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Original Research Article

Reasons of exacerbation among children with reactive airway disease

Anjusha Maheswari Nair[1,*], **Premaletha T**[2], **Bindusha S**[3]

[1]*Dept. of Congenital Heart ICU, Sree Chithra Tirunal Institute For Medical Science and Technology, Medical College, Thiruvananthapuram, Kerala, India*
[2]*Dept. of Paediatric Nursing, Government College of Nursing, Thiruvananthapuram, Kerala, India*
[3]*Dept. of Paediatric Medicine, Sree Avittom Thirunal hospital,, Thiruvananthapuram, Kerala, India*

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ABSTRACT

Background: Reactive airway disease has a multifactorial aetiology, where genetic liabilities and environmental exposures interact in complex ways to cause reversible airway inflammation and obstruction and acute exacerbation can be life threatening. The present study was to assess the reasons of exacerbation among children with reactive airway disease which include infection, cold climate, lunar variations, discontinuation of metered dose inhaler and allergens and irritants.

Materials and Methods: The study was conducted in a tertiary care centre Thiruvananthapuram among 101 caretakers of children with reactive airway disease. A structured interview schedule was used to assess the socio demographic data, clinical data of the child and the reasons of exacerbation.

Results: Among 101 children with reactive airway disease majority of children 67.3% the reason for exacerbation was cold climate, in 16.8% infection, 21.8% activity, 8.9% lunar variation, 10.9% discontinuation of metered dose inhaler and in 28.7% other factors of exacerbation include strong odour, pets, pollen, pests, smoke, mosquito repellents and dust. The study also revealed that 72.3% are having family history of allergic diseases and 27.7% do not have any family history of allergic diseases. Of the 73 children with family history of allergic disease 79.5% were having family history of asthma, 16.4% were having allergic rhinitis and 4.1% were having allergic dermatitis.

Conclusion: Asthma is a chronic inflammatory disease of the airways. It is one of the most common chronic diseases of childhood, affecting more than 6 million children worldwide Advances in science have led to an increased understanding of asthma and its mechanisms as well as improved treatment approaches. Proper identification and elimination of triggers can reduce the exacerbation of asthma.

1. Introduction

Asthma is a common chronic disorder of the airways that is complex and characterized by variable and recurring symptoms, airflow obstruction, bronchial hyper responsiveness, and an underlying inflammation.[1]

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.[2]

Prevalence of asthma in 6-7 year age group is 11.7% as per international study of asthma and allergies in childhood conducted in 98 countries·Prevalence and severity of asthma among Indian school children 6-14 years associated with parental smoking and traffic pollution showed 5.35 % prevalence among 6-7 years.[3]

* *Corresponding author*.
E-mail address: anjushamaheswari60@gmail.com (A. M. Nair).

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Asthma has a multifactorial aetiology, where genetic liabilities and environmental exposures interact in complex ways to cause reversible airway inflammation and obstruction. Along with the physical factors violence and familial stress contributes to asthma outcomes.[4]

The allergic trigger include house dust, mite, pollen and non-allergic triggers include air pollution, cigarette smoke, perfume, stress, negative emotion or physical activity. A study of asthma trigger in six countries including Asia revealed frequent cited triggers include allergens part of pollen, dust, pet dander, tobacco smoke, exercise, air pollution, weather pattern, respiratory infection.[5] Tree pollens, grass pollens and weed pollens can trigger asthma attack. Warner et al reported plant pollen grains are major cause of seasonal asthma.[6]

According to Richard. B. Johnson, materials shed by dust mites could lead to the development of the disease in susceptible people or worsen the disease in known asthmatics. There is evidence that allergy to common indoor pets, particularly cats and dogs is closely associated symptomatic asthma.[7]

Household pests, such as cockroaches, dust mites, rodents such as mites and rats, stinging insect and moulds are all major triggers of asthma and allergies exposure to cockroaches aggravate symptoms in some asthma sufferers.A study conducted by Alicea-Alvarez et al. showed that persistent asthma was found to be associated with most triggers like pets, dust mites, mice, mould, cockroaches.[8]

Non allergic irritants such as paints, fumes, perfumes and air pollution can act as asthma triggers. Humidity, temperature changes and other weather conditions can trigger asthma. Respiratory virus infection is the most common environmental exposure to cause a severe asthma exacerbation.[1] A study conducted in New York has emphasised the role of air pollutants in asthma morbidity among children.[9]

Most children with asthma have symptoms when they exercise. Other triggers include emotional factors, hormonal variations, food, lunar variation and drugs. The relationship between second-hand smoke and asthma morbidity in children is well recognised. Women who smoke during pregnancy increase the risk of wheezing in their babies.[10] According to Le Roux et al. environmental measures such as avoidance of tobacco smoke and reducing allergen exposure are crucial in preventing asthma attacks in infants and young children.[11]

A three year old observational study on children of 6 to 12 years shows that there is significant association between exacerbation of asthma and quality of life.[1]

Bronchial asthma is one of the most common diseases of childhood. In India, mean prevalence of bronchial asthma in 6-7 age group children was found to be at 7.24%. With increasing ambient air pollution, rapid urbanisation, industrialisation, changes in lifestyle, increasing psychological stresses, even in young children, the prevalence of bronchial asthma is definitely going to rise in future.[12]

Along with the physical factors violence and familial stress contributes to asthma outcomes. The allergic trigger include house dust, mite, pollen and non-allergic triggers include air pollution, cigarette smoke, perfume, stress, negative emotion or physical activity. A study of asthma trigger in six countries including Asia revealed frequent cited triggers include allergens part of pollen, dust, pet dander, tobacco smoke, exercise, air pollution, weather pattern, respiratory infection.[5] Tree pollens, grass pollens and weed pollens can trigger asthma attack. Warner et al reported plant pollen grains are major cause of seasonal asthma.[6]

2. Materials and Method

2.1. Source of data

The study was conducted in the asthma clinic of a tertiary referral hospital in Thiruvananthapuram, India after approval by ethics committee. Care takers of children aged 2-12 years attending asthma clinic were selected as sample.

2.1.1. Sample size calculation

$N = \frac{Z\alpha^2 p[1-p]}{d^2}$

Where n= Sample size

Z = Z statistics for a level of confidence.

p = Estimated proportion of an attribute present in the population.

d = Level of precision.

In the present study

p = 0. 65 (from refer study)

d = 15% of p=0. 098.

Z = 1. 96 of α =0. 05.

$N = \frac{(1.96)^2 \times (0.65) \times (0.347)}{(0.098)^2}$

= 91

Minimum sample size for the study is 91 rounded to 101.

2.2. Methodology

2.2.1. Tool- structured interview schedule

The structured interview schedule has two sections

Section A- To assess the socio demographic data of caretakers.

This section includes questions to assess the socio demographic data of caretakers which includes age, gender, education status, income of family, occupation etc.

Section B- To assess the clinical data of the child.

This section includes questions to assess the clinical data of the child which includes the age of onset of disease,

family history of allergic disease, reasons of exacerbation, history of hospitalisation etc.

2.2.2. Procedure

In this study consecutive cases were collected as samples and care takers of children aged 2-12 years were included .The caretakers were selected after obtaining informed consent and assent was obtained from children. Data was collected using interview schedule

2.2.3. Statistical analysis plan

The collected data were coded and was analysed by descriptive statistics in accordance with the study objective. In the present study interpretation of data was done by percentages and frequencies. The analysis pertaining to socio demographic data and clinical data were summarised by frequency distribution table and percentages

3. Results

Among 101 children with reactive airway disease majority of children 67.3% the reason for exacerbation was cold climate, in 16.8% infection, 21.8% activity, 8.9% lunar variation, 10.9% discontinuation of metered dose inhaler and in 28.7% other factors of exacerbation include strong odour, pets, pollen, pests, smoke, mosquito repellents and dust. The study also revealed that 72.3% are having family history of allergic diseases and 27.7% do not have any family history of allergic diseases. Of the 73 children with family history of allergic disease 79.5% were having family history of asthma, 16.4% were having allergic rhinitis and 4.1% were having allergic dermatitis.

Table 1: Distribution of children according to their age (n=101)

Age (years)	Frequency	Percentage
2 – 4	13	12. 9
5 – 7	23	22. 8
8 – 10	35	34. 7
11 – 12	30	29. 7

Table 1 illustrates that 12. 9% of children were in the age group of 2-4 years, 22.8%were in the age group of 5-7 years, 34.7% were in the age group of 8-10 years and 29.7% were in the age group of 11-12 years.

Table 2: Distribution of children based on gender (n=101)

Gender	Frequency	Percentage
Male	67	66. 3
Female	34	33. 7

Table 2 shows that majority (66.3%) of children were males and 33.7% were females.

Table 3 shows that 95% of the children were immunised up to age and 5% were not immunised up to age.

Table 3: Distribution of children according to immunisation status (n=101)

Immunisation Status	Frequency	Percentage
Completed up to age	96	95. 0
Not completed up to age	5	5. 0

Table 4: Distribution of children according to the family history of allergic diseases (n=101)

Allergic diseases	Frequency	Percentage
Yes	73	72.3
No	28	27.7

Table 4 shows that 72.3% of children were having family history of allergic diseases and 27.7% were not having any family history of allergic diseases.

Table 5: Distribution of children according to the type of allergic diseases in the family (n=73)

Type of allergic diseases	Frequency	Percentage
Asthma	58	79. 5
Allergic rhinitis	12	16. 4
Allergic dermatitis	3	4. 1

Table 5 shows that of the 73 children with family history of allergic disease 79.5% were having family history of asthma, 16.4% were having family history of allergic rhinitis and 4.1% were having family history of allergic dermatitis.

Table 6: Distribution of children according to reasons of exacerbation

Reason of exacerbation	Frequency	Percent
Infection	17	16. 8
Cold climate	68	67. 3
Lunar variations	9	8. 9
Discontinuation of MDI	11	10. 9
Others (allergens and irritants)	29	28. 7

Table 6 From the above table 6 it is evident that for majority of children 67.3% the reason for exacerbation was cold climate, in 16.8% infection, 21.8% activity, 8.9% lunar variation, 10.9% discontinuation of metered dose inhaler and in 28.7% other factors of exacerbation include strong odour, pets, pollen, pests, smoke, mosquito repellents and dust.

4. Discussion

The study revealed that 72.3% are having family history of allergic diseases and 27.7% do not have any family history of allergic diseases. Of the 73 children with family history of allergic disease 79.5% were having family history of asthma, 16.4% were having allergic rhinitis and 4.1% were having allergic dermatitis. The result was supported

by a study conducted among the under-fives with RAD at Sree Avittom Thirunal Hospital revealed the 72% having family history of asthma or allergy.[2] Another study on 300 asthmatic children and their parents revealed that 42.3%were atopic, 90.2% of fathers, 84% of mothers and 65% of brothers and sisters had asthma or allergic rhinitis and some mothers with food allergy.[13]

Among the 101 children 16.8% reason for exacerbation was infection, 21.8% activity, 67.3% cold climate, 8.9% lunar variation, 10.9% discontinuation of metered dose inhaler, 28.7% others which include strong odour, pets, pollen, pests and dust. This study finding was controversial with a study on parental perception on asthma which shows reasons for exacerbation as dust in 77%, indoor smoking in 36.5%, infections in 29.5% and food in 14.3%.[14]

According to Richard. B. Johnson, materials shed by dust mites could lead to the development of the disease in susceptible people or worsen the disease in known asthmatics. There is evidence that allergy to common indoor pets, particularly cats and dogs is closely associated symptomatic asthma.[7]

A study conducted among under five children with reactive airway disease at Sree Avittom Thirunal Hospital Thiruvananthapuram have revealed the exacerbation with dust, smoke, pollen , mosquito repellents, incence sticks and exposure to pets.[2]

5. Conclusions

Eliminating the trigger factors form the corner stone in preventing exacerbation of asthma. The present study identifies the major reasons of exacerbation which helps in reducing complications of childhood asthma. Further research is essential, especially from multiple centres.

6. Source of Funding

None

7. Conflict of Interest

Authors declare no conflict of interest

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None

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Author biography

Anjusha Maheswari Nair, Nursing Officer https://orcid.org/0009-0001-7074-983X

Premaletha T, Professor https://orcid.org/0009-0002-7346-8053

Bindusha S, Additional Professor https://orcid.org/0000-0003-1323-1978

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