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The Validity and Reliability of the Turkish Pediatric Quality of Life Inventory for Children 13-18 Years Old

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Abstract

Objective: *The Pediatric Quality of Life Inventory (PedsQL) is a modular instrument that measures health related quality of life, and investigates the physical and psychosocial functioning, unrelated to health, of children 2-18 years old. In this study, the objective was to evaluate the validity and reliability of the Turkish PedsQL in adolescents 13-18 years old.*

Method: *The study included 230 adolescents and 230 parents. The subjects were separated into 3 groups: 1. Healthy; 2. Has an acute disease; 3. Has a chronic disease. The reliability and the validity of PedsQL were computed.*

Results: *The internal consistency of the scale (Cronbach's alpha coefficient) was 0.82 for the child self-report and 0.87 for the parent proxy report. The PedsQL scores of both the child self-report and parent proxy report showed a statistically significant low to medium level of inversely proportional correlation with many indicators of morbidity and illness burden. There was a statistically significant and direct proportional correlation between the child self-report and parent proxy report scores.*

Conclusion: *The PedsQL is valid and reliable for evaluating the quality of life of Turkish adolescents 13-18 years old.*

Key Words: *Health related quality of life, adolescent, Pediatric Quality of Life Inventory PedsQL*

INTRODUCTION

Quality of life had been defined as an individual's perceptions of their position in life, within the context of their cultural and value systems (Spilker, 1996). Measuring quality of life with various psychological tests is important for determining patient quality of life before and after treatment, evaluating the effectiveness of medical interventions and side effects, guiding health politics, and in medical research. For this reason many health-related quality of life scales were developed for adults, such as WHOQOL-100, WOQOL-BREF, and SF-36. The reliability and validity of these scales have been studied in Turkey (Tazaki et al., 1998; Hamingway et al., 1997; Koçyiğit et al., 1999; Fidaner et al., 1999; Eiser and Morse, 2001a).

As it is known, treatment, evaluation, and treatment modalities to illnesses are different for adolescents, children, and adults. Assessment of the quality of life is also different. This difference led to the development of various quality of life scales related to health that can be used for adolescents.

Physical, social, and spiritual wellness can be defined differently, and thus the illness process can be experienced differently. It should be known that there are objective and subjective domains when evaluating quality of life (Testa and Simonson, 1996; Schmeck and Poustka, 1997). Two people who are objectively in the same situation might subjectively perceive their quality of lives differently. In objective evaluation the targets are life conditions, environment and school functionality, and social relationships (Lehman, 1988; Mogotsi et al., 2000). In subjective evaluation, the physical, emotional, and social functionality of the child and adolescent are taken in to account (Wallender et al., 2001). As the individual reflects his own perception related to his condi-

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tion, some researchers place greater value on subjective evaluation (Spilker, 1996). Some researchers believe that the parent forms are more valid as they lead to objective conclusions. For the optimum understanding of the quality of life of the child and adolescent, the best solution is to consider parent and child/adolescent evaluations together (Eiser, 1997).

In general, quality of life scales (QLSs) that can be used with children and adolescents can be divided into 2 groups; QLSs developed for a specific illness and QLSs that measure general well being (Eiser and Morse, 2001a).

General QLSs can be used with both ill and healthy children/adolescents, and can therefore be used in community health studies with large samples. General QLSs have low sensitivity, are generally lengthy, and reflect small changes in children/adolescents in comparison to QLSs that are specific for an illness (Eiser and Morse, 2001a).

QLSs specific for an illness are only valid in the assessment of that specific illness, which increases the internal validity of the scale, as well as its sensitivity and specificity (Eiser and Morse, 2001a). QLSs specific for an illness are adequate in comparing different treatment modalities, evaluating treatment approaches, and comparing the effectiveness and side effects of different treatments (Eiser, 1997). These are the advantages that QLSs specific for an illness have over general QLSs. Their weaknesses are the lack of a QLS for every illness and that they cannot be administered to children/adolescents with more than one illness (Eiser and Morse, 2001a). General QLSs are used in such situations (Eiser and Morse, 2001b).

This study aimed to test the reliability and validity of the Turkish version of the Pediatric Quality of Life Inventory (PedsQL), which is a widely used illness-specific QLS in other countries, with adolescents 13-18 years old.

PROCEDURE

Sample

The study was conducted in a pediatric clinic, a primary school, and a high school between October 2002 and January 2003. The subjects were separated into 3 groups: 1. Healthy; 2. Has an acute disease; 3. Has a chronic disease. Adolescents in the healthy group were chosen from schools. The acute disease group was composed of voluntary adolescents who presented to the pediatric clinic, and the chronic disease group was composed of voluntary adolescents who presented to the pediatric nephrology, allergy-immunology, endocrinology, and hematology departments.

Exclusion criteria for all 3 groups were uneducated parents and lack of mental competency of the adolescent to complete the scale. Mental capacity of the adolescents was evaluated by the clinician, based on their performance completing the scale. A structured intelligence test was not applied due to time constraints. All adolescents that met any of the exclusion criteria were excluded from the study. The healthy group included 93, the acute disease group 72, and the chronic disease group included 65 adolescents. Of the 230 parents that completed the parent scales, 142 were mothers and 88 were fathers. The person accompanying the adolescent to the hospital was considered to be suitable to complete the scale. If both parents were contacted, we preferred the mother to complete the scale, as in the original study. All the adolescents and their parents were informed about the study and were gave written informed consent.

Students

Schooled-based participants came from a primary school and a high school in the city center with populations of mixed socioeconomic levels. The schools were chosen according to the age groups determined by the Ministry of Education. PedsQL was administered to 93 students chosen by random sampling of students in grades 8-11.

Patients

Adolescents who presented to Kocaeli University Pediatrics Department, general pediatrics, nephrology, endocrinology, allergy-immunology, and hematology services, and their parents were included in the study. PedsQL was administered to the adolescents and their parents. There were 72 adolescents in the acute disease group and 65 in the chronic disease group. The acute disease group included adolescents that presented with new symptoms, such as coughing, nausea, sore throat, and head ache. The chronic disease group included 5 (7.8%) adolescents with a nephrologic disease, 34 (53.1%) with an endocrine disease, 16 (25.0%) with an allergic-immunological disease, and 2 (3.1%) with a hematological disease. In addition, 7 adolescents (10.9%) with such illnesses as epilepsy, dermatomiositis, psoriasis, and migraine were included in the chronic group.

The Pediatric Quality of Life Inventory (PedsQL)

PedsQL is a quality of life scale that was developed in

Table I. Internal consistency of the adolescent and parent forms.

Scale	Internal Consistency*	
	Adolescent Form	Parent Form
PHTS	0.758	0.826
EFS	0.647	0.711
SOFC	0.718	0.789
SFC	0.602	0.730
PSTP	0.794	0.824
STC	0.829	0.877

*Cronbach alpha coefficient.
PHTS: physical health total score; EFS: emotional functioning score; SOFC: social functioning score;
SFC: school functioning score; PSTP: psychosocial health total score; STC: scale total score.

1999, following 15 years of work, that aims to measure the health related quality of life of children/adolescents aged between 2 and 18 years (Varni et al., 1999). The scale includes items on physical health, emotional functionality, and social functionality, which are defined as the characteristics of health by the World Health Organization. Psychosocial health total score (PSTP), which includes the scale total score (STC), physical health total score (PHTS), and emotional, social, and school functionality scores, is calculated (Varni et al., 2001). PedsQL is a 23-item general QLS that can be used in both hospitals and schools with healthy and ill children/adolescents. Item scores range from 0 to 100. The scores are calculated as follows: never-100, rarely-75, sometimes-50, frequently-25, and always-0. Higher PedsQL total scores indicate better health related quality of life (Varni et al., 2001). The most important characteristics of the scale is that it is short, can be completed in 5-10 min, it is administered by a researcher, and it is easy to score (Eiser and Morse 2001a; Varni et al., 2001). In evaluating the reliability of PedsQL, an internal consistency analysis was conducted and the Cronbach's alpha coefficient was 0.93. For the validity, construct and clinical validity were examined (Varni et al., 1999; Eiser et al., 2000). Many studies showed that PedsQL has high internal consistency, and is reliable and sensitive (Varni et al., 1999; Varni et al., 2001; Varni et al., 2002a; Varni et al., 2002b; Varni et al., 2002c; Varni et al., 2003a; Varni et al., 2003b,). The reliability and validity of the Turkish version of PedsQL has been studied in children/adolescents 2-18 years old (Üneri, 2005; Çakın Memik, 2005).

The Sociodemographic Information Form

A 21-item sociodemographic information form was developed by the researchers and was completed by parents. The form collected sociodemographic data, and data concerning the child's illness, including the level of the effect of disease on the adolescent in the last 30 days, the number of school days missed, number of days the parent missed work, the number of days the daily activity of the parent was restricted, the level of the effect on the parent's job performance and social relationships, and the degree of the effect on the economic status of the family.

Procedure

Written permission was given by James Varni to conduct the Turkish reliably and validity study of the PedsQL for adolescents aged between 13 and 18 years. The study was approved by ethics committee. The PedsQL for adolescents aged 13-18 years was translated into Turkish by 2 research assistants and 1 instructor working in the Department of Pediatric Mental Health, and was revised by another instructor working in the same department. The revised version was back translated by a research assistant whose English was advanced and the back translation was compared to the original scale by an instructor. As there were no important changes in meaning, the scale was administered to 15 adolescents and their parents. The research team reviewed and corrected the items reported to be incomprehensible or lacking content. Following this phase, the scale was printed and used in the present study.

To include students in the study the consent of the Ministry of Education, administers of the chosen schools, and teachers were obtained. PedsQL was administered by at least 2 researchers at the same time in all classes. After the students completed the scales they were given the parent forms to bring home. The parent forms were collected after approximately 1 week. The adolescents with acute and chronic diseases completed the form in the hospital and the parent that accompanied the adolescent to the hospital completed the parent form.

Data Analysis

The data were evaluated with SPSS for Windows v.10.0 (Statistical Package for Social Sciences, Chicago,

Table II. Total score correlations and PedsQL items according to the groups.

Items	Adolescent			Parent		
	r#			r#		
	Healthy	Acute	Chronic	Healthy	Acute	Chronic
Items related to physical health						
1. Walking more than one block.	0.567**	0.417**	0.580**	0.674**	0.660**	0.629**
2. Running.	0.620**	0.477**	0.611**	0.663**	0.686**	0.600**
3. Doing sports or exercise.	0.482**	0.483**	0.532**	0.553**	0.582**	0.604**
4. Lifting something heavy.	0.466**	0.367**	0.527**	0.492**	0.463**	0.675**
5. Bathing or showering alone.	0.208*	0.321**	0.621**	0.414**	0.570**	0.588**
6. Doing chores around the house.	0.458**	0.375**	0.392**	0.437**	0.637**	0.599**
7. Having aches or pains.	0.588**	0.460**	0.472**	0.541**	0.476**	0.539**
8. Low energy.	0.590**	0.528**	0.492**	0.474**	0.700**	0.585**
Items related to emotional functionality						
1. Feeling afraid or scared.	0.571**	0.479**	0.529**	0.577**	0.535**	0.395**
2. Feeling sad or blue.	0.587**	0.611**	0.550**	0.546**	0.610**	0.655**
3. Feeling angry.	0.536**	0.417**	0.330**	0.430**	0.525**	0.487**
4. Trouble sleeping.	0.320**	0.393**	0.367**	0.435**	0.367**	0.606**
5. Worrying about what will happen.	0.593**	0.520**	0.524**	0.593**	0.515**	0.493**
Items related with social functionality						
1. Trouble getting along with peers.	0.476**	0.496**	0.349**	0.598**	0.505**	0.470**
2. Other kids not wanting to play with him or her.	0.467**	0.286*	0.313*	0.405**	0.465**	0.530**
3. Getting teased by other children.	0.469**	0.316**	0.390**	0.331**	0.629**	0.478**
4. Not able to do things that other children his or her age can do.	0.443**	0.446**	0.608**	0.374**	0.712**	0.680**
5. Keeping up when playing with other children.	0.564**	0.391**	0.516**	0.516**	0.475**	0.626**
Items related with school functionality.						
1. Difficulty concentrating in school.	0.473**	0.521**	0.645**	0.529**	0.644**	0.619**
2. Forgetting things.	0.612**	0.397**	0.515**	0.346**	0.497**	0.401**
3. Difficulty keeping up with schoolwork.	0.712**	0.653**	0.449**	0.509**	0.614**	0.691**
4. Missing school due to not feeling well.	0.222*	0.513**	0.266*	0.221*	0.329**	0.572**
5. Missing school due to doctor or hospital appointment.	0.269**	0.485**	0.495	0.344**	0.279*	0.333**

#Pearson's Correlation Test *P < 0.05 **P < 0.01

IL). In the evaluation of the data, in addition to the descriptive statistics (mean, standard deviation), one-way ANOVA (post-hoc Tukey HSD test) was used in the comparison of quantitative data means of more than 2 groups and the student's t-test was used for comparison of binary groups. Correlation analyses between the param-

Table III. PedsQL mean scores according to groups.

	PEDSQL	Diagnosis										
		Healthy		Acute		Chronic		Total		Statistical test*		
		Ort	SD	Ort	SD	Ort	SD	Ort	SD	F	p	Post-hoc Tukey
Adolescent	PHTS	79.92	13.14	77.69	12.96	72.84	19.66	72.22	15.43	4.195	0.016	(H > Ch)
	EFS	71.93	16.40	67.36	17.84	68.31	19.23	69.48	17.73	1.556	0.213	_
	SOFC	91.56	11.86	87.38	16.27	87.77	14.66	89.18	14.23	2.218	0.111	_
	SFC	76.29	12.96	71.28	17.61	72.25	15.50	73.62	15.34	2.503	0.084	_
	PSTP	79.94	11.28	75.39	11.92	76.17	13.41	77.45	12.55	3.203	0.042	(H > A)
	STC	79.94	10.84	76.17	11.31	74.82	13.17	77.31	11.87	4.138	0.017	(H > Ch)
Parent	PHTS	79.92	14.84	70.87	20.62	71.54	23.54	74.42	19.84	5.607	0.004	(H > Ch, H > A)
	EFS	75.48	15.11	65.70	19.03	67.90	21.38	70.30	18.73	6.531	0.002	(H > Ch, S > A)
	SOFC	92.09	12.14	85.42	19.99	81.13	23.64	86.91	18.99	7.053	0.001	(H > Ch)
	SFC	87.81	12.74	78.24	18.74	75.28	21.33	81.44	18.09	11.260	0.001	(H > Ch, H > A)
	PSTP	83.86	10.17	75.40	14.82	74.18	17.16	78.48	14.56	11.798	0.001	(H > Ch, H > A)
	STC	82.51	10.69	73.82	15.26	73.05	17.48	77.12	14.95	11.106	0.001	(H > Ch, H > A)

*One-way variance analysis (ANOVA).
**Only statistically significant ones are presented.
PHTS: physical health total score; EFS: emotional functioning score; SOFC: social functioning score; SFC: school functioning score; PSTP: psychosocial health total score; STC: scale total score.
H: healthy; A: acute; Ch: chronic.

eters were conducted with Pearson's correlation analysis. The internal consistency of the scale was calculated with the Cronbach's alpha method. The level of significance was determined to be $P \leq 0.05$ within a 95% CI.

FINDINGS

General Findings

PedsQL was administered to 230 children aged between 13 and 18 years. The parent forms were completed by 230 parents, 142 (62.7%) mothers and 88 (38.3%) fathers. Adolescent group distribution was as follows: 40.4% were in the healthy group, 31.3% in the acute disease group, and 28.3% in the chronic disease group.

Of the adolescents, 127 (55.2%) were female and 103 were male (44.8%), the mean age of the sample was 14.85 years (SD: 1.38 years), and there were no age differences between the 3 groups ($P > 0.05$). When the distribution of the diagnoses was evaluated according to gender, the ratio of males was statistically lower in the acute disease group in comparison to the chronic disease group ($P < 0.05$).

When the educational status of the parents was evaluated, it was found that 46.1% were primary school graduates, 30.9% were high school graduates, and 7% were university graduates; there were no statistical differences between diagnostic groups in terms of the educational status of the parents ($P > 0.05$). There were also no differ-

Table IV. Correlations between disease and disease burden predictors and PedsQL scores in the acute and chronic disease groups.

Items	Acute							Chronic						
	r#							r#						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Adolescent														
PHTS	–0.071	–0.029	–0.021	–0.226	–0.127	–0.088	–0.328**	–0.265*	–0.599**	–0.375*	–0.498**	–0.239	–0.403**	–0.242
EFS	–0.139	–0.180	–0.088	–0.110	–0.184	–0.049	–0.142	–0.068	–0.128	–0.004	–0.267	0.114	–0.095	0.048
SOFC	–0.233	–0.356**	–0.087	–0.209	–0.440**	–0.194	–0.339**	0.049	–0.002	–0.178	–0.279	0.070	–0.100	0.106
SFC	–0.399**	–0.280*	–0.174	0.067	–0.362**	–0.207	–0.246*	–0.223	–0.405**	–0.257	–0.399**	0.018	–0.165	–0.177
PSTP	–0.343**	–0.358**	–0.159	–0.170	–0.425**	–0.193	–0.318**	–0.098	–0.213	–0.184	–0.362*	0.095	–0.144	0.009
STC	–0.284*	–0.277*	–0.127	–0.213	–0.366**	–0.179	–0.363**	–0.215	–0.485**	–0.311	–0.551**	–0.073	–0.317*	–0.116
Parent														
PHTS	–0.327**	–0.226	–0.508**	–0.089	–0.304*	–0.416**	–0.296*	–0.232	–0.469**	–0.233	–0.529**	–0.250	–0.312*	–0.180
EFS	–0.405**	–0.145	–0.100	–0.083	–0.360**	–0.357**	–0.220	–0.317*	–0.187	0.081	–0.315*	–0.240	–0.082	–0.098
SOFC	–0.409**	–0.259*	–0.307	–0.129	–0.381**	–0.504**	–0.265*	–0.026	0.009	–0.167	–0.193	–0.045	–0.086	0.068
SFC	–0.501**	–0.513**	–0.129	–0.276*	–0.437**	–0.419**	–0.429**	–0.256	–0.467**	–0.242	–0.580**	–0.179	–0.277*	–0.201
PSTP	–0.576**	–0.356**	–0.220	–0.186	–0.513**	–0.545**	–0.374**	–0.274*	–0.221	–0.099	–0.387**	–0.192	–0.154	–0.052
STC	–0.515**	0.327**	–0.377*	–0.159	–0.464**	–0.538**	–0.373**	–0.293*	–0.376**	–0.205	–0.520**	–0.252	–0.253*	–0.121

Pearson's correlation test. *P < 0.05, **P < 0.01.
PHTS: physical health total score; EFS: emotional functioning score; SOFC: social functioning score; SFC: school functioning score; PSTP: psychosocial health total score; STC: scale total score.
1 = Level of effect of disease on the adolescent. 2 = Number of days missed from school (adolescent). 3 = Number of days missed from work (parent). 4 = Number of days of limited daily activities (parent). 5 = Level of effect on the job performance (parent). 6 = Level of effect on the families economic status. 7 = Level of effect on the social relationships of the family.

ences between the groups when evaluated according to the mean age and employment status of the parents.

Reliability Findings

When the internal consistency of the scale was evaluated, Cronbach's alpha coefficients ranged between 0.60 (school functioning score, adolescent form) and 0.87 (STS, Parent Form) (Table I).

The correlations between total score and PedsQL items were evaluated according to diagnosis in the adolescents. The correlations were significant in all 3 groups, except for the fifth item related to school functionality in the chronic disease group (P < 0.05). The correlations between PedsQL items and total score ranged between 0.208 (fifth item related to physical health, healthy group) and 0.712 (third item related to school functionality, healthy group). On the parent form all correlations between PedsQL items and total score were statistically significant, and ranged between 0.221 (fourth item related to school functionality, healthy group) and 0.712 (fourth item related to social functionality, acute disease group) (Table II).

Validity findings

Construct validity

The known-group method was used in the analysis of construct validity. The physical health and total scale mean scores of the healthy adolescents were significantly higher than those of the chronic disease group (P< 0.05). The psychosocial health total mean of the healthy adolescents was significantly higher than that of the adolescents in the acute disease group (P< 0.05).

The social functionality mean score of the healthy adolescents, based on the parent form, was higher than

Table V. Correlations between adolescent and parent PedsQL scores.

	Items	Adolescent						Parent				
		PHTS	EFS	SOFC	SFC	PSTP	STC	PHTS	EFS	SOFC	SFC	PSTP
Adolescent	EFS	0.390*	-									
	SOFC	0.303*	0.372*	-								
	SFC	0.463*	0.552*	0.403*	-							
	PSTP	0.483*	0.838*	0.719*	0.819*	-						
	STC	0.799*	0.755*	0.639*	0.788*	0.911*	-					
Parent	PHTS	0.539*	0.308*	0.243*	0.373*	0.388*	0.522*	-				
	EFS	0.301*	0.494*	0.256*	0.310*	0.461*	0.458*	0.561*	-			
	SOFC	0.248*	0.179*	0.415*	0.300*	0.363*	0.366*	0.506*	0.385*	-		
	SFC	0.302*	0.249*	0.277*	0.477*	0.415*	0.428*	0.403*	0.383*	0.428*	-	
	PSTP	0.354*	0.416*	0.409*	0.474*	0.545*	0.540*	0.634*	0.798*	0.789*	0.696*	-
	STC	0.485*	0.408*	0.374*	0.478*	0.528*	0.591*	0.873*	0.767*	0.737*	0.633*	0.930*

#Pearson correlation test. *P < 0.01.
PHTS: physical health total score; EFS: emotional functioning score; SOFC: social functioning score; SFC: school functioning score; PSTP: psychosocial health total score; STC: scale total score.

that of the chronic disease group and the remaining mean scores of the healthy group were significantly higher than both the chronic and acute disease group scores (P < 0.01) (Table III).

Correlations between PDSQL Scores, and Morbidity and Disease Burden

The relationship between the level of the effect of the disease on the adolescent in the last 30 days, the number of school days missed, the number of days the parent missed work, the number of days the daily activity of the parent was restricted, the level of effect on parental job performance and social relationships, and the degree of the effect on the economic status of the family, as determined by the sociodemographic form presented to parents and PedsQL scores, were examined. The results revealed that in general there was a negative correlation of low or medium significance between many indicators of burden of disease and scale scores (Table IV).

The Correlations between Adolescent and Parent PEDSQL Scores

The correlations between adolescent and parent PedsQL scores are presented in Table V, which shows that the correlations were significant and directly proportional (P< 0.01).

DISCUSSION

PedsQL, includes 4 sub forms targeting children aged between 2 and 18 years. The present study evaluated the reliability and validity the Turkish version of PEDSQL adolescent form in a sample of adolescents aged between 13 and 18 years.

When considering that our sample was composed only of adolescents aged between 13-18 years, the sample size displayed similarities with other studies conducted with the scale (Varni et al., 2001; Varni et al., 2003a; Bastiaansen et al., 2004; Novik et al., 2003).

Mean PedsQL scores have not been not analyzed according to gender in many international studies conducted with the scale. In a Dutch study, physical health and emotional functionality mean scores of the children forms were higher in girls than in boys (Bastiaaansen et al., 2004). When the PedsQL mean scores were analyzed according to the groups in the present study, there were no statistical differences in STS between the 3 groups in terms of gender. However, as the difference was not statistically significant in the total mean scores of the acute and chronic disease groups, and the total mean scores of the female students were higher than the male students in the healthy group, it was concluded that this finding was specific to the sample.

The education level of the parents in our study was lower in comparison to the original study. As the original study was conducted in the US this difference was expected. In the original PedsQL study, the parent forms were completed by mothers (80%), fathers (13%), and other relatives (7%) (Varni et al., 2001). In the majority of studies conducted with PedsQL, generally mothers completed the parent form, but others, such as fathers or teachers, also completed the scale (Varni et al., 2001; Varni et al., 2003a; Felder-Puig et al., 2004; Uzark et al., 2003). Although the majority of the parent forms in the present study were completed by mothers (62%), the percentage was lower than in other studies. It is known that in Turkey the education level of men is higher than that of women and that men do most of the chores outside the home. This cultural phenomenon is thought to have contributed to the relatively low percentage of mothers that completed the parent form.

In the original study of the scale, scale total score mean for the 2-18 age group was 79.62 for the children and adolescent forms, and 80.87 for the parent forms (Varni et al., 2001). In another study conducted by Varni et al., the scale total score mean for the adolescent form was 83.65 and 79.45 for the parent form (Varni et al., 2003a). In our study, scale total score mean for the adolescent form was 77.31 and 77.12 for the parent form. PedsQL mean scores in our study were lower than the means reported in the literature. This finding can be explained by the lower income levels in Turkey when compared to the US and the lower rate of using health services; factors that result in more difficult living conditions and which have a negative effect on the quality of life.

The Reliability of the Scale

In order to assess the reliability of the PedsQL, internal consistency and item total score correlations were analyzed.

In the original study of PedsQL, all Cronbach's alpha values of the child and adolescent forms, except for the school functionality score, and all values in the parents form were above 0.70 (Varni et al., 2001). Although the Cronbach's alpha values of the PedsQL scale scores were found to be close to 0.70 and above in many studies, the Cronbach's alpha value of school functionality was reported to be below 0.70, or lower than the other values (Varni et al., 1999; Varni et al., 2003a; Bastiaansen et al., 2004; Novik et al., 2003; Felder-Puig et al., 2004; Uzark et al., 2003). In our study, on the adolescent form the Cronbach's alpha value of school functionality was below 0.70 and was close to 0.70 for emotional functionality. In both the parent and adolescent forms, other scores revealed Cronbach's alpha values above 0.70. Our finding of a Cronbach's alpha value for school functionality below 0.70 and lower than the physical health, psychosocial health, and STS is similar to the previously-mentioned studies.

According to the literature, in order to use a measurement device the internal consistency coefficient must be 0.70 and above; when the value is lower it can only be used as a complementary device or for research analysis (Varni et al., 2003a; Özgüven, 1994). The Cronbach's alpha coefficient in our study being above 0.70 suggests that the Turkish version of PedsQL is reliable.

As in the original study, the alpha coefficient of the adolescent form was lower than the parent form in our study. As this result might be an indicator that parents are better in understanding the items on the scale than adolescents, it might also have been due to the resistance of adolescents to completing the scale.

When item total correlations were evaluated, a Pearson's correlation coefficient of 0.40 and above indicated that the scale was highly reliable (Varni et al., 2001). In the original PedsQL study, all items on the parent form and all but 4 items on the child and adolescent form had Pearson's correlations near 0.40 and above (Varni et al., 2001).

When evaluated according to diagnosis, the correlations between PedsQL items and total score were significant and directly proportional in all 3 groups, except for the fifth item related to school functionality in the chronic disease group; all correlations, except for a few, were near 0.40 or above. In conclusion, the internal consistency and item total correlations of the Turkish version of PedsQL were analyzed in order to determine its reliability in adolescents aged between 13 and 18 years, and the scale was found to be highly reliable.

The Validity of the Scale

The validity assessment of PedsQL was conducted using the known-group method for discriminative validity, and for compound validity the scale scores and many indicators of morbidity and illness burden were compared. The findings revealed that PedsQL is a valid device.

In the original study of PedsQL the mean scores statistically differed between the child and adolescent forms, in terms of diagnostic groups, and it was reported that the

mean in the healthy group was higher than in the acute and chronic disease groups (Varni et al., 2001). Other studies also reported a significantly higher mean score in healthy groups than in acute and chronic disease groups (Varni et al., 2003a; Bastiaansen et al., 2004; Novik et al., 2003).

In our study we found that the physical health and total scale mean scores of the healthy adolescents were significantly higher than in the chronic disease group, and that the psychosocial health mean total of the healthy adolescents was only significantly higher than that of the acute disease group.

In a study conducted with children and adolescents with heart disease the scale mean scores of the healthy children were higher than those of the children wit heart disease, except for the physical health total score. When the comparison was repeated in consideration of the severity of heart disease, the physical health mean score of the severely ill children was significantly lower than that of the children with low- and moderate-level heart disease, and healthy children; it was reported that illness severity is important in the assessment of quality of life (Uzark et al., 2003). In a similar study conducted by Chan et al. the new short form of PedsQL and short form of PedsQL developed for asthma were used. It was reported that as the severity of asthma and the number of comorbid diagnoses increased, the scores of both forms decreased (Chan et al., 2005). Many studies showed that the severity and degree of illness, and the level of treatment affect PedsQL mean score (Felder-Puig et al., 2004; Uzark et al., 2003, Chan et al., 2005). Not considering the severity of the disease in our study is one of its limitations, and might have resulted in finding small differences among the diagnostic groups and scale scores on the adolescent form.

In the original scale study, adolescents in the chronic disease group were mostly chosen from orthopedics, cardiology, and rheumatology departments, and a few were chosen from endocrinology (Varni et al., 2001). In our study, the chronic disease group was composed of adolescents from nephrology, allergy-immunology, endocrinology, and hematology units. The significant score differences among the diagnostic groups in the original and present study might be due to very serious diseases, such as heart disease and diseases that affect physical functionality, such as orthopedic and rheumatologic diseases in the original study population. In our study, the diseases had relatively less effect on the quality of life and might have resulted in lower score differences among the adolescents due to increased adjustment to disease.

On the parent form, social functionality scores of the healthy adolescents were significantly higher than those of the chronic disease group, and the remaining mean scores of the healthy adolescents were higher than the other 2 groups. This finding is similar to previous findings in the literature (Varni et al., 2001; Varni et al., 2003a; Novik et al., 2003, Felder-Puig et al., 2004).

The relationship between the level of the effect of the disease on the adolescent in the last month, the number of school days missed, the number of days the parent missed work, the number of days the daily activity of the parent was restricted, the level of effect on the parent's job performance and social relationships, and the degree of the effect on the economic status of the family, and mean scores were separately analyzed for the acute disease and chronic disease groups.

In general, on both the parent and adolescent forms statistically significant low- to medium-level inversely-proportional correlations were detected between the scale scores and many indicators of morbidity and illness burden.

In the original study of the PedsQL validity, the relationship between the scale scores, and the care needs of the child and adolescent in the last month, school discontinuity, the duration of the parent missing work, the effect of the disease on parental work performance and concentration were analyzed. When evaluating the relationship a Pearson's correlation coefficient between 0.10 and 0.29 was considered low, 0.30-0.49 as moderate, and 0.50 and above as high (Varni et al., 2001; Eiser and Morse, 2001c; Cohen, 1988). In the present study the correlation between scale scores, and care needs and school discontinuity of the adolescents was low to moderate on the child forms, and a moderate correlation between scale scores and the duration of the parent missing work on the parent forms was found. While the correlation between the child and adolescent form scale scores, and the effect of the disease on parental work performance and concentration was low to moderate, this correlation was moderate to high on the parent form (Varni et al., 2001).

Although the expectation was a moderate to high correlation between indicators of disease burden and scale scores, the correlations were generally low to moderate in our study, and some correlations were below the significance level, which might have been due to the lack of considering the phase and severity of disease. Studies that examine disease characteristics could further explain this issue.

In the PedsQL validity and reliability study by Varni et al., they compared the scale scores between the child, adolescent, and parents, and reported that congruity scores on the 3 forms ranged between 0.44 and 0.75, and when the scale total score was considered, the congruity was 0.61. It was shown that as age increased, the congruity also increased in children and adolescents (Varni et al., 2003a). In our study the congruity between adolescents and parents ranged between 0.17 and 0.93, and the congruity was 0.59 when the total scale score was considered. In conclusion, similar to previous literature findings (Varni et al., 2003a; Novik et al., 2003, Felder-Puig et al., 2004; Uzark et al., 2003), the congruity between adolescents and their parents was moderate to high and increased with age. These findings indicate that in conditions in which the adolescent has a severe illness that has been a barrier to completing the scale, or when other exclusionary criteria exist, the parent can complete the form. However, the lack of total congruity between adolescent and parents indicate that in order to evaluate the quality life in adolescents, self-report scales are necessary.

It has been concluded from the results of the present research that PedsQL is valid and reliable in evaluating the life quality of Turkish adolescents 13-18 years old.

The Limitations of our Study

Not using the test-retest method in reliability assessments and the lack of factor analysis in the validity assessment are 2 limitations of this study. In addition, the lack of a valid and reliable QLS for adolescents at the time of the study resulted in omitting equivalent scale reliability and synchronous scale validity.

Other limitation of the study was omitting the phase, severity, and treatment phase of the disease in chronic disease group.

Another limitation was not using a standardized intelligence test in order to measure the intelligence level of the adolescents.

Because only parents completed the sociodemographic form, we calculated the relationship between scale scores and disease burden indicators effect only based on parental opinion.

In conclusion, there is a need for further studies with different samples in order to generalize the present study's findings.

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