

A Cross Sectional Study to Evaluate the Prevalence, Risk Factors and Comorbidities of Allergic Rhinitis among School Going Children

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Abstract

Background: Allergic rhinitis is a common disease affecting children and adults all over the world. The prevalence of allergic rhinitis has significantly increased among children in developing countries. It has a significant effect on the quality of life and performance of children. There are only a few studies in India on the prevalence of allergic rhinitis. This was a hospital based cross sectional study aimed to determine the prevalence, risk factors and associated co-morbidities among school going children.

Methods: This was a hospital based observational cross-sectional study conducted in a tertiary care medical college hospital of Kerala for a period of one year. A questionnaire was distributed to 200 parents of children aged 3 to 15 years attending the out-patient department. The questionnaire was prepared based on the one developed by ISSAC Steering committee (International Study of Asthma and allergies in childhood) with some additional questions. Questions regarding the symptoms, risk factors and co morbidities were asked and the responses were analyzed.

Conclusion: In our study we found a high prevalence of allergic rhinitis among children. Moderate - severe persistent was the most common type. It was associated with various co-morbidities.

Key words: Allergic rhinitis, children, asthma, prevalence, risk factors

Introduction

Allergic rhinitis is an inflammatory Ig E mediated reaction of nasal mucosa against inhaled allergens. Patients usually present with symptoms of repeated sneezing, watery rhinorrhea, nasal itching and nasal congestion^{1,2}. The feature of allergic rhinitis includes nasal crease/allergic salute, thin watery nasal secretions, swollen nasal turbinates, congestion and swelling of palpebral conjunctivae, retracted

tympanic membrane. Allergic rhinitis affects over 400 million people all over the world³. The prevalence of allergic rhinitis varies from 10 to 40 %^{4,5}. It is a common chronic disorder in children affecting up to 40% of children⁶. Allergic rhinitis can be seasonal caused by airborne allergens like pollen or perennial caused by mites, household dust or fungal spore⁹. Allergic rhinitis is associated with various co-morbidities. It has a significant impact on the daily activities of children. It has a negative effect on

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the socioeconomic aspects of patient's life⁶. Allergic rhinitis has become a global health problem due to its increasing prevalence⁷. A population-based study showed that allergic rhinitis has got a significant adverse effect on both physical and mental health of the patients². Allergic rhinitis has significant effect on children's social performance, emotions, memory, quality of sleep, and psychosocial interactions. Untreated and uncontrolled allergic rhinitis can lead to several diseases like conjunctivitis, sinusitis, middle ear infections and asthma⁸. Complications of allergic rhinitis includes sinusitis, adenoid hypertrophy, otitis media with effusion, persistent cough etc¹⁰. The prevalence of allergic rhinitis is increasing among school going children in developing countries. It is usually under diagnosed and treated with over-the-counter medications. The different health programs in our country should give importance to the diagnosis and treatment of allergic rhinitis. Since studies on the prevalence of allergic rhinitis are few, we conducted this study.

Materials and Methods

This was a hospital based cross sectional observational study conducted in a tertiary care medical college hospital of Kerala for a period of

one year from September 2021 to August 2022. A questionnaire was distributed to 200 parents of children aged 3 to 15 years of age attending the out-patient department. Patients with nasal polyps, and rhinitis due to other pathologies were excluded from our study. All the participants were made to sign an informed consent before the study. The symptoms were analyzed using a questionnaire (Table 1). The questionnaire was read out to the participants and the response were marked by the investigator. The questionnaire was prepared based on the one developed by ISSAC¹¹ Steering committee with some additional questions. The questionnaire was distributed to 200 patients and the study population was decided from the 101 patients who responded positive to first item of the questionnaire. Patients were divided into mild or moderate - severe groups based on ARIA (allergic rhinitis and its impact on asthma) guidelines. They were also categorized as intermittent or persistent depending on the duration of symptoms. Those patients with allergic symptoms less than 4 days per week or 4 weeks per year belonged to the intermittent group and the rest belonged to the persistent group. They were categorized into mild and moderate - severe groups based on their sleep patterns and daily activities.

Table 1: Questionnaire

SL No.	Questions	Response
1	In the past one year did your child have symptoms of sneezing/running/blocked nose when they did not have cold/flu?	YES/NO
2	If yes were the symptoms more during specific months of the year? YES/NO	YES/NO
3	Does the child have accompanying congestion of eyes/itching/watering? YES/NO	YES/NO
4	Do the symptoms occur in presence of pets/dust/when the child is outside? YES/NO	YES/NO
5	Do the symptoms interfere with child's daily activities? YES/NO	YES/NO
6	Does the child have bronchial asthma/allergic skin problem/adenoids/recurrent ear infections? If yes specify the problem	YES/NO
7	Does any of the family members have allergy or bronchial asthma?	YES/NO
8	Mention the precipitating factor on which symptoms occur - dust exposure/firewood/smoke exposure/going outdoors/contact with animals/symptoms on awakening in the morning	

Results

Out of the 200 parents to which questionnaire was distributed 101 responded positive to the first question. The prevalence was found to be 50.5%. The mean age of the study group was found to be 8.65 years with a standard deviation of ± 3.63 . The minimum age was 3 years and the maximum age was 15 years. 70 patients were females (69.3%) and 31 patients were males (30.7%). In our study group the most common symptom of allergic rhinitis was sneezing (71.3%) followed by blocked nose (62.4%) and running nose (49.5%). 58.8% of the participants had accompanying itching/watering of eyes. 26.7% of the participants responded that the symptoms were more during specific months of the year. In our study majority of the subjects were from urban area (69.3%). 23.8% responded that the symptoms interfered with daily activities. Most of the children (73.3%) responded that the symptoms occurred when they had contact with pets/dust/while playing outside. In our study 17.8% responded that symptoms were more in the early morning hours. The distribution of the trigger factors of allergic symptoms in our study group were dust exposure (43.6%), firewood smoke (9.9%), going outdoors (7.1%), contact with animals (10.9%). 36.6% of subjects had family members with history of allergic rhinitis or bronchial asthma. 23.8% subjects reported that symptoms interfered with daily activities. The distribution of co-morbidities among the study subjects were bronchial asthma (25.7%) allergic skin problems (16.8%) recurrent ear infections (14.9%) adenoid problems (22.8%). In our study distribution of patients as per ARIA guidelines are as follows - moderate - severe persistent (30.7%) mild persistent (26.7%) moderate -severe intermittent (23.8%) mild intermittent (18.8%).

Table 2: Distribution of severity of symptoms as per ARIA Guidelines

Distribution of patients as per ARIA Guidelines	Frequency (percentage)
Moderate /severe/persistent	31(30.7%)
Mild /persistent	27(26.7%)
Moderate /severe intermittent	24(23.8%)
Mild /intermittent	19(18.8%)

Table 3: Distribution of symptoms of allergic rhinitis in the study respondents (n=101)

Variable	Categories	Frequency (percentage)
Sneezing	Present	72(71.3%)
	Absent	29(28.7%)
Running nose	Present	50(49.5%)
	Absent	51(50.5%)
Blocked nose	Present	63(62.4%)
	Absent	38(37.6%)
Eye itching/watering	Present	59(58.4%)
	Absent	42(41.6%)
Bronchial asthma/skin allergy/recurrent sinusitis, ear infection/Adenoids	Present	77(76.2%)
	Absent	24(23.8%)

Discussion

About 30% of total Indian population suffers from at least one allergic disease¹². The prevalence of allergic rhinitis was found to be 50.5% in our study. In our study allergic rhinitis was more in females (69.3%) compared to males (30.7%). This is similar to a study conducted by Dimitrios G Balatsouras et al¹³. In a study conducted in Asian countries by Pawanker R, Bunnag C et al allergic rhinitis was more common in boys¹⁴. In our study group the most common symptom of allergic rhinitis was sneezing (71.3%) followed by blocked nose (62.4%) and running nose (50.5%). 58.8% of the participants had accompanying itching/watering of eyes. In a study conducted in Iran by Rasoul Nasiri Kalmarzi et al the most common symptom was rhinorrhoea followed by itchy nose (82%) nasal congestion (70%) and watery eyes (69%)¹⁵. In a study conducted by Shariat et al 2012 nasal congestion was the most common symptom¹⁶. In our study 58.8% of the participants had accompanying itching/watering of eyes. This is comparable to the findings in a study conducted by J M Klossek et al which showed ocular symptoms in 52% of the patients¹⁷. In a Korean multicenter study 61.2% of patients had accompanying eye symptoms¹⁸. In our study 26.7% of the participants responded that the symptoms were more during specific months of the year. A study conducted by Monika Sultész et al showed a seasonal pattern of allergic rhinitis¹⁹. In our study majority of patients were from urban area. A

study conducted by S.N. Gaur et al in Delhi showed no significant differences in the prevalence of allergic rhinitis in urban and rural areas²⁰. During the last few decades an increase in the prevalence of allergic rhinitis have been noted mainly in urban areas. Many factors like life style changes, increase exposure to pollutants and allergens have been implicated. In our study moderate- severe persistent type(30.7%) was the most common category based on ARIA guidelines. The reason for more percentage of persistent cases can be due to more patients presenting to hospital when the severity of symptoms has increased. This result is similar to a study conducted by Deb A et al in which 32% of patients had moderate/severe persistent type of disease²¹. The distribution of the trigger factors of allergic symptoms in our study group were dust exposure (43.6%), firewood smoke(9.9%), going outdoors(7.1%), contact with animals(10.9%).In a study conducted by Dinesh Mehta et al the major allergens were pollen (51%), food (28.9%), insects(26.9%), fungus(12.6%) and dust(6.7%)²².36.6% of subjects had family members with history of allergic rhinitis or bronchial asthma. Parents with allergic rhinitis was identified as a risk factor for allergic rhinitis in a study conducted by L.M Baumann et al²³. In the present study the distribution of co-morbidities among the study subjects were bronchial asthma (25.7%) allergic skin problems(16.8%) recurrent ear infections (14.9%) adenoid problems(22.8%).In our study 23.8% subjects reported that symptoms interfered with daily activities. This is lower when compared to a study conducted by G Walter et al 42% reported decreased productivity in school activities²⁴.Thus allergic rhinitis leads to decreased night sleep, increased day time sleepiness and school absenteeism.

Conclusion

The prevalence of allergic rhinitis is high among school children. It is associated with various co morbidities and can adversely affect the performance of children. There should be further studies to identify the risk factors. The various health programs should give importance to the early diagnosis and treatment of allergic rhinitis.

Ethical clearance: The ethical clearance was obtained from the institutional ethical committee prior to the commencement of the study.

Conflict of Interest: Nil

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