Assessment of health-related quality of life in asthmatic children and their caregivers

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ABSTRACT

Background: Asthma is a common disease in Egypt that puts a serious burden on children’s health-related quality of life (HRQOL) and their primary caregiver. Objectives: To assess HRQOL of asthmatic children and their caregivers and to identify the most important determinants that adversely affect (HRQOL) of them. Materials and Methods: This cross-sectional study included 112 pairs of asthmatic patients (7-17 years old) and their primary caregivers attending the outpatient pediatric and chest clinics at Benha University and chest Hospitals. Pediatric asthma QOL questionnaire (PAQLQ), pediatric asthma caregiver’s QOL questionnaire (PACQLQ), asthma control questionnaire, and questionnaire of main determinants of asthma were used. Results: The overall PAQLQ score ranged between 1.27 and 5.73 (3.27 ± 1.05), and the overall PACQLQ score ranged between 1.18 and 5.85 (3.21 ± 1.17). There was a significant positive correlation between caregiver individual and overall QOL scores and their children (individual and overall QOL scores). Maternal educational level, social score, and asthma control score were the determinants of overall PAQLQ score for asthmatic children (95% confidence interval [CI] = −0.79 ± 0.04, 0.03 ± 0.08, −0.33 ± 0.004, respectively, R² = 0.46). Social score, asthma control score of the children, and parental smoking were the predictors of overall caregiver QOL score (95% CI = 0.003 ± 0.06, −0.40 ± 0.01, −1.09 ± 0.04, respectively, R² = 0.32). Conclusion: Childhood asthma significantly adversely affects the QOL of the affected children and their caregivers.

KEY WORDS: Childhood Asthma; Caregivers; Quality of Life

INTRODUCTION

Asthma is a highly prevalent chronic respiratory disease affecting 300 million individual worldwide.[1] The prevalence is increasing in most countries especially among children and adolescents.[2] The WHO has estimated that 16 million disability-adjusted life years are lost annually due to asthma, representing 1% of the total global disease burden. Pediatric asthma accounts for a large proportion of childhood hospitalizations; absenteeism from school and missed work days by parents.[3] Asthma is a significant burden not only in terms of health-care costs but also of lost productivity and reduced participation in family life. Annual worldwide deaths from asthma have been estimated at 250,000 deaths.[4]

Asthma is relatively common in Egypt with 7.7% prevalence among school children in the Nile Delta region,[5] particularly among children from less wealthy families.[6] Asthma imposes a significant burden not only in terms of health care costs but also of lost productivity and reduced participation in family life. It is the first cause of absence from school and the third cause of hospitalization of children under 15 years of age.[7] Mortality and morbidity are not the only important outcome
variables to be considered when we evaluate child health interventions; a quality of life (QOL) perspective can identify sensitive child and adolescent issues that may be affected by illness or disability of treatment.[8]

Health related quality of life (HRQOL) is defined as the functional effects of an illness and its consequent therapy on a patient, as perceived by the patient.[9] KSA reported that asthma caused an interruption in daily life that influences physical, emotional and social activities of asthmatic children.[10]

In addition to evaluation of the patient, the integral assessment of asthma requires the evaluation of caregiver HRQOL since the latter is correlated to management of the disease and the presence of certain morbidity indicators: School absenteeism, reduced daily life activities, and an increased number of visits to the Emergency Service.[11]

MATERIALS AND METHODS

This cross-sectional study conducted on asthmatic children their main caregivers (who had spent at least >75% of their time caring for their patients, mainly mothers)[12] in two outpatient clinics (Benha University Hospital and Benha Chest Hospital) from 1st January to 31st August 2015.

Inclusion criteria include all patients aged (7-17) years old with intermittent or persistent asthma and their caregivers who visited the clinic during the study period and accept to participate.

Exclusion criteria were children with other chronic illness affecting major organ systems such as cardiac, renal, and hematological.

Sample size was calculated using the formula below which is used when comparing means.[13]

\[ N = \frac{4\sigma^2 (Z_{\text{crit}} + Z_{\text{powr}})^2}{D^2} \]

\[ N = \text{Total sample size which is the sum of the sizes of both comparison groups} \]
\[ \sigma = \text{the standard deviation of each group, assumed to be equal in both groups} \]
\[ Z_{\text{crit}} = \text{the desired significance criterion} = 0.05 \]
\[ Z_{\text{powr}} = \text{Desired statistical power} = 80\% \]
\[ D = \text{the minimum expected difference} = 0.5 \]

So the sample size was 125 pair (asthmatic child and his caregiver).

Of those, 112 pair who completed the questionnaires; 50 pair from chest hospital and 62 pair from Benha University Hospital (50 pair from pediatric clinic and 12 pair from chest clinic).

Every 3rd clinically diagnosed asthmatic child and his caregiver, who met the inclusion criteria was taken (systemic random sample), and data were collected using pediatric asthma QOL questionnaire (PAQLQ), pediatric asthma caregiver’s QOL questionnaire (PACQLQ), and asthma control questionnaire (ACQ) (obtained from QOL Technologies Ltd., after written approval from Jilly Styles [Personal Assistant to Professor Elizabeth Juniper, McMaster University Canada]).

PAQLQ measures the functional (physical, emotional, and social) problems that were most troublesome to asthmatics (23 questions in three domains [symptoms (5), activity limitation 2, generic (general), 3 patient-specific]) and emotional function (8). Children were asked to recall their experiences during the previous week and to respond to each question on a 7-point scale (7 = no impairment, 1 = severe impairment). Three of the activity questions were “patient-specific” which means that each child identified and scored three activities which were limited by his asthma.

It has been fully validated for use in both clinical practice and clinical trials. It has got both discriminative properties (reliability and cross-sectional validity) and strong evaluative properties (responsiveness and longitudinal validity).[14]

PACQLQ

Caregivers were asked to recall their experiences during the previous week (time specification) and to score impairment on a 7-point scale (7 = no impairment, 1 = severe impairment).[15] It has 13 items in 2 domains (activity limitation [4Q] and emotional function [9Q]).

Health related QOL (HRQOL) will be considered good or bad according to the total score (7 [no impairment], 5-6.9 [mild impairment] both scores are considered good QOL, 3-4.9 [moderate impairment], 1-2.9 [sever impairment] both scores are considered bad QOL).

It is composed of: Sociodemographic factors including social score,[16] disease-related factors duration, level of control by specific ACQ-6 composed of six questions only (Night - time waking, symptoms on waking, activity limitation, shortness of breath, wheeze and rescue short-acting β2-agonist use) with 7-point scale answer (0 = totally controlled, 6 = extremely poorly controlled) with a time specification of 1 week. The questionnaire is self-administered for children ≥11 years and interviewer administered for those (7-10) years.[17]

Patients’ scores were then classified into three prescribed groups as having well-controlled asthma (ACQ-6 score <0.75); partially - controlled asthma (ACQ-6 score 0.75-1.5), or uncontrolled asthma (ACQ-6 score >1.5).
Furthermore, disease adverse events related to patient as school absenteeism due to asthma, hospital admission and its number, intensive care unit admission and its number, difficulty in consultation, difficulty in obtaining prescribed asthma drugs and presence of drug side effects.

Weight and height of the patients were taken to calculate body mass index (BMI).

The study design and methodology was approved by the Ethical Committee of Scientific Research, Faculty of Medicine, Benha University. An informed written consent in Arabic language was obtained from all caregivers of the participants who agreed to their child’s participation in the study, and verbal assent was taken from the children.

Data were analyzed using SPSS (Statistical Package for Social Sciences) version 16. Qualitative data were presented as count and percentage while quantitative data as mean ± standard deviation. Independent t-test was used to compare data between two groups and one-way ANOVA was used when more than two groups were to be compared. Correlations among QOL score and different study parameters were determined using Pearson’s test. Multivariate analysis was performed by multiple linear regression to find out the significant determinants of QOL of asthmatic children and their caregivers. For all tests, \( P < 0.05 \) is considered significant.

### RESULTS

#### Sociodemographic Characteristics

A total of 112 pair of children aged 7-17 years old (10.7) and their caregiver were included. With equal percentage of female and male patients (50%) each. Most of them (78.5%) were in primary school; more than half of the patients lived in rural areas. The majority of fathers had intermediate education/high education (51.8%). Semiprofessional work was the main paternal occupation (39.3%). All caregivers were mothers. The highest percentage of mothers had secondary education (41%), and most of them (68.8%) were housewives. The majority of patients (54.5%) belonged to middle social class. History of parental smoking included 42% of patients and 42% also had family history of asthma and fathers were the most common relative with asthma (38.3).

Table 2 demonstrates that the mean overall PAQLQ score (3.27 [1.05]) was nearly similar to the score of symptoms, emotional function, and physical domain.

#### Effect of Sociodemographic Factors on QOL for the Studied Children

Table 3 reveals that symptoms domain scores were significantly higher among adolescent patients (3.59 [1.03]); emotional domain scores were significantly higher among male group (3.57 [1.18]), patients who live in rural areas had significantly higher scores in overall, symptoms and emotional domain scores (3.52, 3.47 and 3.65, respectively). Symptoms domain scores were significantly higher among patients with preparatory education (3.65) (\( P < 0.05 \)).

Table 1: Sociodemographic and personal characteristics of the studied patients and their caregivers

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number (112) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean age 10.7)</td>
<td></td>
</tr>
<tr>
<td>7-12 (children)</td>
<td>86 (76.8)</td>
</tr>
<tr>
<td>13-17 (adolescents)</td>
<td>26 (23.2)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56 (50)</td>
</tr>
<tr>
<td>Female</td>
<td>56 (50)</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>48 (42.9)</td>
</tr>
<tr>
<td>Rural</td>
<td>64 (57.1)</td>
</tr>
<tr>
<td>Child education</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>88 (78.5)</td>
</tr>
<tr>
<td>Preparatory</td>
<td>21 (18.8)</td>
</tr>
<tr>
<td>Secondary</td>
<td>3 (2.7)</td>
</tr>
<tr>
<td>Father education</td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>4 (3.6)</td>
</tr>
<tr>
<td>Read and write/basic education</td>
<td>14 (12.5)</td>
</tr>
<tr>
<td>Secondary education</td>
<td>36 (32.1)</td>
</tr>
<tr>
<td>Intermediate/high education</td>
<td>58 (51.8)</td>
</tr>
<tr>
<td>Father occupation</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>2 (1.8)</td>
</tr>
<tr>
<td>Unskilled manual worker</td>
<td>12 (10.7)</td>
</tr>
<tr>
<td>Skilled manual worker</td>
<td>19 (17.0)</td>
</tr>
<tr>
<td>Trades/business</td>
<td>23 (20.5)</td>
</tr>
<tr>
<td>Semiprofessional/clerk</td>
<td>44 (39.3)</td>
</tr>
<tr>
<td>Professional</td>
<td>12 (10.7)</td>
</tr>
<tr>
<td>Mother education</td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>77 (68.7)</td>
</tr>
<tr>
<td>Employed</td>
<td>35 (31.3)</td>
</tr>
<tr>
<td>Social class*</td>
<td></td>
</tr>
<tr>
<td>Low social class</td>
<td>40 (35.7)</td>
</tr>
<tr>
<td>Middle social class</td>
<td>61 (54.5)</td>
</tr>
<tr>
<td>High social class</td>
<td>11 (9.8)</td>
</tr>
<tr>
<td>Parental smoking</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>65 (58)</td>
</tr>
<tr>
<td>Positive</td>
<td>47 (42)</td>
</tr>
<tr>
<td>Family history of asthma</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>65 (58)</td>
</tr>
<tr>
<td>Asthmatic relative</td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>10 (8.9)</td>
</tr>
<tr>
<td>Father</td>
<td>18 (16.1)</td>
</tr>
<tr>
<td>Siblings</td>
<td>13 (11.6)</td>
</tr>
<tr>
<td>Others (grandparents)</td>
<td>6 (5.4)</td>
</tr>
</tbody>
</table>

Table 1: Sociodemographic and personal characteristics of the studied patients and their caregivers

AQ1

AQ2

AQ3

AQ4

AQ5

AQ6

AQ7

AQ8

AQ9

AQ10

AQ11

AQ12

AQ13

AQ14

AQ15

AQ16

AQ17

AQ18

AQ19

AQ20

AQ21

AQ22

AQ23

AQ24

AQ25

AQ26

AQ27

AQ28

AQ29

AQ30

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AQ41

AQ42

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AQ48

AQ49

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AQ51

AQ52

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AQ57

AQ58

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AQ60

AQ61

AQ62

AQ63

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AQ66

AQ67

AQ68

AQ69

AQ70

AQ71

AQ72

AQ73

AQ74

AQ75

AQ76

AQ77

AQ78

AQ79

AQ80

AQ81

AQ82

AQ83

AQ84

AQ85

AQ86

AQ87

AQ88

AQ89

AQ90

AQ91

AQ92

AQ93

AQ94

AQ95

AQ96

AQ97

AQ98

AQ99

AQ100
patients with highly educated mothers (3.68, 3.6 and 3.87, respectively) \((P < 0.05)\). Patients with uncontrolled asthma were significantly associated with low QOL scores (Table 4).

Table 5 shows that overweight/obese patients significantly had lowest QOL scores and highest asthma control scores \((P < 0.05)\).

**Linear Regression for Determinants of QOL for Children with Bronchial Asthma**

Maternal education, social score, and asthma control score were the determinants of overall PAQLQ score for children with bronchial asthma which was used as the dependent variable in this model (Table 6).

**QOL Scores for the Studied Caregivers**

Table 7 reveals that there was a significant direct correlation \((P < 0.05)\) between caregivers (individual scores and overall score of QOL) and their children (individual and overall score of QOL). Social score, asthma control score of children, and parental smoking were the predictors of overall caregiver QOL score which was used as the dependent variable in this model (Table 8).

**DISCUSSION**

HRQOL measures have proved to be beneficial for the patient-health professional encounter and communication.\(^{[18]}\)

Studied patients showed impaired QOL, with mean score 3.27 (1.27-5.73). Similarly, Al-Gewely et al. and Perosa et al.\(^{[9,19]}\) reported that participants showed impaired QOL (3.5-4.7). This was lower than Sweden\(^{[20]}\) and Brazil.\(^{[21]}\)

This study found that the physical domain score was the most affected QOL domains which come in accordance with\(^{[19,22]}\).

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**Table 2:** Pediatric asthma quality of life questionnaire (PAQLQ) scores

| Quality of life scores (PAQLQ) (112) Mean±SD | Range 
|--------------------------------------------|-------
| Overall                                   | 3.27±1.05 | 1.27-5.73 
| Physical                                  | 3.20±1.07 | 1.20-6.00 
| Symptoms                                  | 3.28±1.10 | 1.00-6.20 
| Emotional                                 | 3.34±1.17 | 1.38-6.38 

*Total score is 7 (as the score increase, means better quality of life). PAQLQ: Pediatric asthma quality of life questionnaire, SD: Standard deviation

**Table 3:** Comparison between patient’s overall and domain scores of QOL regarding their age, sex, residence, education and social class

<table>
<thead>
<tr>
<th>Patients QOL domains</th>
<th>Overall</th>
<th>Physical</th>
<th>Symptoms</th>
<th>Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children (86)</td>
<td>3.18 (1.05)</td>
<td>3.20 (1.11)</td>
<td>3.09 (1.10)</td>
<td>3.15 (1.12)</td>
</tr>
<tr>
<td>adolescents (26)</td>
<td>3.58 (1.00)</td>
<td>3.52 (0.94)</td>
<td>3.59 (1.03)</td>
<td>3.64 (1.30)</td>
</tr>
<tr>
<td>(t)-test</td>
<td>1.72</td>
<td>1.34</td>
<td>2.02</td>
<td>1.50</td>
</tr>
<tr>
<td>(P) value</td>
<td>0.08</td>
<td>0.1</td>
<td>0.04*</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (56)</td>
<td>3.42 (1.02)</td>
<td>3.31 (1.01)</td>
<td>3.40 (1.08)</td>
<td>3.57 (1.18)</td>
</tr>
<tr>
<td>Female (56)</td>
<td>3.13 (1.07)</td>
<td>3.25 (1.14)</td>
<td>3.01 (1.10)</td>
<td>3.11 (1.12)</td>
</tr>
<tr>
<td>(t)-test</td>
<td>1.52</td>
<td>0.29</td>
<td>1.87</td>
<td>2.07</td>
</tr>
<tr>
<td>(P) value</td>
<td>0.1</td>
<td>0.7</td>
<td>0.06</td>
<td>0.04*</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban (48)</td>
<td>3.52 (1.04)</td>
<td>3.45 (1.12)</td>
<td>3.47 (1.04)</td>
<td>3.65 (1.17)</td>
</tr>
<tr>
<td>Rural (64)</td>
<td>3.09 (1.02)</td>
<td>3.15 (1.03)</td>
<td>3.01 (1.11)</td>
<td>3.11 (1.12)</td>
</tr>
<tr>
<td>(t)-test</td>
<td>2.2</td>
<td>1.45</td>
<td>2.22</td>
<td>2.48</td>
</tr>
<tr>
<td>(P) value</td>
<td>0.03*</td>
<td>0.1</td>
<td>0.02*</td>
<td>0.01**</td>
</tr>
</tbody>
</table>

**Patients education**

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Physical</th>
<th>Symptoms</th>
<th>Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary (88)</td>
<td>3.20 (1.06)</td>
<td>3.20 (1.09)</td>
<td>3.14 (1.10)</td>
<td>3.26 (1.18)</td>
</tr>
<tr>
<td>Preparatory (21)</td>
<td>3.68 (0.91)</td>
<td>3.64 (0.99)</td>
<td>3.65 (0.99)</td>
<td>3.76 (1.08)</td>
</tr>
<tr>
<td>Secondary (3)</td>
<td>2.69 (0.91)</td>
<td>3.00 (0.53)</td>
<td>2.23 (1.16)</td>
<td>2.83 (1.06)</td>
</tr>
<tr>
<td>(F)-test</td>
<td>2.34</td>
<td>1.53</td>
<td>3.16</td>
<td>1.86</td>
</tr>
<tr>
<td>(P) value</td>
<td>0.1</td>
<td>0.2</td>
<td>0.04*</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**Social class**

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Physical</th>
<th>Symptoms</th>
<th>Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (40)</td>
<td>3.17±1.08</td>
<td>3.11±1.09</td>
<td>3.16±1.14</td>
<td>3.23±1.15</td>
</tr>
<tr>
<td>Middle (61)</td>
<td>3.27±0.96</td>
<td>3.35±0.92</td>
<td>3.21±1.03</td>
<td>3.30±1.18</td>
</tr>
<tr>
<td>High (11)</td>
<td>3.84±1.09</td>
<td>3.96±1.28</td>
<td>3.47±1.24</td>
<td>4.07±1.07</td>
</tr>
<tr>
<td>(F)-test</td>
<td>1.94</td>
<td>3.20</td>
<td>0.38</td>
<td>2.48</td>
</tr>
<tr>
<td>(P) value</td>
<td>0.1</td>
<td>0.04*</td>
<td>0.6</td>
<td>0.08</td>
</tr>
</tbody>
</table>

QOL: Quality of life
Table 4: Comparison between patient’s overall and domain scores of QOL regarding their mother’s educational level and asthma control level

<table>
<thead>
<tr>
<th>Patients QOL domains</th>
<th>Overall</th>
<th>Physical symptoms</th>
<th>Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate (11)</td>
<td>2.9±0.70</td>
<td>2.97±0.70</td>
<td>2.83±0.77</td>
</tr>
<tr>
<td>Read and write/basic education (23)</td>
<td>3.17±1.15</td>
<td>3.18±1.14</td>
<td>3.12±1.17</td>
</tr>
<tr>
<td>Secondary/diploma (46)</td>
<td>3.28±0.72</td>
<td>3.42±0.70</td>
<td>3.22±0.68</td>
</tr>
<tr>
<td>Intermediate institute/faculty (32)</td>
<td>3.68±0.10</td>
<td>3.59±1.16</td>
<td>3.60±1.23</td>
</tr>
</tbody>
</table>

F-test value 0.04*
P value 0.01*

Asthma control level
Controlled (7) 4.16±1.29 4.11±1.16 4.07±1.45 4.30±1.38
Partially controlled (11) 3.55±0.81 3.58±0.81 3.54±0.85 3.52±1.16
Un controlled (91) 3.16±1.1 3.18±1.06 3.08±1.05 3.23±1.09

F-test value 0.02* P value 0.05*

*The lower asthma control score the better control (<0.75 in controlled asthma). PAQLQ: Pediatric asthma quality of life questionnaire, SD: Standard deviation

Table 5: Comparison between overall PAQOL score and asthma control score of the patients regarding their body weight

<table>
<thead>
<tr>
<th>??</th>
<th>Overall PAQLQ score (112)</th>
<th>Asthma control score (109)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body weight underweight</td>
<td>3.13±1.07, 29</td>
<td>4.06±0.80, 28</td>
</tr>
<tr>
<td>Normal weight</td>
<td>3.39±1.05, 71</td>
<td>2.71±1.37, 70</td>
</tr>
<tr>
<td>Overweight/obese</td>
<td>2.95±0.91, 112</td>
<td>4.79±0.99, 11</td>
</tr>
</tbody>
</table>

F-test value 0.02* P value 0.001**

Table 6: Multiple linear regression analysis for the predictors of overall PAQLQ score

<table>
<thead>
<tr>
<th>Overall PAQLQ score</th>
<th>Beta</th>
<th>T</th>
<th>P value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td>−0.12</td>
<td>−0.95</td>
<td>0.34</td>
<td>−0.78±0.28</td>
</tr>
<tr>
<td>Father education</td>
<td>0.04</td>
<td>−0.32</td>
<td>0.75</td>
<td>−0.35±0.26</td>
</tr>
<tr>
<td>Mother education</td>
<td>0.34</td>
<td>−2.24</td>
<td>0.02</td>
<td>−0.79±0.04</td>
</tr>
<tr>
<td>Social score</td>
<td>0.70</td>
<td>4.65</td>
<td>0.000</td>
<td>0.03±0.08</td>
</tr>
<tr>
<td>Asthma control score</td>
<td>−0.21</td>
<td>−2.05</td>
<td>0.04</td>
<td>−0.33±0.004</td>
</tr>
<tr>
<td>Duration of the disease</td>
<td>−0.05</td>
<td>−0.43</td>
<td>0.66</td>
<td>−0.07±0.05</td>
</tr>
<tr>
<td>Admission to the hospital</td>
<td>−0.08</td>
<td>−0.68</td>
<td>0.49</td>
<td>−0.17±0.08</td>
</tr>
</tbody>
</table>

R²= 0.46, Adjusted R²= 0.39, F= 6.59, P value<0.001.
PAQLQ: Pediatric asthma quality of life questionnaire, CI: Confidence interval

similarly activity limitation domain was the most affected domain in previous studies measuring QOL among asthmatic children in Poland[23] and Brazil.[21]

This may be inferred to that physical function such as full participation in school sports activity, running and strenuous exercise is limited by asthma. Furthermore, the nature of childhood period is involvement into different physical activities which lead to the appearance of limitation in activities.

In this study, young age group of patients adversely affected physical domain score being worse in asthmatic children than asthmatic adolescents; this study revealed that there were higher scores of overall and individual QOL domains among asthmatic adolescents than asthmatic children, both total and single domain scores improve as the age of children increases.[24,25] Adolescents are able to handle the burden of the disease than younger children owing to cognitive and emotional developmental variations in grasping the content measured.

Female sex adversely affected QOL with higher scores of all PAQLQ domains among asthmatic males. Girls are more anxious about their health, over-report their symptoms, show their deficiencies than boys and incorporate their conditions and the associated treatment regimens into their social and personal identities.[20,26,27]

On the other side, some studies found the reverse and explain their findings by high prevalence, mortality, airway resistance and wide range of activities among males than females.[9,28]

Asthmatic urban dwellers got higher scores of QOL than rural ones, persons lived in small towns may have experienced more prolonged crises due to more limited access to health services, especially emergency, with higher rates of mortality.[19,29] while another study could not demonstrate a significant difference in the QOL scores between rural and urban residence.[19]

Mother educational level affected overall and emotional function score of QOL with better scores among patients with highly educated mothers. High maternal education has been associated with the ability to care properly, greater appreciation of scientific knowledge, and ability to articulate resources for the needs of the child.[9,19]
The level of asthma control significantly affected QOL domain scores as children and adolescents with impaired asthma control were found to have more impaired HR-QOL compared with children and adolescents with controlled asthma. Similarly, researchers found that a child whose asthma symptoms are not well controlled might experience increased levels of anxiety and/or depression, it is believed that emotional reaction as coping strategy influences HRQOL negatively.\(^{[27,30]}\)

Overall PAQLQ score of overweight/obese patients is insignificantly lower than normal and underweight patients while asthma control score is impaired among overweight/obese asthmatic children and adolescents. QOL in children with both excessive body weight and asthma was lower than expected on the basis of the sum of the separate effects of asthma alone or excessive body weight alone. Treatment in children should be aimed at both asthma and excessive body weight. Also, response to asthma medications is influenced by an increasing BMI.\(^{[31,32]}\) Obesity has a significant adverse effect on asthma control.\(^{[33,34]}\)

This study found that there was a direct correlation between caregiver QOL domain scores and QOL domain scores of their children. Obviously, the more impaired QOL in parents as a result of their child’s asthma affects all aspects of family life and it may cause psychological difficulties for his/her parents or other family members, and may affect their interpersonal relationships.\(^{[10,35-37]}\)

In contrast to these results, results by Farnik et al. and Walker et al.\(^{[23,38]}\) found no correlation between PAQLQ score and PACQLQ score.

**Recommendations**

Regular evaluation of HRQOL is recommended to be incorporated into routine asthma care. There is a need to develop asthma management strategies for improving HRQOL.

A study limitation is related to its conduction among a sample of asthmatic children who had particular characteristics excluding those with other chronic conditions other than asthma. All of our patients were outpatients undergoing regular check-ups in general and specialized tertiary hospitals. Therefore, our patients were not representative of all asthmatics, which restrict the possibility of extrapolating our findings to the asthmatic population in general. Another limitation of our study is related to its cross-sectional design, and hence the long-term effects of asthma on QOL of asthmatic children could not be evaluated.

**CONCLUSION**

This study showed that the most affected QOL domain for asthmatic children was physical limitation domain, maternal educational level, social score, and asthma control score were the main predictors of overall PAQOL score. The most affected caregiver QOL domain was emotional function domain and social score, asthma control score of the child and parental smoking.

Patient sex, residence, body weight, difficulty in consultation, and difficulty in obtaining prescribed asthma drugs were the main predictors of asthma control score.

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REFERENCES


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AQ1: Kindly cite table 1 in text part.
AQ2: Kindly provide significant value.
AQ3: Kindly cite significant value.
AQ4: Kindly provide column head.
AQ5: Kindly provide last updated date.