



# Health-related quality of life among Turkish children and adolescents with type 1 diabetes

Turgay Aydın and Cengiz Kara

Department of Pediatric Endocrinology, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey



## Introduction

Health-related quality of life (HRQOL) is defined as a patient's subjective perception related to the satisfaction with own health. There is not enough data on HRQOL of children and adolescents with type 1 diabetes (T1D) living in Turkey. The aim of our study is to evaluate HRQOL in children and adolescents with T1D compared with healthy controls in Turkey, and to identify HRQOL determinants.

## Methods

### Participants

A total of 133 children and adolescents with T1D aged 6-18 (62 boys and 71 girls) were recruited from two sites: the Pediatric Endocrinology and Diabetes Clinic at the Ondokuz Mayıs University Hospital and the primary and high schools from three central districts of Samsun. In addition, a total of 133 matched healthy peers participated as controls. They were recruited from among classmates of the subjects with T1D.

### Measures

Generic HRQOL both of subjects with T1D and healthy controls was measured using the KINDL (KINDER Lebensqualitätsfragebogen: children quality of life questionnaire), which are standardized into Turkish. Kid-KINDL and Kiddo-KINDL questionnaires were applied for children aged 6-11 years and for adolescents aged 12-18 years, respectively.

The KINDL questionnaire takes a generic approach and comprises 24 items to which the participants are asked to respond on a 5-point Likert scale (never, seldom, sometimes, often, all the time). The 24 items cover six dimensions: physical well-being, emotional well-being, self-esteem, family, friends (social contacts), and school (everyday functioning). The subscales of these six dimensions were combined to form a total score, in accordance with the manual. The subscale scores and the total score were calculated so that a higher score corresponded to a higher HRQOL.

In addition, the patients completed a second questionnaire for demographic and disease information. The patients' hospital records were also examined to identify possible factors affecting HRQOL including age, gender, duration of diabetes, HbA1c, and the frequency of hypoglycemia and diabetic ketoacidosis (DKA).

### Statistical analyses

The descriptive statistics are reported as percentages or means and SDs. Total and sub-dimension HRQOL scores of the subjects with T1D were compared with those of healthy controls. Correlation analyses were used to assess associations of medical determinants and HRQOL. Multiple regression analysis was used to analyze the influence of clinical and demographic variables on HRQOL. All analyses were performed with SPSS software.  $P < 0.05$  was considered statistically significant.

**Table 1. Demographic characteristics of the participants**

Characteristics	Subjects with T1D	Healthy controls
Age (yr)	12.5±2.8	12.4±2.9
Girls (%)	54	54
Adolescents (%)	65	65

## Results

Demographic characteristics of the participants are shown in Table 1. Table 2 summarizes clinical characteristics of the subjects with T1D.

Total HRQOL scores of the patients were lower than those of healthy peers ( $p=0.044$ ). Sub-dimension scores including physical well-being, emotional well-being and self-esteem were lower in the patient group compared to the control group ( $p=0.008$ ,  $0.032$  and  $0.003$ , respectively). However, there were no statistically significant differences regarding family, school and friend sub-dimensions between two groups (Table 3).

Total HRQOL scores of both diabetic and healthy adolescents (aged 12-18) were poorer than those of children (aged 6-11) ( $p=0.01$ , Tables 4 and 5).

Lower HRQOL scores were significantly associated with longer duration of diabetes, older age (being adolescent) and experience of DKA (Table 6).

## Conclusions

Our study showed that T1D among Turkish children and adolescents had negative impact on physical and emotional well-being, rather than social well-being.

Adolescents' HRQOL scores (especially sub-dimensions of friends and school) compared to children were lower whether or not they have diabetes.

HRQOL was related to older age, duration of diabetes and experience of DKA, but not to gender, metabolic control and hypoglycemia in our population.

**Table 2. Clinical characteristics of the subjects with T1D**

Characteristics	Subjects (n:133)
Duration of diabetes (yr)	4.3±2.7
Medical follow-up	
Regular ( $\geq 3$ per year)	112 (85%)
Irregular (1 – 2 per year)	21 (15%)
HbA1c (%)	9.1±2.0
Metabolic control level	
Good ( $HbA1c \leq 7.5$ )	36 (27%)
Moderate ( $7.5 < HbA1c \leq 9.0$ )	34 (26%)
Poor ( $HbA1c > 9.0$ )	63 (47%)
DKA at the time of diagnosis	48 (36%)
Number of hospitalization due to DKA after diagnosis	
0	102 (77%)
1	21 (16%)
2	10 (7%)
Frequency of hypoglycemia	
< 1 per month	28 (21%)
1 – 3 per month	46 (35%)
> 3 per month	59 (46%)
Microvascular complications	
Retinopathy	0
Neuropathy	0
Nephropathy	
Insipient (microalbuminuria)	7 (5%)
Overt	0
Insulin regimen	
Multiple daily injections ( $\geq 4$ )	131 (98.5%)
Pump therapy	2 (1.5%)
Nutritional management	
Fixed meal plan	62 (47%)
Carbohydrate counting	49 (37%)
Irregular	22 (16%)

**Table 3. Comparison of HRQOL scores of patients with T1D and healthy controls**

Sub-dimension of health-related quality of life	Patient group (n:133)	Control group (n:133)	P value
Physical well-being	70.3±13.7	74.9±13.1	<b>0.008</b>
Emotional well-being	74.1±11.7	77.0±13.7	<b>0.03</b>
Self-esteem	71.4±13.7	76.7±13.9	<b>0.003</b>
Family	81.3±12.4	81.5±13.5	0.8
Friends	78.6±13.7	79.2±13.2	0.8
School	74.5±14.0	73.7±13.3	0.5
Total score	75.0±8.7	77.2±9.8	<b>0.044</b>

**Table 4. Comparison of HRQOL scores of patients with T1D according to age group**

Sub-dimension of health-related quality of life	Child patient group (n:46)	Adolescent patient group (n:87)	P value
Physical well-being	70.9±16.0	70.0±12.4	0.2
Emotional well-being	76.6±10.8	72.7±11.9	0.1
Self-esteem	72.6±13.1	70.6±14.0	0.5
Family	83.2±10.9	80.2±13.0	0.3
Friends	84.3±12.1	75.5±13.6	<b>0.001</b>
School	78.2±12.2	72.8±14.4	<b>0.02</b>
Total score	77.7±8.1	73.6±8.8	<b>0.01</b>

**Table 5. Comparison of HRQOL scores of healthy subjects according age group**

Sub-dimension of health-related quality of life	Child control group (n:46)	Adolescent control group (n:87)	P value
Physical well-being	76.0±14.1	74.3±12.1	0.5
Emotional well-being	79.3±12.3	75.7±14.2	0.2
Self-esteem	80.6±11.7	77.6±14.6	0.3
Family	83.8±9.5	80.2±14.5	0.4
Friends	84.0±11.1	76.6±13.6	<b>0.002</b>
School	77.0±11.3	71.8±14.0	<b>0.03</b>
Total score	80.1±8.2	75.6±10.1	<b>0.01</b>

**Table 6. Correlations between sub-dimensions of HRQOL and different variables**

	Gender	Age	Diabetes Duration	DKA	HbA1c level	Hypoglycemia
Physical well-being	R	-,150	-,152	-,022	-,218*	-,131
	P	,085	,080	,798	,012	,132
Emotional well-being	R	-,075	-,164	-,014	,040	-,143
	P	,394	,060	,872	,651	,100
Self-esteem	R	,014	-,112	,033	-,062	-,073
	P	,872	,198	,703	,475	,402
Family	R	,093	-,107	-,211*	,081	-,170
	P	,286	,222	,015	,354	,050
Friends	R	,071	-,282**	-,016	,026	-,165
	P	,417	,001	,859	,769	,058
School	R	,083	-,249**	-,028	,019	-,056
	P	,342	,004	,751	,830	,523
Total score	R	-,106	-,258**	-,020	-,053	-,167
	P	,224	,003	,817	,547	,054

\*  $p < 0.05$ , \*\*  $p < 0.01$