

Original Article

QUALITY OF LIFE IN CHILDREN WITH ASTHMA AS A MARKER OF CLINICAL STABILITY

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Abstract

Introduction. In order to improve asthma control, in the last decades an emphasis has been put on the assessment of quality of life (QL). The aim of the study was to assess the role of the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) in order to assess the QL as a marker of clinical stability in asthmatic children.

Methods. A total of 64 asthmatic children aged 7-17 years treated in an outpatient/hospital facility within the University Children's Hospital in Skopje during 2 years were investigated. The children were assessed 3 times during a period of 3 months. To assess the asthma control the Clinical Stability Score (CSS) was used, and for the assessment of the QL the Macedonian version of the PAQLQ from Elizabeth Juniper was used, consisting of 23 questions organized into three domains: symptoms, activities, and emotions. The data were statistically analyzed using Statistica for Windows, version 7.0 and SPSS 14.

Results. An increase in the average values of the PAQLQ scores was established, which means better control of asthma by the end of the 3-month follow-up. There was no statistically significant difference in the QL changes and the age of asthmatic children regarding all three domains and the overall score. Better PAQLQ scores were detected in children with better CSS. A significant improvement of all the PAQLQ scores in the case of beginning the inhaled corticosteroid therapy during the study was found. According to CSS, all of the children were classified as stable (good QL) at the end of the study compared to 78% stability at the beginning of the study.

Conclusions. The Macedonian version of the PAQLQ can be used for assessment of the effects of anti-inflammatory therapy and for attainment of complete asthma control in children between 7 and 17 years of age.

Key words: asthma, children, quality of life

Introduction

Asthma, as the most common chronic disease in chil-

dren, could disturb patient's physical, emotional and social well-being. The aims of asthma management are not only elimination of the symptoms and exacerbation, normalization of the lung function, minimal side effects of the therapy, but also to improve quality of life [1]. World Health Organization (WHO) in 1993 defined QL as individual perception of life position, in the context of cultural value systems in which the individual lives, and in relation to individual's aims, expectations and standards [2]. Health-related quality of life (HRQL) as a component of overall quality of life is defined as a subjective assessment of the health, and usually expressed as discrepancy between what the patient wants and what the patient can do [3].

Clinical representation, lung function and variable bronchial hyperreactivity correlate with pathophysiological mechanisms of the asthma, and their monitoring is essential for assessment of the severity of the disease and the effects of anti-inflammatory therapy. However, conventional clinical measures cannot assess how the child feels and how the child functions in everyday life [4,5]. Children are distressed by the symptoms themselves, but also by any limitations in the activities and social life, which leads to emotional impairments [6].

QL in children with asthma is consequential to achieved control, assessed by the doctor by the frequency and the severity of clinical symptoms, lung activity and function [1]. Pediatric quality of life questionnaire (PAQLQ) is used for upgrade of disease control assessment and for assessment of psychosocial life of the patient [7].

The aim of the study was to assess the role of the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) in order to assess the QL as a marker of clinical stability in asthmatic school children.

Material and methods

A total of 64 asthmatic children aged 7-17 years, Macedonian being their native language, with asthma (defined by GINA) (8, 9) were randomly selected during treatment in an outpatient/hospital facility within the University Children's Hospital in Skopje during a period of 2 years. Before enrollment, parents were asked for their informed consent. Exclusion criteria were clinically manifested diseases (other than asthma and allergic rhinitis) which can affect HRQL, such as acute upper and lower respiratory tract infection within 4 weeks

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before or during the study or use of any other medication (antibiotics, mucolytics) except therapy for asthma (corticosteroids, bronchodilators, immunomodulators, antihistamines).

The study was a prospective one, and patients were assessed 3 times, at the beginning (after 7 running days), after 1 month and at the end (after 3 months). The patients were divided into 3 age groups: 7-10 years, 11-14 years and 15-17. At enrollment they received asthma diary and mini-Wright peak flowmeter (PEFM), and instructions how to record their symptoms, how to use bronchodilator and how to use PEFM. One week before each follow-up clinical visit, peak expiratory flow rates were measured 3 times each morning and evening before taking any medicine, and the highest one was registered, nearest to the predicted value for sex and age.

Asthma diary is a tool based on the asthma control questionnaire by Juniper [10]. It follows daytime symptoms (recorded at bedtime), incidents of nocturnal awakening/symptoms (recorded in the morning upon awakening), and the number of puffs of Salbutamol.

To assess the asthma control, clinical stability score (CSS) was used [11]. It assesses daytime asthma symptoms, nighttime asthma symptoms, limitation of daily activities, presence of expectoration, daily need for bronchodilators and FEV1 under 80% of the predicted value [12,13].

Pulmonary lung function testing was performed according to the American Thoracic Society for FEV1 and PEF, during each follow-up clinical visit. The results were expressed as the percentage of the predicted value for sex and age.

For the assessment of the QL, the Macedonian version

of the PAQLQ from Elizabeth Juniper was used, which is intended for children aged between 7-17 years. The questionnaire is translated and validated in 60 languages. It was also translated into Macedonian at MAPI RESEARCH INSTITUTE, Lion, France. The children were interviewed three times, at the beginning, after 7 running days, after 1 month, and at the end of the study (after three months). PAQLQ consisted of 23 questions that cover those problems identified by children with asthma as being most important and troublesome to them in their everyday life. They are organized into three domains: symptoms-10 questions, activities-5 questions, and emotions-8 questions. Three of the activities were individualized, chosen from 35 physical activities. Moreover, the form of an interview was used, and children completed the questionnaires without their parents' presence. Responses to each item in the PAQLQ were demonstrated on the 7-point Likert's scale, where 1 represented severe impairment and 7 represented no impairment.

Statistical analysis

The data were statistically analyzed with Statistica for Windows 7.0 and SPSS 14. Descriptive analyses are presented in multiple response tables. Significant differences were determined by parametric and nonparametric tests. Spearman's coefficient was used for assessment of the correlation between numerical series with concession of normal distribution. Student's t-test and One-way ANOVA were used for statistical differences between the scores. A p value of <0.05 was considered statistically significant.

Table 1. Changes of PAQLQ score according to age groups

Age groups	Changes of PAQLQ score (beginning-3 months)			
	Overall score	Activities	Symptoms	Emotions
7 - 10	0.39	0.55	0.77	0.31
11 - 14	0.39	0.63	0.64	0.35
15 - 17	0.52	0.75	0.82	0.52

Results

A total of 64 patients 7-17 years of age were enrolled in the study; 44 (68.6%) were males and 20 (31.25) females. Correlation between the sexes was 2.2:1. Ave-

rage age was 11.9±2.9 years.

There was no statistical correlation ($p < 0.05$) between QL score and the age of children, in all three domains, and overall score of QL (Table 1).

Gradient of correlation of PAQLQ analyzed according

Table 2. Changes of PAQLQ score according to type of asthma

Type of asthma	Changes of PAQLQ score (beginning-3 months)			
	Overall score	Activities	Symptoms	Emotions
	0.33	0.56	0.60	0.22*
	0.37	0.52	0.65	0.33*
	0.71	0.94	1.18	0.71*

One-way ANOVA $p < 0.05$

to the severity of asthma showed statistically significant differences only in the domain of emotions ($F=3.65$ $df=2$ $p=0.03$) (Table 2).

Changes in PAQLQ score according to the therapy with ICS (fluticason propionat) are presented in Table 3.

There were statistically significant differences ($p<0.0001$) in the changes in PAQLQ scores of the patients and therapy with ICS regarding all domains, as an overall score. Better results were obtained in children without therapy at the beginning of the study (Table 3).

Table 3. Changes of PAQLQ score according to therapy with ICS – fluticason propionat

Therapy with ICS	Overall score	Changes of PAQLQ score (beginning-3 months)		
		Activities	Symptoms	Emotions
Th. ICS Included previously	0.23*	0.35*	0.38*	0.21*
Th. ICS Included later	0.87*	1.27*	1.61*	0.72*

Student's t-test $p<0.0001$

A significant correlation (from $R=-0.23$ to $R=-0.08$) was shown between all PAQLQ domains and asthma diary, except in clinical visits at 1 month and at 3 months for the domain emotions (Table 4). For the domains activity and symptoms a statistical correlation was shown with FEV1 (from $R=0.27$ to $R=0.40$) and PEF (from $R=0.32$ to $R=0.44$), at the beginning and after 1 month. There was a statistical correlation between use of Salbutamol and all three domains (Table 4).

Table 4. Correlation between clinical parameters and PAQLQ score

Clinical parameters	PAQLQ score		
	Activities	Symptoms	Emotions
Beginning			
Asthma diary	-0.52*	-0.80*	-0.35*
FEV1	0.28*	0.40*	-0.10
PEF	0.37*	0.44*	0.01
Salbutamol	-0.49*	-0.70*	-0.33*
1 month			
Asthma diary	-0.50*	-0.60*	-0.23
FEV1	0.29*	0.27*	-0.07
PEF	0.42*	0.32*	0.06
Salbutamol	-0.37*	-0.33*	-0.19
3 month			
Asthma diary	-0.24*	0.41*	-0.12
FEV1	0.02	0.02	-0.03
PEF	0.20	-0.37*	0.24*
Salbutamol	-0.03*	-0.21	-0.10

* Spearman rank correlation $p<0.05$

Table 5. Association between PAQLQ score and CSS

PAQLQ Domains	CSS		R
	Stable	Unstable	
Beginning			
Activities	32.00	25.78	-0.48*
Symptoms	67.52	58.07	-0.64*
Emotions	51.74	46.07	-0.26*
1 month			
Activities	32.76	29.78	-0.38*
Symptoms	68.42	64.71	-0.43*
Emotions	52.64	50.57	-0.29*

* Spearman rank correlation $p<0.05$

For assessment of ability to detect changes in PAQLQ score, differences between stable and unstable patients were analyzed by CSS. A strong correlation was observed. Stable children had higher PAQLQ scores at both control periods and three domains (Table 5).

Discussion

For assessment of QL in children with asthma, we decided to use PAQLQ by Juniper, because it was validated and widely applied in many countries worldwide, and because it monitors the most important features of HRQL, physical (domain of activities and domain of symptoms) as well as psychological features.

Sensibility of PAQLQ as a specific instrument for QL measuring was analyzed to detect changes in the scores of PAQLQ in stable and unstable patients by CSS and it has shown a strong correlation. At the beginning of the study 78.13 were classified as stable, which indicate high percentage of well-controlled children with asthma. Unstable patients, after beginning of the treatment with ICS or step up of the dose had better control of the disease at the end of the study and became stable. Stable children had higher PAQLQ scores at both control periods in three domains. It shows high index of sensibility of PAQLQ on small but clinical important changes in HRQL in children with asthma and gives practical reliability and validity to the questionnaire. Subtle symptoms and activity restrictions were detectable in everyday life in children with asthma, which were not detectable with conventional clinical measures, and children were adapted because of their permanency. Similar results were reported by Poachanukoon *et al.* in Thailand study for validation of PAQLQ and they indicated the importance of assessing children with asthma [14]. There was no significant difference in changes of QL scores and the age of the children in all three domains, as overall score. It means that the questionnaire is sensitive for measuring of HRQL, independent of the age of the children. Therefore, the reliability and responsiveness across three age group (7-10, 11-14, 15-17) have

been examined by the author of the questionnaire, Juniper, and the consistent results provide evidence that PAQLQ has good measurement properties for all children [10]. Correlation of the score of PAQLQ in relation to therapy with ICS-fluticason propionat showed improvement in PAQLQ scores in all domains, as overall score after initiation of the therapy. It has been expected, since with the therapy, we achieved a better control of the disease, and also a better QL in these children, which has been confirmed in other studies [15-18].

Correlation between PAQLQ score and clinical parameters (asthma diary, FEV1, PEF, CSS), showed statistical significance with activities and symptoms domains and overall QL score, except for the domain of emotions. It seems that only stability of the asthma during extended period have positive impact on emotional life of patients. Our results coincide with the results of validation of the Swedish questionnaire (19), but do not correlate with the results of the Polish study. Authors of the latter study indicated a weak correlation between clinical parameters and the domain of activities, and between asthma diary and the domain of emotions [20].

Conclusions

We can conclude that the Macedonian version of Paediatric Asthma Quality of Life Questionnaire (PAQLQ) provides an opportunity for subtle assessment of symptoms, activity restriction and emotional impairment, especially in children adapted on asthma symptoms. A significant correlation has been determined between all clinical parameters and activities and symptoms domains. It can be used in all children with asthma from 7-17 years of age, for monitoring of the ICS effect, for assessment of clinical stability and it can also help in achieving a complete control of the disease. It makes a stronger bond between doctors and patients with asthma in better understanding and acceptance of the disease, in creating a common treatment plan, which is an integral part for successful assessment of any chronic disease. PAQLQ is simple and easy to use and gives a new dimension in assessment of children with asthma.

Conflict of interest statement. None declared.

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