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Original Research Article

An Assessment of Quality of Life in Adolescent (10-19 years) Patients with Asthma through Physical, Social and Emotional Aspects

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Abstract:

Background: Asthma is a prevalent hyperactive airway disease with physical and emotional impact. Asthma is a prevalent non-communicable disease identified by chronic airway inflammation affecting children and adults worldwide. Differential symptoms are wheezing, dyspnea, chest discomfort, and persistent cough in addition to airflow limitation, especially at night and in the early morning. The pattern and intensity of the symptoms and airflow limitation vary over time, with exercise, allergen, and exposure to irritants, weather changes, and respiratory infections, leading to exacerbation of asthma. Although asthma cannot be cured, exacerbations can be prevented by adequate patient counseling and proper management. Severe asthma is associated with considerable health-related quality of life (HRQoL). The aim of this study is to assess the quality of life through physical, emotional, social and occupational aspects and evaluate the factors affecting HRQoL in patients with asthma.

Materials and Methods: A total of 90 adolescents, aged 10-19 years old and clinically diagnosed with asthma and classified according to Guidelines by the Global Initiative for Asthma in adolescents (GINA) [20], were recruited at the Pediatric Asthma Clinic of the Hospital over a period of 1 year. Patients were randomly recruited at the time of their visit to the clinic, during a period spanning 10 months. All patients were evaluated by pulmonologists, who confirmed a documented clinical history of asthma and follow-up visits, and were classified into 4 asthma severity groups according to GINA guidelines: Intermittent, mild, moderate and severe ; because of the random recruitment, no effort was done to equalize the size's groups. Criteria of eligibility were: a) Be a Indian citizen; b) Clinical history of at least one year of asthma; c) Aged from 10 to 19 years old.

Result: 90 asthmatic children (mean age12.98± 1.7, M:F = 60:30) were evaluated. All 3 domains (activity limitation, symptoms, and emotion) of QOL affected equally and all domains had shown significant improvement after 4 weeks of standard asthma treatment. Children with severe asthma had activity limitation (P = 0.073) and no improvement in emotional score (P = 0.057). Children with uncontrolled asthma showed deterioration in QOL (P = 0.50). There was no difference in QOL among urban and rural residing children, family history of asthma/allergy, and socioeconomic status of parents (P > 0.05).

Conclusion: Although the quality of life and anxiety scores of children with asthma did not differ from the control group, good asthma control in adolescents with asthma may improve QoL. Adolescence is a sensitive age group, and requires meticulous consideration by caregivers. The parents' awareness of anxiety and other psychological symptoms may help them to cope with the challenges.

Keywords: Adolescent, Anxiety, Asthma, Psychological, Quality of life.

Introduction

Asthma is a prevalent non-communicable disease identified by chronic airway inflammation affecting children and adults worldwide. [1] Differential symptoms are wheezing, dyspnea, chest discomfort, and persistent cough in addition to airflow limitation, especially at night and in the early morning. The pattern and intensity of the symptoms and airflow limitation vary over time, with exercise, allergen, and exposure to irritants, weather changes, and respiratory infections, leading to exacerbation of asthma. Although asthma cannot be cured, exacerbations can be

prevented by adequate patient counseling and proper management. [2] Since it is a chronic condition, patients must utilize medications, adhere to treatment recommendations, and follow the written action for the self-control of asthma.

Even though clinical and physiological variables are used to assess asthma, they may not be enough to assess the patient's interpretation of their state of health. Thus, quality of life (QoL) is a significant endpoint as it reflects the impact of the disease from the patient's perception. Improper asthma management can have a substantial effect on the QoL, including physical, emotional, occupational, and social impacts, where the symptoms differ from one patient to another. [3] QoL is explained as the perception that patients have of their position in life in relation to their aims, expectations, concerns, and standards. [4] The patient's wellbeing is the standard clinical outcome to assess QoL and prevents morbidity from uncontrolled disease. [5]

In asthma, QoL is assessed by using the Mini asthma quality of life questionnaire (Mini AQLQ); it is affected by the frequency of exacerbation, manifested through influence on daily work, deteriorated school performance, reduced social and other activities. [6] Other asthma-related factors that negatively affect the patient's QoL are not fully understood, and must be identified and appropriately assessed to improve the QoL. Female gender, older age, obesity, comorbid diseases such as depression, is prognostic factors associated with poor QoL. [7] Poor QoL in asthmatic patients is associated with detrimental consequences resulting in a high prevalence of behavioral and emotional difficulties, depression, and poor academic performance (18). Moreover, avoiding triggers of asthma, and enhancing patient QoL, are effective measures to reduce morbidity and mortality.

In Lebanon, asthma treatment in adults falls far short of the goals specified in the international asthma guidelines, similarly to many other countries around the world. This inadequate control of the illness is associated with disease progression and poor QoL. In Lebanon, several studies were conducted on asthmatic patients that tackled the preschool asthma risk factor scale, evaluated association between different factors and both wheezing and asthma development, assessed asthma control, and evaluated the influence of diet and obesity on asthma. [8] However, data on patients' QoL is still scarce, particularly among adults. [9] Therefore, the purpose of this study is to assess the effect of asthma on physical, emotional, social aspects of QoL among adolescent asthmatic patients.

Materials and Methods

A total of 90 adolescents, aged 10-19 years old and clinically diagnosed with asthma and classified according to Guidelines by the Global Initiative for Asthma in adolescents (GINA) [20], were recruited at the Pediatric Asthma Clinic of the Hospital over a period of 1 year. Patients were randomly recruited at the time of their visit to the clinic, during a period spanning 1year. All patients were evaluated by pulmonologists, who confirmed a documented clinical history of asthma and follow-up visits, and were classified into 4 asthma severity groups according to GINA guidelines: Intermittent, mild, moderate and severe [20]; because of the random recruitment, no effort was done to equalize the size's groups. Criteria of eligibility were: a) Be a Indian citizen; b) Clinical history of at least one year of asthma; c) Aged from 10 to 19 years old.

Patients were excluded if they presented other disorders or diseases, such as acute respiratory tract infections in the past two weeks, or if they were tobacco smokers. The study protocol was approved by the Institutional Review Board (IRB) of the college. All patients and control subjects in this study signed an informed consent approved by the IRB.

Study design and assessment of quality of life

Patients were invited to participate in this survey and an informed written consent was signed from the parent/guardian before administering the questionnaire. The study protocol was approved by the Institutional Review Board (IRB) of the college. Patients were interviewed individually, face to face, in a dedicated room whenever possible, to ensure confidentiality and privacy. The interviewer read the questions keeping in mind the comprehensive capability of the patient/subject. Both the PAQLQ and the Mini-AQLQ overlap in many questions; thus, the applied questionnaire contained all the questions of the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) and complemented with the Mini-AQLQ, for questions pertaining to environmental triggers, which are absent in the PAQLQ [4,6]. Both questionnaires are highly reliable and well validated tools translated into many languages including kannada, Hindi, and cover the most important and bothersome aspects affecting the daily lives of asthmatics [3,6]. Taking into consideration that Indian have distinct cultural, social activities and religious habits compared to Western countries, authors decided to include three exploratory, non-validated questions, to evaluate the potential negative impact of asthma on: a) The performance of their religious customs; b) Whether asthma would affect the choice of a activity/sports; and c) Whether asthma would affect their work efficiency.

Statistical analysis

HRQL score values for each question (variable) ranged from 1 (indicating maximum impairment) to 7 (no impairment at all) [4,6]. Both the mean scores

and the total sums of scores for each question were calculated. The overall score, which is the mean of all responses per asthma severity group was also calculated. For each question item, to determine possible significant differences in HRQL mean scores among the four asthma severity groups, one-way ANOVA was performed; when significant differences were detected (two-tailed P<0.05), Dunnett's multiple comparison tests were performed by comparing the HRQL mean scores of the intermittent group versus those of the mild, moderate and severe groups. Equality of population variances was confirmed through Bartlett's tests in all cases. Further, a score analysis by categories (physical, emotional, social, symptoms, environmental) was performed: For each category, the HRQL scores of corresponding questions were summed up and the means calculated; to determine significant differences among the 4 asthma severity groups, one-way ANOVA tests were done; Dunnett's multiple comparison tests were performed by comparing the intermittent group's score versus those of the mild, moderate and severe asthma groups. Significant differences were considered at two-tailed P values <0.05 in all cases. Data were analyzed using SPSS and/or GraphPad Prism software packages.

Results

During the study period, 90 asthmatic children aged 10–19 years of age reported to us. Baseline characteristics of study participants are summarized in Table 1. Mean PAQLQ (S) was improved significantly after 4 weeks of treatment. It was improved significantly in all 3 domains of PAQLQ (S) symptoms, activity limitations, and emotional functions [Table 2].

Table 1: Baseline characteristic of participants

Parameter	(N=90)
Mean age (years)	12.98±1.7
Male:Female (ratio)	60:30 (2:1)
Mean weight (kg)	31.5±8.8
Height (cm)	140.4±14.6
Mean BMI (kg/m2)	17.30±4.33
Underweight	8
Overweight	19
Severity of asthma	
Mild	42
Moderate	54
Severe	4
Urban/rural	66/24
Family history of asthma/allergy	40
Socioeconomic status*	
Upper	26
Middle	62
Lower	12

Table 2: Primary outcome of study-change in pediatric asthma quality of life questionnaire with standardized activities score 4 weeks' post treatment

PAQLQ (S)	Mean±SD		P
	Pretreatment	Post treatment	
Mean PAQLQ score	6.24±0.65	7.18±0.72	<0.0001
Mean symptoms score	6.04±0.72	7.12±0.72	<0.0001
Mean activities limitations score	6.5±0.92	7.6±0.85	<0.0001
Mean emotions score	6.08±0.92	6.7±2.15	<0.0001

Table 3: Secondary outcome of study-change in pediatric asthma quality of life questionnaire with standardized activities score 4 weeks' post treatment as per severity of asthma

Severity of asthma	PAQLQ (S)	Pretreatment	Mean±SD	Post treatment	P
Mild asthma (n=38)	Mean PAQLQ score	6.29±0.61		7.18±0.8	<0.0001
	Mean symptoms score	5.99±0.68		6.98±0.72	<0.0001
	Mean activities limitations score	6.45±0.92		7.8±0.92	<0.0001
	Mean emotions score	6.5±0.91		7.3±2.16	<0.0001
Moderate asthma (n=50)	Mean PAQLQ score	6.21±0.71		7.18±0.78	<0.0001

	Mean symptoms score	6.2±0.78		7.4±0.71	<0.0001
	Mean activities limitations score	6.3±0.92		7.6±0.82	<0.0001
	Mean emotions score	5.98±0.92		6.9±2.18	0.000
Severe asthma (n=2)	Mean PAQLQ score Mean symptoms score	5.98±0.61 5.9±0.28		7.08±0.33 7±0.53	>0.05 >0.05
	Mean activities limitations score	6.31±2.3		7.21±0.65	>0.05
	Mean emotions score	5.95.18		6.73±0.72	>0.05

Table 4: Secondary outcome of study-change in pediatric asthma quality of life questionnaire with standardized activities score 4 weeks' post treatment as per control of asthma

Control of asthma	PAQLQ (S)	Pretreatment	Mean±SD	Post treatment	P
Controlled (n=58)	Mean PAQLQ score	6.25±0.68		7.18±0.73	<0.0001
	Mean symptoms score	5.99±0.72		7.01±0.72	<0.0001
	Mean activities limitations score	6.38±0.95		7.38±0.93	<0.0001
	Mean emotions score	6.28±0.94		7.02±2.3	<0.0001
Partially controlled (n=30)	Mean PAQLQ score	6.2±0.63		7.18±0.72	<0.0001
	Mean symptoms score	6.07±0.68		7.28±0.64	<0.0001
	Mean activities limitations score	6.33±0.92		7.55±0.71	<0.0001
	Mean emotions score	5.88±0.88		6.24±1.01	<0.0001
Un-controlled (n=2)	Mean PAQLQ score Mean symptoms score	6.80±0.51 6.9±0.75		6.88±0.38 6.6±1.3	>0.05 >0.05
	Mean activities limitations score	6.5±0.75		6.8±0.18	>0.05
	Mean emotions score	7.0±0.0		7.42±0.58	>0.05

We have done subgroup analysis as per severity of asthma at presentation and control of asthma at 4 weeks of treatment [Tables 3 and 4]. Children presented with severe asthma had activity limitation and no change in emotion function even after 4 weeks of treatment [Table 3]. Children who had no control on asthma after 4 weeks of treatment had no improvement of QOL in all domains [Table 4]. Mean PAQLQ (S) score was remained unchanged in underweight children after 4 weeks' post treatment ($P = 0.15$), however, overweight and normal weight children had significant improvement in QOL ($P < 0.05$). Pretreatment total PAQLQ score was higher in males than females though nonsignificant ($P > 0.05$) but posttreatment total PAQLQ scores were significantly higher in males than females ($P = 0.01$). There was no difference in QOL among urban and rural residing children in both pretreatment and posttreatment ($P > 0.05$). QOL was also not affected by family history of asthma/allergy and socioeconomic status of parents

Discussion

Asthma is one of the most common chronic lung disease that requires regular treatment and follow-up. Asthma has considerable physical and psychological effects not only on children but also on their parents. In the comparison of PedsQL both child's and parent's perspective and anxiety levels we couldn't find any significant difference between study groups. In the asthma group the quality of life was associated with asthma severity; all of the PedsQL scores were significantly lower in the uncontrolled asthma group. Asthma severity was also correlated with anxiety, as the uncontrolled asthma group reached the highest STAI-C trait scores. Moreover, in the asthma group when we compared the clinical scores by gender, girls with asthma had significantly lower physical PedsQL and ACT scores than boys.

Mandatory stay-at home, economic burden, school and business closures contributed to negative emotions and cognition. The obscurities at the beginning of the pandemic caused health concerns, fear and anxiety in people especially those with underlying chronic diseases. Many patients with chronic diseases postponed hospital admissions and routine health controls due to risk of contamination. A new healthcare system telemedicine consultation came into our lives during the pandemic which prevents the risk of disease transmission to patients. [11,12]

Long-lasting school closures, reduced air pollution and wearing masks may prevent the transmission of viral infections which may trigger asthma exacerbations. Furthermore, a recent study including adults and children with asthma depicted the lower expression of ACE2 receptors in those with allergic sensitization. These preventive effects may be related to similar QoL and anxiety asthmatic adolescents with the control group. This difference may be related to the diversity in the control status of asthmatic patients. In our study, the control status of asthma was negatively

associated with QoL of asthmatic adolescents. Careful management of asthma may be especially important in uncontrolled patients, may need special care both for physical and psychosocial wellbeing.

Separation from classmates due to school closures, prolonged exposure to internet, online distance learning, health and future concerns led anxiety during the pandemic. In previous studies, well-controlled childhood asthma was associated with no increased risk of anxiety and depression comparing with healthy controls. In our study, most of the patients in the asthma group were classified as well-controlled and partly controlled asthma, this may have had an effect on the absence of difference in anxiety scores between the asthma and control group. [13] Similar to our findings Stridsman reported the female gender and poor asthma control to be associated with low QoL scores.

Although, sometimes there may be differences in perception of QoL between parents and adolescents, in our study group, QoL results of adolescents and parents were correlated with each other.

STAI-C trait and STAI-C state scores of our patients showed an inverse correlation with PedsQL scores. This shows us that asthmatic adolescents with lower QoL may experience higher anxiety and thus physicians must be aware of this possibility to evaluate the presence and help management of anxiety among this patient group.

Asthma control test results of our patients were positively correlated with PedsQL scores, showing that asthma control was correlated with QoL. The effect of disease control has been previously reported in the literature, for increasing the QoL of asthmatic adolescents and the first step is to take measures for providing asthma control. [14]

Asthma control and QoL are important disease outcomes for asthmatic patients. Illness perceptions (cognitive and emotional representations of the illness) and medication beliefs are essential determinants of medication adherence, and subsequently disease control and QoL in adolescents. Kosse have found a strong positive correlation between disease control and QoL in 243 adolescents with asthma. They also mentioned that all illness perceptions items were correlated with disease control and QoL, and medication adherence was correlated to medication beliefs, disease control, and QoL.

In our study population, the PedsQL PH and ACT scores were significantly lower in girls than boys. This gender difference in QoL is in accordance with the literature. Asthmatic girls are reported to have a worse perception of the disease in spite of similar or even better pulmonary function tests and similar medications. This effect of gender is not fully understood, however there have been some probable explanations. Female sex hormones are hypothesized to affect asthma outcomes. Furthermore, females are shown to have lower threshold for healthcare contact and they seem to need more encouragement and education for correct use of inhalers. Caregivers are reported to help their male children better than girls and this may also have an impact. [15]

Moreover, studies have shown the high rate of mental problems in adolescents during the pandemic, and female gender was related with high risk for anxiety and depression symptoms. [16-20] Whatever the underlying reason, adolescent girls have more severely affected quality of life and this indicates to the need for more attention for this patient group during the management of asthma.

In our study, asthma control was declining with increasing age. This may be the effect of adolescent behaviour getting more obvious with increasing age and getting more freedom from parent control for older adolescents.

Conclusion

Although the quality of life and anxiety scores of children with asthma did not differ from the control group, good asthma control in adolescents with asthma may improve QoL. Adolescence is a sensitive age group, and requires meticulous consideration by caregivers. The parents' awareness of anxiety and other psychological symptoms may help them to cope with the challenges.

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Ethical Approval: The study was approved by Institutional Ethics committee

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