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Depression, Anxiety and Quality of Life Among Adult Turkish Patients with Type 1 Diabetes Mellitus

Erişkin Tip 1 Diyabetli Hastalarda Depresyon, Anksiyete ve Yaşam Kalitesi

Volkan Atasoy, İnan Anaforoğlu*, Ekrem Algün*, Remzi Kutanis**

Trabzon Numune Education and Research Hospital, Department of Family Medicine, Trabzon, Turkey
*Trabzon Numune Education and Research Hospital, Department of Endocrinology and Metabolism, Trabzon, Turkey
**Trabzon Numune Education and Research Hospital, Department of Psychiatry, Trabzon, Turkey

Abstract

Purpose: The aim of this study was to investigate quality of life, depression, and anxiety and to determine the variables of illness and sociodemographic features among type 1 diabetic patients and to compare with control subjects.

Material and Method: The Short Form-36 (SF-36) questionnaire for measuring quality of life (QOL), The Beck Depression Inventory, and the State-Trait Anxiety Inventory (STAI) were administered to 58 diabetic patients and 58 control subject (Mean age: 31.9±8.5 and 31.8±7.4 years, respectively; p=0.926) 53.4% of patients were female in diabetic group and 51.7% in control group (p=0.852).

Results: There was a negative correlation between the number of insulin injections and A1c (r=-295, p=0.025). There was no association of components of SF-36, BDI and STAI-TX scores with the number of injections, frequency of glucose measurements, and duration of illness. Body mass index negatively correlated with physical function component of SF-36 (r=-267, p=0.043). A1c positively correlated with BDI scores (r=297, p=0.024). According to frequency of hypoglycemia, patients experiencing hypoglycemia everyday had lower score for pain than patients who had less frequent hypoglycemia (p=0.027). Subjects having hypoglycemia once a month or less had the highest vitality score (p=0.019). Social function scores were significantly lower among patients who had experienced a diabetic coma than in those with no history of a diabetic coma (59.9±25.8 vs 75±19, p=0.022). STAI-TX scores were slightly significantly found to be higher among patients having a history of hospitalisation than in patients without a history of hospitalisation (STAI-TX-I: 60.2±9.7 vs 52.8±6.9, p=0.045; STAI-TX-II: 45.2±9.7 vs 37.8±6.9, p=0.045, respectively).

Discussion: Diabetic patients are more likely to have depression, anxiety and to have deterioration of QOL. These patients should be observed carefully during their follow-up in terms of depression, anxiety and QOL. *Turk Jem 2013; 17: 28-32*

Key words: Type 1 Diabetes Mellitus, depression, anxiety, quality of life, microvascular complications

Özet

Amaç: Bu çalışmada amaç, Tip 1 diyabetli hastalarda, yaşam kalitesi, depresyon ve anksiyete varlığının tespiti, sosyodemografik bulgular ve hastalığın kendisiyle ilişkilerini incelemek ve kontrol grubu ile bulguları karşılaştırmaktı.

Gereç ve Yöntem: Kısa form (SF-36) yaşam kalitesi ölçeği, Beck depresyon ölçeği (BDÖ), kendini değerlendirme durumluluk ve sürekli kaygı ölçeği (STAI-TX) 58 diyabetik ve 58 kişiden (31,9±8,5 vs 31,8±7,4 yıl/p=0,926, sırasıyla) oluşan kontrol grubunda kullanıldı. Hastaların %53,4'ü, kontrol grubunun ise %51,7'si kadınlardan oluşmaktaydı (p=0,852).

Bulgular: Enjeksiyon sayısı ile A1c arasında negatif korelasyon mevcuttu (r=-295, p=0,025). Enjeksiyon sayısı, kendi kendine glukoz ölçümü, hastalık süresi, ile SF-36, BDÖ ve STAI-TX skorları arasında ilişki yoktu. Vücut kitle indeksi ile SF-36'nın fiziksel fonksiyon bileşeni arasında negatif bir ilişki mevcuttu (r=-267, p=0,043). A1c, BDÖ skorları ile pozitif korelasyon gösterdi (r=297, p=0,024). Hipoglisemi sıklığına göre, hergün hipoglisemi yaşayan hastalarda, daha az hipoglisemi yaşayanlara göre ağrı skoru daha düşüktü (p=0,027). Ayda bir veya daha az hipoglisemi yaşayan hastalar en yüksek vitalite skoruna sahipti (p=0,019). Diyabetik koma yaşamış hastaların sosyal fonksiyon skorları yaşamayanlara göre daha düşüktü (59,9±25,8 vs 75±19, p=0,022). Hastanade yatış öyküsü olan hastaların STAI-TX skorları hastanade hiç yatmamış olanlara göre daha yüksek bulundu (STAI-TX-I: 60,2±9,7 vs 52,8±6,9, p=0,045; STAI-TX-II: 45,2±9,7 vs 37,8±6,9, p=0,045, sırasıyla).

Tartışma: Diyabetik hastaların depresyona ve anksiyeteye daha eğilimli oldukları ve yaşam kalitelerinin daha kötü olduğu gözlendi. Bu hastalar, bu bakımlardan daha yakından izlenmelidirler. *Turk Jem 2013; 17: 28-32*

Anahtar kelimeler: Tip 1 Diyabet, depresyon, anksiyete, yaşam kalitesi, mikrovasküler komplikasyonlar

Address for Correspondence/Yazışma Adresi: İnan Anaforoğlu MD, Trabzon Numune Education and Research Hospital, Department of Endocrinology and Metabolism, Trabzon, Turkey
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Introduction

Type 1 diabetes mellitus (T1DM) is a lifelong, chronic disorder requiring rigorous attention regarding a complex regimen of diet, exercise, insulin by injection and self-monitoring of blood glucose to achieve a normal metabolic state. T1DM is also potentially disabling condition and associated with life-threating complications. Depression has a high prevalence among patients with diabetes as in most chronic illness (1). The prevalence of depression among patients with T1DM is 20-27% which is two to three times greater than in non-diabetic population (2,3). It has been stated that depression is the most common psychiatric disturbance followed by anxiety which have direct impacts on metabolic control in patients with T1DM (4). Recently, it has been proposed that there might be a shared biological vulnerability between T1DM and depression (5). Depression has been found to be associated with poor self-care, impaired glycaemic control, poor microvascular and macrovascular outcomes, higher healthcare costs, and impaired QOL (6-9). Heightened anxiety in patients with T1DM is associated with increased fear of diabetes-related events such as nocturnal hypoglycaemia or complications. Anxiety may also lead to distress associated with self-monitoring or insulin injections (10). Impaired QQL has been recognised as an important psychosocial outcome in chronic illness. QQL has been defined as 'patient perceived personal burden with regard to satisfaction, impact, diabetes related worries, and social/vocational worries' in the Diabetes Control and Complications Trial (11). Several guidelines, , including those developed by the International Diabetes Federation, American Diabetes Association, and the UK National Institute for Health and Clinical excellence recommend regular screening of patients with diabetes (12). Previous reports indicated that youth with T1DM have a lower general QOL compared with youth without diabetes (6). The aim of this study was to investigate the quality of life, depression and anxiety and, to determine the variables of illness and sociodemographic features in patients with T1DM.

Materials and Methods

The study group included 58 patients with T1DM and 58 age- and sex-matched control subjects. Patients and controls were all adults. Patients with T1DM, of whom each had been followed for at least 6 months in our outpatient clinic, were recruited for the study. Controls were chosen from among healthy relatives of the hospital staff. Exclusion criteria were having neurologic or metabolic disorder (other than diabetes for the patient group), taking any medication likely to influence depression, being pregnant, having any alcohol or drug dependence. Controls were matched to patients with regard to educational, socioeconomic, occupational and marital status.

Each participant was informed about the purpose of the study before the interview, and they had the right to refuse to participate and withdraw at any time. All participants signed an informed consent document to participate in the study, which was conducted with the approval of the Ethics Committee, Trabzon Numune Education and Research Hospital, Trabzon, Turkey. Questionnaires in Turkish language were administered face-to-face and completed in about 30-45 minutes by the same physician (V.A.) in a quiet room.

The Turkish versions of the Short Form-36 Health Survey Questionnaire (SF-36), Beck Depression Inventory (BDI) and the State-Trait Anxiety Inventory Form (STAI) were applied to the patients and controls.

Short Form-36 Health Survey Questionnaire

The participant's health status was evaluated by using the Turkish version of the SF-36 (13,14). It consists of 36 questions measuring 8 health concepts: physical functioning, physical role functioning, bodily pain, general health perceptions, vitality, social role functioning, emotional role functioning, and mental health. The scoring is conducted upon a scale of 0-100, with higher scores reflecting better health status.

Beck Depression Inventory

The Beck Depression Inventory is a reliable, easy-to-use screening instrument that has been applied worldwide in both psychiatric and non-psychiatric populations. The Turkish version of the BDI was validated by Hisli (14). It comprises 21 items to measure the severity of depressive symptoms. Each item is rated on a 0– to 3-point scale. Total scores range from 0 to 63 (normal: 0–10, mild to moderate depression: 11–17, moderate to severe depression: 18–23, and severe depression: >24) (15).

State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI) is a self-report measure that assesses trait anxiety (20 questions) and state anxiety (20 questions). The temporary condition of 'state anxiety' (STAI-TX1) and the more general and longstanding quality of 'trait anxiety' (STAI-TX2) are clearly differentiated by assessing how respondents feel 'right now' and assessing anxiety proneness or how respondents 'feel generally'. It has been validated for the Turkish population by Öner and Le Compte (16).

All patients were also asked to complete a comprehensive questionnaire inquiring about their medical and social characteristics, such as duration of diabetes, previous hospitalisation, history of diabetic coma, frequency of hypoglycemia, and frequency of daily insulin injections and glucose monitoring, educational, monthly income and marital status. Body mass index (BMI), hemoglobin A1c (A1c), and microvascular complications of diabetes were also recorded.

Body weight was measured in light clothing and without shoes, whereas BMI was calculated by dividing the body weight in kilograms by the height in square meters.

Diabetic nephropathy was diagnosed by performing microalbumin measurement via 24-hour urine test and assessing glomerular filtration rate after the exclusion of urinary tract infection, uncontrolled hypertension, and heart failure. Peripheral sensory neuropathy was diagnosed by electroneuromyographic study and neurological examination. A detailed eye examination was performed by an ophtalmologist to detect any grade of retinopathy.

Statistical Analysis

The SPSS software (version 16.0, SPSS Inc., Chicago, Ill., USA) was used for statistical analyses. Data normality was assessed by the Kolmogorov-Smirnov test. Comparisons between the groups were done with the Student's t-test for normally distributed data and with the Mann-Whitney U test for non-normally distributed data.

Categorical variables were analyzed by the χ^2 test, and one-way ANOVA was used to evaluate the differences between the groups for continuous variables. Frequencies and percentages were used to summarize nominal data; standard deviations were used to summarize continuous data.

Results

There was no difference between the patient and control groups in terms of age and sex (mean age: 31.97±8.5 and 31.8±7.4 years, respectively; p=0.926; 31 (53.4%) women, 27 (46.6%) men vs 30 (52.6%) women, 28 (48.3%) men, respectively p=0.852).

The mean duration of diabetes mellitus was 12.4±9 years (range: 1-37 years). The mean A1c value was 8.7±1.9% (range: 5.5-16%). The frequency of daily insulin injections were as follows; One patient was doing injection once a day, 2 were doing twice a day, 3 patients were doing three times a day, the remaining 53 patients were doing four times a day. Eight patients did not regularly measure their glucose levels by a glucometer, 18 of them were measuring approximately once a day, 9 of them were twice a day, 14 of them were three times a day and 9 of them were making measurements four or more times a day. Five patients had hypoglycemia approximately everyday, 19 had once a week, 15 had 2-3 times a week and 19 had once a month. Twenty-four patients (41.4%) had a history of diabetic coma and 52 (89.7%) had a history of hospitalisation for any reason.

There was a weak negative correlation between frequency of injection and A1c level (r=295, p=0.025). There was no association of SF-36, BDI and STAI-TX scores with number of injections, frequency of glucose measurement, and duration of illness. BMI negatively correlated with physical function component of SF-36 (r=267, p=0.043). A1c positively correlated with BDI scores (r=297, P=0.024). According to frequency of hypoglycemia, patients who had experiencing hypoglycemia everyday had lower score for pain than patients who have less hypoglycemia (p=0.027). Patients having hypoglycemia once a month or less had the highest vitality score (p=0.019) being higher than patients having hypoglycemia more frequently. Social function scores were significantly lower among patients who had experienced a diabetic coma than in those with no history of a diabetic coma (59.9±25.8 and 75±19, respectively; p=0.022). STAI-TX scores were found to be slightly significantly higher among patients having a history of hospitalisation than in those who did not have a history of hospitalisation (STAI-TX-I: 60.2±9.7 and 52.8±6.9, p=0.045; STAI-TX-II: 45.2±9.7 and 37.8±6.9, p=0.045, respectively).

QOL scores were significantly lower among patients compared with control subjects except for physical function, bodily pain, vitality and social function (Table 1). BDI scores were significantly higher in patients than in controls as well STAI-TX scores (Table 1). Frequency of depression was significantly higher among patients than in controls (Table 2).

The frequencies of retinopathy, nephropathy and neuropathy in patients with T1DM were 34.5%, 13.8% and 15.5% respectively. The relationship between scores and microvascular complications are shown on Table 3.

Table 1. Distribution of Quality of Life Scores

	Diabetic patients (n=58)	Controls (n=58)	P
SF-36			
Physical function	77.8±20.1	83.3±18.7	0.135
Role physical	61.6±38.7	76.3±33.6	0.031
Bodily pain	66.4±24.8	70.3±20.8	0.359
General health	47.5±22.9	61.2±23.8	0.002
Vitality	56±21.2	61.1±21.6	0.203
Social function	68.8±23.1	75.9±21.3	0.087
Role emotional	56.9±38.5	71.3±38.2	0.046
Mental health	55±19.9	65.1±16.9	0.004
BDI	18.1±11.8	7.9±7.7	<0.001
STAI-TX1	44.5±9.6	39.1±7.2	0.001
STAI-TX2	59.5±9.6	54.1±7.2	0.001

SF-36: Short Form-36 Quality of Life Questionnaire, BDI: Beck Depression Inventory, STAI-TX1: State-Trait Anxiety Inventory Form

Discussion

We investigated the prevalence of depression, QOL and anxiety scores among patients with T1DM and compared with control subjects. We also investigated the impact of microvascular diabetic complications on the risk of depression, QOL and anxiety scores, and the relationship between control of diabetes and the scores. We found that frequency of insulin injections negatively correlated with A1c levels. This was a predictable result.

Naughton and colleagues (17) found that QOL was better among patients with T1DM using insulin pump vs insulin injections. In a

Table 2. Frequency of depression among patients and controls

		Diabetic patients (n=58)	Controls (n=58)	P
Normal	n (%)	15 (25.9)	42 (72.4)	<0.001
Mild to moderate depression	n (%)	14 (24.1)	5 (8.6)	
Moderate to severe depression	n (%)	14 (24.1)	8 (13.8)	
Severe depression	n (%)	15 (25.9)	3 (5.2)	

Data are presented as number (percentage) of patients. See Methods for definitions

Table 3. Relation between microvascular complications and Quality of Life Scores

	Retinopathy			Nephropathy			Neuropathy		
	(-)	(+)	P	(-)	(+)	P	(-)	(+)	P
SF-36									
Physical function	38	20	0.668	50	8	0.699	49	9	0.144
Role physical	38	20	0.209	50	8	0.108	49	9	0.019
Bodily pain	38	20	0.133	50	8	0.031	49	9	0.089
General health	38	20	0.130	50	8	0.065	49	9	0.002
Vitality	38	20	0.119	50	8	0.108	49	9	0.232
Social function	38	20	0.095	50	8	0.118	49	9	0.070
Role emotional	38	20	0.030	50	8	0.029	49	9	0.008
Mental health	38	20	0.198	50	8	0.169	49	9	0.327
BDI	38	20	0.084	50	8	0.301	49	9	0.021
STAI-TX1	38	20	0.090	50	8	0.037	49	9	0.250
STAI-TX2	38	20	0.092	50	8	0.242	49	9	0.194

SF-36: Short Form-36 Quality of Life Questionnaire, BDI: Beck Depression Inventory, STAI-TX1: State-Trait Anxiety Inventory Form

study involving patients with T1DM and type 2 diabetes mellitus (T2DM), frequency of depression was higher among patients with T2DM receiving insulin than in patients with T2DM without receiving insulin (18). The frequency of depression was highest among patients with T1DM in the same study (18). Recently, Lawrence and colleagues (19) published a paper about QOL among youth with T1DM. They divided patients into three groups: making injections less than three times, more than three times and using insulin pump. They revealed that receiving insulin by injection vs pump significantly negatively affected QOL. In our patient group, there was no association of SF-36, BDI and anxiety scores with number of injections. This may be because there was not any patient using insulin pump in our group. Similar to our results, the authors did not find a correlation between duration of illness and QOL scores (19). Grey and colleagues (2) found that depressive symptoms were more common in the earlier years postdiagnosis, less common between 4 and 9.9 years after diagnosis and rose again after 10 years. We found that there was a negative correlation between BMI and physical component of SF-36. In a study by Lawrence et al., there was no correlation between BMI and QOL (19). There are some conflicting results regarding the effects of BMI on QOL in patients with T1DM (17,19-23). The reason for this may be different questionnaires used by the authors. The other reason may be the varying age groups. Most of studies on T1DM have been made in younger age groups. We included adults in our study, while young adolescents, children and adults constituted the study groups in other studies. A1c correlated positively with high scores of BDI in our study. Dantzer et al. in a systematic review stated that there have been many studies showing negative effects of poor glycemic control on QOL, and some showing no relationship (24). It has been mainly attributed to inadequate statistical analysis and other possible confounding factors (24). Lawrence, Hoey and Naughton (17,19,20) found a better QOL –not depressive symptoms- with lower levels of A1c. In our study, patients having more hypoglycemic attacks were detected to have low scores of QOL. Hypoglycemia is an important cause of mortality and morbidity in patients with diabetes mellitus, recent studies have reported that severe hypoglycemia was associated with significant increases in major macrovascular events and major microvascular events, besides, minor hypoglycemic episodes could also have serious implications for patient health and psychological well being (25). In two studies, having hypoglycemic episodes more than 2 times within past six months was asscoiated with poor QOL (17,19). Korczak and colleagues (5) suggested that the areas that subserve emotional and cognitive functions have high insulin binding regions in the brain in turn, insulin-induced hypoglycemia may be associated with the neurocognitive deficits. Anxiety scores were slightly higher among patients who had an experience of hospitalisation. Social function component of QOL scores was significantly lower in patients with a history of diabetic coma. Both studies also detected that patients with a history of coma or hospitalisation have poorer QOL (17,19). The fear of hypoglycemic events or hospitalisation may have a role in these consequences.

Overall patients with T1DM had lower scores of QOL, higher scores of depression and anxiety in our study group. The frequency of depression or depressive symptoms were higher in patients with T1DM. There have been some studies exploring the biological link between mood disorders and diabetes mellitus (2,5,26). Korzcak et al. (5) explained the possible mechanisms as the effects of circulating cytokines associated with autoimmune diabetes, the direct impact of insulin deficiency on neurogenesis/neurotransmitter metabolism, the effects of chronic hyperglycemic state, occurence of iatrogenic hypoglycemia and the impact of basal hyperactivity of the hypothalamic-pituitary-adrenal axis. In a study by McIntyre et al., the pattern of volumetric and neurocognitive deficits in diabetic populations has been found similar to that in patients with

major depressive disorder (26). Some authors agree that shared biological vulnerabilities may have an impact on the comorbidity of T1DM and depression (2,5,26). From this point of view, it has been proposed that depression may also constitute a major risk factor in the development of T2DM (2,5,26). More studies are needed in this area to define the exact mechanism.

We observed that microvascular complications might have a negative effect on QOL. Higher depression and anxiety scores were detected in patients with neuropathy and nephropathy. Saglam et al. (18) have found that the rate of depression was higher when retinopathy and neuropathy were present.

The present study has some limitations. We have used a relatively general questionnaire for detecting QOL, depression and anxiety. There are some instruments more specific to diabetes mellitus, or T1DM. However, most of the instruments used for patients with T1DM are designed for younger age groups (2,6,17,19,23). Our study sample is relatively a small sample.

Finally, there are many studies in the literature supporting our findings. Physicians should be carefull to manage diabetes and its complications.

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