Original Research

Evaluation of Quality of Life and Psychosocial Problems in Children with Type 1 Diabetes Mellitus

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Abstract

Objectives: To evaluate the frequency of psychosocial problems and the factors affecting the quality of life in children and adolescents aged between 8 and 18 years with type 1 diabetes mellitus (T1DM).

Methods: In the study, children and adolescents aged between 8 and 18 years who had been followed for at least 6 months for T1DM were evaluated (T1DM group), and compared with healthy children and adolescents who applied to the general pediatric outpatient clinic and did not have any chronic disease (control group). Data on disease follow-up of children and adolescents with T1DM were obtained from medical records. Sociodemographic characteristics of both groups were recorded in the study form. In addition, the Children's Depression Inventory (CDI), Screen for Child Anxiety Related Disorders (SCARED) and Children Quality of Life Questionnaire (KINDL: KINDerLebensqualitätsfragebogen) were applied to both groups. The scale scores of the T1DM group and the control group were compared. Factors affecting the scale scores of the T1DM group were evaluated.

Results: A total of 181 children or adolescents, 81 of whom were in the T1DM group and 100 in the control group, were evaluated for this study. The mean age was 13.1±2.4 years in the T1DM group and 12.4±2.1 years in the control group. The mean CDI, SCARED, and KINDL scores, respectively; it was 15.3±7.2, 23.6±11.9, and 53.5±13.7 in the T1DM group and 7.9±6.8, 14.7±13, 60±11.6 in the control group. There was a statistically significant difference between the two groups in terms of mean CDI, SCARED, and KINDL scores (all p values <0.001). As compliance with the diabetic diet decreased at home, there was a significant increase in the mean CDI score (p=0.005) and a significant decrease in the KINDL score (p=0.002). It was observed that KINDL score decreased significantly as compliance with the diabetic diet decreased outside the home (p=0.001).

Conclusion: Quality of life is lower, and levels of depression and anxiety are higher in children with T1DM compared to healthy children. Psychosocial support should be provided from the moment of diagnosis in order to improve the psychosocial problems and quality of life of children with T1DM.

Keywords: Anxiety, child, depression, quality of life, type 1 diabetes mellitus

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Type 1 diabetes mellitus (T1DM) is a chronic disease characterized by insulin deficiency leading to impaired carbohydrate, protein and fat metabolism[1] The incidence of T1DM varies significantly by country and ethnicity. Finland and Sardinia have 50 new cases per 100,000 population per year, while one case is known to occur in parts of China and South America.[1] The incidence of T1DM in the world increases by approximately 2% to 3% each year.[1] In its pathogenesis, genetic predisposition and autoimmune destruction of pancreatic islets, which causes dysfunction of pancreatic beta cells, play a role.

In addition to medical outcomes, it has been shown that the incidence of psychopathological problems is increased in children and adolescents with T1DM compared to healthy children. It is very difficult to provide daily blood glucose monitoring, insulin injection, acute and chronic complications that may develop, dietary restrictions and exercise obligations in children and adolescents with T1DM. These difficulties can cause psychosocial problems and negatively affect their quality of life in children with T1DM.[2, 3] It has been reported that the most common psychiatric problems in children and adolescents with T1DM are anxiety and depression.[4]

Abnormalities and irregularities in blood sugar levels can directly affect the neurotransmitter system of the brain, thus causing changes in mental functions. In hypoglycemia, excessive glutamate is released into the synaptic gap and intracellular calcium toxicity increases, and thus selective neuron death develops as a result of excitotoxic cell damage.[5] In hyperglycemia, the function of the blood-brain barrier and cerebral blood flow are acutely impaired. Chronic hyperglycemia is associated with the development of cerebrovascular disease and neuropathy.[5] The effect of fluctuations in glucose levels on the osmotic balance of the central nervous system is not clear. It has been reported that cognitive functions are adversely affected due to decreased neuromodulatory and neuroprotective effects of insulin in children and adolescents with T1DM.[6] In addition, blood sugar level is also affected by mental and emotional changes. It is known that blood sugar levels may not be regulated despite appropriate medical treatment due to stress and anxiety. Depression accompanying diabetes adversely affects the patient's compliance, quality of life, response to treatment, prognosis, mortality and morbidity, and makes it difficult to control diabetes.[7]

The aim of study is to determine the frequency of depression and anxiety and the quality of life with appropriate scales applied in children and adolescents with T1DM and to compare them with healthy peers in the same age range without chronic disease. Also, to evaluate the socio-demographic characteristics and disease-related factors that affect the results.

Methods

Study Design

The study was planned as a prospective, cross-sectional, and case-control. Children and adolescents aged between 8 and 18 years who were followed up by the Pediatric Endocrine Department of our hospital for at least 6 months due to T1DM were included in the study. T1DM group was formed with those met the inclusion criteria and whose verbal and written consents by their parents were obtained to participate in the study. A control group was formed with children between the ages of 8 and 18 who were brought to our hospital's pediatric outpatient clinic, who did not have any chronic physical or mental illness and for whom consent were given to participate in the study by their parents. Patients with any chronic disease, neurodevelopmental disorder, psychotic disorder and autism spectrum disorder were excluded from the study. First of all, the contact information and demographic characteristics of the patients from the archive of our hospital were recorded. The parents of the patients were informed about the purpose and content of the study by telephone. Those who volunteered to participate in the study were invited to the hospital. Demographic data and scale scores of both groups were compared. In addition, the relationship and correlations between scale scores and demographic characteristics in the T1DM group were evaluated.

Scales, Questionnaires and Evaluations Used for the Study

Demographic data of both groups were obtained by the researcher from their parents and recorded on the study forms. The patients' age, gender, body mass index, Hemoglobin A1C (HbA1c) level, disease period (compliance with diabetic diet at home, compliance with diabetic diet outside the home, reason for not comply the diet outside the home) and treatment (duration of illness, type of insulin use, the number of blood glucose measurements per day, person injecting insulin), and sociodemographic and family characteristics of the parents (mother's education, father's education, working status of the mother, working status of the father) were recorded. Children's Depression Inventory (CDI), Screen for Child Anxiety Related Disorders (SCARED) and Children Quality of Life Questionnaire (KINDL: KINDer-Lebensqualitätsfragebogen) scale scores of all participants were recorded.

Children's Depression Inventory (CDI) Form

The CDI was designed by Kovacs in 1981.[8] The CDI is a 27-item self-report measure designed to measure depression symptom levels in children between the ages of 7 and 17. The questions in the scale were either read to the children or asked to be read by the children themselves and asked to choose the phrase that best suited them for the past two weeks. Each item is numbered 0, 1 or 2 points according to the severity of the symptom. The maximum total score is 54 points, and the pathological cut-off value is suggested as 19 points.[8] Higher scores indicate higher depressive symptom levels. The validity and reliability study of CDI for our country was performed by Öy in 1991.[9]

Screen for Child Anxiety Related Disorders (SCARED) Form

It is a brief self-report assessment designed to screen childhood anxiety disorders by Birmaher in 1999.[10] The SCARED form consists of a total of 41 items, is evaluated with Likert-type scoring, and both parent and child forms are available. In this study, the SCARED child form was used to determine the anxiety levels of the participants. Increasing scores on the scale indicate increased anxiety levels. The validity and reliability of the scale were evaluated for Türkiye by Çakmakçı,[11] and they reported that a score of 25 and above was considered a warning for anxiety disorder

Children Quality of Life Questionnaire form (KINDL: KINDerLebensqualitätsfragebogen)

The KINDL is a scale that has been developed by Ravens-Sieberer ve Bullinger for especially children and adolescents and evaluates the health-related quality of life.[12] The KINDL includes different self-report forms for different age groups. In this study, Kid-KINDL, which evaluates children between the ages of 8 and 12, and Kiddo-KINDL, which evaluates children and adolescents aged 13 and over, were used. Both KINDL scales are a 5-point Likert type scale which consists of 24 items and 6 dimensions including; physical well-being, emotional well-being, self-esteem, family, friends and school (school or kindergarten/nursery where daily activities are held). For each dimension, the scores given to the items are counted, and the score is calculated by scaling between 0 and 100. The scores of the dimensions are measured separately. Total quality of life score is obtained by the average of these six dimensions. Zero indicates the worst quality of life, while 100 indicates the best quality of life. The Turkish validity and reliability of the scale was performed by Eser et al.[13] in 2008.

Statistical Analysis

Data were analyzed with SPSS for Windows version 23.0 (SPSS Inc., Chicago, IL, USA). Mean, standard deviation and ratio values were used in descriptive statistics of the data. The significance of the difference between groups for categorical variables was evaluated with the Chi-Square test. Parametric tests were used in the analysis of normally distributed data, and non-parametric tests were used in data that did not show normal distribution. Mann Whitney U test was used for pairwise group comparisons and Kruskall Wallis test was used for group comparisons of more than two groups. Correlation of continuous variables (age, follow-up time, daily blood glucose measurement, HbA1c level) with score values was evaluated with Spearman Correlation test. Correlation coefficient between 0 and 0.3 was considered as weak correlation, between 0.3 and 0.7 as moderate correlation, and above 0.7 as strong correlation. $P<0.05$ was deemed to indicate statistical significance.

Ethical Issues

The local human research Ethics Committee approved the study and written informed consent was obtained from all participants' parents or guardians (approval number: 2017/279, date: 9/25/2017). The study was performed according to the Declaration of Helsinki.

Results

A total of 181 children or adolescents, 81 of whom were in the T1DM group and 100 in the control group, were evaluated for this study. The distribution of demographic characteristics and the mean scale scores of the groups are shown in Table 1. There was no significant difference between the

Table 1. The distribution of demographic characteristics and the mean scale scores of the groups

	Control group	T1DM group	p
Gender, n (%)			0.130[b]
Female	43 (43)	44 (54.3)	
Male	57 (57)	37 (45.7)	
Age (years)	12.4±2.1	13.1±2.4	0.094[c]
Age distribution, n (%)			
8-10 years	14 (14)	11 (13.6)	0.243
11-13 years	41 (41)	30 (37)	
14-16 years	44 (44)	32 (39.5)	
17-18 years	1 (1)	8 (9.9)	
Scales[a]			
CDI score	7.9±6.8	15.3±7.2	<0.001
SCARED score	14.7±13	23.6±11.9	<0.001
KINDL score	60±11.6	53.5±13.7	<0.001

[a]Values are given as mean±standard deviation; [b]Chi-square test; [c]Mann Whitney-U test; CDI: Children's depression inventory; SCARED: Screen for Child Anxiety Related Disorders; KINDL: KINDerLebensqualitätsfragebogen: Children Quality of Life Questionnaire- child form.

two groups in terms of age and gender distribution. Although the mean CDI and SCARED scores were statistically significantly higher in the T1DM group than in the control group, the mean KINDLE score was significantly lower. The CDI score was above the pathological cut-off point in 35 cases (43.2%) in the T1DM group and in 7 cases (7%) in the control group. The SCARED score was found above the pathological cut-off point in 33 cases (40.7%) in the T1DM group and in 16 cases (16%) in the control group.

The relationship between CDI, SCARED and KINDL scores and gender, duration of illness, mother's education, father's education, working status of the mother, working status of the father, type of insulin use, and person injecting insulin in the T1DM group are shown in Table 2. There was no significant correlation between CDI, SCARED and KINDLE scores and demographic characteristics in the T1DM group (all p>0.05). It was found that the CDI score was statistically significantly lower in the children and adolescents of unemployed fathers than the children whose fathers were employed, while the KINDL score was significantly higher (p=0.029 and p=0.014, respectively). When the working status of the father was evaluated, it was determined that all unemployed fathers were retired.

The correlation analyses between CDI, SCARED and KINDL scores and age, period of time after the diagnosis of diabetes, the number of blood glucose measurements per day, body mass index, and HbA1c level in the T1DM group are shown in Table 3. The mean HbA1c level in the T1DM group was 9.7±2.4%. While there was a weak positive correlation between HbA1c level and SCARED score value (p=0.016, r=0.267), no significant correlation was found between HbA1c level and CDI and KINDL scores (p=0.316 and p=0.154, respectively). There was no significant correlation between CDI, SCARED and KINDLE scores and age, period of time after the diagnosis of diabetes, the number of blood glucose measurements per day, and body mass index (all p>0.05).

The relationship between CDI, SCARED and KINDL scores and compliance with diabetic diet at home, compliance with diabetic diet outside the home, reason for not comply the diet outside the home in the T1DM group are shown in Table 4. It was determined that as compliance with diabetic diet at home decreased, there was a significant increase in the mean CDI score (p=0.005) and a significant decrease in the KINDL score (p=0.002). It was observed that KINDL score decreased significantly as compliance with the diabetic diet decreased outside the home (p=0.001). When the reason for not comply the diet outside the home is examined, children and adolescents with T1DM who were embarrassed in peer group had a significantly higher CDI score (p=0.001), and children and adolescents with T1DM who were forced to eat by peers had a significantly lower KINDL score (p<0.001).

Discussion

T1DM is one of the most important chronic diseases in childhood and should be evaluated not only with their physical consequences but also in terms of psychosocial support needs and the emotional and behavioral problems they may cause. Children and adolescents with T1DM frequently apply to outpatient clinics due to restrictive diet, treatment modality, acute and chronic complications, and unregulated blood sugar, and also sometimes these patients may require hospitalization. Thus, the psycho-social and emotional states of these children may deteriorate and their quality of life may decrease.[2,3]

In the present study, anxiety and depression symptoms and quality of life were evaluated in order to determine the psychosocial and emotional states of patients with T1DM. The results of children and adolescents with T1DM were compared with those of healthy children without any chronic disease. In our study, mean CDI and SCARED scores were significantly higher in the T1DM group than in the control group. The depression scale in 43.2% and the anxiety disorder scale in 40.7% of the cases were above the cut-off values in the T1DM group.

The rates of depression and anxiety in T1DM patients are higher than in healthy individuals.[14-17] Kovacs et al.[14] evaluated 92 newly diagnosed patients with T1DM between the ages of 8 and 13, and reported that 47.6% of the patients developed psychiatric disorders by the 10th year of the disease. In addition, it was stated that 26% of the cases developed major depressive disorder and 20% developed general anxiety disorder, the incidence of the disease was highest in the first year, and it was a specific risk factor for the development of depression in children with depression in the mother.[14] It has been shown that the rates of psychiatric disorders, especially somatic symptoms, sleep disorders, compulsions and depressive mood, are three times higher in adolescents with T1DM compared to healthy subjects, and it has been reported that 37% of the cases meet the DSM-IV psychiatric disorder criteria 10 years after the onset of the disease.[18, 19] In a multicenter study with diabetic teenagers between the ages of 10 and 21, it was found that 14% of the adolescents were mildly depressed and 8.6% were moderately/severely depressed, and adolescence was a risk factor for the development of depression.[20] In a different study conducted on adolescents with T1DM, psychopathology, quality of life, and parental attitudes were evaluated. Psychiatric disorders were reported

Table 2. Relationship between demographic characteristics and CDI, SCARED and KINDL scales in T1DM group

	n	CDI score Mean±SD	SCARED score Mean±SD	KINDL score Mean±SD
Gender				
Female	44	14.9±7.4	24.5±11.3	54.1±12.6
Male	37	15.7±6.9	22.5±12.6	52.7±15
p		0.594	0.556	0.428
Duration of illness				
≤3years	51	15.1±6.5	22.2±9.5	53.1±13.9
>3 years	30	15.5±8.3	25.9±15	54.2±13.5
p		0.98	0.47	0.62
Mother's education				
Primary School	40	15.2±5.9	24.1±10.8	50.6±9.6
Middle School	18	14.2±7.4	18.7±10.3	58.4±17.2
High School	14	17.1±8.6	24±12.1	54.1±16
College-University	3	15.3±6.4	20±7	61.7±11.2
Did not go to school	6	14.7±11.6	35.5±17.7	52±18.5
p		0.805	0.110	0.434
Father's education				
Primary School	24	14.5±6.3	21.3±8.7	54.4±13.4
Middle School	25	14.5±6.5	24.6±14.7	56.2±14.2
High school	29	16.5±8.6	25±11.9	50.8±13.5
College- university	3	16.3±2.9	19±7.5	48.3±13.6
p		0.371	0.769	0.360
Working status of the mother				
Working	17	17.2±8.5	26.1±10.9	54.4±14.5
Not working	64	14.8±6.7	22.9±12.1	53.2±13.5
p		0.138	0.210	0.880
Working status of the father				
Working	76	15.7±7.1	23.3±11.7	52.6±13.5
Not working	5	8.4±4.7	27.6±14.5	66.8±8.9
p		0.029	0.569	0.014
Insulin injection form				
Four times SC/per day	70	15.6±6.6	24.1±11.5	52.8±13.6
Pump	11	6.6±12.9	11.5±19.9	57.6±13.4
p		0.24	0.11	0.25
Who does the insulin injection				
Mother	16	14.1±9.1	29.4±15.4	54.6±16.6
Child	65	15.5±6.7	22.1±10.5	53.2±13
p		.454	0.063	0.826

CDI: Children's depression inventory; SCARED: Screen for Child Anxiety Related Disorders; KINDL: KINDerLebensqualitätsfragebogen: Children Quality of Life Questionnaire- child form. SC: subcutaneously; T1DM: Type 1 Diabetes Mellitus.

in 68% of the cases, the most common being adjustment disorder, social/specific phobia, major depressive disorder/dysthymia, generalized anxiety disorder, and attention deficit hyperactivity disorder.[17]

Different results have been reported in studies evaluating the quality of life of children and adolescents with T1DM. There are studies in the literature showing that the quality of life of children and adolescents with T1DM is not affected and that it is similar to healthy children.[17, 21, 22] Laffel et al.[23] evaluated 100 T1DM patients using the 'Pediatric Quality of Life Inventory (PedsQL)' in their study and regarding children and adolescents with T1DM; they reported that despite frequent insulin injections, frequent snack requirements, and frequent blood glucose monitoring, patients can have a quality of life similar to that of healthy children.

Table 3. The correlation analyzes of the anxiety, depression and quality of life score results with demographic characteristics in the T1DM group

Characteristics of T1DM	a	CDI score	SCARED score	KINDL score
Age				
	r	-0.056	-0.134	0.080
	p	0.617	0.232	0.480
Period of time after the diagnosis of T1DM				
	r	-0.114	-0.023	0.091
	p	0.310	0.836	0.417
The number of blood glucose measurements per day, (n)				
	r	0.084	0.073	-0.101
	p	0.457	0.515	0.369
Body mass index (g/m^2)				
	r	-0.050	-0.121	0.021
	p	0.660	0.282	0.854
HbA1c (%)				
	r	0.113	0.267	-0.160
	p	0.316	0.016	0.154

CDI: Children's depression inventory; SCARED: Screen for Child Anxiety Related Disorders; KINDL: KINDerLebensqualitätsfragebogen: Children Quality of Life Questionnaire- child form. T1DM: Type 1 Diabetes Mellitus. [a]Spearman Correlation tests.

Table 4. Relationship between dietary compliance and CDI, SCARED and KINDL scores in children with Type 1 Diabetes Mellitus

	n (%)	CDI score Mean±SD	SCARED score Mean±SD	KINDL score Mean±SD
Compliance with diabetic diet at home				
It always complies	6 (7.4)	9.3±2.7	21.2±18.6	72.8±12.1
Often complies	30 (37)	16.4±6.8	24±10	53.2±12.4
Sometimes it complies	31 (38.3)	13.4±7.3	22.5±12	53.4±12.4
It never complies	14 (17.3)	19.5±6.2	26±12.8	46.1±12.8
p		0.005	0.777	0.002
Compliance with diabetic diet outside the home				
It always complies	1 (1.2)	11	22	68
Often complies	17 (21)	11.5±7.3	25.7±13.3	63.9±12.1
Sometimes it complies	41 (50.6)	15.5±7.5	22.5±13.5	51.4±13.8
It never complies	22 (27.2)	18±5.3	24±7	48.6±10.5
p		0.059	0.773	0.001
Reason for not comply the diet outside the home				
Feel hungry	25 (30.9)	11.2±6.7	26.2±13.2	61.9±13
Being embarrassed in the peer group	9 (11.1)	19.1±2.8	23.2±10.3	53±6.5
Being forced to eat by the peer group	46 (56.8)	16.8±7.1	22.2±11.4	48.8±12.9
p		0.001	0.288	<0.001

CDI: Children's depression inventory; SCARED: Screen for Child Anxiety Related Disorders; KINDL: KINDerLebensqualitätsfragebogen: Children Quality of Life Questionnaire- child form. T1DM: Type 1 Diabetes Mellitus.

On the contrary, in a study investigating the quality of life perceptions of children and adolescents with T1DM and their parents, similar to our study, it was shown that the quality of life of children and adolescents with T1DM was lower.[24]

Different results have been reported about the effects of gender on anxiety, depression and quality of life in children and adolescents with T1DM. Although some studies have reported that the probability of psychiatric diagnosis in adolescent girls with T1DM is higher than in boys; In some studies, it has been shown that there is no difference in terms of both genders.[18, 19] In the evaluation of quality

of life in children with T1DM, there are studies reporting that the quality of life is similar for both genders or that the quality of life is better for boys than girls.[24, 25] In our study, no significant difference was found between boys and girls with T1DM in terms of anxiety, depression and quality of life scale scores. Grey et al.[26] followed 142 children with T1DM for 2 years after their diagnosis and reported that the mean depression score of the patients were higher in the second year of the disease compared to the first year. In our study, we compared the duration of illness as less than 3 years and above, we did not find a significant correlation between scale scores and age and duration of illness.

The family situation plays a central role in the management of juvenile type 1 diabetes.[27] In our study, patients whose fathers were unemployed (retired) had lower depression and higher quality of life scores than patients whose fathers were employed. The fact that the fathers of children and adolescents with T1DM are at home may be the result of spending more time with their children and thus establishing a closer relationship with their children. Especially during the illness, the support of the father may increase the child's emotional adaptation and quality of life. In our study, although the anxiety scores of children and adolescents with T1DM who received insulin injections by their mothers were higher than those who injected insulin themselves, no statistically significant difference was found. Compliance with treatment and taking responsibility for the treatment of children and adolescents with T1DM who administer insulin by themselves may be an indication that they are able to cope with the disease process. To the best of our knowledge, we have not found any study evaluating this relationship in the literature. Although T1DM patients using insulin pumps had lower depression and anxiety scores compared to T1DM patients who injected four times a day, there was no statistically significant difference. This may be due to the fact that the use of an insulin pump is an easier method for the patient. The lack of statistical significance may be due to the small number of patients using insulin pumps in our study.

The relationship between depression and metabolic control of diabetes still remains unclear.[28] In the literature, besides studies reporting that poor metabolic control increases the risk of depression and psychiatric problems in children with T1DM, there are also studies reporting that no relationship was found between metabolic control and depression.[19, 29, 30] Similarly, some studies have reported that there is no relationship between HbA1c level and quality of life in children with T1DM, while others report that low HbA1c level may be associated with better quality of life.[22, 24, 25] Although there was no significant correlation between HbA1c level and depression and quality of life scale scores

in the T1DM group in our study, there was a weak positive correlation between anxiety scale scores.

As dietary compliance deteriorates in children and adolescents with T1DM, the rates of mental illness may increase, or the presence of mental illness may be the cause of dietary non-compliance.[17] In our study, as the compliance with diabetic diet of the patients with T1DM decreased, the depression and anxiety scale scores increased, while the quality of life scale scores decreased. In a study evaluating compliance with diabetic diet in children and adolescents with T1DM, it was shown that 32% of the cases had good compliance to diet, 38% had moderate compliance and 30% had poor compliance, and also it was reported that there was a significant positive correlation between the presence of mental illness and non-compliance with a diabetic diet.[17]

Among the reasons why patients did not comply with their diabetic diets in our study; being embarrassed of their peers and being forced by their peers to eat foods other than their diet. Depression rate is highest among those who do not comply with their diets outside the home because of being embarrassed from their peers, and patients who were forced to eat foods other than their diets by their peers had the lowest quality of life score. This situation reveals the importance of peer interaction in children and adolescents with T1DM. For this reason, diabetes education should not only be provided to children and adolescents with diabetes and their parents but also to the whole society through schools and education channels.

Limitations of Study

The limitations of our study are that it is a cross-sectional and single-center study. The selection of participants included in the study was on a voluntary basis. Planning future studies prospectively and performing correlation analyses may provide more reliable information.

In conclusion, depression and anxiety are more common in children and adolescents with T1DM compared to healthy children and adolescents, and negatively affect their quality of life. In addition, children and adolescents with T1DM are at risk for psychosocial adjustment problems. In addition to the medical treatment of diabetes in these patients, psychosocial support should be provided from the diagnosis of the disease in order to prevent future psychological problems and to improve their quality of life. Fathers should be encouraged to be more involved in the treatment process, as they are effective in the psychosocial adjustment process of children and adolescents with T1DM. Peer interaction is very important in patients' compliance to their diet and treatment.

Conclusion

Quality of life is lower, and levels of depression and anxiety are higher in children with T1DM compared to healthy children. Psychosocial support should be provided from the moment of diagnosis in order to improve the psychosocial problems and quality of life of children with T1DM. As the compliance of patients with T1DM with the diabetic diet decreases, depression and anxiety scale scores increase, while quality of life scale scores decrease. One of the important reasons for non-compliance with the diet is the interaction of patients with T1DM with their peers. Therefore, diabetes education should be provided not only to children and adolescents with diabetes and their parents but also to the whole society through schools and educational channels.

Disclosures

Ethics Committee Approval: The Bakirkoy Sadi Konuk Training and Research Hospital human research ethics committee approved the study (date: 25.09.2017, number: 2017/279).

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