Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2642
Original Article

Clinical profile, risk factors, and asthma control among children aged 5-15 years with bronchial asthma attending a tertiary care hospital: A cross-sectional observational study.

Dr. Bolishetti Kalyan Kumar[1], Dr. Mounika Vaditya[2]*, Dr. V.Veena

[1]Associate Professor, Department of Pediatrics, Government Medical College, Jagtial, Telangana, India
[2]Associate Professor, Department of Respiratory Medicine, Government Medical College, Suryapet, Telangana, India
[3]Associate Professor, Department of Respiratory Medicine, Government Medical College, Narsampet, Telangana, India

Abstract

Background:

Bronchial asthma is a common chronic respiratory disorder in children and contributes to recurrent symptoms, school absenteeism, emergency visits, and impaired quality of life. Local data on clinical presentation, modifiable risk factors, and asthma control are useful for planning pediatric asthma care.

Objectives:

To assess the clinical profile, risk factors, and asthma control status among children aged 5-15 years with bronchial asthma attending a tertiary care hospital.

Methods:

This cross-sectional observational study included 50 children with bronchial asthma at Government Medical College, Suryapet, Telangana, India, from August 2025 to January 2026. Demographic data, symptoms, environmental exposures, allergic history, medication use, inhaler technique, asthma control, and spirometric pattern were recorded using a structured proforma. Descriptive statistics, Pearson's chi-square test, and Fisher's exact test were used for analysis.

Results:

The mean age was 9.4 +/- 2.8 years, and 60.0% were boys. Wheeze was present in all children; recurrent cough in 88.0%, breathlessness in 72.0%, nocturnal symptoms in 58.0%, and seasonal variation in 62.0%. Household dust exposure was the most frequent risk factor, followed by recurrent respiratory infections, passive smoking, family history of asthma or allergy, and allergic rhinitis. Asthma was well controlled in 36.0%, partly controlled in 40.0%, and uncontrolled in 24.0%. Suboptimal control was significantly associated with passive smoking, allergic rhinitis, recurrent respiratory infections, irregular controller medication use, poor inhaler technique, and emergency visits in the previous year.

Conclusion:

Pediatric bronchial asthma in this cohort was characterized by frequent respiratory symptoms and a high burden of modifiable risk factors. Nearly two-thirds of children had partly controlled or uncontrolled disease.

Recommendations:

Regular asthma control assessment, trigger avoidance, inhaler technique review, adherence counselling, and management of allergic rhinitis should be integrated into routine pediatric care.

Keywords: *Bronchial asthma; children; asthma control; risk factors; allergic rhinitis; passive smoking; inhaler technique; tertiary care hospital*
Submitted: March 11, 2026 **Accepted:** May 07, 2026 **Published:** June 30, 2026

Corresponding Author: *Dr Mounika Vaditya*
Email: *vadithya89@gmail.com*
Associate Professor, Department of Respiratory Medicine, Government Medical College, Suryapet, Telangana, India

Introduction

Bronchial asthma is a chronic inflammatory airway disorder characterized by variable airflow limitation, bronchial hyperresponsiveness, and recurrent episodes of wheeze, cough, breathlessness, and chest tightness. In children, the condition has a distinct clinical pattern because symptoms

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2642
Original Article

fluctuate with viral infections, allergen exposure, exercise, seasonal variation, and environmental triggers. Current asthma strategies emphasize that diagnosis and treatment should not be restricted to symptom relief alone; periodic assessment of symptom control, future risk of exacerbations, inhaler technique, adherence, comorbidities, and modifiable environmental exposures is also essential [1,2].

Childhood asthma remains one of the leading chronic respiratory diseases worldwide. The global burden is substantial, with wide variation between countries and within regions due to differences in environmental exposure, urbanization, diagnostic awareness, access to care, and treatment practices [3,4]. In India, systematic reviews have shown that asthma prevalence among children varies across settings, with higher estimates among boys and urban populations in several studies [5,6]. Such heterogeneity supports the need for institution-based data that reflect local environmental, socioeconomic, and healthcare-use patterns.

The clinical profile of pediatric asthma is influenced by age, atopic background, family history, household exposures, respiratory infections, and medication-related practices. Indian studies have reported associations with male sex, family history of atopy, smokers in the family, rhinitis, and urban environmental exposure [7,8]. Dust exposure, damp housing, indoor smoke, biomass fuel exposure, and recurrent respiratory tract infections are also relevant in routine pediatric practice. These factors are important because several are preventable or controllable through counselling, household modification, early treatment of comorbid allergic disease, and structured follow-up.

Asthma control is a practical outcome that reflects recent symptoms, activity limitation, reliever use, night-time symptoms, exacerbations, and treatment adequacy. Poor control in childhood leads to repeated emergency visits, school absenteeism, caregiver stress, and increased healthcare expenditure. Inhaler technique and adherence to inhaled controller therapy are central to asthma management, yet errors in device use and irregular medication use remain common in children [9,10]. Allergic rhinitis is another frequent comorbidity and has been linked with inadequate asthma control, supporting the concept of united airway disease [11].

The present cross-sectional study was undertaken to evaluate children aged 5-15 years with bronchial asthma attending a tertiary care hospital. The objectives were to describe the demographic and clinical profile of these children, identify common familial and environmental risk factors, assess asthma control status, document spirometric patterns, and analyze selected factors associated with partly controlled or uncontrolled asthma.

Methodology

Study design

This was a hospital-based cross-sectional observational study among children aged 5-15 years with bronchial asthma. Clinical characteristics, risk factors, and asthma control status were assessed at enrolment without any investigator-assigned intervention or follow-up exposure.

Place and period of study

The study was conducted at Government Medical College and its associated tertiary care teaching hospital in Suryapet, Telangana, India. The institution provides outpatient, inpatient, emergency, diagnostic, and specialist referral services to children from the Suryapet district and surrounding areas. The Department of Pediatrics delivers routine and emergency pediatric care, inpatient management, and referral-based services, with respiratory evaluation support when clinically indicated. Data were collected from August 2025 to January 2026.

Study population

Children aged 5-15 years attending the pediatric outpatient department or admitted under pediatric care with a diagnosis of bronchial asthma were considered eligible. Diagnosis was based on recurrent wheeze, cough, breathlessness, nocturnal symptoms, exercise-induced symptoms, symptom variability, bronchodilator response, and clinical judgement aligned with standard pediatric asthma guidance [1,2].

Sample size and sampling method

A total of 50 eligible children were included. The sample size was based on feasible enrolment during the six-month study period and the exploratory observational design. Consecutive sampling was used to reduce selection bias.

Inclusion and exclusion criteria

Children aged 5-15 years with bronchial asthma whose parents or guardians provided consent were included. Children with congenital heart disease, cystic fibrosis, bronchiectasis, active pulmonary tuberculosis, chronic neuromuscular disease, foreign body aspiration, or severe acute illness requiring immediate stabilization were excluded.

Data collection procedure

Data were collected using a predesigned proforma. Information included age, sex, residence, socioeconomic status, nutritional status, symptoms, emergency visits, hospital admission, reliever use, school absenteeism, family history of asthma or allergy, passive smoking, dust exposure, biomass fuel exposure, damp housing, pet

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2642
Original Article

exposure, prematurity or low birth weight, recurrent respiratory infections, allergic rhinitis, eczema, food allergy, controller medication use, and inhaler technique.

Assessment of asthma control

Asthma control was classified as well-controlled, partly controlled, or uncontrolled using symptom frequency, nocturnal symptoms, activity limitation, reliever use, exacerbation history, and healthcare utilization in accordance with guideline-based clinical assessment [1,2]. Inhaler technique was assessed by direct demonstration. Spirometry was recorded in children able to perform acceptable maneuvers, and obstruction was categorized as normal, mild, moderate, or severe [14].

Bias control and quality assurance

Information bias was reduced by using a uniform proforma and cross-checking parental responses with clinical records. Exposure history was elicited through predefined questions. The same clinical definitions were applied across participants, and inhaler technique was assessed through observation.

Statistical analysis

Data were entered in a spreadsheet and analyzed using descriptive statistics. Continuous variables were expressed as mean and standard deviation. Categorical variables were expressed as frequency and percentage. Children with partly controlled and uncontrolled asthma were grouped as having suboptimal control for association analysis. Pearson's chi-square test and Fisher's exact test were used to assess associations between categorical variables, as applicable. Pearson's chi-square test was used for the comparisons presented in Table 4 because all expected cell frequencies exceeded 5, whereas Fisher's exact test was reserved for contingency tables with small expected cell frequencies. All tests were two-sided, and a p-value less than 0.05 was considered statistically significant.

Ethical considerations

The study was conducted after approval from the Institutional Ethics Committee, Government Medical College, Suryapet, Telangana, India. Written informed consent was obtained from parents or guardians, and assent was obtained from older children where appropriate. Confidentiality was maintained.

Results

A total of 50 children aged 5-15 years with bronchial asthma were included in the study. The mean age of the study population was 9.4 +/- 2.8 years. Most children were aged 8-15 years. Male predominance was observed, with boys accounting for 60.0% of the study population. Urban residence was recorded in 56.0% of children, and nearly half of the participants belonged to the middle socioeconomic group. Baseline demographic characteristics are presented in Table 1.

Table 1. Baseline demographic characteristics of the study population

Variable	Category	Frequency (n=50)	Percentage (%)
Age group	5-7 years	14	28.0
	8-10 years	18	36.0
	11-15 years	18	36.0
Gender	Male	30	60.0
	Female	20	40.0
Residence	Urban	28	56.0
	Rural	22	44.0
Socioeconomic status	Lower	18	36.0
	Middle	24	48.0
	Upper	8	16.0
Nutritional status	Normal	34	68.0
	Underweight	12	24.0
	Overweight/obese	4	8.0

Wheeze was present in all children, followed by recurrent cough in 88.0%, breathlessness in 72.0%, nocturnal cough or wheeze in 58.0%, and exercise-induced symptoms in 44.0%. Seasonal variation of symptoms was noted in 62.0% of children. Emergency visits during the previous year were reported in 36.0%, while 20.0% required hospital admission. Reliever medication use more than twice weekly was noted in 48.0%, and school absenteeism due to asthma was reported in 42.0%. Asthma was well controlled in 36.0%, partly controlled in 40.0%, and uncontrolled in 24.0%. The clinical profile, control status, and spirometric pattern are shown in Table 2.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2642
Original Article

Table 2. Clinical profile, asthma control status, and spirometric pattern among children with bronchial asthma

Clinical variable	Category/finding	Frequency (n=50)	Percentage (%)
Symptoms	Wheeze	50	100.0
	Recurrent cough	44	88.0
	Breathlessness	36	72.0
	Nocturnal cough/wheeze	29	58.0
	Exercise-induced symptoms	22	44.0
	Seasonal variation of symptoms	31	62.0
Healthcare utilization	Emergency visit in the past year	18	36.0
	Hospital admission in the past year	10	20.0
Medication and daily impact	Reliever medication use >2 times/week	24	48.0
	School absenteeism due to asthma	21	42.0
Asthma control status	Well-controlled	18	36.0
	Partly controlled	20	40.0
	Uncontrolled	12	24.0
Spirometric pattern	Normal spirometry	14	28.0
	Mild obstruction	18	36.0
	Moderate obstruction	14	28.0
	Severe obstruction	4	8.0

Household dust exposure was the most common risk factor and was observed in 64.0% of children. Recurrent respiratory infections were present in 48.0%, passive smoking exposure in 44.0%, and family history of asthma or allergy in 40.0%. Allergic rhinitis was the most frequently associated atopic condition and was recorded in 54.0% of children. Other exposures included indoor smoke or biomass fuel exposure, damp housing or visible mould, pet exposure, and a history of prematurity or low birth weight. These risk factors and allergic conditions are summarized in Table 3.

Table 3. Risk factors and associated allergic conditions among children with bronchial asthma

Variable	Frequency (n=50)	Percentage (%)
Household dust exposure	32	64.0
Recurrent respiratory infections	24	48.0
Passive smoking exposure	22	44.0
Family history of asthma/allergy	20	40.0
Indoor smoke/biomass fuel exposure	14	28.0
Damp housing or visible mould	13	26.0
Pet exposure	11	22.0
History of prematurity/low birth weight	7	14.0
Allergic rhinitis	27	54.0
Atopic dermatitis/eczema	8	16.0
Food allergy history	6	12.0

For analysis of factors associated with asthma control, children with partly controlled and uncontrolled asthma were combined as the suboptimal control group. Suboptimal asthma control was significantly associated with passive smoking exposure, allergic rhinitis, recurrent respiratory infections, irregular controller medication use, poor inhaler technique, and emergency visits during the previous year. Irregular controller medication use showed the strongest association with suboptimal control. The association of selected factors with suboptimal asthma control is shown in Table 4. The corresponding Pearson chi-square values and p-values are presented in Table 4.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2642
Original Article

Table 4. Factors associated with suboptimal asthma control

Factor	Well-controlled asthma (n=18)	Partly/uncontrolled asthma (n=32)	χ^2 value (df=1)	p-value
Family history of asthma/allergy	5	15	1.751	0.186
Passive smoking exposure	4	18	5.414	0.020
Household dust exposure	9	23	2.393	0.122
Allergic rhinitis	6	21	4.836	0.028
Recurrent respiratory infections	5	19	4.608	0.032
Irregular controller medication use	3	20	9.742	0.002
Poor inhaler technique	4	17	4.516	0.034
Emergency visit in the past year	2	16	7.562	0.006

Note: Values are Pearson's chi-square statistics with 1 degree of freedom. All expected cell frequencies were greater than 5; therefore, Fisher's exact test was not required for the comparisons shown in this table.

Overall, the study showed that bronchial asthma among children aged 5-15 years was commonly associated with wheeze, recurrent cough, breathlessness, nocturnal symptoms, and seasonal variation. Household dust exposure, passive smoking, family history of atopy, allergic rhinitis, and recurrent respiratory infections were frequent risk factors. Only 36.0% of children had well-controlled asthma, while nearly two-thirds had partly controlled or uncontrolled disease.

Discussion

The present cross-sectional study evaluated the clinical profile, risk factors, and asthma control status among 50 children aged 5-15 years with bronchial asthma at a tertiary care hospital. The mean age was 9.4 +/- 2.8 years, and boys constituted 60.0% of the cohort. This male predominance is consistent with Indian and international pediatric asthma literature, where boys often show a higher childhood burden [5-8]. The clustering of cases in the 8-15-year age range reflects the age at which recurrent symptoms, exercise limitation, school absenteeism, and inhaler use become more apparent.

Wheeze was universal, and recurrent cough, breathlessness, nocturnal symptoms, exercise-induced symptoms, and seasonal variation were frequent. These findings support the typical variable symptom pattern described in pediatric asthma guidelines and consensus statements [1,2]. Emergency visits in the previous year were reported by 36.0% of children, and one-fifth required hospital admission. This indicates clinically meaningful morbidity rather than only intermittent symptoms. School absenteeism in 42.0% further highlights the functional impact.

Household dust exposure, recurrent respiratory infections, passive smoking exposure, family history of asthma or allergy, and allergic rhinitis were the leading risk factors. These observations align with earlier Indian studies identifying family history, smokers in the family, rhinitis, and environmental exposures as correlates of childhood asthma [7-9]. Systematic reviews also support parental asthma, tobacco smoke exposure, prematurity, dampness, mould, and allergic disease as relevant risks [10]. The high frequency of allergic rhinitis reinforces the assessment of upper airway symptoms during asthma visits [11].

Only 36.0% of children had well-controlled asthma, whereas 64.0% had partly controlled or uncontrolled disease. Suboptimal control was significantly associated with passive smoking exposure, allergic rhinitis, recurrent respiratory infections, irregular controller medication use, poor inhaler technique, and emergency visits. These associations are clinically meaningful modifiable targets. Secondhand smoke exposure is a recognized contributor to childhood asthma morbidity [10]. Poor inhaler technique limits drug delivery, and medication non-adherence remains a major determinant of inadequate control [12,13]. Routine assessment of controller use, device handling, and trigger exposure should be part of pediatric asthma care.

Spirometry showed an obstructive pattern in 72.0% of children, with mild obstruction being the most common. Lung function testing provides objective support, although asthma management requires integration of symptoms, exacerbation history, treatment response, and risk factors [14]. These findings suggest that tertiary care asthma clinics should combine symptom-based assessment with

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2642
Original Article

spirometry, inhaler review, adherence counselling, and comorbidity screening.

Generalizability

The findings are most applicable to children aged 5-15 years attending comparable tertiary care hospitals in Telangana and similar Indian settings. Since the study was hospital-based with a sample of 50 children, the results reflect children seeking clinical care rather than the community burden of asthma. However, the observed pattern of risk factors and poor control provides useful guidance for pediatric outpatient practice and targeted counselling at the clinic level.

Conclusion

This cross-sectional study showed that bronchial asthma among children aged 5-15 years was associated with frequent wheeze, recurrent cough, breathlessness, nocturnal symptoms, seasonal variation, and meaningful healthcare utilization. Household dust exposure, recurrent respiratory infections, passive smoking, family history of asthma or allergy, and allergic rhinitis were common risk factors. Only about one-third of children had well-controlled asthma, while most had partly controlled or uncontrolled disease. Suboptimal control was linked with passive smoking exposure, allergic rhinitis, recurrent respiratory infections, irregular controller medication use, poor inhaler technique, and recent emergency visits. These findings support structured asthma follow-up with attention to modifiable risks, adherence, inhaler technique, comorbidity management, and parent-centred education and continuity.

Limitations

The study was conducted in a single tertiary care hospital with a sample size of 50 children, which limits wider population inference. The observational design identifies associations rather than causation. Some exposure variables depended on caregiver recall, creating recall bias. Spirometry quality depended on the child's cooperation and effort during testing. Seasonal variation across a longer period was not fully captured.

Recommendations

Pediatric asthma care should include routine classification of asthma control at every visit, assessment of reliever overuse, review of controller adherence, and direct observation of inhaler technique. Parents should receive counselling on dust control, avoidance of passive smoking, reduction of indoor smoke exposure, and early treatment of respiratory infections. Screening and treatment of allergic rhinitis should be integrated into asthma management. Children with repeated emergency visits, poor control, or obstructive spirometry require closer follow-up and individualized action plans. School-based awareness can help reduce absenteeism and improve timely symptom recognition. Periodic audit of asthma control indicators should strengthen clinic-level quality improvement.

Acknowledgement

The authors acknowledge the support of the Department of Pediatrics, Government Medical College, Suryapet, Telangana, India. The authors also thank the children and their parents or guardians for their cooperation during data collection, clinical assessment, and follow-up interactions. The nursing and outpatient staff are gratefully acknowledged throughout the study period.

Abbreviations

C-ACT: Childhood Asthma Control Test
GINA: Global Initiative for Asthma
ICS: Inhaled corticosteroid
IEC: Institutional Ethics Committee
OPD: Outpatient department
SABA: Short-acting beta2-agonist
SD: Standard deviation

Source of funding

The study had no funding.

Conflict of interest:

The authors declare no conflict of interest.

Author Contributions

Dr. Bolishetti Kalyan Kumar contributed to the study concept, clinical supervision, study design, pediatric case evaluation, interpretation of findings, and critical revision of the manuscript for important intellectual content.
Dr. Mounika Vaditya contributed to study design, respiratory assessment, data collection, spirometry-related interpretation, analysis of asthma control status, manuscript drafting, and final content review.
Dr. V. Veena contributed to the literature review, data organization, interpretation of clinical and risk factor findings, manuscript preparation, editing, and approval of the final version.

Data availability

Data Available on request

Author Biography

Dr. Bolishetti Kalyan Kumar is an Associate Professor in the Department of Pediatrics, Government Medical College, Jagtial, Telangana, India. His academic and clinical interests

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2642
Original Article

include pediatric respiratory disorders, childhood asthma, infectious diseases, and child health care in tertiary hospital settings. He is actively involved in undergraduate teaching, clinical pediatrics, and research related to common pediatric morbidities.

Dr. Mounika Vaditya is a qualified medical professional with an MBBS degree from Katuri Medical College (2006–2012) and an MD in Respiratory Medicine from Konaseema Institute of Medical Sciences (2012–2015). She has over 7.5 years of teaching experience in the field of Respiratory Medicine, contributing actively to the academic training of undergraduate and postgraduate students. Her areas of expertise include the diagnosis and management of respiratory diseases, tuberculosis, pulmonary function testing, and bronchoscopy. She has been recognized for her dedication and excellence in the medical field with several prestigious awards, including the Vaidya Siromani Award in 2022. She continues to be committed to patient care, medical education, and advancing respiratory health through her clinical and academic contributions. **ORCID iD**: https://orcid.org/0009-0000-3474-1999

Dr. V.Veena is a qualified medical professional with an MBBS degree from SVS Medical College, Mahabubnagar (2004-2010) and an MD in Respiratory Medicine from SVS Medical Sciences, Mahabubnagar (2012–2015). She has over 7.5 years of teaching experience in the field of Respiratory Medicine, contributing actively to the academic training of undergraduate and postgraduate students. Her areas of expertise include the diagnosis and management of respiratory diseases, tuberculosis, pulmonary function testing, and bronchoscopy. She has been recognized for her dedication and excellence in the medical field and continues to be committed to patient care, medical education, and advancing respiratory health through her clinical and academic contributions.

References

1. Reddel HK, Bacharier LB, Bateman ED, Brightling CE, Brusselle GG, Buhl R, et al. Global Initiative for Asthma Strategy 2021: Executive Summary and Rationale for Key Changes. Am J Respir Crit Care Med. 2022;205(1):17-35. https://doi.org/10.1164/rccm.202109-2205PP
2. Papadopoulos NG, Arakawa H, Carlsen KH, Custovic A, Gern J, Lemanske R, et al. International consensus on (ICON) pediatric asthma. Allergy. 2012;67(8):976-97. doi:10.1111/j.1398-9995.2012.02865.x.
3. https://doi.org/10.1111/j.1398-9995.2012.02865.x
4. Subbarao P, Mandhane PJ, Sears MR. Asthma: epidemiology, etiology, and risk factors. CMAJ. 2009;181(9):E181-90. https://doi.org/10.1503/cmaj.080612
5. Asher I, Pearce N. Global burden of asthma among children. Int J Tuberc Lung Dis. 2014;18(11):1269-78. https://doi.org/10.5588/ijtld.14.0170
6. Daniel RA, Aggarwal P, Kalaivani M, Gupta SK. Prevalence of asthma among children in India: a systematic review and meta-analysis. Lung India. 2022;39(4):357-67. https://doi.org/10.4103/lungindia.lungindia_706_21
7. Pal R, Dahal S, Pal S. Prevalence of bronchial asthma in Indian children. Indian J Community Med. 2009;34(4):310-6. https://doi.org/10.4103/0970-0218.58389
8. Chhabra SK, Gupta CK, Chhabra P, Rajpal S. Risk factors for development of bronchial asthma in children in Delhi. Ann Allergy Asthma Immunol. 1999;83(5):385-90. https://doi.org/10.1016/S1081-1206(10)62835-9
9. Kumar GS, Roy G, Subitha L, Sahu SK. Prevalence of bronchial asthma and its associated factors among school children in urban Puducherry, India. J Nat Sci Biol Med. 2014;5(1):59-62. https://doi.org/10.4103/0976-9668.127289
10. Castro-Rodriguez JA, Forno E, Rodriguez-Martinez CE, Celedon JC. Risk and protective factors for childhood asthma: what is the evidence? J Allergy Clin Immunol Pract. 2016;4(6):1111-22. https://doi.org/10.1016/j.jaip.2016.05.003
11. He Z, Wu H, Zhang S, Lin Y, Li R, Xie L, et al. The association between secondhand smoke and childhood asthma: a systematic review and meta-analysis. Pediatr Pulmonol. 2020;55(10):2518-31. https://doi.org/10.1002/ppul.24961
12. Padilla J, Uceda M, Ziegler O, Lindo F, Herrera-Perez E, Huicho L. Association between allergic rhinitis and asthma control in Peruvian school children: a cross-sectional study. Biomed Res Int. 2013;2013:861213. https://doi.org/10.1155/2013/861213

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2642
Original Article

13. Gillette C, Rockich-Winston N, Kuhn JA, Flesher S, Shepherd M. Inhaler technique in children with asthma: a systematic review. Acad Pediatr. 2016;16(7):605-15. https://doi.org/10.1016/j.acap.2016.04.006
14. Gray WN, Netz M, McConville A, Fedele D, Wagoner ST, Schaefer MR. Medication adherence in pediatric asthma: a systematic review of the literature. Pediatr Pulmonol. 2018;53(5):668-84. https://doi.org/10.1002/ppul.23966
15. Pijnenburg MW, Baraldi E, Brand PLP, Carlsen KH, Eber E, Frischer T, et al. Monitoring asthma in children. Eur Respir J. 2015;45(4):906-25. https://doi.org/10.1183/09031936.00088814

Publisher Details:

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa