

A Study of Clinical Profile and Risk Factors for Asthma Exacerbation in Children Visiting Tertiary Care Teaching Hospital

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ABSTRACT:

BACKGROUND: Asthma is one of the commonest chronic disease in pediatric age group. It results in episodic airflow obstruction. Asthma management is aimed at decreasing airway inflammation. Hypersensitivity or susceptibility to a variety of provocative exposures or triggers can lead to airway inflammation.

Objectives: To study the clinical profile and identifying common triggers of asthma exacerbations in children visiting a tertiary care teaching hospital.

Methods: This was a prospective study conducted at tertiary care centre in Jharkhand between Jan. 2015 to June 2016. Inclusion criteria was children between age of 5-15 years of age who presented with signs and symptoms of hyperreactive airway disease. These patients were assessed for predisposing factors and factors related to exacerbation. Asthma was diagnosed on the basis of detailed history, clinical examination and spirometry having obstructive pattern and reversibility showing reversibility of more than 12% or 200 ml after inhaling short acting beta 2 agonist.

RESULT: Out of 86 children with acute severe asthma, 60(70%) were between 5-10 years. Male gender was more predisposed. Ratio of Male:Female::1.5:1. Common risk factors for acute exacerbation were bacterial and viral respiratory tract infections (76%), Poor drug compliance (68%), exposure to allergens (8%). 56(65%) of children had exacerbation during winter. Majority of cases 67(78%) were from rural areas whereas 19(22%) cases were from urban areas.

CONCLUSION: In present study majority of patients were males. They belonged to rural areas. Maximum cases of asthma exacerbation were reported during winter season. Interventions aimed at preventing the triggering factors are likely to reduce the mortality and morbidity due to asthma exacerbation.

KEYWORDS: Asthma exacerbation, Risk factors, Becker score, Respiratory infections, Allergens

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I. Introduction

Asthma is a chronic inflammatory condition of the lung airways resulting in episodic airflow obstruction. This chronic inflammation increases the airways responsiveness to provocative exposures. Acute asthma exacerbation is one of the most common reasons for presentation to the pediatric emergency and for hospitalisation. Asthma exacerbation are acute or subacute episodes of progressively worsening symptoms and airflow obstruction. Airflow obstruction during exacerbation can become extensive, resulting in life threatening respiratory insufficiency[2]. Often asthma exacerbations worsen during sleep (between midnight and early morning) when airflow inflammation and hyperresponsiveness are at their peak.

Transient worsening of asthma may occur as a result of exposure to risk factors for asthma symptoms or triggers such as exercise, air pollutants, certain weather conditions, viral infections of upper respiratory tract or allergen exposure which increase inflammation in the lower airways.

Most patients with acute severe asthma presents with cough, wheezing and symptoms of respiratory distress. Chest tightness and shortness of breath are other common complains. The degree of wheezing doesnot correlate well with severity of the disease[3]. Risk factors for severe asthma includes past pediatric intensive care admissions, previous sudden deterioration, previous respiratory failure with need for mechanical ventilation.

II. Materials And Methods

This was a prospective observational study. It was carried out in a tertiary care teaching hospital in Jharkhand between January 2015 to June 2016. Age group included in the study was between 5 years to 15 years of age children who were admitted in the pediatric ward and Pediatric intensive care unit of this teaching hospital. Wheezing children with features of respiratory distress and previous history of recurrent wheezing were included in the study. Children less than 5 years of age were not included in the study. Asthma mimics like foreign bodies in trachea, bacterial pneumonia, congestive heart failure were excluded from the study based on clinical and radiological findings. Demographic details like age, gender, address were taken. Any history of atopy was noted. Patient details were taken at the time of admission. Informed consent was taken from parents and children fulfilling inclusion criteria were included in the study. Detailed history of the patients was taken. General and systemic examination was done. Severity of respiratory distress was assessed according to Becker's score [13]. Peak flow recording using a hand held peak flow meter was done. Decreased peak flow recording and a reversibility of more than 12% Or 200 ml after inhaling a short acting beta 2 agonist was considered significant. Other routine investigations such as CBC with Peripheral blood smear, ESR, CRP, AEC, Liver function test, kidney function test, Serum electrolyte was done. Chest x-ray was done to rule out other causes of respiratory distress including pneumonia, foreign body aspiration etc. Peak expiratory flow rate was taken threetimes and maximum value was taken.

III. Results

Out of the 86 cases presenting with acute asthma exacerbations, 52(60%) were males and 34(40%) were females [Table 1]. 60(70%) of the patients were in the age group 5-10 years. Out of these 37(62%) were males. 26(30%) were in the age group 10-15 years [Table 2]. 67(78%) patients were from rural areas [Table 3]. However most of the patients 52(60%) presenting to the hospital had mild exacerbation at the time of presentation in hospital. 7 patients (8%) had severe exacerbation at presentation and needed intensive care support.

TABLE 1. DISTRIBUTION ACCORDING TO SEX

TOTAL	MALE	FEMALE
86	52 (60%)	34 (40%)

TABLE 2: DISTRIBUTION ACCORDING TO AGE

AGE GROUP	TOTAL	MALE	FEMALE
5-10 YEARS	60(70%)	37(62%)	23(38%)
10-15 YEARS	26(30%)	15(58%)	11(42%)

TABLE 3: DISTRIBUTION ACCORDING TO LOCALITY

LOCALITY	TOTAL	MALE	FEMALE
RURAL	67(78%)	42(62%)	25(38%)
URBAN	19(22%)	11(58%)	08(42%)

TABLE 4: SEVERITY OF ASTHMA EXACERBATION AT TIME OF PRESENTATION

MILD (BECKER SCORE 1-3)	52(60%)
MODERATE (BECKER SCORE 4-7)	27(32%)
SEVERE (BECKER SCORE >7)	07(8%)

Etiology of acute exacerbation: Respiratory tract infection (Viral and bacterial) were most common trigger factor for acute severe exacerbation in 65(76%) of cases. 7(8%) of cases had some allergen exposure like smokes, fumes, cold exposure etc. 3(3%) of the acute exacerbations were exercise induced. 11(13%) of cases were of unknown etiology.

IV. Discussion

Asthma is a common pediatric disease and a common cause of pediatric emergency admission. Status asthmaticus is a severe life threatening condition as there are marked changes in cardiopulmonary functions during status asthmaticus. The recognition of factors associated with increased asthma mortality might allow for earlier, more effective treatment and avoidance of complications. However there are many respiratory conditions that show symptoms similar to asthma. Clinical manifestations need to be studied and a proper diagnosis is necessary to rule out asthma.

Our present study analysed the visits in pediatric OPD, pediatric ward and pediatric intensive care unit of a tertiary care teaching hospital in Jharkhand, for asthma exacerbation. Our study data showed that respiratory tract infection (both viral and bacterial) are the most common trigger for asthma exacerbation. These infections were responsible factors for acute exacerbation in 65(76%) cases while 7(8%) cases were due to allergen exposure. 3 cases were due to exercise induced asthma. 11(13%) cases had acute exacerbation due to unknown etiology. Also most of the exacerbations 56(65%) were during winter season. These findings were similar to other studies done by Robert et al. So, as seen in our study infections and allergy are the most frequent triggers in asthma exacerbation. So, preventive measures to check infection and avoid allergen exposure play an important role in management of pediatric asthma. Proper vaccination to younger children and adolescent is one such important measure. Written action plan for management and referral of acute asthma exacerbation cases is another important measure in management of acute asthma.

In our study it was found that male were more affected than females. These results were similar to those conducted by Balaji et al., sadhanaraut et al., shivkumar et al[4,5,6]. In our study 78% cases were from rural areas and 22% cases were from urban areas. Being a government teaching hospital most of the population catered by this hospital is from rural areas. This could be a cause for larger number of patients of asthma exacerbation from rural areas. This result was similar to other studies done by A K Singh et al [7].

Though our study group was between 5-15 years of children, most of the patients with acute asthma were between 5-10 years (70%). Similar results were found in studies conducted by shivakumar et al. Lower age groups were not included in this study to avoid asthma mimics like bronchiolitis and difficulty in performing spirometry by hand held spirometer in this lower age group. 52(60%) patients had mild severe presentation while 28(32%) patients had moderately severe exacerbation at presentation. Only 7 (8%) patients had severe exacerbation at time of presentation. Severity was categorized based on Beckers score. This finding was similar to other studies conducted by Bekmezian et al.

V. Conclusion

Respiratory infections were the most common exacerbating factors for acute asthma in our study. Actions aimed on prevention of exacerbating factors, written action plans and possibly vaccination and allergen avoidance is likely to reduce the morbidity and mortality from acute asthma. Long term aim of asthma management requires a better understanding of the risk factors contributing to acute exacerbation.

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