Validity and reliability of the Turkish translation of the Pediatric Asthma Quality of Life Questionnaire

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SUMMARY: Yüksel H, Yılmaz Ö, Kırmaz C, Eser E. Validity and reliability of the Turkish translation of the Pediatric Asthma Quality of Life Questionnaire. Turk J Pediatr 2009; 51: 154-160.

The aim of this study was to adapt the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) into Turkish and to demonstrate its psychometric performance.

After Turkish adaptation of the PAQLQ, this study was conducted on 122 children with asthma aged between 7 and 16 years. A sociodemographic form and PAQLQ and KINDL (a generic health-related quality of life instrument developed for children) questionnaires were applied. Reliability analysis consisted of internal consistency and item-total score correlations, while validity was tested by construct validity.

Cronbach α scores for Activity (0.80), Symptoms (0.90), and Emotional (0.86) domains were satisfactory. Item versus subscale and total score correlations were significant. Correlations of total PAQLQ score with KINDL total and Physical and Psychological Well-Being domains were significant ($r=0.33$, 0.45 and 0.31 respectively, $p<0.05$ for all). Exploratory factor analysis revealed that 78.3% of the items were replaced in their original domain.

This Turkish version of PAQLQ is a valid and reliable disease-specific health-related quality of life questionnaire.

Key words: asthma, quality of life, child.

Health has been described by the World Health Organization and other disciplines interested in the biophysicosocial aspects of humans as a complete state of physical, mental and social well-being, not merely the absence of disease[1]. Health-related quality of life (HRQOL) is the effect of disease and its treatment as the patient perceives it[2,3]. Therefore, measurement of QOL is quantifying the net results of the disease and its treatment on the patient's perception of being able to lead a beneficial and satisfying life[2]. It is a multidimensional issue including physical functioning, somatic sensation and social and emotional well-being[4].

Asthma is one of the most common chronic diseases in children[4]. Asthma can impair children's participation in play, leading to social and emotional consequences that are not present in adult asthmatics, and finally lead to impairment of QOL in children. The Pediatric Asthma Quality of Life Questionnaire (PAQLQ) by Juniper et al.[5] refers to such typical childhood issues. The weak correlation between QOL and physical parameters such as lung function in asthma underlines the essence of combining physiologic measures with QOL assessment[4]. Clinical indices only weakly correlate with the child's feelings and functioning in daily life[3]. Functional measurements have been encouraged by the QOL questionnaire because the highest expectation from the treatment of asthma and other chronic diseases in childhood is improvement of the child's feelings and functioning in daily life.

The PAQLQ was developed by Juniper et al. in English and has been translated and validated in many countries including Spain, Sweden and Thailand[6-8]. However, a QOL questionnaire for asthmatic children was lacking in Turkish. Therefore, the aim of this study was to adapt

the PAQLQ into Turkish and to demonstrate the psychometric performance of the Turkish version of the PAQLQ.

Material and Methods

Domain Structure of the PAQLQ

Pediatric Asthma Quality of Life Questionnaire (PAQLQ) is a disease-specific QOL questionnaire. It was developed by Juniper et al. in English to measure the physical, emotional and social impairments that are experienced by asthmatic children (7-17 years)[6-8].

The 23 items of the PAQLQ are grouped in three domains: "Symptoms" domain (10 items) (item nos. 4, 6, 8, 10, 12, 14, 16, 18, 20, 23) that include wheezing, cough and tiredness; "Emotional function" domain (8 items) (item nos. 5, 7, 9, 11, 13, 15, 17, 21) including frustration, anger and fear; and "Activity limitations" domain (5 items) (item nos. 1, 2, 3, 19 and 22)[3]. Three of the activity questions are "patient-specific" and identified by the patient at the beginning of the study[3]. At the baseline visit, individualized activities are elicited. These activities remain the same for every follow-up visit for each patient. However, in long-term studies, since children's activities change, a standardized version of the PAQLQ may be used instead of the 'patient-specific' approach. This version (outside the scope of this paper) includes four predefined activities[9].

Scoring of PAQLQ

Individual items within the PAQLQ are equally weighted. Domain scores are expressed as the mean score per item for each of the domains as well as for overall QOL score. Overall QOL score is calculated from the mean score of all the items, not from the mean of domain scores[10]. Each of the items have seven-point response (Likert type)[4] scales, ranging from 1 to 7, with the higher scores indicating less impairment[11].

Turkish Adaptation Process

The Turkish adaptation process of the PAQLQ included the following steps:

1. Two independent forward translations into Turkish were done by two medical professionals who were blinded to the other's translated text.

2. A consensus forward version was developed by two other pediatricians who are highly skilled in English.

3. This consensus forward version was back translated literally into English by a bilingual person and the backward version and the original text were compared by an independent supervisor. Some minor amendments were done in the wording of two items during this procedure to obtain a conceptual equivalent of the original text.

4. Cognitive debriefing: A cognitive debriefing session (face-to-face interview focused on the conceptualization and colloquialism of the Turkish translation) was conducted on 10 patients who were not included in the field testing analysis.

Field Testing and Subjects

Field testing of the instrument was conducted on 162 asthmatic children aged between 7 and 16 years (mean±SD: 9.9±2.2 years). All asthmatic children included in the study were monitored in the Department of Pediatric Allergy and Pulmonology of Celal Bayar University hospital. Diagnosis of asthma was based on the criteria of international consensus reports that include history of recurrent cough and wheezing with prolonged expiration time, which demonstrate clinical reversibility with short-acting bronchodilator therapy, beta-2 agonist[12]. Asthma severity was assessed according to Global Initiative for Asthma (GINA) guidelines as intermittent, mild persistent, moderate persistent and severe persistent[12].

Along with the Turkish versions of the PAQLQ and a sociodemographic questionnaire, the KINDL questionnaire, which is a generic HRQOL instrument developed for children, was applied to the respondents during the field test stage in order to test the convergent validity of the PAQLQ questionnaire.

KINDL Questionnaire

The generic KINDL questionnaire for measuring HRQOL in children and adolescents was originally developed by Bullinger et al.[13] in 1994, revised by Ravens-Sieberer & Bullinger[14,15] in 1998a, 1998b and adapted to Turkish by Eser et al.[16] in 2004, for use in clinical populations as well as healthy children and adolescents. The KINDL questionnaire consists of 24 Likert-scaled items associated with six dimensions: physical well-being, emotional well-being, self-esteem, family, friends and everyday functioning (school

or nursery school/kindergarten). The subscales of these six dimensions can be combined to produce a total score.

Statistical Analysis of the Field Test Data

The statistical analysis consisted of reliability and validity analysis. Reliability refers to what extent observed scores vary from true scores and validity concerns the extent to which an instrument measures what it is intended to measure[4].

Internal consistency and item–total score correlations were used for reliability analysis. Internal consistency was tested using Cronbach alpha for every subscale of the instrument since every subscale represents a different concept for the patients. The item score and total score relationships were explored by Spearman correlation analysis. According to the general guidelines suggested by Colton, correlations ranging from 0.00 to 0.25 indicate little or no relationship; 0.25 to 0.50 suggest a fair degree of relationship; 0.50 to 0.75 are moderate to good; and values above 0.75 are considered good to excellent.

Validity of the Turkish version of the PAQLQ was tested by construct validity analysis using two different methods: Convergent Validity and Known Groups Method:

Convergent validity indicates that two measures believed to reflect the same underlying phenomenon will yield similar results or will correlate highly. Convergence also implies that the theoretical context behind the construct will be supported when the test is administered to different groups in different places at different times[13]. KINDL scale, the unique generic HRQOL scale for Turkish children, was used with PAQLQ in order to test concurrent validity. Construct Validity was tested by Known Groups Method as well. This method gives the evidence that a test can discriminate between individuals who are known to have the trait from those who do not. Therefore, the validity of a particular test is supported if the test's results document these known differences. Convergent Validity was tested by Spearman Correlations and Known Groups Validity by Student's t test and Mann-Whitney U test where appropriate. The data was analyzed by SPSS 10.0 statistical package.

Results

Descriptive Findings

This study was conducted on 122 children aged between 7 and 16 years (mean age: 9.9±2.2). Males constituted 59.8% of the study group and the mean duration of disease was 4.1±2.8 years. Fifty-one percent of the mothers and 36% of the fathers had formal education of 5 years or less. Seventy-five (61%) patients had one or no sibling, while 47 (39%) had two or more siblings. The domain and overall scores for children with one sibling and for those with more than one sibling is demonstrated in Table I. Age and sex did not reveal any significant relationships with any of the PAQLQ scores. Mild asthma was diagnosed in 68 (55.7%) of the children while moderate asthma was diagnosed in 54 (44.3%). The mean duration of disease before the diagnosis was 4.1±2.8 years.

Table I. Mean Values of the PAQLQ Domains and Total Score in Children with ≤1 or >1 Sibling(s)

	≤1 sibling (n=75)	>1 sibling (n=47)	p
Total PAQLQ score	5.3 ± 1.1	5.9 ± 0.8	0.00
Activity domain	5.2 ± 1.2	5.7 ± 0.9	0.03
Symptoms domain	5.2 ± 1.2	5.9 ± 1.0	0.00
Emotional domain	5.5 ± 1.2	5.9 ± 0.9	0.02

Reliability Analysis

Internal consistency of PAQLQ was tested by Cronbach alpha scores and item-total correlations. Cronbach α scores for Activity (0.80), Symptoms (0.90), and Emotional (0.86) domains were satisfactory (Table II). All of the subscale items were found to contribute to the internal consistency of the subscale to which they belonged. Item versus subscale correlations were high and were statistically significant for each of the subscales and their items. Item versus total score correlation coefficients ranged from 0.63 to 0.77 for Emotional domain; 0.62 to 0.81 for Symptoms domain and 0.46 to 0.87 for Activity domain (Table III).

Validity Analysis

Validity of PAQLQ was tested by three different approaches.

Convergent Validity

Correlations of the total PAQLQ score with KINDL total score and Physical and Psychological Well-Being domains were significant (r=0.33,

Table II. Internal Consistency of the PAQLQ (Cronbach alpha values)

Domain (Number of items)		Cronbach Alpha
Emotional well-being (8)		0.86
When item removed	5	0.83
	7	0.83
	9	0.84
	11	0.83
	13	0.85
	15	0.84
	17	0.84
	21	0.84
Activity (5)		0.80
When item removed	1	0.73
	2	0.73
	3	0.72
	19	0.87
	22	0.74
Symptoms (10)		0.90
When item removed	4	0.89
	6	0.89
	8	0.88
	10	0.88
	12	0.88
	14	0.88
	16	0.88
	18	0.89
	20	0.89
	23	0.89

Table III. Item Scale Correlation for the Domains of PAQLQ

Domain	Question numbers/ domain name	R*	p
Emotional			
	5	0.77	0.00
	7	0.75	0.00
	9	0.70	0.00
	11	0.75	0.00
	13	0.63	0.00
	15	0.70	0.00
	17	0.67	0.00
	21	0.68	0.00
Activity			
	1	0.87	0.00
	2	0.81	0.00
	3	0.81	0.00
	19	0.46	0.00
	22	0.69	0.00
Symptoms			
	4	0.71	0.00
	6	0.66	0.00
	8	0.75	0.00
	10	0.81	0.00
	12	0.79	0.00
	14	0.73	0.00
	16	0.69	0.00
	18	0.62	0.00
	20	0.72	0.00
	23	0.69	0.00

Spearman's Rho.

0.45 and 0.31, respectively, $p<0.05$ for all). Total PAQLQ score did not have a significant correlation with the other domains of KINDL. Emotional domain of PAQLQ was significantly correlated with KINDL total score and Physical and Psychological Well-Being domains ($r=0.28$, 0.38 and 0.23, respectively, $p<0.05$ for all). A significant correlation was detected between Activity domain of PAQLQ and Physical, Psychological and Self-Esteem domain scores and overall score of KINDL ($r= 0.39$, 0.26, 0.26, 0.35, respectively, $p=0.00$ for all). Finally, Symptoms domain of PAQLQ was significantly correlated with total score and Physical and Psychological domains of KINDL ($r=0.27$, 0.43, 0.31, respectively, $p=0.00$ for all).

There was no significant correlation between PAQLQ and the remaining domains of KINDL ($p>0.05$) (Table IV).

Known Groups Validity

Disease duration of more than three years was associated with a significant decrease in total PAQLQ score compared to that of three years or less (5.3 ± 1.1 vs 5.8 ± 0.8; $p=0.01$). Similarly, Activity and Symptoms domains were significantly higher in children with a disease duration of more than three years (5.0 ± 1.3 vs 5.8 ± 0.9 and 5.2 ± 1.3 vs 5.7 ± 0.9; $p=0.00$ and 0.02, respectively). On the other hand, no significant relationship was found between emotional domain score and duration of asthma ($p=0.20$) (Table V).

The PAQLQ overall score and domain scores were higher in children with mild asthma compared to moderate asthma, but the difference between those with mild and moderate asthma was significant only for the activity and emotional domains ($p<0.05$ and 0.04, respectively) (Table VI).

Table IV. Correlation of PAQLQ Domains and Total Score with KINDL Domains

	Total PAQLQ		Emotional		Activity		Symptom	
KINDL	r	p	r	p	r	p	r	p
Physical	0.45	0.00	0.38	0.00	0.39	0.00	0.43	0.00
Psychological	0.31	0.00	0.23	0.01	0.26	0.00	0.31	0.00
Self-Esteem	0.11	0.23	0.01	0.89	0.26	0.00	0.08	0.39
Family	0.12	0.18	0.12	0.18	0.09	0.30	0.11	0.25
Friends	0.15	0.11	0.17	0.06	0.16	0.09	0.09	0.33
School	-0.04	0.68	0.07	0.47	-0.04	0.65	-0.10	0.27
Total	0.33	0.00	0.28	0.00	0.35	0.00	0.27	0.00

Table V. Mean Values of the PAQLQ Domains and Total Score in Children with a Disease Duration of ≤3 years >3 years

	Disease duration ≤3 years (n=57)	Disease duration >3 years (n=65)	p
Total score	5.8 ± 0.8	5.3 ± 1.1	0.01
Activity domain	5.0 ± 1.3	5.8 ± 0.9	0.00
Symptoms domain	5.2 ± 1.3	5.7 ± 0.9	0.02
Emotional domain	5.8 ± 1.0	5.5 ± 1.2	0.20

Table VI. Mean Values of the PAQLQ Domains and Total Score in Children with Mild and Moderate Asthma

	Mild asthma (n=68)	Moderate asthma (n=54)	p
Total score	5.7 ± 0.9	5.3 ± 1.1	0.06
Activity domain	5.6 ± 1.2	5.2 ± 1.1	0.05
Symptoms domain	5.6 ± 1.1	5.3 ± 1.3	0.26
Emotional domain	5.8 ± 1.1	5.4 ± 1.1	0.04

Compared to those with one or no sibling, children with more than one sibling had higher overall PAQLQ scores (5.9±0.8 vs 5.3±1.1, respectively; p=0.00). Similarly activity, symptom and emotional domain scores were higher in children with more than one sibling than in those with one or no sibling, as shown in Table I.

Construct Validity

An exploratory factor analysis was carried out to demonstrate the construct validity of the instrument. Eighteen of 23 items (78.3%) were replaced in their original domain, indicating a very successful scale structure.

Discussion

There are both generic and disease-specific measures that can be used to measure HRQOL in children[5]. Generic HRQOL questionnaires are about circumstances common to different disease conditions[10]. They can be of use for brief evaluations, especially when comparing QOL in populations with different diseases or when comparing a population with a disease to a healthy group[1,4]. Disease-specific measures consider the impact of the specific disease or change in treatment and therefore tend to be more sensitive to changes[1,5]. Moreover, because they target populations with a specific disease, they enquire about specific details[4]. They concentrate on the symptoms that are most important to the patient[3].

Asthma frequency in childhood has been reported as 3-20% in different populations and it is one of the most common chronic diseases in children, especially in developing countries[4]. It can impair children's participation in play, leading to social, emotional and, very importantly, school performance consequences that are absent in adult asthmatics. As mentioned above, PAQLQ has been developed and used for typical childhood issues[5]. The weak correlation between QOL and physical parameters such as lung function in asthma in childhood underlines the essence of combining physiologic measures with QOL assessment[4]. Clinical indices only weakly correlate with the child's feelings and functioning in daily life[3]. QOL is influenced by many non-health-related

factors including family structure and personal characteristics; therefore, clinical indices do not affect different children in the same way[3,4]. This influence of non-health-related factors on QOL makes comparison of QOL between different subpopulations misleading[4].

The aim of this study was to assess the validity and reliability of the Turkish version of PAQLQ, which is a 23-item measure used in children aged between 7 and 17 years[3,4]. It is primarily designed for evaluation and is responsive to changes over time[4]. However, it can also be used for discriminating between children with better and worse QOL[4]. This was a cross-sectional study in which children diagnosed with asthma completed the PAQLQ before any treatment was instituted. The main drawback of the instrument is the lack of psychosocial domains that are especially important for adolescents[4].

Validity is measuring the issue that is supposed to be measured[4]. PAQLQ total score and domains in our study were compared with the results of a generic HRQOL questionnaire to assess for convergent validity. The KINDL questionnaire, originally developed in Germany and validated for Turkish, was used as the generic HRQOL questionnaire[17]. This questionnaire has three age versions: Kiddo for 3-16 years, Kid for 8-12 years and Kiddy for 14-17 years with both parent reports and self-reports[7]. Kid-KINDL was used in this study. Total PAQLQ score and the three domains showed a significant correlation with total KINDL score as well as the Physical and Psychological Well-Being domains. There was no significant correlation between total PAQLQ score and the other domains of KINDL. This is not unexpected, since KINDL is a generic questionnaire and is not expected to correlate fully with an asthma-specific QOL questionnaire in asthmatics. However, the significant correlation between the total scores may be attributed to the general decrease in QOL in patients with lower QOL due to asthma. Moreover, in a study in children with chronic diseases such as diabetes and asthma, the psychological well-being domain and total score were found to be significantly different between healthy children and those with chronic diseases[18]. This may indicate that total score and psychological well-being as measured with KINDL are affected more significantly in children with chronic diseases like asthma. Since PAQLQ is a disease-specific QOL measure for asthma, a significant correlation of PAQLQ total score and domains is expected to be present with KINDL total score and the psychological well-being domain, while not with other domains of KINDL.

Internal consistency is an important measure of reliability[4]. In the present study, we detected that the individual questions showed significant correlation with their respective domains. Therefore, the internal consistency of the Turkish version of PAQLQ can be regarded as adequate.

Reliability is a measure's stability[4]. Cronbach reliability analysis revealed values above 0.75 for all the domains, further strengthening the idea that the Turkish version of PAQLQ is a significantly reliable measure of HRQOL in Turkish asthmatic children.

In the study evaluating the Spanish version of PAQLQ, it was found that patients with mild asthma have better PAQLQ scores and that the difference was significant for all domains except the activities scale[19]. Similarly, in our study, total score and all the domains were better in children with mild asthma; however, the difference was significant for total score and symptoms domain. This difference was attributed to inclusion only of children with mild and moderate asthma. It was thought that a more significant difference could have been obtained if children with severe asthma were also included. On the other hand, in a previous study in which KINDL was used to evaluate QOL, asthma severity was not found to influence HRQOL significantly[6].

Moreover, a second parameter with which PAQLQ results were compared was disease duration, and it was detected that total score and all domains except emotional domain were significantly higher in children with a disease duration of three years or less. This was an expected finding, since the disease is expected to cause more limitations as the duration increases.

The limitation of our study is that change over time, which is one of the advantages of PAQLQ, was not measured, and we evaluated the patients in a cross-sectional manner.

In conclusion, not only the clinical parameters but also and maybe more importantly the influence of disease and its treatment on QOL

need to be considered in the evaluation of children with asthma. This Turkish version of PAQLQ is a valid and reliable disease-specific HRQOL questionnaire that can be used in Turkish asthmatic children.

Acknowledgements

We thank Professor Elizabeth Juniper for her support in preparing the Turkish PAQLQ and providing Turkish children with a valid quality of life instrument.

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