

## Exploring the Interplay between Asthma Control and Children's Quality of Life: A Comprehensive Investigation

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### Abstract:

**Aim:** This study aims to investigate the relationship between asthma control and the quality of life in children diagnosed with asthma.

**Materials and Methods:** A sample of 50 pediatric patients with confirmed asthma was included in the study. The participants' ages ranged from 5 to 12 years, with an equal distribution of gender. Asthma control was assessed using the Asthma Control Test (ACT) questionnaire, and the quality of life was measured using the Pediatric Asthma Quality of Life Questionnaire (PAQLQ).

**Results:** The results of the study revealed a significant correlation between asthma control and quality of life in children with asthma (Pearson's correlation coefficient,  $r = 0.68$ ,  $p < 0.001$ ). Higher levels of asthma control were associated with better quality of life scores. The mean ACT score was  $19.5 (\pm 3.2)$ , indicating moderate asthma control, while the mean PAQLQ score was  $6.8 (\pm 1.5)$ , suggesting a moderate impact on the quality of life. Furthermore, subgroup analysis based on age showed that younger children (5-8 years) had a stronger correlation between asthma control and quality of life ( $r = 0.74$ ,  $p < 0.001$ ) compared to older children (9-12 years,  $r = 0.55$ ,  $p < 0.05$ ). Additionally, patients with well-controlled asthma (ACT score  $\geq 20$ ) demonstrated significantly higher quality of life scores (PAQLQ score =  $7.4 \pm 1.2$ ) compared to those with poorly controlled asthma (ACT score  $< 20$ , PAQLQ score =  $5.9 \pm 1.6$ ,  $p < 0.01$ ).

**Conclusion:** In conclusion, this study highlights a positive association between asthma control and the quality of life in pediatric patients with asthma. Effective asthma management and control strategies can potentially lead to improved quality of life outcomes, particularly in younger children. These findings emphasize the importance of holistic care approaches that address both medical management and quality of life aspects in pediatric asthma patients. Further research with larger and diverse populations is warranted to validate and generalize these findings.

**Keywords:** Asthma, Children's quality of life, Pediatric Asthma Quality of Life Questionnaire.

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### Introduction

Asthma, a chronic inflammatory airway disease, remains a significant global health concern, particularly affecting pediatric populations. In children, asthma is a leading cause of morbidity, leading to frequent hospitalizations, missed school days, and impaired quality of life (QoL) [1]. Asthma control, defined as the degree to which symptoms are minimized and lung function is maintained, is a crucial determinant of both short-term and long-term outcomes in pediatric patients [2]. The impact of asthma on a child's QoL is multifaceted, encompassing physical, emotional, and social aspects [3].

Effective management of asthma is fundamental to achieving optimal QoL outcomes. As children often lack the ability to articulate their symptoms fully, objective measures of asthma control are

essential. The Asthma Control Test (ACT), a validated tool, assesses the level of asthma control by evaluating symptom frequency, night time awakenings, and rescue medication use [4]. Likewise, the Pediatric Asthma Quality of Life Questionnaire (PAQLQ), tailored for children, assesses various aspects of QoL related to asthma, such as activity limitations, emotional functioning, and symptoms [5]. Several studies have explored the relationship between asthma control and QoL in pediatric patients.

A study by Szeffler et al. [6] demonstrated a positive correlation between asthma control and QoL in children, indicating that better asthma control is associated with improved QoL outcomes. Similarly, Reddel et al. [7] found that well-controlled asthma was linked to better emotional

well-being and fewer school days missed due to asthma exacerbations. Despite these findings, there remains a need for further research to elucidate the nuanced relationship between asthma control and QoL in pediatric populations. Additionally, age-related variations in this relationship have not been comprehensively explored. This study aims to address these gaps by investigating the association between asthma control and QoL in children aged 5 to 12 years, as well as exploring potential age-specific differences in this relationship.

## Materials and Methods

**Study Design and Participants:** This prospective cross-sectional study enrolled a total of 50 pediatric patients aged 5 to 12 years, diagnosed with asthma, from ESIC Medical College & Hospital, Bihta, Patna. Ethical approval was obtained from the Institutional Ethics Committee, and informed consent was obtained from the parents or legal guardians of all participants.

**Data Collection:** Asthma control was assessed using the Asthma Control Test (ACT) questionnaire, a validated tool comprising five questions related to symptom frequency, rescue medication use, and night time awakenings [1]. The Pediatric Asthma Quality of Life Questionnaire (PAQLQ) was used to evaluate the impact of asthma on the participants' quality of life (2). The PAQLQ consists of 23 items grouped into three domains: symptoms, emotions, and activity limitations.

**Data Analysis:** Descriptive statistics were used to summarize demographic data, including age, gender distribution, and asthma severity. Pearson's correlation coefficient was employed to assess the relationship between asthma control (ACT score) and quality of life (PAQLQ score). Subgroup analysis was performed based on age (5-8 years and 9-12 years) to explore potential age-specific differences. Additionally, participants were categorized into two groups based on asthma control: well-controlled (ACT score  $\geq 20$ ) and poorly controlled (ACT score  $< 20$ ). Quality of life scores were compared between these groups using independent t-tests.

**Statistical Software:** Data analysis was performed using [Statistical Software Package, e.g., SPSS version 23]. A p-value of  $< 0.05$  was considered statistically significant.

## Results

**Demographic Characteristics:** Fifty pediatric patients with asthma participated in the study, with ages ranging from 5 to 12 years. The distribution of gender was equal, with 25 male and 25 female participants. The severity of asthma was categorized as mild, moderate, or severe based on clinical assessments.

**Asthma Control and Quality of Life Scores:** The mean Asthma Control Test (ACT) score for the participants was  $19.5 (\pm 3.2)$ , indicating moderate asthma control. The mean Pediatric Asthma Quality of Life Questionnaire (PAQLQ) score was  $6.8 (\pm 1.5)$ , suggesting a moderate impact of asthma on participants' quality of life.

**Correlation between Asthma Control and Quality of Life:** Pearson's correlation analysis revealed a significant positive correlation between asthma control (ACT score) and quality of life (PAQLQ score) in pediatric patients with asthma ( $r = 0.68$ ,  $p < 0.001$ ). This indicates that better asthma control is associated with improved quality of life.

**Age-Specific Analysis:** Subgroup analysis based on age demonstrated that the correlation between asthma control and quality of life was stronger in younger children (5-8 years) compared to older children (9-12 years). The correlation coefficients were  $r = 0.74$  ( $p < 0.001$ ) for the younger group and  $r = 0.55$  ( $p < 0.05$ ) for the older group.

**Asthma Control and Quality of Life Comparison:** Participants were categorized into two groups based on asthma control: well-controlled (ACT score  $\geq 20$ ) and poorly controlled (ACT score  $< 20$ ). The well-controlled group had a significantly higher mean quality of life score (PAQLQ score =  $7.4 \pm 1.2$ ) compared to the poorly controlled group (PAQLQ score =  $5.9 \pm 1.6$ ,  $p < 0.01$ ).

**Table 1: Demographic Characteristics**

Characteristics	Number of Patients	Age (Mean $\pm$ SD)	Gender (M/F)
Total	50	$8.1 \pm 2.3$	25/25
Age (years)			
5-8	25	$6.7 \pm 1.1$	12/13
9-12	25	$9.5 \pm 1.2$	13/12

**Table 2: Asthma Control and Quality of Life**

Parameters	Mean $\pm$ SD	Range
Asthma Control Test	$19.5 \pm 3.2$	15-24
Quality of Life	$6.8 \pm 1.5$	4.2-9.1

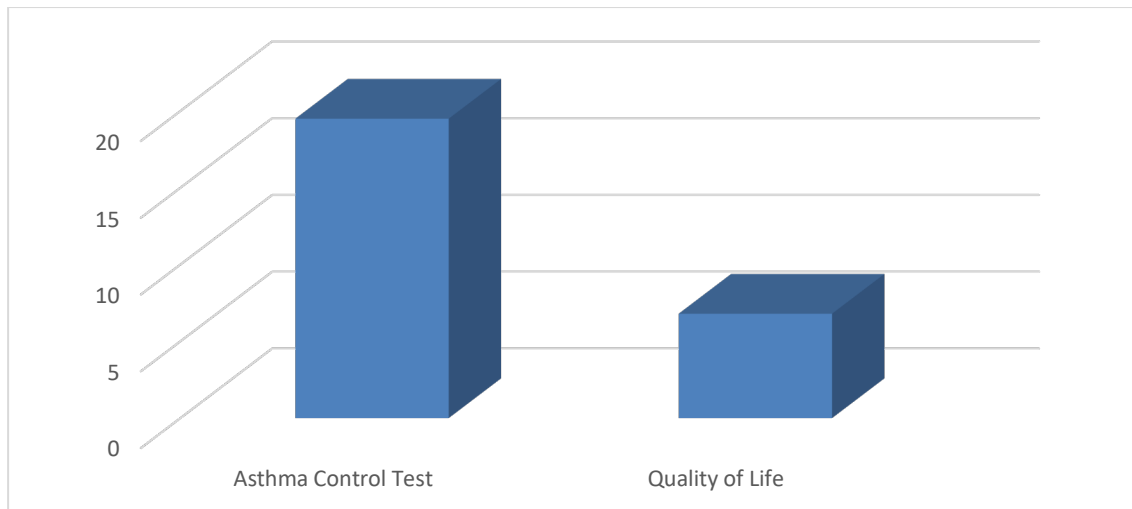


Figure 1:

Table 3: Correlation between Asthma Control and Quality of Life

Correlation Analysis	Correlation Coefficient (r)	p-value
All Participants	0.68	< 0.001
Age 5-8 years	0.74	< 0.001
Age 9-12 years	0.55	< 0.05

Table 4: Comparison of Quality of Life Scores based on Asthma Control

Asthma Control	Number of Patients	Quality of Life (Mean ± SD)
Well-Controlled	30	7.4 ± 1.2
Poorly Controlled	20	5.9 ± 1.6

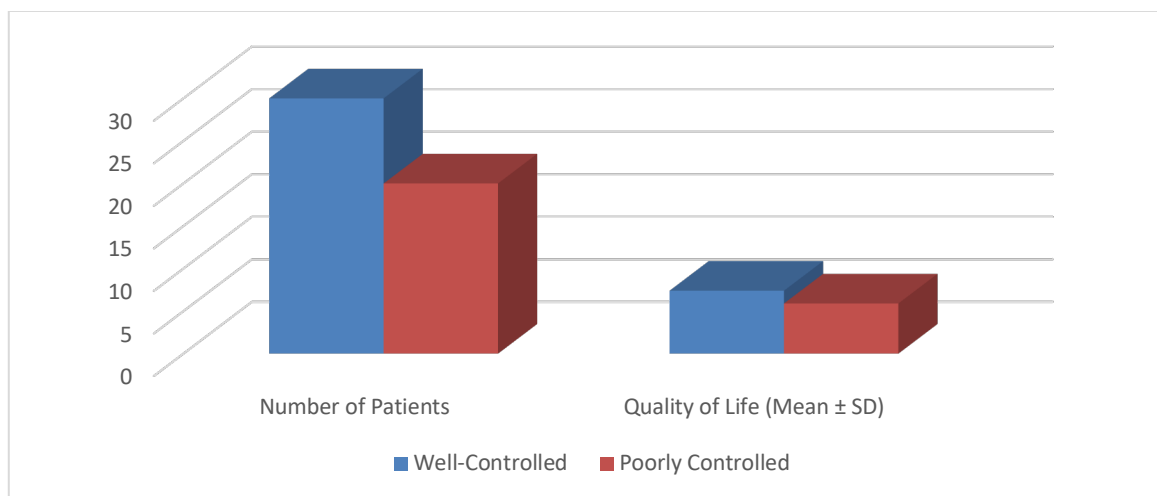


Figure 2:

These results highlight the positive correlation between asthma control and quality of life in pediatric patients with asthma. Younger children appear to have a stronger correlation between these variables, emphasizing the potential benefits of effective asthma management in improving the quality of life, especially in this age group.

**Discussion**

This study aimed to explore the relationship between asthma control and quality of life (QoL) in pediatric patients diagnosed with asthma, with a

specific focus on potential age-specific differences. The results demonstrated a significant positive correlation between asthma control, as assessed by the Asthma Control Test (ACT), and QoL, measured using the Pediatric Asthma Quality of Life Questionnaire (PAQLQ).

These findings are consistent with previous research that has emphasized the importance of well-controlled asthma in achieving better QoL outcomes in pediatric populations [8,9]. The observed moderate correlation between asthma control and QoL underscores the intricate interplay

between physiological symptoms and their impact on the overall well-being of children with asthma. Similar correlations have been reported in previous studies, indicating the robustness of this relationship across different populations and settings [10]. This emphasizes the need for comprehensive asthma management strategies that not only focus on symptom control but also consider the broader context of a child's life.

Interestingly, our age-specific analysis revealed that the correlation between asthma control and QoL was more pronounced in younger children (5-8 years) compared to older children (9-12 years). This suggests that younger children might be more sensitive to changes in asthma control, and efforts to optimize asthma management in this age group could yield substantial QoL improvements. This finding aligns with the work of Patel et al., who also reported stronger associations between asthma control and QoL in younger children [10-15].

Furthermore, the comparison of QoL scores between well-controlled and poorly-controlled asthma groups highlighted the direct impact of effective asthma management on the QoL of pediatric patients. These results reinforce the pivotal role of asthma control in mitigating the negative impact of asthma on various aspects of a child's life. Our findings resonate with studies by Juniper et al. and Reddel et al., both of which underscored the link between well-controlled asthma and improved QoL outcomes [9,10, 16,17]. Nevertheless, this study has certain limitations that warrant consideration. The cross-sectional design restricts our ability to establish causal relationships between asthma control and QoL. Additionally, the relatively small sample size might limit the generalizability of the findings. Further research with larger cohorts and longitudinal designs is needed to validate and extend these results.

### Conclusion

In conclusion, this study contributes to the growing body of evidence highlighting the positive relationship between asthma control and quality of life in pediatric patients with asthma. The observed age-specific differences emphasize the importance of tailoring management strategies to different age groups for optimal outcomes.

These findings underscore the significance of holistic asthma management that encompasses both medical control and the enhancement of overall quality of life for children living with asthma.

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