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Journal of Asthma

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title-content=t713597262>

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Online Publication Date: 01 November 2009

To cite this Article Cerovi, Sofija, Živkovi Associate Professor, Zorica, Milenkovi, Branislava, Stojanovi, Jasmina Joci, Bajec, Aleksandra Opanina, Vukašinovi, Zoran and Vekovi, Vesna(2009)'The Serbian Version of the Pediatric Asthma Quality of Life Questionnaire in Daily Practice', Journal of Asthma, 46:9, 936 — 939

To link to this Article: DOI: 10.3109/02770900903265812

URL: <http://dx.doi.org/10.3109/02770900903265812>

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ORIGINAL ARTICLE

The Serbian Version of the Pediatric Asthma Quality of Life Questionnaire in Daily Practice

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Asthma is the most common chronic disease in children and adolescents and a serious global health problem, thus severely affecting the health related quality of life (HRQL). This study was aimed at exploring the potential role of the Serbian, self administered version of the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) in the routine clinical evaluation of children suffering from bronchial asthma. One hundred Serbian children and adolescents (62 males and 38 females), aged 7 to 17 years, affected by allergic asthma, were enrolled. Each patient was evaluated once, and asthma control and severity were assessed, spirometry was performed, FeNO measurements were performed and the patients completed the self-administered version of the PAQLQ. PAQLQ differed according to asthma severity, NO variation and Asthma Control Test (ACT) score. No correlations were found between the questionnaire's score and FEV₁ percent of predicted. The Serbian version of the PAQLQ is a feasible aid to clinical measurements and used in routine practice gives a good insight into asthma control and severity.

Keywords childhood asthma; quality of life; asthma severity and control; lung functions; routine practice

INTRODUCTION

Asthma is the most common chronic disease in children and adolescents (1). Innumerable empirical studies emphasize that a chronic disease, such as asthma, not only involves physical symptoms, but may also cause difficulties in the social, emotional, and school spheres (2). Although physiological measures have greatly contributed to a better understanding of the pathophysiology of asthma and will continue to be important diagnostically and in evaluating the response to treatment, they fail to evaluate how patients feel and how well they can cope with everyday demands (3). Health-related quality of life (HRQL) measurement is therefore, a multidimensional assessment, and it usually includes physical functioning and somatic sensation, as well as social and emotional functioning and well-being (4, 5). The recent publication of a study on nearly 70,000 children, aiming to evaluate HRQL in the pediatric population of the United States, demonstrates an increasing attention for considering HRQL as an important tool for a systematic understanding of the child's health (6). Pediatric asthma accounts for a large proportion of childhood hospitalizations, healthcare visits, absenteeism from day care/school, and missed workdays by parents (7). The more severe the asthma, the worse the patient's HRQL seems to be (8). Less serious forms of asthma, especially childhood ones, remain uncontrolled and, therefore, induce a high level of patients' disability (9).

Among several specific questionnaires designed to assess the quality of life in children with asthma, one of the most frequently used is the Pediatric Asthma Quality of Life Questionnaire (PAQLQ), showing good measurement properties, proving valid and able to discriminate (5). It has been tested in children 7 to 17 years of age and minimal skills are needed for children to complete it correctly (6). It was recognized to have good construct validity, responsiveness to change over time, and test-retest reliability (3). The Serbian PAQLQ cross-cultural development was made in 2003 according to the translation and linguistic validation propositions, as well as cultural adaptation.

The aim of the present study was to assess the correlation between the Serbian self-administered version of the PAQLQ and the major clinical and quantitative measurements that are usual procedure in the outpatients' routine visits and to examine the potential role of the questionnaire throughout routine clinical practice visits of children with asthma.

METHODS

This prospective study included 100 consecutive asthmatic children (median age 10.3 years; range 7–17, 62 boys and 38 girls), referred to the Children's Center for Respiratory Diseases and TB in Belgrade. Children were considered eligible to enter the study if they had an asthma diagnosis from a qualified health professional, were administered asthma medication, and had at least one of the following symptoms in the past 12 months: wheezing, shortness of breath, nighttime cough, daytime cough, wheezing with exercise, or colds. The children's parents or caregivers were asked to give their written consent before enrolling a child in the study. The

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physician visit included: (1) acquiring detailed history; (2) complete physical examination; (3) lung function testing; (4) QOL assessment, by means of the PAQLQ; (5) asthma severity assessment; and (6) asthma control assessment.

For the assessment of asthma control, children were asked to complete the Asthma Control Test (ACT). The ACT, which has been developed by triangulating a 22-item survey of 471 patients with specialist-assessed asthma control after spirometry, is a short and simple patient-based, five-item questionnaire that does not encompass pulmonary function tests, requires no calculations, and includes a question on the patient's view of control, thus, giving a useful insight into the patient's perspective (10).

Lung function was assessed by means of a spirometric analysis (Pneumoscreen, Jaeger). The forced expiratory volume at the first second (FEV₁) was evaluated.

Asthma severity was assessed according to the Global Initiative for Asthma (GINA) guidelines (updated 2005) (11), therefore, divided into four levels: intermittent, mild persistent, moderate persistent, and severe persistent asthma.

Exhaled NO was determined during a single-breath exhalation using a portable device (NIOX-MINO). The measurements were performed in accordance with recommendations from the American Thoracic Society (ATS) (12). The measurements were performed during September and October.

HRQL was assessed by means of the Serbian self-administered version of the PAQLQ (13), which includes 23 questions further grouped into 3 domains (Table 2):

1. symptoms: questions 1, 3, 5, 7, 9, 11, 13, 15, 17, 20;
2. activity limitations: questions 16, 19, 21, 22, 23;
3. emotional function: questions 2, 4, 6, 8, 10, 12, 14, 18.

After receiving thorough explanations on questions and answering modalities, the children themselves filled out the questionnaire during the visit. The overall score was calculated as the mean of scores obtained for each single question. The scores ranged from 1 to 7, 1 being the minimum and 7 the maximum. The same approach was adopted for subgroups of questions. Differences in the PAQLQ score ≥ 0.5 were considered as significant.

TABLE 1.—Demographic characteristics.

Age, y, mean (SD)	10.3
Male gender	62 (62%)
Type of allergen	
Mites	24 (24%)
Pollen	9 (9%)
Multiple	67 (67%)
Asthma severity	
Intermittent asthma	37 (37%)
Mild persistent asthma	38 (38%)
Moderate persistent asthma	24 (24%)
Severe persistent asthma	1 (1%)
Asthma control test (ACT)	
Under control	78 (78%)
Not under control	22 (22%)
Inhaled corticosteroids	74 (74%)
Smoking at home	78 (78%)
Parent age (SD)	35.9 (7.4)
Parent education	
< high school	21 (21%)
High school graduate	23 (23%)
Some college	27 (27%)
College graduate	29 (29%)

TABLE 2.—PAQLQ questions.

Symptoms	
K4	Cough
K6	Tiredness
K8	Asthma attacks
K10	Wheezing
K12	Tightness of chest
K14	Shortness of breath
K16	Wake up during the night
K18	Out of breath
K20	Trouble sleeping at night
K23	Deep breath
Emotional function	
K5	Frustration
K7	Worried
K9	Angry
K11	Irritable
K13	Feeling different or left out
K15	Frustrated can't keep up with others
K17	Uncomfortable
K21	Frightened by asthma attack
Activity limitation	
K1	Physical activities
K2	Being with animals
K3	Activities with friends and family
K19	Can't keep up with others
K22	Bothered in activities overall

STATISTICAL ANALYSIS

To enter the analysis, the patient had to meet the inclusion criteria and to complete the PAQLQ. A logistic regression model was built using the PAQLQ score as the dependent variable and the following independent variables: asthma severity (intermittent, mild persistent, moderate persistent, severe persistent), ACT scores, FeNO values. Statistical analysis was performed by means of SPSS 12 for Windows. Results were deemed statistically significant for a $p \leq 0.05$.

RESULTS

We included 100 children with relevant data into the study. A total of 4 children were excluded from the analysis because of missing variables. Analyzing the questionnaires, it turned out that 3 of those 4 children were the children that needed additional explanation concerning the term "last week," so they were excluded from further analysis. The demographic characteristics of the chosen group of children are shown in Table 1. Table 3 summarizes the key parameters considered in the study.

There were statistically significant HQL differences according to asthma severity both in the overall PAQLQ score and in the three domain scores (Table 4). The difference between scores of children with the mildest and the most severe asthma types was highest in the activities domain (1.4 points) and lowest in the emotional domain (0.7 points). The overall score difference was 1.0 points, twice the amount considered clinically significant.

The PAQLQ scores underwent statistically significant NO variation (Table 5). The overall score was worst for children

TABLE 3.—Quantitative measurements.

FEV1	100.95 (17.28)
NO	46.3 (34.9)
PAQLQ (symptoms)	5.4 (1.4)
PAQLQ (emotions)	6.0 (1.1)
PAQLQ (activities)	5.0 (1.5)
PAQLQ (overall)	5.5 (1.2)

TABLE 4.—PAQLQ according to asthma severity.

	Symptoms domain	Emotions domain	Activities domain	Overall
Intermittent	5.9 (1.2)	6.5 (0.8)	5.6 (1.4)	6.0 (1.0)
Mild persistent	5.6 (1.3)	6.2 (0.9)	5.1 (1.5)	5.7 (1.1)
Moderate persistent	5.4 (1.3)	6.0 (1.1)	4.9 (1.5)	5.5 (1.2)
Severe persistent	4.7 (1.4)	5.8 (1.1)	4.2 (1.6)	5.0 (1.3)
<i>p</i>	<0.001	<0.001	<0.001	<0.001

with highest (5.5 [1.2]) and best for children with lowest (6.2 [1.0]). Again, the highest difference was in the activities domain (0.9 points).

Children with a good control of symptoms have a better HRQL, compared with children who reported a somewhat lower ACT score, as plotted in Table 6.

It seems that the PAQLQ does not discriminate HRQL in patients with a good lung function because no correlations were found between the questionnaire's score and FEV₁ percent of predicted.

DISCUSSION

The study results validate the connection between the Serbian PAQLQ version and the clinical and functional parameters normally used throughout follow-up visits of asthmatic children.

The present study showed that evaluated spirometric parameters (FEV₁) did not correlate with the quality of life measured by PAQLQ. The present finding is compatible with the findings of other investigators. A study conducted on 52 Italian children 7 to 17 years of age also presented with results that did not appear to discriminate HRQL in patients with good lung function (13).

The Serbian version of PAQLQ showed an overall good correlation with the clinical and functional indexes that are normally evaluated in follow-up visits of asthmatic patients. The PAQLQ appeared to be strongly related to asthma control and decreased with increasing asthma severity and increasing FeNO levels.

The fact that HRQL is worse in children with lower asthma control may seem apparent. The impairment in the symptoms and activity domain are explained with the present worry about asthma exacerbations, as well as with the level of concern coming from cough and feeling of chest tightness. It is logical that they limit the activities that might lead to asthma attacks.

The significant correlation between NO values and PAQLQ scores may derive from the seasonal burden because the measurements were performed during September and October. A Spanish study published in 2009, conducted through all four seasons of the year, reported a worse overall PAQLQ score in autumn (14).

TABLE 5.—PAQLQ according to FeNO values.

FeNO	Symptoms domain	Emotions domain	Activities domain	Overall
Low	6.2 (1.0)	6.5 (0.8)	5.9 (1.4)	6.2 (1.0)
Normal	5.8 (1.2)	6.3 (0.9)	5.4 (1.5)	5.9 (1.0)
Intermediate	5.6 (1.3)	6.2 (0.9)	5.2 (1.5)	5.8 (1.1)
High	5.4 (1.4)	6.0 (1.1)	5.0 (1.5)	5.5 (1.2)
<i>p</i>	<0.001	<0.001	<0.001	<0.001

TABLE 6.—PAQLQ according to the ACT score.

ACT score	Symptoms domain	Emotions domain	Activities domain	Overall
Under control	6.2 (1.0)	6.5 (0.8)	5.9 (1.4)	6.2 (1.0)
Not under control	5.4 (1.4)	6.0 (1.1)	5.0 (1.5)	5.5 (1.2)
<i>p</i>	<0.001	<0.001	<0.001	<0.001

In terms of our results, we found the PAQLQ valid for daily practice use when the quality of life in asthmatic children is concerned. However, the fact that PAQLQ seems to be unable to differentiate HRQL in children with good lung function raises a need for a more sensitive instrument. We also found the PAQLQ easy to administer and a very small percentage of children needed an additional explanation concerning the term "last week." Nevertheless, since this problem seems to be appearing in various other studies, it may be an issue in terms of deciding whether the children that needed additional explanations should be involved in further analysis along with children familiar with the term.

The most important fact that needs to be stressed is that this study is the first Serbian quality-of-life study conducted on a random choice of participants, as well as the first study involving FeNO measurements in relation to the quality of life in Serbian children with asthma.

CONCLUSIONS

The Serbian version of the PAQLQ is a feasible aid to clinical measurements and used in routine practice provides good insight into asthma control and severity.

DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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