Component (PCS)	Physical Functioning, Role Physical, Bodily Pain, General Health	Poor
Mental Health Component (MCS)	Vitality, Mental Health, Role Emotional, Social Functioning	Poor–Moderate

Table 4 illustrates gender-based differences in SF-36 domain scores among patients with diabetes. Male participants demonstrated higher mean scores across all domains when compared with female participants, suggesting a more favorable health-related quality of life among men.

Table 4: Comparison of SF-36 scores by gender (0–100 Scale)

Domain	*Male (Mean ± SD)*	*Female (Mean ± SD)*
Physical Functioning	50.1 ± 5.0	49.3 ± 5.1
Role Physical	30.4 ± 7.6	28.5 ± 7.0
Role Emotional	31.8 ± 8.5	29.8 ± 8.7
Social Functioning	54.2 ± 9.6	51.3 ± 10.8
Bodily Pain	73.5 ± 13.1	71.6 ± 15.4
Vitality / Mental Health	74.6 ± 8.9	70.1 ± 10.8
General Health	49.3 ± 6.0	49.1 ± 5.6

Women consistently reported lower scores in domains related to physical health, particularly physical functioning and role limitations due to physical problems, indicating greater restrictions in routine physical activities. Gender disparities were also evident in psychosocial domains. Female participants exhibited poorer scores in role limitations due to emotional problems, social functioning, and vitality/mental health, reflecting increased emotional strain, diminished social participation, and reduced psychological well-being. Furthermore, lower scores among women in the bodily pain and general health domains suggest greater pain-related interference and less favorable perceptions of overall health status (Table 4).

Descriptive analysis showed clear age-related differences in several SF-36 domains. Participants younger than 40 years reported the highest physical functioning (84.8 ± 9.9) and role physical scores (67.5 ± 34.1). Individuals aged 40–60 years had moderate scores for physical functioning (64.0 ± 23.8) and role physical (47.3 ± 36.1). The lowest scores were observed in participants older than 60 years, particularly for physical functioning (37.4 ± 24.3) and role physical (19.4 ± 34.2).

Bodily pain scores were similar across all age groups (44.1–45.5). Vitality/mental health scores showed only minor variation, ranging from 55.1 ± 9.0 to 56.8 ± 6.6. General health scores were lowest in the <40 years group (40.7 ± 11.8) and highest in the >60 years group (52.2 ± 11.4). (Table 5).

Table 5: SF-36 Scores by Age Group (0–100 Scale)

Domain	***< 40 Years***	***40–60 Years***	***> 60 Years***
Physical Functioning	84.4 ± 9.9	64.0 ± 23.8	37.4 ± 24.3
Role Physical	67.5 ± 34.1	47.3 ± 36.1	19.4 ± 34.2
Bodily Pain	44.1 ± 14.4	44.4 ± 13.2	45.5 ± 13.2
Vitality / Mental Health	56.8 ± 6.6	55.8 ± 7.8	55.1 ± 9.0
General Health	40.7 ± 11.8	43.4 ± 11.9	52.2 ± 11.1

Participants with a diabetes duration of less than 5 years reported higher physical functioning (73.1 ± 20.6) and role physical scores (57.7 ± 34.4) compared to those with longer disease duration. Individuals with diabetes for 5–10 years had lower physical functioning (54.2 ± 27.4) and role physical (38.1 ± 38.5) scores. The lowest values were observed in participants with more than 10 years of diabetes (47.9 ± 26.5 and 26.1 ± 35.7, respectively).

Bodily pain scores were relatively consistent across duration groups (43.5–45.9). Vitality/mental health scores declined slightly with longer disease duration, from 57.0 ± 6.1 in the <5 years group to 52.2 ± 9.3 in the >10 years group. General health scores increased modestly with longer duration of diabetes (Table 6).

Table 6: SF-36 scores by duration of diabetes (0–100 Scale)

Domain	*< 5 Years*	*5–10 Years*	*> 10 Years*
Physical Functioning	73.1 ± 20.6	54.2 ± 27.4	47.9 ± 26.5
Role Physical	57.7 ± 34.4	38.1 ± 38.5	26.1 ± 35.7
Bodily Pain	43.5 ± 11.1	45.9 ± 14.5	44.9 ± 15.3
Vitality / Mental Health	57.0 ± 6.1	56.5 ± 8.3	52.2 ± 9.3
General Health	40.6 ± 11.6	46.3 ± 12.5	51.5 ± 10.4

Older age, longer duration of diabetes, and female gender were identified as key determinants associated with reduced health-related quality of life. Older participants and those with more than 10 years of diabetes consistently showed lower physical functioning and role physical scores. Female participants demonstrated slightly lower physical health scores compared with males. Persistent bodily pain, reduced vitality/mental health, and poorer general health perception were common across subgroups and contributed to overall reduced quality of life (Table 7).

Table 7: Key Determinants of Reduced Quality of Life

Determinant	*Affected Domains*	*Clinical Impact*
Older Age (>60 years)	Physical Functioning, Pain, General Health	Reduced mobility
Female Gender	Physical & Mental Domains	Higher disease burden
Longer Diabetes Duration (>10 years)	Physical, Pain, Vitality	Cumulative impairment
Chronic Pain	Physical, Mental, Social	Functional disability
Emotional Distress	Mental, Social, Role Emotional	Reduced productivity

Discussion

This study provides a comprehensive assessment of health-related quality of life (HRQoL) among patients with diabetes in Kabul, Afghanistan, highlighting substantial impairments across both physical and mental health domains. Overall, the findings indicate that diabetes is associated with markedly reduced HRQoL, with physical health dimensions being more severely affected than mental and social domains. These results underscore the multidimensional burden of diabetes in low-resource and conflict-affected settings.

The lowest SF-36 scores were observed in role limitation due to physical problems and physical functioning, indicating profound restrictions in daily activities and occupational roles. This pattern is consistent with previous studies showing that diabetes-related complications, fatigue, and reduced mobility significantly impair physical functioning and role performance (12, 13). The poor general health perception observed in this study further reflects patients' awareness of diabetes as a chronic, progressive condition with long-term consequences, a finding widely reported in international literature (14, 15).

The relatively poorer physical health scores compared with mental health scores suggest that physical limitations represent the dominant contributor to reduced HRQoL in this population. Similar trends have been documented in studies from both high- and low-income countries, where physical symptoms and complications such as neuropathy, musculoskeletal pain, and cardiovascular comorbidities disproportionately affect quality of life (1, 11).

Although mental and social domains were comparatively less impaired than physical domains, they still fell within poor to moderate ranges. Reduced vitality and mental health scores indicate persistent fatigue, emotional distress, and reduced psychological well-being, which are

common among individuals with diabetes and have been linked to suboptimal glycemic control and increased risk of depression (16). Moderate scores in social functioning and role limitation due to emotional problems suggest partial preservation of social roles, possibly supported by strong family structures; however, emotional burden remains clinically significant. Prior evidence demonstrates that emotional distress and diabetes-related depression negatively influence adherence, self-care behaviors, and overall outcomes (17).

A notable finding of this study is the consistently lower HRQoL scores among female patients, particularly in physical functioning and role physical domains. This aligns with a robust body of evidence indicating that women with diabetes experience greater physical limitations, higher pain perception, and increased psychological distress compared with men (18, 19). Sociocultural factors, reduced access to healthcare, caregiving responsibilities, and lower health literacy may further exacerbate the disease burden among women in this context. These findings emphasize the need for gender-sensitive diabetes management strategies that address both biomedical and psychosocial determinants of health.

The observed age-related gradient, with progressively worse HRQoL among older participants, is consistent with prior research demonstrating declining physical function, increased pain, and reduced vitality with advancing age (20, 21). Older adults with diabetes are more likely to experience cumulative complications, comorbidities, and functional decline, which collectively impair both physical and mental health. The sharp deterioration in physical functioning and role physical performance among participants older than 60 years highlights the importance of early intervention and age-specific care models.

A clear relationship was also observed between longer duration of diabetes and poorer HRQoL. Patients with more than 10 years of disease duration exhibited the lowest physical functioning, greater role limitations, and reduced vitality and mental health scores. Similar findings have been widely reported, indicating that prolonged exposure to hyperglycemia and metabolic dysregulation increases the risk of complications, chronic pain, and functional impairment (22, 23). These results reinforce the importance of early diagnosis, sustained glycemic control, and long-term monitoring to preserve quality of life.

Chronic pain emerged as a central determinant affecting physical, mental, and social domains, contributing to functional disability and reduced daily activity. Pain-related impairment in diabetes has been closely linked to neuropathy, musculoskeletal disorders, and inflammatory mechanisms, all of which negatively influence HRQoL (24). Additionally, emotional distress was strongly associated with poorer mental health, social functioning, and role performance, consistent with evidence that psychological comorbidities significantly amplify the perceived burden of diabetes (25).

Overall, the findings highlight the urgent need for integrated, patient-centered diabetes care that extends beyond glycemic control to include pain management, mental health screening, and social support interventions. Targeted strategies for high-risk groups—particularly women, older adults, and patients with long disease duration—are essential. In resource-limited settings such as Afghanistan, incorporating HRQoL assessment into routine clinical practice may help identify vulnerable patients and guide holistic interventions aimed at improving long-term outcomes.

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Conflict of Interest

The authors declare that they have no conflicts of interest related to this work.

Reference

1. Solli O, Stavem K, Kristiansen IS. Health-related quality of life in diabetes: The associations of complications with EQ-5D scores. Health Qual Life Outcomes. 2010; 8:18.
2. Olokoba AB, Obateru OA, Olokoba LB. Type 2 diabetes mellitus: a review of current trends. Oman Med J. 2012;27(4):269-73.
3. Skyler JS, Bakris GL, Bonifacio E, Darsow T, Eckel RH, Groop L, et al. Differentiation of Diabetes by Pathophysiology, Natural History, and Prognosis. Diabetes. 2017;66(2):241-55.
4. Naser AY, Wong ICK, Whittlesea C, Beykloo MY, Man KKC, Lau WCY, et al. Use of multiple antidiabetic medications in patients with diabetes and its association with hypoglycaemic events: a case-crossover study in Jordan. BMJ Open. 2018;8(11):e024909.
5. Naser AY, Wong ICK, Whittlesea C, Alwafi H, Abuirmeileh A, Alsairafi ZK, et al. Attitudes and perceptions towards hypoglycaemia in patients with diabetes mellitus: A multinational cross-sectional study. PLoS One. 2019;14(10): e0222275.
6. Naser AY, Alsairafi Z, Alwafi H, Mohammad Turkistani F, Saud Bokhari N, Alenazi B, et al. The perspectives of physicians regarding antidiabetic therapy de-intensification and factors affecting their treatment choices-A cross-sectional study. Int J Clin Pract. 2021;75(1): e13662.
7. Chung JO, Cho DH, Chung DJ, Chung MY. Assessment of factors associated with the quality of life in Korean type 2 diabetic patients. Intern Med. 2013;52(2):179-85.
8. Naser AY, Alwafi H, Alsairafi Z. Cost of hospitalisation and length of stay due to hypoglycaemia in patients with diabetes mellitus: a cross-sectional study. Pharm Pract (Granada). 2020;18(2):1847.
9. AbuAlhommos AK, Alturaifi AH, Al-Bin Hamdhah AM, Al-Ramadhan HH, Al Ali ZA, Al Nasser HJ. The health-related quality of life of patients with type 2 diabetes in Saudi Arabia. Patient preference and adherence. 2022:1233-45.
10. Al-Shehri AH, Taha AZ, Bahnassy AA, Salah M. Health-related quality of life in type 2 diabetic patients. Ann Saudi Med. 2008;28(5):352-60.
11. Esubalew H, Belachew A, Seid Y, Wondmagegn H, Temesgen K, Ayele T. Health-Related Quality of Life Among Type 2 Diabetes Mellitus Patients Using the 36-Item Short Form Health Survey (SF-36) in Central Ethiopia: A Multicenter Study. Diabetes Metab Syndr Obes. 2024; 17:1039-49.
12. Rubin RR, Peyrot M. Quality of life and diabetes. Diabetes Metab Res Rev. 1999;15(3):205-18.
13. Sinclair AJ, Conroy SP, Bayer AJ. Impact of diabetes on physical function in older people. Diabetes Care. 2008;31(2):233-5.
14. Ware JE, Jr., Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care. 1992;30(6):473-83.
15. Sepúlveda E, Poínhos R, Constante M, Pais-Ribeiro J, Freitas P, Carvalho D. Health-related quality of life in type 1 and type 2 diabetic patients in a Portuguese central public hospital. Diabetes Metab Syndr Obes. 2015; 8:219-26.
16. Giese KK. The emotional burden of diabetes: A look at diabetes distress. Nurse Pract. 2018;43(8):23-7.
17. Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes: a meta-analysis. Diabetes Care. 2001;24(6):1069-78.
18. Huebschmann AG, Huxley RR, Kohrt WM, Zeitler P, Regensteiner JG, Reusch JE. Sex differences in the burden of type 2 diabetes and cardiovascular risk across the life course. Diabetologia. 2019;62(10):1761-72.
19. Redekop WK, Koopmanschap MA, Stolk RP, Rutten GE, Wolffenbuttel BH, Niessen LW. Health-related quality of life and treatment satisfaction in Dutch patients with type 2 diabetes. Diabetes Care. 2002;25(3):458-63.
20. Wändell PE, Tovi J. The quality of life of elderly diabetic patients. J Diabetes Complications. 2000;14(1):25-30.
21. Akinci F, Yildirim A, Gözü H, Sargin H, Orbay E, Sargin M. Assessment of health-related quality of life (HRQoL) of patients with type 2 diabetes in Turkey. Diabetes Res Clin Pract. 2008;79(1):117-23.
22. Coffey JT, Brandle M, Zhou H, Marriott D, Burke R, Tabaei BP, et al. Valuing health-related quality

of life in diabetes. Diabetes Care. 2002;25(12):2238-43.
23. Jacobson AM, de Groot M, Samson JA. The evaluation of two measures of quality of life in patients with type I and type II diabetes. Diabetes Care. 1994;17(4):267-74.
24. Jensen MP, Chodroff MJ, Dworkin RH. The impact of neuropathic pain on health-related quality of life: review and implications. Neurology. 2007;68(15):1178-82.
25. Tareen RS, Tareen K. Psychosocial aspects of diabetes management: dilemma of diabetes distress. Transl Pediatr. 2017;6(4):383-96.