



ASSOCIATION BETWEEN COMORBID ALLERGIC DISEASES AND ASTHMA CONTROL AMONG CHILDREN AGED 1–15 YEARS: A HOSPITAL-BASED CROSS-SECTIONAL STUDY

Dr Sanjay KM^{1*}, Dr Manjusha C², Dr Veena RS³

¹Professor, Department of Paediatrics, Sree Mookambika Institute of Medical Sciences, Kulasekaran, Kanyakumari, India

^{2,3}Junior Resident, Department of Paediatrics, Sree Mookambika Institute of Medical Sciences, Kulasekaran, Kanyakumari, India

Corresponding Author*: Dr Manjusha C, Junior Resident, Department of Paediatrics, Sree Mookambika Institute of Medical Sciences, Kulasekaran, Kanyakumari, India.

Email ID: biya

DOI: <https://doi.org/10.59551/IJHMP/25832069/2026.7.2.103>

How to cite this article: Sanjay KM, Manjusha C, Veena RS. Association between Comorbid Allergic Diseases and Asthma Control among Children Aged 1–15 Years: A Hospital-Based Cross-Sectional Study. *Indian J. Health Care, Med. Pharm. Pract.* 2026;7(2):15-22.

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Received: 15 April, 2026, Decision for Acceptance: 07 July, 2026

ABSTRACT

Background: Asthma is one of the most common chronic respiratory diseases among children and is frequently associated with allergic comorbidities such as allergic rhinitis, atopic dermatitis, allergic conjunctivitis, and food allergy. These conditions may aggravate airway inflammation and adversely affect asthma control, leading to increased morbidity and healthcare utilization.

Aim: To evaluate the impact of comorbid allergic diseases on asthma control among pediatric patients aged 1–15 years attending a tertiary care hospital.

Materials and Methods: A hospital-based analytical cross-sectional study was conducted among 106 children aged 1–15 years with physician-diagnosed bronchial asthma. Participants were recruited using consecutive sampling after obtaining informed consent. Demographic and clinical data were collected using a structured case record form. Allergic comorbidities were identified through detailed clinical evaluation and medical records. Asthma control was assessed using age-appropriate Global Initiative for Asthma (GINA)-recommended tools, including the Childhood Asthma Control Test (C-ACT) and Asthma Control Test (ACT). Data were analyzed using IBM SPSS Statistics version 26.0. Associations between allergic comorbidities and asthma control were evaluated using the Chi-square test, with a p-value <0.05 considered statistically significant.

Results: Among the 106 children studied, 58.5% were males and the majority (43.4%) were aged 6–10 years. Allergic rhinitis was the most common allergic comorbidity (52.8%), followed by atopic dermatitis (22.6%), allergic conjunctivitis (17.9%), and food allergy (12.3%). Asthma was well controlled in 45.3% of participants, partly controlled in 32.1%, and poorly controlled in 22.6%. Allergic rhinitis showed a significant association with poor asthma control (p=0.009). Children with multiple allergic comorbidities had a significantly greater proportion of poorly controlled asthma than those without multiple comorbidities (41.4% vs. 15.6%; p=0.003).

Conclusion: Allergic comorbidities, particularly allergic rhinitis and the coexistence of multiple allergic diseases, were significantly associated with suboptimal asthma control in children. Early recognition and comprehensive management of these comorbid conditions, alongside standard asthma therapy, may improve symptom control, reduce exacerbations, and enhance overall quality of life. Routine screening for allergic diseases should be incorporated into the clinical evaluation of pediatric patients with bronchial asthma.

KEYWORDS: Bronchial Asthma, Pediatric Asthma, Allergic Rhinitis, Atopic Dermatitis, Allergic Conjunctivitis, Food Allergy, Asthma Control, Childhood Asthma Control Test, Comorbid Allergic Diseases, Cross-sectional Study.

Introduction

Bronchial asthma is one of the most common chronic non-communicable respiratory diseases affecting children worldwide and remains a major cause of pediatric morbidity despite substantial advances in diagnosis and treatment. It is a heterogeneous inflammatory disorder characterized by chronic airway inflammation, bronchial hyperresponsiveness, and variable expiratory airflow limitation, resulting in recurrent episodes of wheezing, cough, breathlessness, and chest tightness. The disease develops through a complex interaction between genetic predisposition, immune dysregulation, and environmental exposures such as aeroallergens, respiratory viral infections, tobacco smoke, and air pollution. According to the Global Initiative for Asthma (GINA), the principal goal of asthma management is to achieve optimal symptom control while minimizing future risks of exacerbations, decline in lung function, and treatment-related adverse effects. However, a considerable proportion of children continue to experience inadequately controlled asthma despite receiving guideline-based therapy, emphasizing the need to identify modifiable factors that contribute to poor disease control[1,2].

Asthma affects an estimated 260 million individuals globally and accounts for a substantial burden of disability, healthcare utilization, and socioeconomic costs. In children, asthma is among the leading causes of emergency department visits, hospital admissions, school absenteeism, sleep disturbances, and impaired quality of life. Epidemiological studies have demonstrated a steady increase in the prevalence of childhood asthma over the past few decades, particularly in low- and middle-income countries undergoing rapid urbanization and industrialization. In India, the prevalence of childhood asthma has been reported to range between 3% and 12%, with marked regional variation attributable to differences in environmental exposures, socioeconomic conditions, healthcare accessibility, and diagnostic practices. Increasing environmental pollution, indoor allergen exposure, changing dietary habits, climate change, and reduced microbial exposure have further contributed to the rising burden of allergic diseases among children[3–5].

Asthma commonly coexists with other allergic disorders such as allergic rhinitis, atopic dermatitis, allergic conjunctivitis, and food allergy. These diseases share common pathogenic pathways involving type 2 (T2) immune inflammation mediated by immunoglobulin E (IgE), eosinophils, mast cells, and T-helper-2 cytokines, including interleukin (IL)-4, IL-5, and IL-13. The concept of the “atopic march” describes the characteristic progression of allergic diseases from atopic dermatitis and food allergy during infancy to allergic rhinitis and bronchial asthma later in childhood. Similarly, the “united airway disease” hypothesis proposes that inflammation of the upper and lower respiratory tracts represents a continuous pathological process rather than separate disease entities. Consequently, persistent inflammation of the nasal mucosa and other

allergic tissues may aggravate lower airway inflammation, increase bronchial hyperresponsiveness, and compromise asthma control if left untreated[2,6–8].

Among allergic comorbidities, allergic rhinitis is the most prevalent and has been reported in nearly one-half to three-quarters of children with asthma. Several studies have shown that children with concomitant allergic rhinitis experience more frequent daytime and nocturnal symptoms, increased use of rescue medications, greater risk of asthma exacerbations, impaired lung function, and reduced quality of life compared with those without rhinitis. Likewise, atopic dermatitis and food allergy are considered markers of systemic allergic sensitization and have been associated with more severe asthma phenotypes, persistent airway inflammation, and greater healthcare utilization. Allergic conjunctivitis frequently accompanies respiratory allergies and may further indicate an underlying atopic predisposition. The coexistence of multiple allergic diseases may therefore exert an additive effect on asthma severity and disease control, underscoring the importance of comprehensive evaluation of allergic comorbidities during routine pediatric asthma care[7–10].

Current international guidelines emphasize that identification and appropriate management of associated comorbidities are integral components of successful asthma treatment. Nevertheless, many children continue to receive treatment focused primarily on lower airway symptoms, while coexisting allergic disorders remain under-recognized or inadequately treated. Failure to address these conditions may result in persistent airway inflammation, recurrent exacerbations, increased healthcare utilization, and poor long-term clinical outcomes. Although numerous studies have evaluated the relationship between individual allergic diseases and asthma, relatively few have comprehensively examined the cumulative impact of multiple allergic comorbidities on asthma control, particularly among Indian children. Furthermore, regional differences in allergen exposure, socioeconomic status, environmental factors, and healthcare-seeking behavior necessitate locally generated evidence to guide clinical practice.

In this context, the present hospital-based cross-sectional study was undertaken to evaluate the prevalence of common allergic comorbidities, including allergic rhinitis, atopic dermatitis, allergic conjunctivitis, and food allergy, among pediatric patients aged 1–15 years with bronchial asthma and to determine their association with asthma control using standardized age-appropriate assessment tools recommended by GINA. The findings of this study are expected to enhance understanding of the influence of allergic comorbidities on asthma outcomes and support a comprehensive, patient-centered approach to pediatric asthma management. Early recognition and effective treatment of coexisting allergic diseases may contribute to improved asthma control, reduction in acute exacerbations and hospitalizations, optimization of healthcare resource

utilization, and improvement in the overall quality of life of affected children and their families.

Aim and Objectives

Aim

To evaluate the association between comorbid allergic diseases and the level of asthma control among pediatric patients aged 1–15 years attending a tertiary care hospital.

Objectives

- To determine the prevalence of common allergic comorbidities (allergic rhinitis, atopic dermatitis, allergic conjunctivitis, and food allergy) among children aged 1–15 years diagnosed with bronchial asthma.
- To assess the level of asthma control using age-appropriate validated asthma control assessment tools among pediatric asthma patients.
- To evaluate the association between individual and multiple allergic comorbidities and asthma control, while examining the influence of demographic and clinical characteristics.

Materials and Methods

Study Design

This hospital-based analytical cross-sectional study was conducted to evaluate the impact of comorbid allergic diseases on asthma control among pediatric patients aged 1–15 years diagnosed with bronchial asthma. The study was designed to determine the prevalence of allergic comorbidities and to assess their association with the level of asthma control at a single point in time.

Study Setting

The study was carried out in the Department of Pediatrics of a tertiary care teaching hospital. Eligible participants were recruited from the pediatric outpatient clinics and inpatient pediatric wards where children with bronchial asthma were routinely evaluated and managed. The hospital serves as a referral center for urban and rural populations, ensuring representation of children with varying severities of asthma.

Study Duration

The study was conducted over a period of 18 months, including participant recruitment, data collection, analysis, and interpretation.

Study Population

The study population comprised children aged between 1 and 15 years with a diagnosis of bronchial asthma attending the Department of Pediatrics during the study period.

Eligibility Criteria

Inclusion Criteria

Children were included in the study if they fulfilled all of the following criteria:

- Age between 1 and 15 years.
- Previously diagnosed with bronchial asthma by a pediatrician according to the Global Initiative for Asthma (GINA) recommendations.
- Receiving treatment and follow-up at the study hospital.
- Parent or legal guardian willing to provide written informed consent.
- Assent was obtained from children whenever appropriate according to institutional guidelines.

Exclusion Criteria

Children were excluded if they had:

- Acute severe asthma requiring immediate intensive care at the time of recruitment.
- Congenital heart disease or chronic respiratory disorders other than asthma, such as cystic fibrosis, bronchopulmonary dysplasia, or primary ciliary dyskinesia.
- Known primary or secondary immunodeficiency disorders.
- Chronic systemic illnesses including chronic kidney disease, chronic liver disease, malignancy, or neurological disorders likely to influence asthma control.
- Incomplete clinical records or refusal to participate.

Sample Size Calculation

The required sample size was estimated using the single population proportion formula for cross-sectional studies:

$$n = Z^2PQ / d^2$$

where:

- n = required sample size
- Z = standard normal deviate corresponding to a 95% confidence interval (1.96)
- P = expected prevalence of comorbid allergic diseases among pediatric asthma patients = 53% (0.53)
- $Q = 1 - P = 47\%$ (0.47)
- d = absolute precision of 10% (0.10)

Substituting the values:

$$n = (1.96)^2 \times 0.53 \times 0.47 / (0.10)^2$$

$$n = 3.84 \times 0.2491 / 0.01$$

$$n = 95.65$$

The minimum required sample size was therefore 96 participants. To compensate for an anticipated non-response rate of approximately 10%, the sample size was increased to 106 participants.

The prevalence estimate of 53% was adopted from the original study by Melo JM et al., which evaluated allergic comorbidities among pediatric patients with bronchial asthma.

Sampling Technique

A consecutive sampling technique was employed. All eligible

children attending the pediatric outpatient department or admitted to the pediatric ward during the study period who satisfied the inclusion criteria were recruited consecutively until the desired sample size was achieved.

Study Procedure

Following approval from the Institutional Ethics Committee, eligible participants were identified during routine pediatric consultations. The objectives of the study were explained to the parents or legal guardians, and written informed consent was obtained before enrolment.

A structured and pretested case record form was used to collect study information. Demographic details including age, sex, place of residence, socioeconomic status, and family history of allergic diseases were recorded.

Clinical information included age at asthma onset, duration of disease, frequency of exacerbations during the previous year, hospital admissions, emergency visits, current controller medications, inhaler technique, adherence to therapy, exposure to passive smoking, domestic pets, biomass fuel, environmental allergens, and family history of atopy.

Each participant underwent a detailed clinical examination by a pediatrician. Anthropometric measurements including height and weight were recorded using standardized techniques.

Assessment of Allergic Comorbidities

Allergic comorbidities were diagnosed based on detailed history, clinical examination, and available medical records.

Allergic rhinitis was diagnosed based on recurrent sneezing, rhinorrhea, nasal itching, nasal obstruction, and supporting clinical findings.

Atopic dermatitis was diagnosed according to the Hanifin and Rajka clinical diagnostic criteria.

Allergic conjunctivitis was identified by recurrent itching, redness, tearing, and conjunctival congestion associated with allergen exposure.

Food allergy was diagnosed based on a convincing history of reproducible symptoms following ingestion of a specific food with supporting documentation whenever available.

The presence of multiple allergic diseases in the same child was also documented.

Assessment of Asthma Control

Asthma control was evaluated using age-appropriate validated instruments recommended by GINA.

Children aged 4–11 years were assessed using the Childhood Asthma Control Test (C-ACT), whereas those aged 12–15 years completed the Asthma Control Test (ACT). For younger children, asthma control was determined based on GINA symptom-control criteria and caregiver responses.

Asthma control was categorized as:

- Well-controlled
- Partly controlled
- Poorly controlled (uncontrolled) according to standard guideline recommendations.

Outcome Measures

The primary outcome measure was the level of asthma control.

Secondary outcome measures included:

- Prevalence of allergic rhinitis.
- Prevalence of atopic dermatitis.
- Prevalence of allergic conjunctivitis.
- Prevalence of food allergy.
- Frequency of multiple allergic comorbidities.
- Association between allergic comorbidities and asthma control.

Data Management

All collected data were entered into Microsoft Excel after verification for completeness and consistency. Double data entry and periodic cross-checking were performed to minimize transcription errors. Confidentiality was maintained throughout the study by assigning unique identification numbers to each participant.

Statistical Analysis

Data analysis was performed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean $\pm$ standard deviation or median with interquartile range depending on data distribution. Categorical variables were summarized as frequencies and percentages.

Associations between allergic comorbidities and asthma control categories were assessed using the Chi-square test or Fisher's exact test where appropriate. Continuous variables were compared using the independent Student's t-test or Mann–Whitney U test according to data normality. Variables showing significant association in univariate analysis were entered into multivariable logistic regression to identify independent predictors of poor asthma control. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported. A two-tailed p-value <0.05 was considered statistically significant.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee before commencement of the study. Written informed consent was obtained from the parents or legal guardians of all participating children. Assent was obtained from older children whenever applicable. Participation was entirely voluntary, confidentiality of participant information was maintained, and all procedures were carried out in accordance with the ethical principles of the Declaration of Helsinki.

Results

Table 1: Baseline Demographic and Clinical Characteristics of the Study Participants (n = 106)

Variable	Frequency (n)	Percentage (%)
Age Group (years)		
1–5	28	26.4
6–10	46	43.4
11–15	32	30.2
Gender		
Male	62	58.5
Female	44	41.5
Duration of Asthma		
<2 years	29	27.4
2–5 years	47	44.3
>5 years	30	28.3
Family History of Allergy		
Present	51	48.1
Absent	55	51.9

The majority of participants belonged to the 6–10-year age group (43.4%). Males constituted 58.5% of the study population. Nearly half (48.1%) had a positive family history of allergic diseases.

Table 2: Distribution of Comorbid Allergic Diseases Among Children with Asthma (n = 106)

Allergic Comorbidity	Frequency (n)	Percentage (%)
Allergic rhinitis	56	52.8
Atopic dermatitis	24	22.6
Allergic conjunctivitis	19	17.9
Food allergy	13	12.3
≥2 Allergic comorbidities	29	27.4
No allergic comorbidity	31	29.2

Allergic rhinitis was the most frequent allergic comorbidity (52.8%), followed by atopic dermatitis (22.6%). Nearly one-third of children had more than one allergic disease.

Table 3: Distribution of Asthma Control Among the Study Participants (n = 106)

Asthma Control Category	Frequency (n)	Percentage (%)
Well controlled	48	45.3
Partly controlled	34	32.1
Poorly controlled	24	22.6
Total	106	100.0

Approximately 45.3% of children had well-controlled asthma, whereas 22.6% had poorly controlled asthma.

Table 4: Association Between Allergic Rhinitis and Asthma Control (n = 106)

Asthma Control	Allergic Rhinitis Present n (%)	Allergic Rhinitis Absent n (%)	Total	p value
Well controlled	18 (37.5)	30 (62.5)	48	
Partly controlled	21 (61.8)	13 (38.2)	34	
Poorly controlled	17 (70.8)	7 (29.2)	24	
Total	56 (52.8)	50 (47.2)	106	0.009*

Chi-square test.

Allergic rhinitis was significantly more common among children with partly controlled and poorly controlled asthma compared with those having well-controlled asthma ($p = 0.009$).

Table 5: Association Between Multiple Allergic Comorbidities and Asthma Control (n = 106)

Multiple Allergic Comorbidities	Well Controlled n (%)	Partly Controlled n (%)	Poorly Controlled n (%)	Total	p value
Present	7 (24.1)	10 (34.5)	12 (41.4)	29	
Absent	41 (53.2)	24 (31.2)	12 (15.6)	77	
Total	48	34	24	106	0.003*

Chi-square test

Children with two or more allergic comorbidities had a significantly higher proportion of poorly controlled asthma compared with those without multiple allergic diseases (41.4% vs. 15.6%; $p = 0.003$).

Discussion

The present hospital-based cross-sectional study evaluated the impact of comorbid allergic diseases on asthma control among 106 children aged 1–15 years with bronchial asthma. The findings demonstrated that allergic comorbidities, particularly allergic rhinitis and the coexistence of multiple allergic disorders, were significantly associated with suboptimal asthma control. These observations support the concept of a unified allergic airway and emphasize the importance of comprehensive evaluation and management of allergic diseases in pediatric asthma.

The majority of children in the present study belonged to the 6–10-year age group (43.4%), and males constituted 58.5% of the study population. This age and sex distribution is consistent with the epidemiological pattern of childhood asthma reported by Dharmage et al., who observed that asthma is more prevalent in school-aged children and occurs more frequently in boys before puberty because of differences in airway caliber, immune maturation, and hormonal influences. Similar observations have also been reported in the Global Initiative for Asthma (GINA) 2025 report, which describes childhood asthma as being predominantly diagnosed during the early school years with a slight male predominance before adolescence[1,9].

Nearly half of the participants (48.1%) had a positive family history of allergic diseases, reflecting the important contribution of genetic predisposition to the development of atopic disorders. This finding agrees with the epidemiological evidence presented by Dharmage et al., who identified familial atopy as one of the strongest predictors for persistent childhood asthma and associated allergic diseases. Likewise, the World Allergy Organization White Book emphasizes that hereditary factors substantially increase susceptibility to allergic sensitization and multiple allergic manifestations[5,9].

In the present study, allergic rhinitis was the most common allergic comorbidity, affecting 52.8% of children with asthma. Atopic dermatitis, allergic conjunctivitis, and food allergy

were identified in 22.6%, 17.9%, and 12.3% of participants, respectively. These findings are remarkably consistent with the multicountry International Study of Asthma and Allergies in Childhood (ISAAC), which demonstrated that allergic rhinitis and rhinoconjunctivitis frequently coexist with childhood asthma across different geographic regions. Asher et al. reported a strong epidemiological overlap between asthma, allergic rhinitis, and eczema, supporting the concept that these conditions share common inflammatory pathways and genetic susceptibility[3].

The predominance of allergic rhinitis observed in the present study also agrees with the landmark Allergic Rhinitis and its Impact on Asthma (ARIA) report by Bousquet et al., which established allergic rhinitis as the commonest comorbid allergic disease among individuals with asthma. The ARIA guidelines proposed the concept of “one airway, one disease,” highlighting that inflammation simultaneously affects both the upper and lower respiratory tract and that untreated rhinitis contributes to worsening asthma symptoms and reduced disease control[2].

Approximately one-quarter (27.4%) of children in the present study had two or more allergic comorbidities. This finding supports the concept of the “atopic march,” in which allergic diseases develop sequentially from infancy to adolescence. Spergel described the progression from atopic dermatitis during infancy to allergic rhinitis and subsequently asthma, emphasizing that many children develop multiple allergic conditions because of shared immunological mechanisms involving immunoglobulin E-mediated sensitization and T-helper 2 immune responses. The coexistence of multiple allergic diseases observed in the present study is therefore biologically plausible and consistent with previous evidence[8].

Regarding asthma control, 45.3% of children had well-controlled asthma, whereas 22.6% demonstrated poor asthma control despite ongoing treatment. These findings are comparable with the observations summarized in the GINA 2025 strategy document, which indicates that a substantial proportion of pediatric patients continue to experience uncontrolled asthma because of persistent airway inflammation, poor adherence, environmental allergen exposure, and untreated comorbid conditions[1]. Similar concerns regarding inadequate asthma control have also been

highlighted by Masoli et al., who reported that uncontrolled asthma remains a major contributor to childhood morbidity and healthcare utilization worldwide despite advances in pharmacological therapy[4].

One of the most important findings of the present study was the significant association between allergic rhinitis and asthma control ($p = 0.009$). Children with allergic rhinitis demonstrated a markedly higher proportion of partly controlled and poorly controlled asthma than those without rhinitis. This observation strongly agrees with the original work of Licari et al., who reported that upper airway diseases are important determinants of asthma control in children. Their study demonstrated that persistent nasal inflammation adversely affects lower airway function through common inflammatory pathways, resulting in increased symptoms, impaired quality of life, and frequent asthma exacerbations. The present findings reinforce the importance of evaluating and treating allergic rhinitis as an integral component of asthma management[10].

The present results are also in close agreement with the work of Bousquet et al., who demonstrated that allergic rhinitis significantly increases asthma severity, healthcare utilization, emergency visits, and exacerbation frequency. Their study concluded that effective treatment of rhinitis improves asthma symptoms and overall disease control, providing strong evidence for integrated management of upper and lower airway diseases[2].

Similarly, Bousquet, Vignola, and Demoly further expanded the concept of interconnected upper and lower airway inflammation, explaining that allergic inflammation extends continuously throughout the respiratory tract. They observed that patients with untreated rhinitis exhibit greater bronchial hyperresponsiveness and poorer asthma outcomes than patients without nasal disease. The significant relationship observed in the present study therefore reflects the common inflammatory mechanisms shared by allergic rhinitis and bronchial asthma[7].

The present study also demonstrated that children with multiple allergic comorbidities had significantly poorer asthma control than those without multiple allergic diseases (41.4% versus 15.6%; $p = 0.003$). This finding supports the concept that cumulative allergic inflammation contributes to increasing disease severity. Pawankar et al. similarly emphasized that the coexistence of several allergic disorders increases disease burden, impairs quality of life, and complicates long-term asthma management because multiple inflammatory pathways remain simultaneously activated[5].

The relatively high prevalence of atopic dermatitis observed in the present study (22.6%) further supports previous evidence regarding the progression of allergic diseases. Hanifin and Rajka established the diagnostic criteria for atopic dermatitis and demonstrated its close relationship with subsequent allergic respiratory disorders. Spergel

later explained that disruption of the skin barrier and early allergen sensitization predispose affected children to later development of asthma and allergic rhinitis. The coexistence of eczema and asthma observed in the present study therefore reflects the natural evolution of allergic disease rather than isolated pathological conditions[6,8].

Overall, the findings of the present study are consistent with current evidence demonstrating that allergic diseases represent a continuum rather than separate clinical entities. The coexistence of allergic rhinitis, atopic dermatitis, conjunctivitis, and food allergy contributes significantly to poor asthma control by perpetuating chronic systemic and airway inflammation. The present study therefore supports current GINA and ARIA recommendations advocating routine screening for allergic comorbidities in all children with asthma. Early identification and appropriate management of these associated allergic conditions may substantially improve asthma control, reduce exacerbations, enhance quality of life, and decrease long-term healthcare utilization.

The principal strengths of the present study include the use of standardized assessment of asthma control, systematic evaluation of common allergic comorbidities, and inclusion of a representative pediatric population across a broad age range. However, the cross-sectional design limits causal inference, and the findings reflect a single-center experience, which may limit generalizability. In addition, objective allergy investigations such as serum allergen-specific IgE estimation or skin prick testing were not routinely performed, and seasonal variations in allergen exposure were not evaluated. Future multicenter longitudinal studies incorporating immunological markers and long-term follow-up are warranted to further clarify the influence of allergic comorbidities on asthma progression and treatment outcomes in children.

Conclusion

The present hospital-based cross-sectional study demonstrated that comorbid allergic diseases are highly prevalent among children with bronchial asthma and have a significant influence on the level of asthma control. Allergic rhinitis emerged as the most common associated allergic disorder, followed by atopic dermatitis, allergic conjunctivitis, and food allergy. A substantial proportion of children with multiple allergic comorbidities experienced partly controlled or poorly controlled asthma, indicating that the coexistence of allergic diseases contributes to persistent symptoms and inadequate disease control.

The study further showed a significant association between allergic rhinitis and poor asthma control, highlighting the close relationship between upper and lower airway inflammation. Children with more than one allergic comorbidity were more likely to have suboptimal asthma control than those without associated allergic diseases, emphasizing the cumulative impact of allergic disorders

on disease severity. These findings support the concept that asthma should be managed as part of a systemic allergic disease rather than as an isolated respiratory condition.

Conflict of Interest

The authors declare that they have no conflict of interest.

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