Original Research Article

Prevalence of allergic rhinitis among school going children of urban and rural area - A cross-sectional study

Kayedjohar K Rathwala

Associate Professor, Department of Otorhinolaryngology, Parul institute of Medical Sciences and Research Centre, Vadodara, Gujarat, INDIA.
Email: drpiyushpujara@gmail.com

Abstract

Background and Aim: Multiple co-morbidities like sinusitis, asthma, conjunctivitis, eczema, Eustachian tube dysfunction and otitis media are generally associated with allergic rhinitis. Aim of the present study is to determine the prevalence of allergic rhinitis among school going children in the district of central Gujarat. **Material and Methods:** Present cross-sectional study was conducted in government and private schools in the district of central Gujarat between for the period of 14 months. A total of 350 students were taken for the study including both male and female students. A detailed clinical history and physical examination was done. Questions were asked regarding the demographic profile, socioeconomic status and residential address. Detailed otorhinolaryngological examination was done which included: Anterior rhinoscopy, otoscopy, oral examination, nasal endoscopy, neck examination tunning fork tests, impedance audiometry. **Results:** The prevalence of allergic rhinitis was found to be 27.10% in school going children among district of central Gujarat. The percentage of allergic rhinitis in school going children was 51.5% in urban and 48.4% in rural population of school going children. The symptoms in the school going children was found to be Sneezing in 68.42%, watery rhinorrhoea in 65.2%, nasal obstruction in 78.9%, itching of nose in 49.4%, itching eyes in 61% and pharyngeal prutritis in 26.31%. 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%. **Conclusion**: 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.

Key Words: allergic rhinitis, asthma, children, cross-sectional study

***Address for Correspondence:**
Dr. Kayedjohar K. Rathwala, Associate Professor, Department of Otorhinolaryngology, Parul institute of medical sciences and research centre, Vadodara, Gujarat, INDIA
Email: drpiyushpujara@gmail.com
Received Date: 21/10/2019 Revised Date: 09/11/2019 Accepted Date: 17/12/2019
DOI: https://doi.org/10.26611/10161236

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 20 December 2019

INTRODUCTION

The prevalence of allergic rhinitis and other allergic diseases has increased globally in the last three decades, and the geographical prevalence rates vary from 10% to 45%.[1-4] In addition to genetic factors, lifestyle factors influence the prevalence of allergic rhinitis and other allergic diseases. These include changing life styles, increasing vehicular pollution, increasing ownership of indoor plants and pets, choice of bedding and carpets, and an increasing use of air conditioning. Data suggests that AR is the most common chronic disorder in the pediatric population with up to 40% of children affected.[5] The disease along with associated co-morbidities has a profound impact on the daily lives of children. Irritability, sadness, impairment of sleep and limitation of activities at school as well as home are often seen in these children. AR results in day-time fatigue and impairment of cognition and memory in children which significantly affect the learning process and thus impacts on school

How to cite this article: Kayedjohar K Rathwala. Prevalence of allergic rhinitis among school going children of urban and rural area - A cross-sectional study. *MedPulse International Journal of ENT.* December 2019; 12(3): 98-101. https://www.medpulse.in/ENT/

performance and all these aspects upset the family.[5] 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.[6] 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.6 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.[7,8] thus the aim of the present study is to determine the prevalence of allergic rhinitis among school going children in district of central Gujarat.

MATERIAL AND METHODS

Present cross-sectional study was conducted among government and private schools in the district of central Gujarat between for the period of 14 months. The data collection was done after obtaining the permission from the concerned principals of both the government and private schools. A total of 350 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.

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: Nasal obstruction, Watery rhinorrhoea , Sneezing, Itching nose , Pharyngeal pruritis , Itching eyes and Itching nose.

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

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

Total score for each patient was calculated separately.

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

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

Investigations

- Base line investigations, complete haemogram.
- Specific investigations
- Total serum IgE levels
- Blood eosinohhil count
- Skin prick test using dust mite

Spirometry

- Computed assisted spirometry was done to diagnose the asthma. The parameters used were FEV1/FEF25-75 and FVC.
- Short acting bronchodilator was given to patients to confirm asthma.
- An improvement of 10% in FEV1 was taken for inclusion criteria.

Imaging

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

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

Statistical analysis

The data were analyzed using SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

RESULTS

The prevalence of allergic rhinitis was found to be 27.10% among school going children in district of central Gujarat. The percentage of allergic rhinitis in male and females was 55.7% and 43.2% respectively. (Table 1) The percentage of allergic rhinitis in school going children was 51.5% in urban and 48.4% in rural population of school going children. (Table 2) The percentage having persistent allergic rhinitis was 59.5% and intermittent rhinitis was in 39.4%. The symptoms in the school going children was found to be Sneezing in 68.42%, watery rhinorrhoea in 65.2%, nasal obstruction in 78.9%, itching of nose in 49.4%, itching eyes in 61% and pharyngeal prutritis in 26.31%. (Table 3) 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%. (Table 4) The distribution of skin prick test was found to be dust mite in 75.4%, pollen

in 66.2%, moulds in 14.5%, only dust mite in 24.4%, only pollen in 18.1%, only mould in 9.10%, dust mite + pollen in 42.90%, dust mite +moulds in 5.85% and dust mite + pollen + moulds in 3.9%.

Table 1: Gender distribution of school going children presenting with symptoms of allergic rhinitis (n=95)

Gender	Number	Percentage (%)
Male	53	55.7
Female	42	44.2
Total	95	100

Table 2: Geographical distribution of school going children presenting with symptoms of allergic rhinitis (n=95)

Area	Number	Percentage (%)
Urban	49	51.5
Rural	46	48.4
Total	95	100

Table 3: Distribution of school going children with allergic rhinitis as per symptomatology (n=95)

Symptoms	Number	Percentages
Sneezing	65	68,42
Watery rhinorrhoea	62	65.2
Nasal obstruction	75	78.9
Itching nose	47	49.4
Itching eyes	58	61
Pharyngeal pruritis	25	26.31

Table 4: Distribution of chest symptoms suggestive of latent asthma in school going children with allergic rhinitis (n=95)

Chest Symptoms	Number	Percentages
Cough	24	25.2
Nocturnal waking	15	16.6
Occasional wheezing	12	12.6
Chest tightness	7	7.3

DISCUSSION

This study was conducted for a period of 14 months in patients who met the criteria of allergic rhinitis as per the predetermined proforma was 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.[9] In the current study out of 350 patients of rhinitis 95 patients were found to have allergic rhinitis, As such the prevalence in this study was found to be 27.1%. Epidemiological studies demonstrate discernible global variation in the prevalence rates of rhinitis symptoms, which might be positive or negative by allergy tests. Self-reported seasonal or perennial rhinitis symptoms significantly overestimate the prevalence of AR well-defined by a positive history and positive allergy tests. However, positive allergy tests are also common in those without self-reported rhinitis symptoms [10]. Dykewicz *et al* reported in their study the prevalence of 10-30% in adults and upto 42% of children.[11] Thus the results of our study are consistent with the above discussed studies. incidence between ages of 13-19 years.[12] In the present study it was observed that allergic rhinitis was prevalent more frequently in 2nd decade of life. 2nd and 3rd decade accounting for more than 2/3rd of patients, reflecting that children and young adults are the most affected group. Cruz *et al*, on publications between 2000 and 2005 on allergic rhinitis and its associated co morbidity (bronchial asthma) also found highest incidence rate of allergic rhinitis, in both genders from 17-22 years.[13]Allergic rhinitis is more common in males than females. It was reported that the prevalence of parallel allergic rhinitis and asthma displays a strong male predominance in childhood and appears to switch to a female predominance in adolescents.[14] Cross-sectional study suggested that allergy prevalence in childhood is higher in boys compared to girls, but it remains uncertain whether this inequality changes after puberty.[15] 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.[16] 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.[17,18] 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.[19] Allergic rhinitis has been recognized as a significant risk factor for adult onset asthma. This result was expected and is consistent with previous studies in the literature.[20-22] International studies have demonstrated a varying association between rhinitis and asthma with a range of 40% to 90%. Asthma and rhinitis often represent a spectrum of the same disease (the one-airway hypothesis). The association between asthma and rhinitis is related to several factors, including the neural nasal-bronchial interaction, disturbances of the nasal mucosa warming and humidification functions, drainage of irritant and inflammatory materials into the lungs and the presence of similar cellular infiltrates and proinflammatory mediators in both the upper and lower airways.

CONCLUSION

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. Further, the results indicated that

rhinitis symptoms are also associated with a high frequency of asthma symptoms.

REFERENCES

1. Sibbald B, Rink E. Epidemiology of seasonal and perennial rhinitis: clinical presentation and medical history. Thorax 1991;46:895-901.
2. Asher MI, Barry T, Clayton J, Crane J, D'Souza, Ellwood P, *et al*. The burden of symptoms of asthma, allergic rhinitis and atopic aczema in children and adults in six New Zealand centers: ISAAc phase one. NZ Med J 2001;114: 114-20.
3. ISAAC-2; World wide variation in the prevelance of asthma symptoms: The International Study of Asthma and Allergies in Childhood. Eur Respir J 1998;12:315-35.
4. Bellanti JA, Wallerstedt DB. Allergic rhinitis update: epidemiology and natural history. Allergy Asthma Proc 2000;12: 367-70.
5. Jauregui I, Mullol J, Davila I, Ferrer M, Bartra J, del Cuvillo A, Montoro J, Sastre J, Valero A. Allergic rhinitis and school performance. J Investig Allergol Clin Immunol 2009;19 Suppl 1:32-9.
6. Shah A, Pawankar R. Allergic rhinitis and co-morbid asthma: perspective from India -- ARIA Asia-Pacific Workshop report. Asian Pac J Allergy Immunol 2009;27:71-7.
7. Von Parquet. Allergic Munc Med Wochenshr 1906;53()5):1457.
8. Gel Philip, Combi RRA. Clinical aspects of immunology London: Blackwell. 1967.
9. Ciprandi G, Cirillo I, Pistorio A. Impact of allergic rhinitis on asthma effects on spirometric parameters. J Allergy. 2008;63:255-60.
10. Mims JW. Epidemiology of allergic rhinitis. International Forum of Allergy and Rhinology, 2014, pp. S18-20.
11. Soto MTS, Patiño A, Nowak D, Radon K. Prevalence of asthma, rhinitis and eczema symptoms in rural and urban school-aged children from Oropeza Province - Bolivia:a cross-sectional study. BMC Pulmonary Med. 2014;14:40.
12. Jáuregui I, Mullol J, Dávila I, Ferrer M, Bartra J, del Cuvillo A, *et al*. Allergic rhinitis and school performance. J Investig Allergol Clin Immunol. 2009;19 Suppl 1:32-9.
13. Magnan A, Meunier JP, Saugnac C, Gasteau J, Neukirch F. Frequency and impact of allergic rhinitis in asthma patients in everyday general medical practice:a French observational cross-sectional study. Allergy. 2008;63(3):292-8.
14. Fröhlich, Matthias, *et al*. "Is there a sex-shift in prevalence of allergic rhinitis and comorbid asthma from childhood to adulthood? A meta-analysis." Clinical and Translational Allergy, Vol. 7, No. 1, 2017, p. 44.
15. Keller, Theresa, *et al*. "The sex-shift in single disease and multimorbid asthma and rhinitis during puberty-a study by MeDALL."Allergy, 2017.
16. Wright Al, Holberg CJ, Martinez FD, Halonen M, Morgan W, Taussig LM. Epidemiology of physician diagnosed Allergic rhinitis in childhood. Pediatrics. 1994;94:895-9014.
17. Demoly P, Bousquet PJ. Links between allergic rhinitis and asthma still reinforced. Allergy. 2008;63:251-4.
18. Braun-Fahrlander C, Gassner M, Grize L, Neu U, Sennhauser FH, Varonier HS, *et al*. Prevalence of hay fever and allergic sensitization in farmers children and their peers living in the same rural community (Swiss study). Clin Experimental Allergy. 1999;29:28-34.
19. Demoly P, Allaert FA, Lecasble M, Bousquet J; PRAGMA. Validation of classification of ARIA (Allergic rhinitis and its impact on asthma). Allergy. 2003;58:672-5.
20. Spector SL, Bernstein IL, Li JT, Berger WE, Kaliner MA, Schuller DE, *et al*. Parameters for the diagnosis and management of sinusitis. J Allergy Clin Immunol 1998;102:S107-S44.
21. Shamssain MH, Shamsian N. Prevalence and severity of asthma, rhinitis, and atopic eczema in 13- to 14-year-old schoolchildren from the northeast of England. Ann Allergy Asthma Immunol 2001;86:428-32.
22. Sichletidis L, Chloros D, Tsiotsios I, Gioulekas D, Kyriazis G, Spyratos D, *et al*. The prevalence of allergic asthma and rhinitis in children of Polichni, Thessaloniki. Allergol Immunopathol (Madr) 2004;32:59-63.

Source of Support: None Declared
Conflict of Interest: None Declared