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Quality of Life in Children and Adolescents with Bronchial Asthma in a Tertiary Care Hospital: Cross Sectional Study

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ABSTRACT

Bronchial asthma adversely impacts children's Quality of Life (QoL) across physical, emotional, and social domains. This study assesses QoL in pediatric asthma patients and identifies factors contributing to impaired well-being. A cross-sectional study was conducted among 200 children aged 6-18 years with physician-diagnosed asthma at a tertiary hospital. QoL was assessed using the Pediatric Asthma Quality of Life Questionnaire (PAQLQ). Asthma severity, exacerbation frequency, school absenteeism, hospitalizations, and socioeconomic status were recorded. Statistical analysis included t-tests, ANOVA, and logistic regression. Moderate (42.5%) and severe (22.5%) asthma were common. QoL scores declined significantly with increased severity ($p < 0.001$), with the activity limitation and emotional domains most affected. Predictors of impaired QoL included severe asthma (OR = 5.21), frequent exacerbations (OR = 4.38), hospitalizations (OR = 3.95), absenteeism >10 days (OR = 3.65) and low socioeconomic status (OR = 2.12). Bronchial asthma substantially impairs QoL in children and adolescents, especially in severe cases. Interventions targeting asthma control, psychological support, and socioeconomic disparities are essential for improving pediatric QoL.

INTRODUCTION

Bronchial asthma is a prevalent chronic respiratory condition among children and adolescents, characterized by airway inflammation and hyperresponsiveness leading to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing^[1,2]. Beyond its physical manifestations, asthma significantly impacts the Quality of Life (QoL) of young individuals, affecting their daily activities, academic performance and psychological well-being^[3-5].

Asthma can impose considerable limitations on the everyday activities of children and adolescents. Physical exertion often acts as a trigger for asthma symptoms, leading many affected individuals to avoid participation in sports and recreational activities. This reduction in physical activity not only hampers social interactions but also contributes to decreased physical fitness. A study analyzing the QoL of children with asthma highlighted that those residing in urban areas reported lower QoL scores compared to their rural counterparts, suggesting that environmental factors and lifestyle differences may influence activity levels^[6].

The chronic nature of asthma can adversely affect school attendance and academic performance. Frequent asthma exacerbations may lead to increased absenteeism, resulting in missed instructional time and challenges in keeping up with coursework. Research indicates that untreated asthma correlates with higher absenteeism and poorer academic outcomes in children, underscoring the importance of effective asthma management to support educational attainment^[7].

The psychological impact of asthma on young individuals is profound. Adolescents with asthma are at a higher risk of developing emotional problems, including lower self-esteem, anxiety, and depressive symptoms, compared to their non-asthmatic peers. The constant concern over potential asthma attacks and the necessity to manage a chronic condition can contribute to heightened stress levels. Moreover, studies have found that a significant proportion of adolescents with asthma report feelings of depression and have higher rates of emergency department visits, indicating a complex interplay between emotional well-being and asthma management^[8,9].

Family environment and support systems play a critical role in the QoL of children and adolescents with asthma. Positive family dynamics, characterized by understanding and support, can mitigate the psychological burden of the disease. Conversely, dysfunctional family interactions may exacerbate stress and negatively impact disease management. Encouraging social interactions and creating conditions for the appropriate development of social competencies are essential in reducing stress associated with social interactions^[6].

The aim of this study is to assess the quality of life (QoL) in children and adolescents with bronchial asthma and to evaluate the impact of asthma on their daily activities, school performance, psychological well-being and social interactions. The study also aims to identify factors influencing QoL in these patients and explore potential interventions to improve their overall well-being.

MATERIALS AND METHODS

Study design and setting: This cross-sectional observational study was conducted over a period of six months in 2024 at the Pediatric Pulmonology Department of a tertiary care hospital. The study aimed to assess the Quality of Life (QoL) in children and adolescents diagnosed with bronchial asthma. Ethical approval was obtained from the institutional ethics committee before initiating the study. Written informed consent was obtained from the parents or legal guardians of all participants, and assent was obtained from children above the age of 7 years.

Study population: Children and adolescents aged 6 to 18 years diagnosed with bronchial asthma based on the Global Initiative for Asthma (GINA) guidelines were included in the study. Patients with other chronic respiratory illnesses, congenital heart disease, neurological disorders, or developmental delays that could impact their QoL were excluded.

Sample size calculation: The sample size was calculated based on a previous study that assessed the QoL in pediatric asthma patients, considering a prevalence of impaired QoL of 40%, a confidence interval of 95%, and a margin of error of 5%. The estimated sample size was 200 participants to ensure adequate statistical power.

Data collection: Participants were recruited during their routine outpatient visits or hospital admissions for asthma exacerbations. Data collection was conducted using a structured questionnaire and a validated Pediatric Asthma Quality of Life Questionnaire (PAQLQ). The questionnaire was administered through face-to-face interviews with children and their caregivers.

Demographic and clinical data:

- Age, gender, socioeconomic status
- Family history of asthma or allergies
- Duration and severity of asthma (mild, moderate, severe)
- Frequency of asthma exacerbations in the past year
- Hospitalizations and emergency room visits due to asthma

Quality of life assessment:

Pediatric asthma quality of life questionnaire (PAQLQ):

This validated tool assesses asthma-related QoL across three domains:

- **Symptoms:** Frequency and severity of asthma symptoms
- **activity limitation:** Impact on physical and social activities
- **emotional functioning:** Feelings of worry, frustration, or embarrassment due to asthma

Each question was scored on a 7-point Likert scale (1 = extremely bothered, 7 = not bothered at all), with higher scores indicating better QoL.

Psychosocial and academic impact:

- School absenteeism due to asthma
- Participation in sports and outdoor activities
- Anxiety and depressive symptoms using the Strengths and Difficulties Questionnaire (SDQ)
- Parental perception of their child's QoL

Statistical analysis: Data were entered and analyzed using SPSS version 25.0. Continuous variables were expressed as Mean±standard deviation (SD), while categorical variables were presented as frequencies and percentages. Differences in QoL scores between groups (e.g., mild vs. severe asthma) were analyzed using the independent t-test or ANOVA for continuous variables and the chi-square test for categorical variables. Multivariate logistic regression was performed to identify predictors of impaired QoL, including asthma severity, frequency of exacerbations, and psychosocial factors. A p<0.05 was considered statistically significant.

Ethical considerations: The study followed ethical guidelines, ensuring participant confidentiality and voluntary participation. All collected data were anonymized, and no identifying information was recorded. The study adhered to the principles of the Declaration of Helsinki for research involving human subjects.

RESULTS AND DISCUSSION

A total of 200 children and adolescents diagnosed with bronchial asthma participated in this study. The results are presented in tables, each analyzing different aspects of the study, including demographic

characteristics, asthma severity, quality of life (QoL) scores, and factors associated with impaired QoL (Table 1).

The majority of participants were in the 11-18 years age group (57.5%), with a slight male predominance (56% male, 44% female). Most participants belonged to middle or low socioeconomic backgrounds. Regarding asthma severity, 42.5% had moderate asthma, while 22.5% had severe asthma. A positive family history of asthma was observed in 60% of cases, indicating a strong genetic predisposition (Table 2).

Asthma exacerbations were significantly higher in children with moderate and severe asthma (p<0.001). A striking 88.9% of severe asthma cases experienced three or more exacerbations in the past year, compared to only 21.5% in mild asthma cases. Similarly, hospitalizations were more frequent in severe asthma cases (66.7%), indicating the burden of disease severity. School absenteeism was significantly higher in children with moderate and severe asthma, affecting 62.2% of severe asthma patients (Table 3).

Children with severe asthma had significantly lower QoL scores across all domains compared to those with mild or moderate asthma (p<0.001). The activity limitation domain showed the greatest decline in scores for severe asthma patients (mean = 3.2±1.4), indicating a major impact on physical activities. Similarly, the emotional well-being domain was notably lower in severe cases, suggesting a higher psychological burden.

Multivariate logistic regression analysis revealed that severe asthma had the strongest association with impaired QoL (OR = 5.21, p<0.001). Frequent exacerbations (≥3 per year) and hospitalizations were

Table 1: Demographic and clinical characteristics of the study population

Characteristic	No.	Percentage
-----N = 200-----		
Age group		
6-10 years	85	(42.5)
11-18 years	115	(57.5)
Gender		
Male	112	(56)
Female	88	(44)
Socioeconomic status		
Low	65	(32.5)
Middle	90	(45)
High	45	(22.5)
Asthma severity		
Mild	70	(35)
Moderate	85	(42.5)
Severe	45	(22.5)
Family history of asthma		
Yes	120	(60)
No	80	(40)

Table 2: Asthma exacerbations, hospitalizations, and school absenteeism

Variables	Mild (n = 70)	Moderate (n = 85)	Severe (n = 45)	p-value
Asthma exacerbations (last year)				
0-2 episodes	55 (78.5)	30 (35.3)	5 (11.1)	<0.001*
≥3 episodes	15 (21.5)	55 (64.7)	40 (88.9)	
Hospitalizations (last year)				
No	65 (92.8)	60 (70.5)	15 (33.3)	<0.001*
Yes	5 (7.2)	25 (29.5)	30 (66.7)	
School Absenteeism (>10 days/year)	8 (11.4)	32 (37.6)	28 (62.2)	<0.001*

(*p<0.05 is statistically significant)

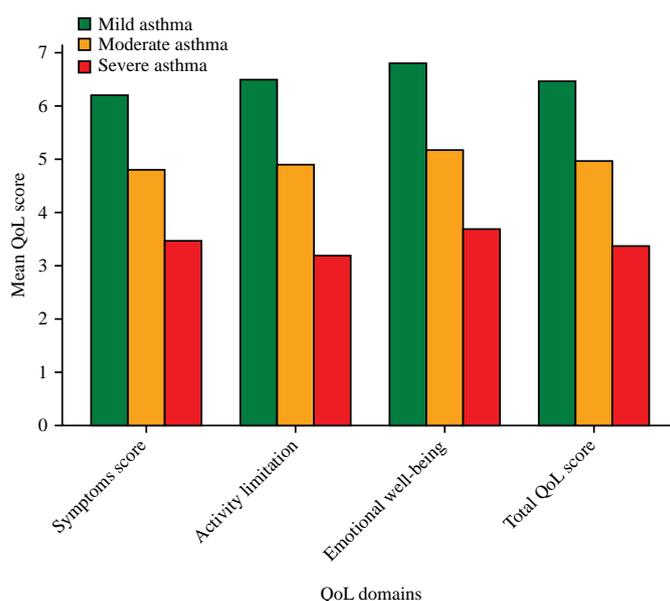


Fig. 1: Mean QoL scores by asthma severity

Table 3: Quality of life (QoL) scores in different domains

QoL domain	Mild asthma (Mean±SD)	Moderate asthma (Mean±SD)	Severe asthma (Mean±SD)	p-value
Symptoms score	6.2±1.1	4.8±1.3	3.5±1.5	<0.001*
Activity limitation	6.5±0.9	4.9±1.2	3.2±1.4	<0.001*
Emotional well-being	6.8±0.8	5.2±1.1	3.7±1.3	<0.001*
Total QoL score	6.5±0.9	5.0±1.1	3.4±1.4	<0.001*

Table 4: Logistic regression analysis for predictors of impaired QoL

Variables	Odds ratio (OR)	95% CI	p-value
Severe asthma	5.21	2.78-9.82	<0.001*
≥3 Exacerbations/year	4.38	2.20-7.45	<0.001*
Hospitalization (yes)	3.95	2.15-6.98	<0.001*
School Absenteeism (>10 days)	3.65	2.10-6.45	<0.001*
Low Socioeconomic Status	2.12	1.22-3.98	0.015*

(*p<0.05 is statistically significant)

also strong predictors of poor QoL. School absenteeism (>10 days per year) was significantly associated with reduced QoL (OR = 3.65, p<0.001). Additionally, children from low socioeconomic backgrounds had a higher likelihood of impaired QoL (OR = 2.12, p = 0.015), suggesting that economic factors play a role in asthma management and quality of life (Table 4).

Figure 1 illustrates the mean QoL scores across different asthma severities. Severe asthma cases consistently show the lowest QoL scores in all domains, particularly in activity limitation and emotional well-being. Children with mild asthma have significantly better scores, indicating fewer restrictions and a better overall QoL.

Bronchial asthma significantly impacts the Quality of Life (QoL) in children and adolescents, affecting their physical activities, emotional well-being, and social interactions. Our study corroborates existing literature, highlighting that increased asthma severity correlates with diminished QoL across multiple domains.

The symptoms domain of the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) revealed a marked decline in QoL scores among participants with

severe asthma. This finding aligns with previous research indicating that uncontrolled asthma symptoms are a primary contributor to reduced QoL in pediatric patients. Effective medical treatment and counseling have been shown to significantly improve QoL in asthmatic children, particularly in the activity and symptom domains, though the emotional domain often shows no significant improvement^[7].

In the activity limitation domain, our study observed substantial restrictions in physical and social activities among children with severe asthma. This is consistent with findings that asthma can impair QoL in its various domains and may affect the daily lives of the affected population. Asthma can affect the level of quality of life (QoL) of both children and their caregivers^[10].

The emotional well-being domain scores were notably lower in participants with severe asthma, indicating heightened psychological distress. This observation is supported by studies reporting that a significant proportion of adolescents with asthma experience feelings of depression and anxiety, which are associated with increased emergency department visits and school absenteeism^[9].

Our multivariate logistic regression analysis identified several predictors of impaired QoL, including severe asthma, frequent exacerbations, hospitalizations, school absenteeism, and low socioeconomic status. These findings are in line with research demonstrating that asthma severity and poor control are linked to diminished QoL in children^[10]. Additionally, the association between low socioeconomic status and poorer QoL highlights the need for targeted interventions to address health disparities in asthma management.

The transition from adolescence to young adulthood has been identified as a critical period where health-related QoL decreases in individuals with asthma. This decline underscores the necessity for continuous and developmentally appropriate healthcare support during this transition to maintain optimal QoL^[11].

Furthermore, the role of family dynamics cannot be overlooked. Studies suggest that self-esteem and family support serve as protective factors for the well-being of adolescents with bronchial asthma. Therefore, involving family members in asthma management plans may enhance adherence to treatment and improve overall QoL^[12].

It is also noteworthy that the QoL of children with asthma is comparable to that of children with other chronic diseases such as nephrotic syndrome, chronic kidney disease, and epilepsy. This comparison underscores the significant burden asthma places on pediatric patients and the importance of comprehensive management strategies^[12].

CONCLUSION

Our study reinforces the substantial impact of bronchial asthma on the QoL of children and adolescents. Addressing factors such as disease severity, frequency of exacerbations and socioeconomic challenges is crucial in developing effective interventions aimed at enhancing the well-being of this vulnerable population.

RECOMMENDATIONS

Based on our findings, it is essential to implement multidisciplinary strategies to improve the quality of life (QoL) in children and adolescents with bronchial asthma. Regular asthma education programs for both patients and caregivers should be emphasized to enhance disease awareness and medication adherence. Early and aggressive asthma control measures, including the use of personalized asthma action plans, should be prioritized to reduce exacerbations and hospitalizations. Schools should be actively involved in asthma management by ensuring asthma-friendly policies and providing necessary support to affected students. Psychological support should also be integrated into asthma care, as mental health significantly influences QoL. Additionally, targeted interventions for children from lower

socioeconomic backgrounds should be developed to address healthcare disparities. Future research should focus on long-term interventions and their impact on improving QoL in pediatric asthma patients.

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