Original Research Paper

Volume - 16 | Issue - 07 | July - 2026 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Paediatrics

PREVALENCE AND RISK FACTORS OF BRONCHIAL ASTHMA AMONG CHILDREN OF AGE GROUP 6–13 YEARS PRESENTING WITH RESPIRATORY SYMPTOMS

Dr. Shifa Muhammed*	Postgraduate In Paediatrics, Travancore Medical College, Kollam, Kerala. *Corresponding Author
Dr. Gopi Mohan R	Professor, Department Of paediatrics, Travancore Medical College, Kollam, Kerala.
Dr. John Stephanos	Professor, Department Of Paediatrics, Travancore Medical College, Kollam, Kerala.
Dr. Jumaly George	Professor, Department Of Paediatrics, Travancore Medical College, Kollam, Kerala.

ABSTRACT **Background:** Bronchial asthma is one of the most common chronic respiratory diseases among children and is influenced by genetic, environmental, and allergic factors. Early identification of asthma and associated risk factors is essential to reduce morbidity and improve quality of life. **Methods:** A hospital-based cross-sectional study was conducted among 230 children aged 6–13 years presenting with respiratory symptoms. Detailed history regarding respiratory complaints, environmental exposures, allergic conditions, and family history was collected using a structured questionnaire. Clinical examination and assessment for bronchial asthma were performed. Statistical analysis was carried out using appropriate tests, and $p<0.05$ was considered statistically significant. **Results:** Among 230 children, 58 (25.2%) were diagnosed with bronchial asthma, while 172 (74.8%) were non-asthmatic. Most asthmatic children were newly diagnosed during the study (75.9%). Exercise-induced symptoms were the most common complaint, observed in 79.6% of children, followed by chest tightness (29.1%) and nocturnal cough (26.1%). Family history of asthma was present in 27.8% of participants, while passive smoking exposure was reported in 17.4%. Significant associations with asthma were observed for nocturnal cough ($p=0.042$), exercise-induced symptoms ($p<0.001$), family history of asthma ($p<0.001$), family smoking habits ($p<0.001$), urban residence ($p<0.001$), pet exposure ($p=0.026$), passive smoking ($p=0.049$), and past COVID-19 infection ($p<0.001$).**Conclusion:** Bronchial asthma was prevalent among children with respiratory symptoms, with many cases remaining previously undiagnosed. Familial predisposition, environmental exposures, and allergic factors were significantly associated with asthma. Early diagnosis, risk factor reduction, and timely management are important for improving pediatric respiratory health.

KEYWORDS : Bronchial Asthma, Children, Respiratory Symptoms, Pediatric Asthma, Risk Factors, Passive Smoking, Family History, Exercise-Induced Symptoms, Environmental Exposure, Childhood Wheezing

INTRODUCTION

Bronchial asthma is a chronic inflammatory disorder of the airways characterized by recurrent episodes of wheeze, cough, breathlessness, and chest tightness associated with variable and usually reversible airflow obstruction [1]. It is one of the most common chronic diseases in children and a leading cause of school absenteeism, emergency visits, and hospitalization worldwide [2]. Persistent airway inflammation results in bronchial hyperresponsiveness, mucosal edema, and mucus hypersecretion, contributing to recurrent respiratory symptoms and impaired quality of life [3].

According to the World Health Organization, asthma affects more than 260 million people globally and remains a major cause of disability among children [4]. The prevalence of childhood asthma varies across regions, ranging from less than 5% in some developing countries to over 20% in industrialized nations [5]. In India, studies have reported prevalence rates between 2% and 15%, with higher rates observed in urban areas [6]. A study from Kerala reported a prevalence of approximately 8.4% among school-aged children [7].

The development of asthma is influenced by a complex interaction between genetic predisposition and environmental exposures. Important risk factors include family history of asthma, allergic rhinitis, eczema, passive smoking, indoor and outdoor air pollution, biomass fuel exposure, pet allergens, and recurrent respiratory infections [8,9]. Urbanization and changing lifestyles have further increased the burden of asthma in low- and middle-income countries [10].

Despite its high prevalence, childhood asthma remains under-diagnosed and undertreated because symptoms are often intermittent and overlap with other respiratory illnesses [11]. Early diagnosis and identification of modifiable risk factors are essential to reduce morbidity and improve long-term outcomes. The present study was undertaken to determine the prevalence of bronchial asthma and analyze associated risk factors among children aged 6–13 years presenting with respiratory symptoms.

METHODOLOGY

hospital-based cross-sectional study was conducted in the Department of Paediatrics at a tertiary medical college in Kollam, Kerala over a period of 16 months from August 2023 to November 2024. The study included children aged 6–13 years presenting with respiratory symptoms such as recurrent cough, wheeze, breathlessness, nocturnal cough, or exercise-induced symptoms, either attending the pediatric outpatient department or admitted to pediatric wards.

Children with chronic lung diseases including bronchiectasis, pulmonary tuberculosis, bronchopulmonary dysplasia, congenital heart disease, and neurological disorders were excluded. The sample size was calculated using a previously reported asthma prevalence of 21.2% among symptomatic children by Tannistha Maji et al, [12] yielding a minimum requirement of 230 participants. Consecutive sampling was used to recruit eligible children after obtaining written informed consent from parents or guardians and assent from children older than 10 years. Ethical approval was obtained from the Institutional Ethics Committee.

Data were collected using a structured and prevalidated questionnaire. Sociodemographic details, symptom profile, family history of asthma and atopy, environmental exposures, and past medical history were recorded. Children without a prior diagnosis of asthma were screened using the International Study of Asthma and Allergies in Childhood core questionnaire. A positive response to any one of the four standardized questions was considered suggestive of asthma. Children with prior physician-diagnosed asthma were also classified as asthmatic.

All participants underwent clinical examination and peak expiratory flow rate (PEFR) measurement using a standard peak flow meter. Three readings were obtained, and the highest value was recorded. Predicted PEFR was calculated based on height using the formula: $\text{PEFR (L/min)} = (\text{Height in cm} \times 5.3) - 433$.

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics. Categorical variables were expressed as frequencies and percentages. Associations between asthma and potential risk factors were assessed using Chi-square or Fisher's exact test, while continuous

variables were compared using the independent t-test. A p-value <0.05 was considered statistically significant.

RESULTS

The present study was conducted among 230 children aged 6–13 years presenting with respiratory symptoms who attended the paediatric outpatient department or were admitted to the paediatric wards of a tertiary medical college in Kollam, Kerala.

Table 1 shows the sociodemographic characteristics of the 230 study participants. The majority of children belonged to the 6–8 years age group (38.7%), followed by 9–11 years (37.8%), while 23.5% were aged 12–13 years. Boys constituted 52.2% of the study population and girls 47.8%, indicating slight male predominance. Most children were from rural areas (70.9%), whereas only 29.1% were from urban areas. Regarding parental education, secondary education was the most common among mothers (36.1%) and fathers (35.2%). Graduate-level education was observed in 20.4% of both mothers and fathers, while postgraduate education was comparatively low.

Table 1: Sociodemographic Characteristics of the Study Participants (n = 230)

Variable	Category	Frequency (N)	Percentage (%)
Age group	6–8 years	89	38.7
	9–11 years	87	37.8
	12–13 years	54	23.5
Gender	Boys	120	52.2
	Girls	110	47.8
Residence	Urban	67	29.1
	Rural	163	70.9
Mother's education	Primary	39	17.0
	Secondary	83	36.1
	Higher secondary	53	23.0
	Graduate	47	20.4
	Postgraduate	8	3.5
Father's education	Primary	35	15.2
	Secondary	81	35.2
	Higher secondary	57	24.8
	Graduate	47	20.4
	Postgraduate	10	4.3

Exercise-induced symptoms such as coughing, wheezing, or shortness of breath were the most common complaints, reported in 183 children (79.6%). Chest tightness was present in 67 children (29.1%), nocturnal cough in 60 children (26.1%), and wheezing in 53 children (23%). Symptoms worsened during winter or rainy seasons in 104 children (45.2%), and 84 children (36.5%) showed relief with nebulisation. Most participants, 168 children (73%), experienced only 1–3 attacks during the previous year. Sleep disturbances were absent in 137 children (59.6%), while only 19 children (8.2%) had symptoms one or more nights weekly.

Family history of atopic dermatitis or eczema was present in 79 children (34.4%), smoking habit in family members in 77 children (33.5%), and family history of asthma in 64 children (27.8%). Allergic rhinitis and allergic conjunctivitis in family members were reported in 21.3% and 23% respectively. Among children, allergic rhinitis was observed in 40 cases (17.4%), atopic dermatitis in 36 (15.7%), and food allergy in 18 (7.8%). Symptoms after pet exposure were seen in 65 children (28.3%), passive smoking exposure in 40 (17.4%), and previous COVID-19 infection in 77 children (33.5%).

Gas was the most commonly used cooking fuel, reported in 166 households (72.2%). Firewood was used in 27 households (11.7%), kerosene stove in 13 (5.7%), and other biomass fuels in smaller proportions. Only 14 children (6.1%) had received controller therapy such as inhaled steroids, whereas the majority, 216 children (93.9%), had not received regular controller treatment. Among the 58 asthmatic children, 42 (72.4%) had a history of previous hospital admission due to asthma, while 16 children (27.6%) had no prior hospitalization history, indicating substantial disease burden among affected children.

Out of 230 children, 58 children (25.2%) were diagnosed with bronchial asthma, while 172 children (74.8%) were non-asthmatic. Among the 58 children diagnosed with bronchial asthma, the majority (44 children, 75.9%) were newly diagnosed during the present study, while 14 children (24.1%) had a prior diagnosis of bronchial asthma. (Figure 1)

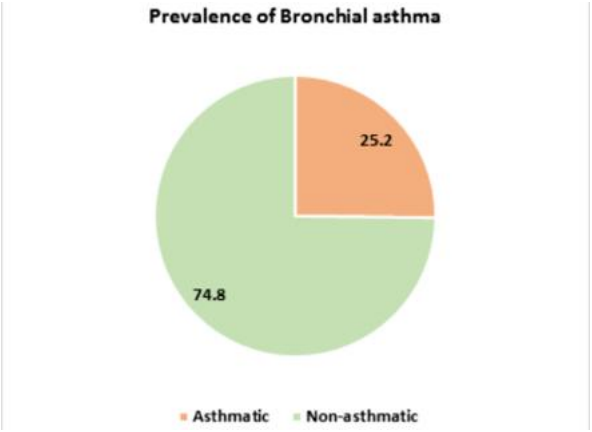

Figure 1: Distribution of Study Subjects Based on Prevalence of Bronchial Asthma

Table 2 shows the factors significantly associated with bronchial asthma. Waking from sleep due to cough was significantly associated with asthma, with 35% of affected children having asthma (p = 0.042). Exercise-induced symptoms showed a highly significant association, with asthma present in 30.6% of children with exercise symptoms compared to only 4.3% without symptoms (p <0.001). Family history of asthma and smoking habit were strongly associated with asthma, with prevalence rates of 51.6% and 51.9% respectively (p <0.001). Urban residence, pet exposure, passive smoking, and past COVID-19 infection also demonstrated statistically significant associations with bronchial asthma.

Table 2: Factors Significantly Associated with Bronchial Asthma

Variable	Asthma Present n (%)	Asthma Absent n (%)	Chi-square value	p-value
Waking from sleep due to cough	21 (35.0)	39 (65.0)	4.119	0.042*
Exercise-induced symptoms	56 (30.6)	127 (69.4)	13.764	<0.001*
Family history of asthma	33 (51.6)	31 (48.4)	32.636	<0.001*
Family history of smoking	40 (51.9)	37 (48.1)	43.858	<0.001*
Urban residence	32 (47.8)	35 (52.2)	25.478	<0.001*
Symptoms after pet exposure	23 (35.4)	42 (64.6)	4.967	0.026*
Passive smoking	15 (37.5)	25 (62.5)	3.874	0.049*
Past COVID-19 infection	37 (48.1)	40 (51.9)	32.006	<0.001*

DISCUSSION

The present study evaluated the prevalence, clinical profile, and associated risk factors of bronchial asthma among children with respiratory symptoms. In the present study, the majority of children belonged to the 6–8 years age group (38.7%), with a slight male predominance (52.2%). Similar findings were reported by Kamath SP et al., who observed higher prevalence of bronchial asthma among younger school-aged children and boys in South India [6]. The predominance of rural participants in the present study may reflect the demographic characteristics of the study setting.

Exercise-induced symptoms such as coughing, wheezing, and shortness of breath were the most common clinical features observed in 79.6% of children, followed by chest tightness (29.1%) and nocturnal cough (26.1%). Al-Shamrani A et al. similarly reported recurrent wheezing, nocturnal cough, and exercise intolerance as important clinical indicators suggestive of childhood asthma [11]. Seasonal aggravation of symptoms was noted in 45.2% of participants, which was comparable to the findings of Maji T et al., who identified seasonal variation as an important triggering factor among children with asthma [12].

In the present study, family history of asthma (27.8%), family smoking habits (33.5%), and allergic disorders such as atopic dermatitis (34.4%) were common among participants. Similar observations were made by Patra PK et al., who reported strong associations between

childhood asthma and family history, environmental pollution, and tobacco smoke exposure [7]. Burke H et al. also demonstrated that passive smoke exposure significantly increases the risk of asthma and wheezing disorders in children [8]. Exposure to pets and biomass fuel smoke were additional environmental risk factors identified in the present study. Guarnieri M et al. emphasized that environmental pollutants and inhaled irritants contribute significantly to airway inflammation and asthma exacerbation [9].

The prevalence of bronchial asthma in the present study was 25.2%, with 75.9% of cases being newly diagnosed during the study period. Similar trends of underdiagnosis and increasing prevalence of childhood asthma were highlighted by Pearce N et al. in the ISAAC Phase III study [10]. The ISAAC study conducted by Asher ME et al. also established the importance of standardized screening methods for identifying asthma among school children worldwide [5]. Significant associations observed between asthma and nocturnal cough, exercise-induced symptoms, passive smoking, urban residence, and family history in the present study support the multifactorial etiology of childhood bronchial asthma described by Papi A et al. [3]. Furthermore, Ferrante G et al. emphasized that pediatric asthma continues to impose a substantial health burden and requires early diagnosis and preventive strategies [2].

The present study had certain limitations. Being a hospital-based cross-sectional study, the findings may not represent the general pediatric population. The sample size was relatively small and limited to a single tertiary care center, reducing generalizability. Diagnosis of asthma was mainly based on clinical assessment and questionnaire responses, which may introduce recall bias. Environmental exposures such as passive smoking and pet exposure were self-reported and not objectively measured. Long-term follow-up of children was also not performed.

CONCLUSION

The present study demonstrated that bronchial asthma is a significant health problem among children with respiratory symptoms, with a prevalence of 25.2%. Exercise-induced symptoms, nocturnal cough, family history of asthma, passive smoking, pet exposure, and urban residence were significantly associated with bronchial asthma. A large proportion of children were newly diagnosed during the study, indicating underrecognition of childhood asthma. Environmental and familial factors played an important role in disease occurrence. Early identification of symptoms, awareness regarding risk factors, reduction of environmental exposures, and timely initiation of appropriate treatment are essential to reduce asthma-related morbidity and improve the quality of life among affected children.

REFERENCES

1. Venkatesan P. 2023 GINA report for asthma. Lancet Respir Med. 2023 Jul;11(7):589.
2. Ferrante G, La Grutta S. The burden of pediatric asthma. Frontiers in pediatrics. 2018 Jun 22;6:186.
3. Papi A, Brightling C, Pedersen SE, Reddel HK. Seminar asthma. Lancet. 2018; 391(10122):783-800.
4. Asthma [Internet]. [cited 2025 Dec 16]. Available from: https://www.who.int/news-room/fact-sheets/detail/asthma
5. Asher ME, Keil U, Anderson HR, Beasley R, Crane JM, Martinez F, Mitchell EA, Pearce N, Sibbald B, Stewart AW. International Study of Asthma and Allergies in Childhood (ISAAC): rationale and methods. European respiratory journal. 1995 Mar 1;8(3):483-91.
6. Kamath SP, Kumar SS, Jain A, Ramakrishna A, Baliga SB. Prevalence of bronchial asthma among school-going children in Mangalore, South India. Indian Journal of Community Health. 2017 Mar 31;29(1):46-54.
7. Patra PK, Bhattarai D, Prasad A, Jain H, Ranjan S, Ranjan A. Prevalence and risk factors of asthma among school going children in urban area of North India. Journal of family medicine and primary care. 2021 Jan 1;10(1):421-6.
8. Burke H, Leonardi-Bee J, Hashim A, Pine-Abata H, Chen Y, Cook DG, Britton JR, McKeever TM. Prenatal and passive smoke exposure and incidence of asthma and wheeze: systematic review and meta-analysis. Pediatrics. 2012 Apr 1;129(4):735-44.
9. Guarnieri M, Balmes JR. Outdoor air pollution and asthma. The Lancet. 2014 May 3;383(9928):1581-92.
10. Pearce N, Aït-Khaled N, Beasley R, Mallol J, Keil U, Mitchell E, Robertson C. Worldwide trends in the prevalence of asthma symptoms: phase III of the International Study of Asthma and Allergies in Childhood (ISAAC). Thorax. 2007 Sep 1;62(9):758-66.
11. Al-Shamrani A, Bagais K, Alenazi A, Alqwaiee M, Al-Harbi AS. Wheezing in children: Approaches to diagnosis and management. International Journal of Pediatrics and Adolescent Medicine. 2019 Jun 1;6(2):68-73.
12. Maji T and Adhikary M. A Study to assess the occurrence of asthma and its risk factors among children with respiratory symptoms in a selected district hospital of West Bengal Int. J. of Adv. Res. 11 (Jan 2023). 407-412]