



## PATTERN OF ASTHMA EXACERBATION IN CHILDREN SEEN AT FEDERAL MEDICAL CENTRE, UMUAHIA, NIGERIA

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### ABSTRACT

**Background:** The pattern of presentation of asthma is protean especially during childhood period when a lot of asthma mimics abound. The ability to identify asthma exacerbation in a busy Emergency Room aids appropriate triaging and cost-effective management especially in resource-poor countries.

**Objectives:** To determine the pattern of asthma exacerbation including peak season of presentation and the common precipitating factors in children at the Emergency Room of Federal Medical Centre, Umuahia, Nigeria.

**Method:** A retrospective descriptive study using data of children managed for bronchial asthma at the Emergency Room of Federal Medical Centre, Umuahia, Nigeria over a 5 year period.

**Results:** The proportion of children managed for bronchial asthma was 98/10004 (1%). Out

of 98 subjects, 60 (61.2%) were males. Their ages ranged from 1 to 16 years with a median age of 6.5 years and a modal age of 4 years, and with 38/98 (38.8%) being 5 years and younger. The peak period of presentation was in rainy season (72/98 - 73.1%). Cold air was the highest 16/98 (16.3%) identifiable precipitating factor, followed by dust 13/98 (13.2%), while the commonest clinical features were cough 86/98 (87.8%), breathlessness 85/98 (86.7%) and rhonchi 69/98 (70.4%).

**Conclusion:** The commonest clinical features of asthma exacerbation in children in our environment are similar to those in other climes, and they include cough, breathlessness and rhonchi. As in other studies around the world, there is a male preponderance. The peak presentation is in the rainy season, with cold air as the commonest precipitating factor.

**Key words:** Childhood, Asthma, Exacerbation, Pattern, Nigeria.

### INTRODUCTION

The ability to identify, appropriately triage and institute timely treatment for acutely ill children that present to emergency rooms remains a major challenge especially in low and middle income countries. Asthma exacerbation in children is one of the illnesses that require such prompt decision,

and it is defined as acute or sub-acute episodes of progressive increase in asthma symptoms, associated with airflow obstruction<sup>1</sup>. It contributes to high childhood morbidity and cost of healthcare. The contributors to this high morbidity are delay in detection and poorly instituted treatment<sup>2</sup>.





There is a high level of mimicry between asthma exacerbation and other illnesses in children. Hence, a high index of suspicion for prompt diagnosis is needful<sup>3</sup>.

In developing countries, there is dearth of facilities and manpower to aid prompt diagnosis. Therefore interventions that hasten detection of asthma exacerbation based on the common clinical features may reduce the burden. Hence, this study sets out to discover the pattern of presentation in our locality.

#### **METHODOLOGY**

**Study area and population:** The study was conducted in the Emergency Room (ER) of Department of Paediatrics, Federal Medical Centre (FMC), Umuahia, Abia State. The FMC, Umuahia is a specialist health facility located in Southeastern Nigeria. The Paediatrics Department is comprised of daily General Children's Out-Patient (CHOP) clinics and daily subspecialty clinics with an average patient attendance rate of 7,350 per annum. For inpatient admissions, there are the Pediatric General Ward (40 bed spaces), Newborn Special Care Unit (25 bed spaces) with an average admission rate of 570 and 530 per annum respectively, and the Emergency Room (ER) which has 17 bed spaces with an average patient attendance of 2,250 per annum.

The Emergency Room (ER) functions for 24 hours and for seven days of the week. It is equipped with basic equipment required for management and resuscitation of patients. Critically ill patients can be admitted to the ER directly or referred from Children Out-Patient Clinics (CHOP). Stable patients are either discharged from ER or transferred to

the ward for further review and management. Consultants, Resident Doctors, House Officers and Nurses oversee activities in the ER with the consultant being in-charge.

**Study design:** The study was a descriptive retrospective study which reviewed the medical records of children who were admitted in the ER over 5 years from January 2008 to December 2012. The medical records of children who were managed for bronchial asthma were retrieved.

**Ethical consideration:** The ethical clearance to commence the review was obtained from the Health Research Ethics Committee (HREC) of FMC Umuahia, Abia State, Nigeria.

**Data collection:** The medical records of children managed for bronchial asthma were retrieved from the Medical Records Department. Information recorded on the proforma were: age, gender, presenting symptoms, identifiable precipitating factor(s), revealed signs, family history of asthma, previous episode(s) of asthma and season the illness occurred.

**Data analysis:** Data were analyzed using the Statistical Package for the Social Sciences (SPSS) software version 20.0 for Windows (IBM SPSS Inc. 2011 Chicago, Illinois, USA). Descriptive statistics was used to describe the frequency, mean, median and standard deviation of continuous variables. Pearson Chi-square and Fisher exact tests were used for tests of association and significance for parametric and non-parametric variables as appropriate. Significant level was set at  $p$  value of  $<0.05$ .

## RESULTS

### Demographic characteristics of the subjects

Out of the 10,004 children admitted in the ER within the period under review, 98 (1.0%) were managed for bronchial asthma. Sixty (61.2%) of the subjects were males. Their ages ranged from 1 to 16 years with median age of 6.5 years and modal age of 4 years, whereas 38 (38.8%) were 5 years and younger. The mean age was 7.46 years (SD 4.209).

Bronchial asthma was commoner in males, with a male: female ratio of 1.6:1. Chi square: 9.0000, p value of 0.0027, Odds Ratio (OR): 2.49, CI: 1.40 to 4.43. (Table 1).

**Table 1:** Gender distribution

SEX	Frequency	Percent
Male	60	61.22%
Female	38	38.78%
Total	98	100.00%

**Table 2:** Precipitating factors

Precipitating factors	Frequency	Percentage (%)
Cold	16	16.3
Dust	13	13.2
Smoke	12	12.4
Exercise	5	5.1

### Common presenting features

The most common presenting features were cough (87.8%), breathlessness (86.7%) and rhonchi (70.4%). See Table 3 below.

**Table 3:** Clinical Scenario of the Patients

Variables	N	%
Symptoms (n=98) Cough	86	87.8
Breathlessness	85	86.7
Rhinorrhea	35	36.1
Wheezing	35	35.7
Chest tightness	3	3.1
Physical signs (n=98) Rhonchi	69	70.4
Pyrexia	33	33.7
Crepitation	31	31.6
Eczema	5	5.1
Cyanosis	0	0

## DISCUSSION

The prevalence rate of bronchial asthma in this study is 1%. This is quite low in view of reported increase in the overall prevalence of bronchial asthma in other parts of the world<sup>4,5</sup>. In Nigeria, it is generally accepted that 6 – 10% of children in a given community have asthma with a further 3-6% being undiagnosed. Hence, bronchial Asthma is second only to pulmonary tuberculosis among the commonest chronic respiratory conditions in children<sup>6</sup>. The low prevalence rate in our study which involved asthma exacerbations in Emergency Room, is in contrast with higher prevalence rates reported in studies involving patients with previously diagnosed bronchial asthma even when they are in controlled state<sup>7-10</sup>. A study among children with asthma exacerbation by Edelu and colleagues<sup>11</sup> in Enugu, Nigeria, is similar to this study, reporting a higher prevalence rate of 6.5%. But the higher rate may be because it was a prospective study done in a larger urban health centre.

As revealed in this study, majority presented with cough and breathlessness as well as seasonal increase in episodes. These findings

should inform a high index of suspicion in emergency situations. Cough and breathlessness ranked highest among the symptoms and similar to what has been reported by Edelu *et al*<sup>11</sup> at Enugu, Nigeria. Since later development of childhood asthma has been associated with both prolonged cough (up to 28 days) and cough without cold in infants independent of wheezing<sup>12</sup>, cough as a symptom deserves closer attention in childhood asthma diagnosis. On the other hand, cyanosis, a serious asthma symptom<sup>13</sup> was not recorded for any patient. This finding may be a pointer to a less severe phenotype in our environment and opens a new area of research<sup>14</sup>. Associated comorbid clinical features noted in this study include rhinorrhea, crepitation, fever and eczema. Respiratory tract infections commonly caused by rhinoviruses have been shown to influence asthma severity. The presence of eczema points to a possible allergic march, which implies that allergic conditions may evolve to asthma<sup>15</sup>.

High male preponderance (male to female ratio of 1.6:1) in this study is similar to other reports<sup>16-18</sup>. The reason for male preponderance is not known but may be related to increased physical activity in males which apart from being a trigger for asthma in itself, also exposes them to outdoor cold air which was the major trigger for asthma documented in this study. Also, the preference placed on the male child who may likely be brought to healthcare facilities in this environment more often than the female child, may have influenced this male preponderance. Contrary to the known trend, for reasons unknown, a slight female preponderance (male to female ratio of 1:1.04) among children was documented in a

similar study by Edelu *et al*<sup>11</sup> in Enugu, South east Nigeria. Although a reversal to female preponderance, likely influenced by hormonal changes occurs at puberty<sup>19</sup>, this factor does not count significantly in a study done in mainly younger age group.

Of significant note is the high frequency of presentation in the wet seasons of the year as also observed by Oguonu *et al*<sup>20</sup>. This finding clearly provides a strong basis for control of exacerbations through behavioural modifications during the wet seasons. Cold air as the commonest (16.3%) precipitating factor in this population deserves attention, considering the need for behavioral changes that protect the children from cold air, especially in wet seasons. Other triggers noted like dust (13.2%), smoke (12.4%) and exercise (5.1%) as observed in this population also need to be controlled.

Almost three-quarters of the patients (67.4%) never had a prior episode of symptoms before presentation. The magnitude of the new cases may point to increasing incidence of the disease in this environment. It may as well be due to poor understanding of the pattern of presentation for which reason they never sought medical attention earlier.

Coupled with various mimics of asthma that may be valid confounders in children 5 years and younger, the difficulty in assessing them with lung function tests often makes the diagnosis of bronchial asthma a challenge such that for the sake of these children, a high index of suspicion is needful<sup>21</sup>. Hence, the modal age of 4 years and the number of the subjects within the ages of 5 years and below (38.8%) in this study, poses a challenge in



diagnosis which is often not easy in this age group. This however appeals to the position of the Global Initiative for Asthma (GINA)<sup>21</sup> that the presence of symptoms (wheeze, cough, shortness of breath), family history and response to inhaled corticosteroids or short acting beta agonists should be paramount in diagnosis in this age group.

Although family history is a strong factor in the evolution of asthma<sup>21</sup>, only about half of the subjects whose family histories were documented showed a positive family history. However, the fear of stigmatization may have affected the ease with which caregivers volunteer the information.

### RECOMMENDATIONS

Educating the communities on the subtle manner of presentation, and concerted efforts to discourage stigmatization among sufferers will greatly improve early hospital presentation. Environmental manipulation and guided physical outdoor activities in under-5 aged children can contribute to reduction in attacks. Behavioural modifications that involve avoidance of known triggers will be helpful. Efforts to discover the allergen through allergy testing has been advocated so that frequent exacerbations can be avoided<sup>22</sup>.

Whereas respiratory tract infections commonly caused by rhinoviruses have been shown to influence asthma severity, overcrowding in such settings should be avoided<sup>23-25</sup>. This is particularly relevant in day-care centres, where more attention to preventive care is very needful.

### CONCLUSION

Despite the low prevalence in this study, the

overall pattern of asthma exacerbation in our environment is similar to those in other climes. It is more in males, especially in rainy seasons, and mainly triggered by cold air, followed by dust and smoke in our environment. Improved seasonal behavioural modifications and high index of suspicion in children during rainy seasons and unhealthy environment is advocated.

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**Conflict of interest:** There was no conflict of interest

**Ethical conformity:** Due ethical clearance from the Hospital Ethical Research Committee was obtained

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