Original Article

Anxiety Levels, Quality of Life and Related Socio-Demographic Factors in Patients with Type 2 Diabetes

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Abstract

Objective: The aim of this study was to investigate the relationship between anxiety level and quality of life in patients with diabetes mellitus and the sociodemographic factors affecting them. **Materials and Methods:** This cross-sectional study enrolled 150 patients with DM who presented to the endocrinology clinic of Gaziantep University Şahinbey Research and Training Hospital for outpatient treatment between March 2017 and April 2017. The Beck Anxiety Inventory (BAI) and Eortc-Qlqc30 Quality of Life Scale (EORTC- QLQ-C30) were used to evaluate anxiety levels and quality of life of the patients. **Results:** The mean score of the patients obtained from BAI was 18 ± 13 and 51.4 ± 26 from EORTC- QLQ-C30. Mean body mass index of patients' was 27.03. There was a statistically significant negative correlation between BAI and EORTC QLQ-C30 (r:−0.359) and sub scales in terms of physical function (r: −0.253), emotional function (r: −0.201), role function (r: −0.308), cognitive function (r: −0.309) ($P < 0.05$). There was a statistically significant positive correlation between BAI and the symptom subscales of EORTC QLQ-C30 in terms of pain score (r: 0.276), fatigue score (r: 0.305), dyspnea score (r: 0.198), insomnia score (r: 0.247), loss of appetite score (r: 0.216) ($P < 0.05$). **Conclusion:** A negative relationship was determined between anxiety levels and quality of life. Age, marital status, number of spouses, co inhabitants at home, educational status, living place were related with both quality of life and anxiety levels of DM patients. Increasing the psychosocial support systems of individuals with DM may reduce their anxiety levels and increase quality of life.

Keywords: *Anxiety, diabetes mellitus, quality of life*

Introduction

Diabetes Mellitus is a metabolic chronic desease with decreased insulin levels or decreased sensitivity to insulin hormone. Incidence and burden of Diabetes Mellitus (DM) is increasing in the world and in Turkey.[1] The psychiatric problems experienced by the individuals during the struggle with the symptoms of DM are required psychiatric interventions.[1] Especially anxiety and depression comorbidity is common in DM and increases the burden of disease. The lifetime prevalence of anxiety symptoms in DM patients is 40%, and 33.8% of psychiatric patients are diagnosed with DM.[2-5] It has been reported that when comorbid anxiety disorder is present, symptoms of DM worsen, complications and pain symptoms increase and also body mass index increases.[6]

Quality of life is the difference between individual's family life, business life, socioeconomic conditions and his/her goals, expectations, hopes. In other words, it is defined as the satisfaction that the individual receives from his/her daily life.[7] DM deteriorates the individual's ability of coping strategies by adversely affecting

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the social life of the patient. So DM itself is a factor that decreases the quality of life.[8,9] Similary, anxiety disorders significantly reduce the quality of life. Since the improvement in quality of life should be in all physical, mental and social domains, holistic approach becomes important in DM patients. The aim of DM treatment is not only to prevent complications but also to improve the quality of life of the patients.[10] Therefore, the effect of anxiety on quality of life of patients with DM should be known and precautions should be taken against to complications.

Some sociodemographic factors such as age and gender have also been shown to affect the quality of life of the patients with DM.[11] Knowing the sociodemographic characteristics affecting patients' quality of life is also important in the implementation of health protocols and psychoeducation, as well as in interpreting other results.

In this study we aimed to investigate the relationship between anxiety levels and quality of life in patients with DM, and also socio-demographic factors that affect the anxiety levels and quality of life to display possible factors that lower the quality of life and increase anxiety levels among patients with DM.

Materials and Method

This cross-sectional study analyzed the relationship between anxiety levels and quality of life in patients with DM and the socio-demographic factors affecting the quality of life. Patients with DM who presented to the endocrinology clinic of Gaziantep University Şahinbey Research and Training Hospital for outpatient treatment between 01.03.2017 and 01.04.2017 were included in the study. The effect size was determined as 0.35 for the study to be statistically significant, whereas the minimum required number of participants was 126 in order to investigate relationship between anxiety levels and quality of life in patients with DM (α = 0,05, 1-β = 0,80). Totally 183 patients were admitted to the endocrinology clinic between 01.03.2017 and 01.04.2017 with the diagnosis of DM. Patient exclusion criteria were: being under 18 years of age, having mental retardation, substance abuse, schizophrenia spectrum and other psychotic disorders, bipolar disorder, history of head trauma, having neurological diseases (cerebrovascular event, Parkinson's disease etc). Inclusion criteria were being over 18 years of age and having type 2 diabetes at least for 2 years. Patients were diagnosed DM type 2 according to American Diabetes Association (ADA) criterias by an endocrinologist. ADA citerias are having fasting plasma glucose ≥126 mg/dL (7.0 mmol/L) or plasma glucose ≥200 mg/dL at the second hour during OGTT or Hb A1C ≥6.5% or having a random plasma glucose ≥200 mg/dL with classic symptoms of hyperglycemia or hyperglycemic crisis.[12] 150 patients who met inclusion criterias were included in the study.

The purpose of the study was explained to the participants with DM, and they were informed that participation was entirely voluntary, and they could opt out whenever they wished to do so. Written approvals were obtained from Gaziantep University Clinical Research Ethics Committee and the Ministry of Health of the Gaziantep University Şahinbey Research and Training Hospital where the study was conducted. Participants included in the study were informed regarding the study, and oral and written consents were obtained from those who accepted to participate. This study was approved by the Clinical Research and Ethical Committee of Gaziantep University (Protocol 2017/110).

Research data were collected by the researchers using the "Sociodemographic questionnaire Beck Anxiety Inventory (BAI)," Eortc-Qlqc30 Quality of Life Scale (EORTC- QLQ-C30).

Assessment tools

The Sociodemographic questionnaire was prepared by researchers in accordance with literature. It is comprised of 24 questions on the age, gender, marital status, education level, number of children, employment status, number of children of the patients, spare time activities, etc.

Beck Anxiety Inventory (BAI) is a 21-item self-assessment scale used to determine the frequency of anxiety symptoms experienced by individuals. It was developed by Beck *et al*. and Turkish validity and reliability study had been reported by Ulusoy *et al*. Subjective, somatic and panic-related symptoms of anxiety are described items in the BAI. Each item contains 4 options, scoring from 0 to 3. A total of 21 items were scored with a score of 0–63, and an increase in total score indicated an increase in anxiety symptoms. A high total score does not make anxiety diagnosis, but it shows the high level of anxiety or severity.[13,14] Anxiety levels of the patients can be interpreted according to the scores received from BAI: 0–17 points indicate low, 18–24 points indicate moderate, and 25 and higher points indicate the presence of severe anxiety.[15] The cronbach alpha coefficient of the scale was determined as 0.947 for this study.

The EORTC-QLQ-C30 Quality of Life Scale (EORTC-QLQ-C30) was developed by Aeronson in order to determine the health-related quality of life of patients.[16] Turkish validity and reliability study was conducted by Beşer and Öz. The cronbach alpha coefficient of the scale was found to be 0.90. The

EORTC-QLQ-C30 Quality of Life Scale includes three subtitles and 30 questions including general well-being, functionality and symptom control. Of the 30 items in the scale, the first 28 were four-point Likert-type scales and the items were evaluated as None: 1, Slightly: 2, Quite: 3 or Very: 4. In the 29th and 30th question of the scale, the patient is asked to assess the his/her health and the quality of life with the scale from 1 to 7 (1: Very bad and 7: Excellent) respectively. Questions 29 and 30 are questions that make up the general state of well-being. High scores in this section indicate that quality of life is high and low scores indicate that quality of life is low. In the functional area and symptoms sections, low scores indicate that the quality of life is high and the high scores indicate the quality of life is low.[17,18] The cronbach alpha coefficient of the scale was determined as 0.934 for this study.

Statistical analysis

The normal distribution of the data was tested with the Shaphirowilk test and the Mann Whitney u test was used to compare the normal non-dispersive properties in two independent groups. In addition Kruskal-Wallis test and All-pairwise multiple-comparison test were used for the non-normal distribution of the numerical data in more than two independent groups. The relationships between the numerical variables were tested with Spearman's correlation coefficient. Mean ± standard deviation for numerical variables and number and% for categorical variables were given as descriptive statistics. SPSS Windows version 24.0 package program was used for statistical analysis and $P < 0.05$ was considered statistically significant.

Results

Of 150 patients with DM, 55.3% were women, % 44.7 were man. 68% were married. The mean value of BMI of the patients was 27 ± 5. The socio–demographic characteristics of the patients and the total scores obtained from BAI and EORTC QLQ–C30 are given in Table 1. A statistically significant difference was found between age groups in terms of BAI, BMI and EORTC QLQ-C30. The significant difference between

Table 1: Comparison of Socio - Demographic Characteristics of Patients with Type 2 Diabetes and Eortc Qlqc30 Quality of Life Scale and Beck Anxiety Inventory Total Score Averages

Socio-Demographic Characteristics	*n*	Eortc-Qlqc30 Quality of Life Scale Mean±SD	Statistical Values	Beck Anxiety Inventory Mean±SD	Statistical Values	Body Mass Index Mean±SD	Statistical Values
Age							
18-24	7	72.61±23.43		28.28±13.28		21.53±3.25	
25-29	14	69.04±23.66	x^2=43.30	25.00±11.62	x^2=31.55	24.57±3.67	x^2=23.04
			p=0.000		p=0.000		p=0.006
30-34	10	75.00±15.21		20.10±9.32		24.52±2.89	
35-39	11	54.54±28.47		26.45±18.57		28.18±6.52	
40-44	16	51.04±25.79		20.43±12.84		26.53±2.88	
45-49	22	60.22±27.33		21.09±11.19		27.34±4.19	
50-54	25	43.00±19.64		15.36±12.42		28.11±5.83	
55-59	19	45.61±19.11		11.31±8.45		27.94±4.60	
60-64	14	31.41±18.36		10.64±10.47		26.94±4.49	
65 and above	12	28.47±22.87		10.08±12.37		30.70±7.24	
Maritual Status							
Married	102	48.01±24.61	X^2=20.62	16.01±11.67	X^2=19.54	27.77±5.34	X^2=19.95
			P=0.000		P=0.000		P=0.000
Single	23	71.37±22.02		27.34±11.60		23.25±3.03	
Divorced	10	60.83±25.47		24.70±17.62		26.91±5.41	
Widow	15	37.22±26.13		12.66±13.48		27.89±5.08	
Number of Children							
No	29	71.83±19.59		25.31±11.77		23.70±3.53	
1	7	59.52±22.78	X^2=26.72	17.28±8.75	X^2=13.51	26.47±2.40	X^2=21.40
			P=0.000		P=0.004		P=0.000
2	36	51.38±25.85		17.55±14.58		26.29±2.80	
3 and Above	78	42.96±24.48		15.55±12.24		28.67±5.86	
Who Do You Live With							
Alone	14	49.40±28.58		15.85±11.68		26.77±5.58	

Contd...

Table 1: Contd...

Socio-Demographic Characteristics	*n*	Eortc-Qlqc30 Quality of Life Scale Mean±SD	Statistical Values	Beck Anxiety Inventory Mean±SD	Statistical Values	Body Mass Index Mean±SD	Statistical Values
Only Spouse	16	50.52±22.04	X^2=12.96	13.58±13.96	X^2=12.76	28.81±6.80	X^2=11.35
			P=0.011		*P*=0.012		*P*=0.023
Spouse and Children	83	48.29±25.12		16.79±11.18		27.62±5.04	
Parents	25	67.66±21.82		26.56±14.70		24.11±3.56	
Other	12	41.66±33.54		17.18±16.28		26.81±1.61	
Where Do You Live							
Village	49	39.40±22.19		14.30±13.78		27.97±5.14	
Town	5	45.00±15.13	X^2=16.36	10.40±8.23	X^2=12.86	27.20±3.50	X^2=7.27
			P=0.001		*P*=0.005		*P*=0.026
Center of the city	96	57.88±25.95		20.28±12.35		26.55±5.10	
Educational Status							
İlliterate	37	36.71±20.64		35.64±11.50		30.32±7.04	
Literate	28	54.93±26.47	X^2=32.57	23.14±14.47	X^2=17.98	26.20±2.62	X^2=23.83
			P=0.000		*P*=0.003		*P*=0.000
Primary School	32	44.53±24.92		14.15±13.73		27.11±4.50	
Secondary School	15	48.88±20.37		14.13±12.38		24.88±3.03	
High School	21	68.25±24.80		22.09±12.34		26.84±3.39	
University	17	72.05±20.61		22.41±9.19		23.23±3.17	
Working Condition							
Working	66	53.15±26.88	*Z*=−0.869	18.01±12.22	*Z*=−3.098	25.93±3.50	X^2=2.80
			P=0.385		*P*=0.690		*P*=0.005
Not Working	84	49.38±24.99		17.98±14.06		28.36±6.28	
Spare Time Activities							
Sport	6	80.55±14.59		26.00±14.33		27.42±3.97	
Watching Television	98	45.36±23.75		17.23±13.14		27.34±5.33	
Reading Book	7	59.52±26.54	X^2=28.43	20.71±12.65	X^2=4.772	27.20±1.60	X^2=16.78
			P=0.000		*P*=0.444		*P*=0.005
Entertaining With Friends	19	74.56±20.68		20.10±11.44		23.80±3.85	
To Deal With Hobbies	15	46.66±29.00		17.33±15.71		28.00±5.58	
Other	5	48.33±23.86		13.60±5.27		29.63±3.42	
Other Chronic İllness							
Yes	35	40.93±24.56	*Z*=−2.629	18.02±13.43	*Z*=−0.111	27.38±6.39	*Z*=0.400
			P=0.009		*P*=0.112		*P*=0.689
No	115	54.49±25.84		17.99±12.98		26.93±4.64	
Who Do You Want to Help							
I Solve the Problems myself	105	49.59±25.39		15.31±11.61		26.93±4.83	
Parents	22	59.84±25.41	X^2=3.679	25.45±14.35	X^2=15.52	25.64±5.04	X^2=6.41
			P=0.298		*P*=0.001		*P*=0.093
Close Friends	18	54.16±30.55		25.55±15.09		28.29±5.98	
Other	5	41.66±24.99		14.40±3.78		30.84±6.02	

Z=Mann Whitney U test, X^2=Kruskal Wallis test

sociodemographic factors in terms of BAI, BMI and EORTC QLQ-C30 are shown in Table 1.

The mean score obtained from the Beck Anxiety Scale (BAI) of the patients with DM was 18 ± 13. The overall health status subscale of the EORTC QLQ-C30 scale was 51.4 ± 26. The mean score of the quality of life subscales were as follows; physical function 72.8 ± 22.9, role performance 76.6 ± 24.3, emotional status 74.0 ± 23.3, cognitive status 75.4 ± 26.0 and social status 56.4 ± 28.2. It was determined that the patients had the highest score from the role function subscale and the lowest score from the social function. In the symptom subscale of the patients, it was found that they had the highest total score from the economic

Table 2: The Quality of Life Scale and its subscales and the Beck Anxiety Inventory Total Score Mean and Cronbach's alpha α Value

Quality of Life Scale	*n*	min	Max	Mean	ss	Cronbach's alpha α
Global Quality of Life	150	0.00	100.00	51.44	26.02	0.934
Functional Status Subscale						
Physical Functioning	150	0.00	100.00	72.88	22.90	
Role Functioning	150	0.00	100.00	76.66	24.34	
Emotional Functioning	150	0.00	100.00	74.05	23.22	
Cognitive Functioning	150	0.00	100.00	75.44	26.09	
Social Functioning	150	0.00	100.00	56.44	28.29	
Symptoms Subscale						
Fatigue	150	0.00	100.00	39.11	25.28	
Nausea Vomiting	150	0.00	100.00	10.11	18.30	
Pain	150	0.00	100.00	30.88	25.57	
Dyspnea	150	0.00	100.00	22.44	26.61	
Insomnia	150	0.00	100.00	36.22	32.75	
Appetite Loss	150	0.00	100.00	23.77	29.99	
Constipation	150	0.00	100.00	16.66	25.54	
Diarrhea	150	0.00	100.00	6.44	17.13	
Financial Diffuculties	150	0.00	100.00	49.77	33.16	
Beck Anxiety Inventory (BAI)	150	0.00	60	18.00	13.04	0.947
Body Mass Index (BMI)	150	17.19	44.98	27.03	5.08	

difficulty item, followed by fatigue, difficulty in sleeping and pain [Table 2].

A statistically significant negative correlation was found between BAI and EORTC QLQ-C30 general quality of life (r:−0.359) ($P < 0.001$). There was a statistically significant positive correlation between BAI and the symptom subscales of EORTC QLQ-C30 in terms of pain score (r: 0.276), fatigue score (r: 0.305), dyspnea score (r: 0.198), insomnia score (r: 0.247), loss of appetite (r: 0.216) ($P < 0.05$). There was a statistically significant negative correlation between BAI and subscales of EORTC QLQ-C30 in terms of physical function (r: −0.253), emotional function (r: −0.201), role function (r: −0.308), cognitive function (r: −0.309) ($P < 0.05$) [Table 3].

The body mass index (BMI) and EORTC QLQ-C30 Quality of Life subscales showed a significant negative correlations in terms of global quality of life (r: −0.206), physical function (r: −0.201) ($P < 0.05$). A statistically significant positive correlation was found between BMI and dyspnea score (r: 0.186), constipation (r: 0.232), insomnia score (r: 0.169) and financial difficulty

Table 3: EORTC QLQ-C30 Quality of Life Scale and subscales, Beck Anxiety Scale and Body Mass Index Correlation of Patients with Type 2 Diabetes

EORTC QLQ-C30 Quality of Life Scales and Subscales	Correlation Values	Beck Anxiety Inventory	Body Mass Index (BMI)
Global Quality of Life	R	−0.359**	−0.206*
	P	0.000	0.012
Physical Functioning	R	−0.253**	−0.201*
	P	0.002	0.013
Emotional Functioning	R	−0.201*	−0.127
	P	0.014	0.120
Role Functioning	R	-0.308**	−0.104
	P	0.000	0.204
Cognitive Functioning	R	−0.309**	−0.075
	P	0.000	0.364
Social Functioning	R	0.075	−0.099
	P	0.360	0.227
Pain	R	0.276**	0.154
	P	0.001	0.060
Nausea Vomiting	R	−0.023	0.142
	P	0.779	0.084
Fatigue	R	0.305**	0.087
	P	0.000	0.292
Dyspnea	R	0.198*	0.186*
	P	0.015	0.022
Insomnia	R	0.247**	0.169*
	P	0.002	0.039
Appetite Loss	R	0.216**	−0.010
	P	0.008	0.904
Constipation	R	−0.073	0.232**
	P	0.374	0.004
Diarrhea	R	−0.104	0.033
	P	0.206	0.690
Financial Diffuculties	R	−0.095	0.206*
	P	0.249	0.012
BECK Anxiety Inventory	R	1.000	-0.091
	P	.	0.268
BMI	R	−0.091	
	P	0.268	

R=Spearman rank correlation coefficient,**r = 0.001 significant, *r = 0.005 significant

(r: 0.206). There was not a significant correlation between the Beck Anxiety Inventory and the Body Mass Index (BMI) ($P = 0.268$) [Table 3].

Discussion

DM can cause mental problems due to the effects on brain functions, illness perception and burden of the desease.[19] In chronic diseases such as DM, the severity of the disease, the frequency of symptoms, the difficulty of the treatment process, changes in fuctionality, cognitive impairment and socio-economic problems can adversely affect the quality of life.[20]

In this study, we analyzed the relationship between anxiety levels and quality of life in patients with DM, and also socio-demographic factors that affect them. It was determined that there was a negatitive correlation between anxiety and general quality of life. Statistically significant positive correlations were found between anxiety and the symptom subscales of quality of life in terms of pain, fatigue, dyspnea, insomnia, loss of appetite. Statistically significant negative correlations were found between anxiety and subscales of quality of life in terms of physical function, emotional function, role function, and cognitive functions.

The presence of anxiety symptoms in DM patients may lead to deterioration of treatment compliance and inadequate treatment response, resulting in more complications, which may lead to a decrease in the quality of life of patients. Grigsby *et al*. found that 14% of patients had generalized anxiety disorder and 40% of patients had high anxiety symptoms as a result of systematic review of 18 studies with 4076 DM patients.[21] Sönmez *et al*. found 21.8% of the DM patients had an above-threshold value of anxiety in a study on 400 patients with DM.[22] Turhan found that 38% of DM patients had mild anxiety and 34% had severe anxiety.[23] Similarly to these studies in our study patients had moderate level of anxiety. Also, we showed that the level of anxiety related to quality of life of these patients.

Gökpınar found that 41.6% of patients diagnosed with type II DM had a poor quality of life.[24] Quality of life was found to be low in similar studies with patients with DM.[15,25,26] The presence of complications, the lack of adequate metabolic control, the presence of another chronic disease and previous psychiatric illnesses have been found to affect the quality of life negatively in diabetic patients.[27,28] Also mental problems were found to affect blood glucose levels negatively and this was related to quality of life.[29] Also high level of anxiety lowers the treatment adherence[30] and poor treatment adherence lower quality of life of diabetic patients.[31] In our study we showed that higher level of anxiety related to lower quality of life of patients with DM. Therefore, increased anxiety may negatively affect blood glucose levels and the associated complications may increase, or anxiety may interfere with treatment compliance, and even anxiety disorder at the syndromal level itself may reduce the quality of life in diabetic patients.

Age, marital status, number of spouses, co inhabitants at home, spare time activities, educational status, living place were found to be related with quality of life of DM patients. Also, age, marital status, number of spouses, co inhabitants at home, educational status, living place were found to be related with anxiety levels of DM patients.

Numerous studies determined that the anxiety levels of diabetic patients with low education levels were high and their quality of life was low.[25,26,22,32] Similarly we found that the anxiety levels were higher and quality of life was lower in patients with low level of education.

In our study patients aged 65 years and older were found to have lower levels of anxiety and quality of life. Similar to our study it was shown in studies that anxiety level decreases with increasing age in DM patients[27,32] contrary to our study a study found that there was an increase in anxiety levels as age increases.[32] DM is a chronic disease and continues lifetime, complications associated with illness duration increases with age.[33] However; older age was reported to predict satisfaction with diabetes.[34]

In our study, single patients were more likely to have anxiety levels than the married patients. In similar studies, it was found that the anxiety levels of those with single were higher than those of married people in patients with DM.[35] When the relationship between marital status and quality of life was evaluated, the quality of life of single patients was lower.

The anxiety levels of the patients with 3 or more children were found to be lower than the anxiety levels of the patients without children. A study found that number of children has positive correlation with anxiety in married women in our country. However, involuntary childlessness causes high anxiety.[36,37]

There were no significant differences between spair time activities in terms of anxiety levels. But the patients who do sports and entertain with friends in spare times had better quality of life. Sport is found to be positive contributed to mental health.[38] Also, the patients who solve the problems themselves had lower anxiety levels than the patients who want help from their family or close friends to solve the problems. Considering that problem-solving ability is negatively related to anxiety,[39] it was expected that the patients who tried to solve the problem alone would have lower levels of anxiety.

In patients with DM, increase in body mass index is a risk factor for anxiety,[40,41] Sonmez and Kasim determined that as weight gain increases in patients, anxiety levels increase and their quality of life decreases.[22] Anxiety levels are higher in patients with obesity and this might be due to the psychosocial affects of obesity itself.[42] There were no correlation between anxiety and BMI in our study but there was a negative correlation between BMI and life quality. BMI may contribute to poor life quality unrelated with anxiety.

Because the number of participants in this study is low, the results cannot be generalized to all DM patients. There are many criterias for determining anxiety levels and the use of different scales in the studies may create problems in determining anxiety. Another limitation of the study is that duration of diabetes, severity of diabetes, presence of micro vascular complications and macro vascular complications have not been evaluated separately.

Conclusions

A negative relationship was determined between anxiety levels/body mass index and quality of life and a positive relationship was determined between anxiety and body mass index. Age, marital status, number of spouses, co inhabitants at home, spare time activities, educational status, living place were related with quality of life of DM patients. Also, age, marital status, number of spouses, co inhabitants at home, educational status, living place were related with anxiety levels of DM patients. We suggest that patients with DM should be routinely given psychoeducation to cope with their stress and to be referred for specialist help if necessary.

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Conflicts of interest

There are no conflicts of interest.

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