IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 15, Issue 4 Ver. X (Apr. 2016), PP 92-94
www.iosrjournals.org

A tertiary hospital based study on various triggers of asthma exacerbation among children

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Abstract:
Background: *Asthma is a prevalent disease in Sub-Himalayan region of North Bengal and there are frequent exacerbation of asthma symptoms. There are many acknowledged triggers of asthma in the world. They include viral infections, exercise, weather conditions, dust, pets, sinusitis, pollen, gastroesophageal reflux disease, smoke, emotional stress and many more. So we have done a prospective study for one year on 94 children aged 3-12 years, who presented with asthma.*
Objective: *To observe if there are any geographic or demographic variations of triggers of asthma symptoms in this Sub-Himalayan region so that the cost of theray and frequent exacerbation can be reduced by preventing the trigger factors if possible.*
Methods: *The study was conducted in the Department of Pediatrics, North Bengal Medical College & Hospital, Susrutanagar, Darjeeling, West Bengal, India and the drainage area of the study population is North Bengal Terai Region which includes Cooch behar, Jalpaiguri & Terai area of Darjeeling district. Patients of 3-12 years of age presented to our institute,were tested for reversibility (PEFR) and/ or variability wherever feasible, were given anti-asthma drug trial and were followed up to observe the improvement and thus were diagnosed as childhood asthma excluding other differential diagnoses. In this prospective hospital based study 94 children suffering from asthma were followed up for common triggers of asthma for a period of one year from 1st February, 2009 to 31st January, 2010 .*
Results: *Among the total patients (n=94), 65.95% patients experienced exacerbation of asthma due to weather change, followed by exercise (48.94%), viral respiratory tract infections (45.74), dusts (40.40%), cooking smoke (31.91%), cigarette smoke (25.53%), plants (27.70%), pets (8.51%), foods (6.40%) and others (13.80%) like perfume, mosquito repellants, etc.*
Conclusion: *Exacerbation of asthma symptoms in children is probably due to various trigger factors of this Sub-Himalayan region like frequent change in weather, high altitute, using smoke emitting fuels as cooking materials, presence of various herbs, tea gardens, etc and genetic variations of people living here. Long term, multicenter, large studies are required to carry out to know the exact pattern of asthma triggers in this region.*
Keywords: *Asthma, Childhood asthma, Triggers, Exacerbation*

I. Introduction

Asthma is a prevalent disease among children in Sub-Himalayan region of North Bengal. In this present tertiary hospital based research, we have studied children of 3-12 years of age, presented with asthma symptoms in the department of pediatric medicine, North Bengal Medical College, Darjeeling, West Bengal, India.

There are many acknowledged triggers of asthma. They include viral infections, exercise, weather conditions, dust, cats, sinusitis, pollen, gastroesophageal reflux disease, dogs, smoke, and emotional stress, etc. [1] Allergic children can develop reactions to ordinarily harmless materials such as pollen, mold, food, or animals.[2] Allergen may be the cause of unrecognized or hidden asthma. Minor allergic reactions can be more important than obvious or severe reactions, in which an allergic person tends to avoid exposure to allergens that have caused severe reactions, while ignoring the minor allergens.[3]

Here we undertook the study on childhood asthma triggers to observe if there are any geographic or demographic variations of triggers of asthma symptoms in this Sub-Himalayan region so that the cost of theray and frequent exacerbation can be reduced by preventing the trigger factors if possible.

II. Materials And Methods

Permission from the Ethical Committee of North Bengal Medical College and Hospital was taken and case history of patients was written in a typed proforma only after taking proper consent from the guardians of the children. The study period is one year (from 1st February, 2009 to 31st January, 2010) and it was conducted in the Department of Pediatrics, North Bengal Medical College & Hospital, Susrutanagar, Darjeeling, West

Bengal, India and the drainage area of the study population is North Bengal Terai Region which includes Cooch behar, Jalpaiguri & Terai area of Darjeeling district. In this prospective hospital based study 94 children suffering from asthma were followed up for common triggers of asthma for a period of one year.

Case Definition: Patients of 3-12 years of age presented to OPD or inpatient department with clinical signs and symptoms such as episodic cough, wheezing, breathlessness, and a chest tightness which prompt clinical suspicion of asthma, were tested for reversibility (PEFR) and/ or variability wherever feasible, given anti-asthma drug trial and were followed up to observe the improvement and history of allergens and triggers were taken and thus diagnosed as asthma after excluding other important differential diagnoses.

Inclusion Criteria: The Children belonging to rural, urban, urban slum, tea garden and forest area of North Bengal Terai region in the age group of 3 years to 12 years, attending the Department of pediatrics, North Bengal Medical College & Hospital, Sushrutanagar, Darjeeling, West Bengal, with history of asthma like symptoms were included in the study group.

Exclusion Criteria: Children presented with pulmonary symptoms which are due to any acute or chronic illness other than asthma such as tuberculosis, congenital heart disease, GERD, chronic rhino-sinusitis, recurrent viral lower respiratory tract infections, cystic fibrosis, broncho pulmonary dysplasia, congenital malformations causing narrowing of the intrathoracic airways, any congenital respiratory tract diseases, foreign body aspiration, primary ciliary dyskinesia syndrome & others, were excluded from the study group.

III. Results

Table-1 shows the frequency and percentage of triggers of childhood asthma

Table-1

ARI – Acute Respiratory infection

Triggers	Weather change	ARI	Plants	Pets	Cooking smoke	Cigarette smoke	Dust	Exercise	Food	Others
Frequency(n=94)	62	43	26	8	30	24	38	46	6	13
Percentage	65.95	45.74	27.7	8.51	31.91	25.53	40.40	48.94	6.4	13.8

IV. Discussion

The various triggers of asthma exacerbation in the study population have been categorized and described as below. Among the total patients (n=94), 65.95% patients experienced exacerbation of asthma due to weather change, followed by exercise (48.94%), viral respiratory tract infections (45.74), dusts (40.40%), cooking smoke (31.91%), cigarette smoke (25.53%), plants (27.70%), pets (8.51%), foods (6.40%) and others (13.80%) like perfume, mosquito repellants, etc. So there were one or several triggers for exacerbation of asthma for each patient.

Kuo et al[1] and Paramesh[4] showed weather change was responsible for 43% and 40% exacerbations of asthma respectively. In our study weather change was responsible for 65.95% exacerbations. This higher number of exacerbations of asthma due to weather change may be explained by various factors like frequent showers in Sub-Himalayan region with thunder storms, abrupt fall of temperature and low temperature in the winter season, dryness of air in some days and months, again increased humidity due to rain, viral infections due to change of weather and cold exposure, increased dampness causing moulds in the home environment in humid conditions. Kuo et al.[1], Paramesh[26] and Johnston et al[5] showed viral respiratory tract infection was associated with 74%, 40% and 80% asthma attacks respectively. In our study viral respiratory tract infection was responsible for 45.74% of asthma exacerbations which corroborates with a study with Paramesh.[4] Exercise triggers asthma in 48.94% of patients which corroborates with study by Kuo et al.[1] Dust was responsible for exacerbations in 40.40% patients which tallies with findings of studies by Kuo et al[1] (38%) and Harmanchi et al[6] (44.3%) and Paramesh[4] (50%). Cooking smoke was the triggering factor of asthma in 31.91% of patients in this present study. Kuo et al[1] reported cooking smoke as the trigger in 28% patients in their study. So in the present study cooking smoke was responsible a little bit more as the asthma trigger and this can be explained by the higher number of families using fuels with smoke emission for cooking purpose. Melsom et al[7] also showed that 26% children were bothered by house hold cooking smoke exposure. Cigarette smoke was as the trigger of asthma in 25.53% patients in this present study sample. In this study, plants were responsible for triggering of asthma in 27.70% children. Harmanchi et al[6] and Kuo et al[1] showed pollens as asthma triggers in 29.9% and 32% patients respectively. These findings corroborate with our study. According to a study by Paramesh[4] pollen and mould sensitivity was 7.5% which was much lesser than that of our study and it can be explained by the abundance of herbs, tea gardens and various kind of trees in our study area of Sub-Himalayan Terai region. Pets were responsible for asthma triggers according to history given by parents in 8.51% children in our study. According to study by Kuo et al[1] dogs and cats were responsible in 30% and 36% children for triggering of asthma respectively. According to Harmanci et al[6] in their study population cats were responsible to exacerbate asthma in 1.6 % patients. Dogs, cats, birds and cattle were the pets in the houses of the present

study population. In our study, cattle might act as protective factors as stated by Melsom et al.[7] Foods were as triggers in 6.40% patients and other triggers like perfume, mosquito repellants, etc. were responsible in 13.80% children of the present study population.

V. Conclusion

Frequent exacerbation of asthma symptoms in children in North Bengal Terai region is probably due to various trigger factors of this Sub-Himalayan region like frequent change in weather, high altitute of this geographic region, using wood and other smoke emitting fuels as cooking materials, presence of various herbs, tea gardens, etc and genetic variations of people living here. Multicenter long term large studies are required to carry out in future to know the exact pattern about various asthma triggers in this region.

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