

## Original Research Article

# Prevalence of allergic rhinitis in school going children in Kashmir

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### ABSTRACT

**Background:** Allergic rhinitis is a common chronic paediatric disorder affecting about 40% of children affected. Allergic rhinitis results in day time fatigue, impairment of cognition and memory which significantly affect the learning process and impact on the school performance of children. The aim of the study was to determine the prevalence of allergic rhinitis in school going children in Kashmir.

**Methods:** Cross sectional questionnaire based observational study. Study group included the school going children chosen randomly from various schools of urban and rural areas of Kashmir valley aged 6-18 years.

**Results:** Out of the 402 children prevalence of allergic rhinitis was 28.85%. Prevalance in urban and rural area school going children was 55.2% and 44.8% respectively. The most common symptom was nasal obstruction 79.31%. The most common allergen was dust mite 77.58% and the most common comorbidity was asthma.

**Conclusions:** The prevalence of allergic rhinitis shows a significant rise in last few years, more common in rural areas, and existing as co-morbidity in a significant proportion of children demanding a comprehensive strategic approach to deal with them.

**Keywords:** Prevalence, Allergic rhinitis, Asthma, Comorbidity

### INTRODUCTION

Introduction The Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 updated document estimates that there are 500 million subjects in this world who suffer with allergic rhinitis (AR).<sup>1</sup> Allergic rhinitis and its impact on asthma (ARIA) suggests that AR is the common chronic disorder in the pediatric population with up to 40% of children affected.<sup>1</sup> Allergic rhinitis results in day time fatigue and impairment of cognition and memory in children which significantly affect the learning process and thus impacts on school performance and all these upset the family.<sup>2</sup> Many of these problems go completely unnoticed as children often fail to share them at school or at home.

Furthermore, adverse effects of medications used for treatment of allergic rhinitis often compound these

problems.<sup>2</sup> Multiple co-morbidities like sinusitis, asthma, conjunctivitis, eczema, Eustachian tube dysfunction and otitis media are generally associated with allergic rhinitis. Although AR greatly impacts life at home, school and even while sleeping, it is treated as a trivial and a commonplace disorder. Consequently, it does not receive the attention it deserves from the patient, the family as well as the health care professionals, especially in developing countries like India.<sup>3</sup>

The concept of allergy was originally introduced in 1906 by Viennese pediatrician Clemens von Pirquet, after he noted that some of his patients were hypersensitive to normally innocuous entities such as dust, pollen or certain foods.<sup>3</sup> Pirquet called this phenomenon allergy from the Ancient Greek words *allos* meaning other and *ergon* meaning work. All forms of hypersensitivity used to be classified as allergies, and all forms were thought to

be caused by an improper activation of the immune system.<sup>4,5</sup>

**Table 1: ARIA classification.**

Intermittent symptoms	Persistent symptoms
<4 days per week or <4 weeks	>days per week or >4 weeks
Mild severity	Moderate severity (1 or more following items)
Normal sleep, normal daily activities, sports, leisure, normal work and school, no troublesome symptoms	Abnormal sleep, impairment of daily activities, sports, leisure, problems at work or school, troublesome symptoms

Aims and objectives of the study are:

- To determine the prevalence of allergic rhinitis in school going children in Kashmir.
- To determine the prevalence of allergic rhinitis in rural and urban school going children in Kashmir.
- To determine the predominant etiological factor for allergic rhinitis in school going children in Kashmir.
- To determine any comorbidity of allergic rhinitis in school going children in Kashmir.
- To determine the response to treatment of allergic rhinitis in school going children in Kashmir.

## METHODS

The study was a population based cross-sectional study conducted first time in government and private schools of Kashmir between March 2013 to October 2014 for 18 months. The data collection was done for a period of 18 months after obtaining the permission from the concerned principals of both the government and private schools.

A total of 402 students were taken for the study including both male and female students. All students were interviewed. The information was collected from them through interview using a questionnaire after taking informed consent and risks associated with skin prick test were explained. The study design was descriptive Cross-sectional type of study.

A detailed clinical history and physical examination was done. Questions were asked regarding the demographic profile, socioeconomic status and residential address. All the school going children in the age group of 6-18 years including both male and female students presented with one or more of the following symptoms:

1. Nasal obstruction
2. Watery rhinorrhoea
3. Sneezing
4. Itching nose
5. Pharyngeal pruritis
6. Itching eyes
7. Itching nose

Each of the above symptoms were scored as described by Wilson et al 2001.

0. Absence of a given symptom
1. Significant symptoms, mild, well tolerated
2. Well defined, discomforting, affecting activities that require high concentration
3. High intensity barely tolerated hindering daily activities and sleep.

Total score for each patient was calculated separately.

Patients were also enquired of the following.

- A. Any history of allergy to dust, pollen, perfumes, edibles.
- B. Any family history of allergy.
- C. Occupational history and any constant exposure to irritants.
- D. Drug history to rule out any drug allergy
- E. History of any precipitating factors.
- F. History of chest symptoms like cough, occasional wheezing, tightness of chest, breathlessness ongoing upstairs, chest symptoms during pollen season.

Detailed general and physical examination was done. Detailed otorhinolaryngological examination was done which included:

Anterior rhinoscopy, otoscopy, oral examination, nasal endoscopy, neck examination tuning fork tests, impedance audiometry.

## Investigations

- Base line investigations, complete haemogram.
- Specific investigations
  - Total serum IgE levels
  - Blood eosinophil count
- Skin prick test using dust mite (dermatophagoids farinae, dermatophagoids pteronyssimus).
- Parthenium hysterophorus (pollen)
- Moulds (Aspergillus species).

## Spirometry

- Computed assisted spirometry was done to diagnose the asthma. The parameters used were FEV<sub>1</sub>/FEF<sub>25-75</sub> and FVC.
- Short acting bronchodilator was given to patients to confirm asthma.
- An improvement of 10% in FEV<sub>1</sub> was taken for inclusion criteria.

## Imaging

- NCCT PNS was done in school going children with allergic rhinitis with chronic rhinosinusitis with asthma.
- Chest x-ray was done in patients with deranged spirometric parameters.

- Nasal Endoscopy was done in school going children with persistent chronic rhinosinosis.

**Treatment**

All the patients were started on inhalational nasal corticosteroid (flutacasona). Patients were put on.

**RESULTS**

A total of 402 students were taken for the study including both male and female students. All students were interviewed. The information was collected from them through interview using a questionnaire after taking informed consent and risks.

**Table 2: Prevalence of allergic rhinitis in school going children presenting with symptoms of rhinitis.**

<b>Total no. of cases studied</b>	402
<b>No. of cases with allergic rhinitis</b>	116
<b>Prevalence</b>	28.85%

The prevalence of allergic rhinitis was found to be 28.85% in school going children in Kashmir.

**Table 3: Gender distribution of school going children presenting with symptoms of allergic rhinitis (n=116).**

Gender	No. of Cases	Percentage (%)
<b>Males</b>	65	56.0
<b>Females</b>	51	44.0
<b>Total</b>	116	100.0

The percentage of allergic rhinitis in male and females was 56% and 44% respectively.

**Table 4: Geographical distribution of school going children presenting with symptoms of allergic rhinitis (n=116).**

Geography	No. of Cases	Percentage (%)
<b>Urban</b>	64	55.2
<b>Rural</b>	52	44.8
<b>Total</b>	116	100

The percentage of allergic rhinitis in school going children was 55.2% in urban and 44.8% in rural population of school going children.

The percentage having persistent allergic rhinitis was 63.8% and intermittent rhinitis was in 36.2%.

The disease severity was mild in 25.67% of persistent rhinitis and 47.62% of intermittent rhinitis, while it was moderately severe in 74.33% in persistent rhinitis and 52.38% in intermittent rhinitis.

**Table 5: Distribution of school going children with symptoms of allergic rhinitis into persistent allergic rhinitis and intermittent allergic rhinitis**

Type of rhinitis	No. of cases	Percentage (%)
<b>Persistent AR (4 &gt;days and &gt;4 weeks)</b>	74	63.8
<b>Intermittent (&lt;4 days or &lt;4 weeks)</b>	42	36.2
<b>Total</b>	116	100

**Table 6: Disease severity distribution among school going children with persistent and intermittent allergic rhinitis.**

Disease severity (%)	Persistent rhinitis (%)	Intermittent rhinitis (%)
<b>Mild</b>	19 (25.67)	20 (47.62)
<b>Moderate severe</b>	55 (74.33)	22 (52.38)
<b>Total</b>	74 (100.00)	42 (100.00)

**Table 7: Distribution of school going children with allergic rhinitis as per symptomatology (n=116).**

Symptoms	No. of cases	Percentage (%)
<b>Sneezing</b>	78	67.24
<b>Watery rhinorrhoea</b>	76	65.51
<b>Nasal obstruction</b>	92	79.31
<b>Itching nose</b>	54	46.17
<b>Itching eyes</b>	69	59.48
<b>Pharyngeal pruritis</b>	33	28.44

The symptoms in the school going children was found to be Sneezing in 67.24%, watery rhinorrhoea in 65.51%, nasal obstruction in 79.31%, itching of nose in 46.17%, itching eyes in 59.48% and pharyngeal pruritis in 28.44%.

**Table 8: Distribution of chest symptoms suggestive of latent asthma in school going children with allergic rhinitis (n=116).**

Symptomatology	No. of cases	Percentage (%)
<b>Cough</b>	32	27.05
<b>Nocturnal waking</b>	20	17.24
<b>Occasional wheezing</b>	16	13.79
<b>Chest tightness</b>	10	8.62

The chest symptoms were found to be cough in 27.05%, nocturnal waking in 17.24%, occasional wheezing in 13.79% and chest tightness in 8.62%.

The distribution of skin prick test was found to be dust mite in 77.58%, pollen in 68.96%, moulds in 13.79%,

only dust mite in 25%, only pollen in 17.24%, only mould in 8.62%, dust mite + pollen in 43.10%, dust mite +moulds in 6.03% and dust mite + pollen + moulds in 3.44%.

**Table 9: Distribution of skin prick test (n=116).**

Allergen	No. of cases	Percentage (%)
Dust mite	88	77.58
Pollen	80	68.96
Moulds	16	13.79
Only dust mite	29	25
Only pollen	20	17.24
Only moulds	10	8.62
Dust mite +pollen	50	43.10
Dust mite +moulds	7	6.03
Dust mite +pollen+ moulds	4	3.44

**Table 10: Skin prick tests in persistent rhinitis group.**

Skin prick test	No. of cases	Percentage (%)
Dust mite	66	89.15
Pollen	34	52.70
Moulds	16	21.62

The skin prick test was positive with dust mite in 89.15%, pollen in 52.70% and moulds in 21.62%.

**Table 11: Skin prick test in intermittent rhinitis group.**

Skin prick test	No. of cases	Percentage (%)
Dust mite	20	47.61
Pollen	41	97.61
Moulds	6	14.28

The skin prick test was positive in intermittent rhinitis with dust mite was 47.61%, with pollen in 97.61% and moulds in 14.28%.

**Table 12: Abnormal parameters of the studied population (n=116).**

Investigations	No of cases	Percentage (%)
IgE levels (n=90)	78	77.58
Total Eosinophills (n=98)	80	84.48
Spirometry (n=116)	46	39.65
FEV1	35	30.17
FEF25-75	48	41.37
FVC	24	20.68

## DISCUSSION

The present study was conducted in the Department of Otorhinolaryngology, Head and Neck Surgery, SMHS

Hospital, and associated hospital of government medical college Srinagar Kashmir. This study was conducted for a period of 18 months from March 2013 to October 2014 patients who met the criteria of allergic rhinitis as per the predetermined proforma were included in the study.

Allergic rhinitis is a part of systemic disease complex whose prevalence has risen over the last 10 years and ranks among top 5 chronic medical conditions, affecting 10-40% of the population.<sup>6</sup> In the current study out of 402 patients of rhinitis 116 patients were found to have allergic rhinitis, As such the prevalence in this study was found to be 28.85%. In France, Magnan et al, in their hospital based study found the prevalence of allergic rhinitis of 10 to 40% in adults.<sup>7</sup> Dykewicz et al reported in their study the prevalence of 10-30% in adults and upto 42% of children.<sup>8</sup> Thus the results of our study are consistent with the above discussed studies.

Allergic rhinitis has been found to be most common in children, with mean age of onset of about 10 years and peak incidence between ages of 13-19 years.<sup>9</sup> In the present study it was observed that allergic rhinitis was prevalent more frequently in 2<sup>nd</sup> decade of life (52.13%). 2<sup>nd</sup> and 3<sup>rd</sup> decade accounting for more than 2/3<sup>rd</sup> of patients, reflecting that children and young adults are the most affected group.

A review article by Cruz et al, on publications between 2000 and 2005 on allergic rhinitis and its associated comorbidity (bronchial asthma) also found highest incidence rate of allergic rhinitis, in both genders from 17-22 years.<sup>10</sup> Wright et al in their study entitled “epidemiology of physician diagnosed allergic rhinitis in children” found that the prevalence of allergic rhinitis is upto 42% in children and 10-30% of adults.<sup>11</sup> These findings are consistent with the current study. Allergic rhinitis is more common in males than females. Male gender can be a contributing factor to the development of allergic rhinitis. This may be genetically determined as IgE levels, are higher in boys from birth. In the present study there were 65 (56%) males and 51 (44%) females. This finding is corroborated by many epidemiological studies.<sup>12</sup>

The increase in allergic rhinitis has been observed over last few decades and is more common in developed countries and increase in prevalence is seen with urbanization of non-westernized societies.<sup>13</sup> Many possible factors suggested such as lifestyle changes, increased exposure to allergens, pollution and irritants, diminution of protective nutrients, decrease in infections (hygiene hypothesis), and stress has been implicated.<sup>14,15</sup> The current study also highlights the same facts showing that 55.2% of cases belonged to urban areas and 44.8% cases belonged to rural areas. A review article by Cruz et al on allergic rhinitis have found the prevalence of rhinitis and asthma in rural communities or middle to low income countries in general is lower than that in the developed urban communities.<sup>16</sup> Fahrlander et al in their

study found reduced incidence of seasonal allergic rhinitis sensitization in farmers children compared to their peers living in the same village in a non-farming family. These epidemiological studies are in accordance with the findings of current study.<sup>17</sup>

*Allergic rhinitis is characterized by typical symptoms of running*

Allergic rhinitis has been recognized as a significant risk factor for adult onset asthma. It is being found that atop acquired at an early stage is an important predictive factor for asthma continuing into late childhood. Patients with long duration persistent rhinitis and severe nasal symptoms have additional increased risk for asthma.<sup>18-20</sup>

In our study patients with persistent rhinitis of 6-10 year duration were 21.62%, 11-13 years duration were 51.35% and 14-16 years duration were 24.32%. Among these patients the asthma symptoms were more frequent in group with 11-13 years of duration of symptoms (51.35%) whereas patients with symptoms duration of 1-5 years. Thus we observed in this study that duration of allergic rhinitis was associated with increased incidence of asthma.

The new ARIA guidelines classify allergic rhinitis on the basis of severity of symptoms into mild and moderate severe disease. The classification is based on the effect of allergic rhinitis on quality of life parameters like sleep, daily activities, and normal work. In the current study it was seen that asthma symptoms were more common in patients with increasing severity of allergic rhinitis. Among the patients with allergic rhinitis score of 4-6 only 18 % patients had latent asthma where as in patients with score of 13-15, 74.4% had latent asthma and patients with allergic rhinitis score of 16-18, 90.88% had asthma.

## CONCLUSION

In this cross-sectional study of 18 months duration, a total of 402 school going children present with nasal symptoms suggestive of allergic rhinitis were evaluated Out of which only 116 were skin prick test positive. So with statistical analysis we conclude that the allergic rhinitis is one of the most common chronic disorder in paediatric population which affects more commonly males than females. Allergic rhinitis is more commonly prevalent in urban population as compared to rural population. Allergic rhinitis is one of the common disorder in school going children and thus impacts on the performance of school going children The prevalence of allergic rhinitis is increasing in school going children demanding an early possible intervention. Screening for allergic rhinitis in school going children should be done both in the urban and rural schools. Allergic diagnostic kits should be made easily accessible and freely available in all health centres both in rural and urban schools. School teachers should have adequate knowledge about allergic diseases, can be helpful for the identification

school children having symptoms suggestive of allergic rhinitis

Accurate measures should be taken for the appropriate diagnosis and newly different treatment modalities of allergic rhinitis. Awareness programmes in the form of regular seminars should be held in schools of rural and urban areas. Last but not least because of rising prevalence of allergic rhinitis in school going children, in developing countries like India specific measures for early diagnosis and treatment of allergic rhinitis are still missing.

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