RESEARCH PAPER

General and Disease-specific Scales in Children with Asthma and their Parents

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Objective: To investigate and compare the efficiency of general and disease-specific life quality scales in children with asthma. **Methods:** Children with asthma, and their parents completed the Childhood Asthma Control Test (C-ACT), Pediatric Asthma Quality of Life Questionnaire (PAQLQ), Pediatric Quality of Life Inventory (PedsQL), and also underwent spirometry. **Results:** 82 children (55 males) with a median (IQR) age of 10.1 (8.9-10.5) years were included. C-ACT, PAQLQ and PedsQL child scores were significantly higher in children with controlled asthma. **Conclusions:** Quality of life in children, assessed using disease-specific quality of life measures, is better for children with good asthma control.

Keywords: *Quality of life, Questionnaire, Surveys*.

Asthma is the most common chronic respiratory disease in childhood throughout the world. It has detrimental effects on the quality of life of children and their parents [1,2]. Life quality scales used in children and adults can be divided into two main groups: those measuring general well-being and those developed for specific diseases [3]. We aimed to investigate and compare the utility general life quality scales and disease-specific scales for asthma, and to determine the relationship between quality of life and asthma control status in children with asthma.

Methods

Children 8 to 12 years of age who were previously diagnosed as having asthma according to GINA guidelines [4], and who presented to the Pediatric Allergy Department of Gulhane Military Medical Academy, Ankara, Turkey, between May 2013 and June 2014 were invited to participate in the study. Children who were able to undergo proper spirometric evaluation were included in the study. All children were followed-up for at least 1 year, and were provided regular treatment according to GINA guidelines [4]. Patients with recent exacerbation at the time of enrolment, and those with coexisting chronic lung disease (*e.g.* bronchiectasis) or other chronic diseases were excluded. All patients and parents signed consent forms, and the institutional review board of the GATA School of Medicine approved the study.

Baseline characteristics, including demographic data, aeroallergen sensitization and patient medications were recorded for all patients. Children and parents completed the Childhood Asthma Control Test (C-ACT; official Turkish version [5]), Pediatric Asthma Quality of Life Questionnaire (PAQLQ), Pediatric Quality of Life Inventory (PedsQL), and also underwent spirometry.

Children and parents answered their respective parts of the C-ACT questionnaire separately, and the sum of their scores was used for analysis. All participants completed the official validated Turkish version of the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) themselves [6]. The PAQLQ developed by Juniper and colleagues was used to assess the effects of asthma on asthma-related quality of life (AQOL) [7]. All patients and parents completed the official validated Turkish version of the Pediatric Quality of Life Inventory (PedsQL) themselves [8]. The PedsQL 4.0 is a life quality scale designed by Varni, *et al*. [9] in 1999. It consists of a generic core questionnaire in five subscales questioning the child's functioning in areas featuring the state of being healthy. Domain scores are reported as total scale score (TSS), physical health summary score (PSS), and psychosocial health summary score (PsychoSS).

An asthma specialist assessed the control status of each child according to GINA guidelines [4]. Patients were grouped as having well controlled, partly controlled, or uncontrolled asthma. Patients with partly controlled and uncontrolled asthma were further classified as having not controlled asthma.

All patients underwent a spirometry test using the

ZAN100 spirometry system (nSpire Health, Longmont, Colorado, USA) to measure the prebronchodilator forced expiratory volume in 1 second (FEV1), the FEV1 to forced vital capacity (FVC) ratio, and the forced expiratory flow between 25% and 75% of vital capacity (FEF25%-75%).

The SPSS Statistics Version 21.0 (IBM, Chicago, IL, USA) was used for all calculations. Descriptive data for categorical and numerical variables were expressed as frequencies and medians with interquartile ranges. Group comparisons were established using Kruskal-Wallis tests or Mann-Whitney U-tests as appropriate, and the Chi-square test or Fisher test for categorical variables. Associations among the scores of C-ACT, PAQLQ and PedsQL, and asthma control status were evaluated using Spearman correlation coefficients. A *P* level <0.05 was considered significant.

RESULTS

Eighty-two children with a median (IQR) age of 10.1 (8.9-10.5) year were included in the study. Demographic characteristics are summarized in ***Table* I**. Asthma control status was 'controlled' in 52 (63.4%) children, 'partly controlled' in 17 (20.7%) children and 'uncontrolled' in 13 (15.9%) children. There were no statistically significant differences between children in terms of demographic data according to asthma control status.

C-ACT scores were significantly higher for patients with controlled asthma (25 *vs.* 20; *P*<0.001). PAQLQ scores, including symptoms (6.4 *vs.* 5.0; *P*<0.001), activity limitation (6.4 *vs.* 5.3; *P*<0.001), emotional function (6.8 *vs.* 5.4; *P*<0.001) and total scores (6.5 *vs.* 5.2; *P*<0.001), were significantly higher in children with controlled asthma. The PedsQL child scores, including physical health summary score (675 *vs.* 588; *P*=0.019), psychosocial health summary score (1300 *vs.* 1163; *P*=0.022) and total scale score (1962 *vs.* 1725; *P*=0.009), were significantly higher for children with controlled asthma.

The PedsQL parent physical health summary score (650 *vs.* 550; *P*=0.017) was significantly higher for parents of children with controlled asthma. The psychosocial health summary score (1150 *vs.* 1075; *P*=0.13), and total scale score (1788 *vs.* 1625; *P*=0.052) of parents of children with controlled asthma was not significantly different from those with children having partly controlled or uncontrolled asthma.

Significant direct correlations were found between the TSS and all subscale summary scores (TSS: r = 0.72, *P*<0.001; PsychoSS: r = 0.72, *P*<0.001; PSS: r = 0.63, *P*<0.001). When the correlation between parameters obtained from scales and asthma were analyzed, the most significant correlations were found between C-ACT and asthma control (r=0.572; *P*<0.001). There were also significant correlations between PAQLQ scores and asthma control.

DISCUSSION

In the present study, children with controlled asthma had significantly higher C-ACT, PAQLQ and PedsQL scores. C-ACT and PAQLQ have also emerged as better variables than PedsQL for identifying children with not-controlled asthma. Moreover, the performance of PedsQL-parent version in determining patients with uncontrolled asthma was poor in comparison. We observed that asthma control status of children directly affected both disease-specific and general quality of life scores.

Lower quality of life scores are usual in children with asthma in both general purpose and disease specific quality questionnaires. But in our study, when we examined the correlation of these two forms, there was a moderate statistically significant relation using PAQLQ but there was a poor relation using the PedsQL pediatric scale. The lower sensitivity of general life quality scales, longer completion time and their lower capacity to reflect minimal changes in children and adolescents may cause such results.

Assessing the quality of life in pediatric asthma patients helps the parents to better understand the disease and its treatment [10]. In a study that analyzed the

TABLE I DESCRIPTIVE CHARACTERISTICS OF THE STUDY POPULATION (*N*=82)

*Age, y	10.1 (8.9,10.5)
*Age at initial symptoms start, y	5.0 (3.0,8.6)
*Asthma duration, y	4.9 (2.5,7.3)
Male gender	55 (67.1)
Family history of atopic disease	28 (34.1)
Allergic rhinitis	49 (59.7)
Atopic dermatitis	8 (9.8)
Atopy	60 (73.2)
Asthma exacerbation in last year	21 (25.6)
Asthma control status	
Controlled	52 (63.4)
Partly controlled	17 (20.7)
Uncontrolled	13 (15.9)
Age of parent	38 (33,42)
Education of parent: < high school	46 (56.1)
Parental asthma	10 (12.2)

*Values in n(%) or * median (IQR).*

WHAT THIS STUDY ADDS?

- Asthma-specific quality of life scales correlate better with asthma control than general pediatric quality of life scales.

concordance and consistency of child and parent scores in children's quality of life questionnaires, there was a poor consistency between child and parent scores [11]. In our study, asthma control levels showed a decrease in the PedsQL physical health summary score but made no difference in the psychosocial health summary score. This result may be related to the parents giving more importance to their child's physical wellness than their psychosocial condition.

The cross-sectional design of our study may be regarded as a limitation; longitudinal follow-up of the patients may inform us about the predictive performance of these tools for possible life quality changes and loss of asthma control.

We conclude that better asthma control leads to better quality of life for children with asthma. Asthma- specific quality of life scales correlate better with asthma control than general pediatric quality of life scales.

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