

The Prevalence of Allergic Rhinitis among 11-15 Years-old Children in Shiraz

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ABSTRACT

Background: Allergic rhinitis is one of the most common forms of allergic disorders affecting children. The prevalence rate of allergic rhinitis differs among countries and even among regions within the same country. **Objectives:** To determine the prevalence of childhood allergic rhinitis and the presence and significance of eosinophilia in nasal secretions. **Method:** 4584 children aged 11-15 years-old of both sexes with allergic rhinitis were studied. The study was done during a four-season period. After physical examination of the nose, smear was taken from nasal secretions and it was stained. The results compared with nasal smears related to 340 healthy children controls. **Results:** 445 cases (9.7%) were diagnosed as having allergic rhinitis, on the basis of clinical criteria. Significant nasal eosinophilia was present in 274 (62%) of children with allergic rhinitis. 226 students (5.8%) of Shiraz school children had proven or classic allergic rhinitis. **Conclusion:** Allergic rhinitis is one of the major health problems among children in Shiraz. Eosinophilia of nasal secretions had a diagnostic specificity of 96% and sensitivity of 62% and seems to be having a moderate value as screening test for nasal allergy.

Keywords: Allergic Rhinitis, Eosinophilia, Prevalence

INTRODUCTION

Disorder of the nasal mucosa, commonly termed rhinitis is an IgE-mediated hypersensitivity. It's the most common chronic disease suffered by human. As rhinitis isn't a fatal condition, it has often been trivialized but to the sufferers, it causes

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considerable morbidity. In infancy, it may contribute to difficulties during feeding and sucking and in childhood, it may contribute to disturbances of sleep and day time concentration, lack of productivity in school, work or sport and social ostracism. It may lead to complications such as sinusitis or otitis media with effusion (1-2). Allergic rhinitis has a tendency to be familial and it is induced by exposure to the allergens that cause sneezing, rhinorrhea, nasal pruritus and obstruction. The most common allergens include pollens of grasses, weed and trees, animal dander, house-dust mites. When nasal symptoms last for several months, allergic rhinitis should be certainly considered. Positive nasal smear cytology for eosinophils is often found in these patients (3-4). Epidemiological studies have shown an increasing rate in the prevalence of allergic rhinitis in the last 20-30 years (5). The onset of allergic rhinitis occurs most commonly at late childhood or adolescence and its incidence remains constant during young adulthood (6). The current study was designed to determine the prevalence of allergic rhinitis among 11-15- years old children of both sexes in four seasons in Shiraz.

PATIENTS AND METHODS

We surveyed 4584 children aged 11-15 years-old of both sexes with allergic rhinitis. They were selected from 8 schools in Shiraz during a four-season period. The selection was as cluster and simple random sampling and about 150 children were studied in each school. A questionnaire about symptoms of rhinitis (rhinorrhea, obstruction, sneezing and nasal pruritus) was completed by children or their parents. Examination of nasal cavity was performed by anterior rhinoscopy (nasal speculum); color and swelling of the mucosa, the presence of nasal secretion and transverse crease of external nose was evaluated. Nasal smear was taken and then Wright staining was done. The classification of nasal smears for eosinophils and neutrophils was according to the following semi-quantitative scale:

Normal (+1); <10 cells/ High Power field (HPF) or <5% of HPF

Mild (2+); 10-30 cells/HPF or small clumps

Moderate (+3); numerous cells or large clumps, not covering the entire microscopic field.

Marked (+4); numerous cells or large clumps, but covering the entire microscopic field.

When 10 or more cells (eosinophils or neutrophils) were seen in any 2 separate HPF, the slide was graded as positive for these cells. According to the questionnaire (after excluding the infectious rhinitis), those with nasal symptoms, were suspected to have allergic rhinitis, those who had one symptom and one of the following signs: nasal mucosal color change (bluish or whitish), wetness or swelling of mucosa and nasal crease, labeled clinical allergic rhinitis and those who had two nasal symptoms for longer than 2 weeks and positive findings in physical exam with nasal smear 2+ or more, were identified as proven allergic rhinitis.

Data were analyzed for statistical significance by chi-square test. A significant value occurred when the 95% confidence interval of y did not include zero ($P \leq 0.05$).

RESULTS

In the questionnaires, 22% of the students reported that they had symptoms of allergic rhinitis. But according to the clinical criteria that was mentioned before, 445 children (9.7%) had clinical allergic rhinitis. 62% of this group of children had significant eosinophilia in nasal smears. 226(5.8%) of children at late childhood, had classic or proven allergic rhinitis. In our study, allergic rhinitis occurred slightly more in male than female. It was more common in older children (Fig. 1) and it occurred more in spring and summer (Fig. 2).

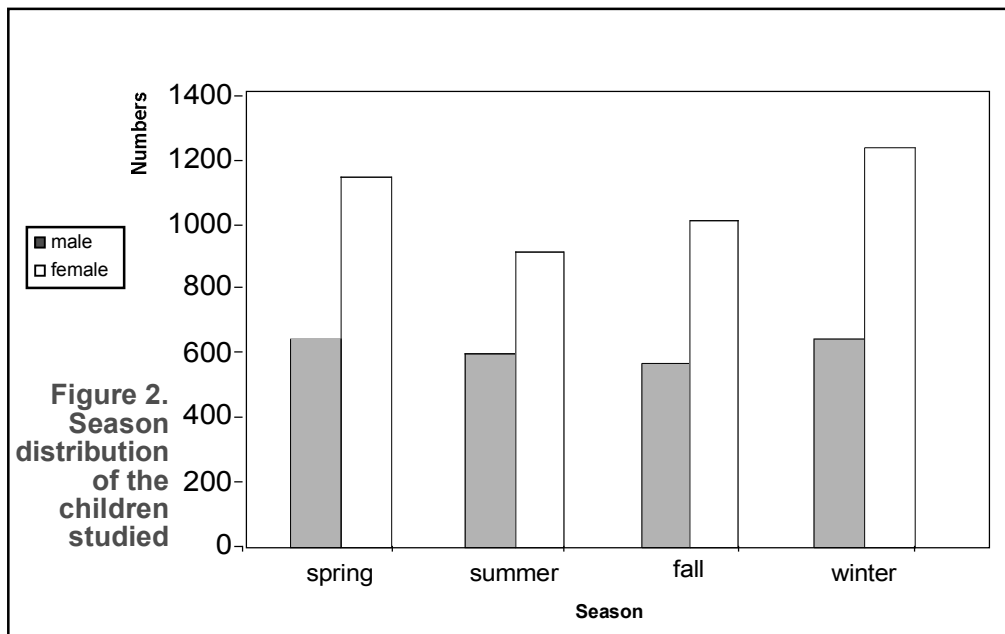
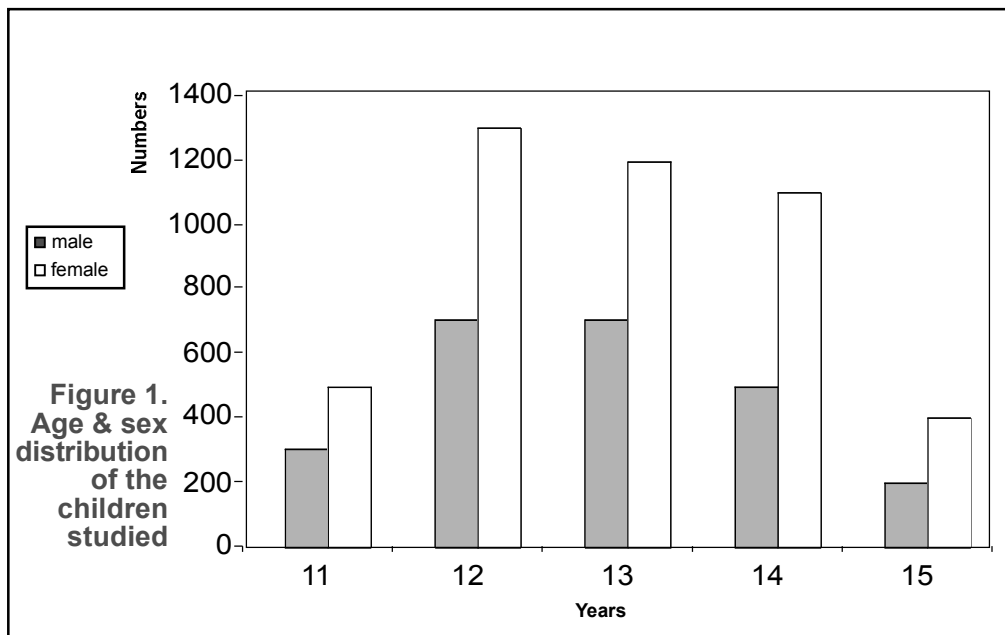
Rhinorrhea (85%) and nasal obstruction (65%) were more frequent symptoms of clinical allergic rhinitis but in proven cases, the color change of nasal mucosa (88%) and mucosal swelling (60%) were more common signs (Table 1). There was no significant difference in age, sex or season in nasal symptoms and signs distribution. The signs were more important than symptoms in diagnosis of allergic rhinitis. 52% of children with allergic rhinitis had pale mucosa, 36% had violaceous and 12% had normal mucosal color. Smear eosinophilia ($\geq 2+$) in allergic rhinitis (62%) were significantly higher than control group (4%) ($P<0.002$). Smear eosinophilia for suspected, clinical and proven allergic rhinitis were 28%, 62% and 100% respectively. Among the symptoms and signs of the nasal allergy, nose rubbing, sneezing and swollen turbinate had significant relationship with eosinophils ($P<0.01$). Smear neutrophilia ($\geq 2+$) in allergic rhinitis (43%) was less important than smear eosinophilia (62%).

DISCUSSION

Our study was the first epidemiological survey of the prevalence of childhood allergic rhinitis in Iran (Shiraz). This study revealed that allergic rhinitis was clinically present in 9.7% and as proven by nasal eosinophilia in 5.8% of children. The total number of cases in this study was more than other studies. As in the other studies (2,3,4), we used clinical criteria for identification of subjects with nasal allergy. But for confirmation,

Table1. The frequency of nasal signs and symptoms in school children with allergic rhinitis in Shiraz.

Symptoms & signs	Suspected No. (%)	Clinical No. (%)	Proven No. (%)
Rhinorrhea	587(55)	378(85)	208(92)
Obstruction	598(56)	289(65)	190(84)
Sneezing	438(41)	240 (54)	151(67)
Itching	363(34)	191(43)	101(45)
Color change	239(22)	221(50)	199(88)
Mucosal swelling	164(15)	151(34)	135(60)
Nasal wetness	133 (12)	120(27)	106(47)
Nasal crease	33 (3)	31(7)	27(12)
Total	N=1068	N=445	N=226



we assessed eosinophils in nasal smears. The study demonstrated that nasal eosinophilia in children with allergic rhinitis, were significantly higher than healthy control group. Nasal eosinophilia was almost twice as high when symptoms and signs were both suggestive of clinical rhinitis. This finding was compatible with the effect of ECF (Eosinophilic Chemotactic Factor) which is released from eosinophils at early allergic response (7). Because of high involvement of eosinophils in pathophysiology of nasal allergy, there was significant relationship between nasal eosinophilia and the most specific signs and symptoms of nasal allergy. But, 38% of clinical allergic rhinitis did not have nasal eosinophilia. It may be related to the late appearance of eosinophils in secretions in mild cases of nasal allergy. The poor cooperation of children for smear sampling (4% of cases) and poor staining of a few slides may explain this limitation. Infection may also cause a temporary disappearance of eosinophils from the nasal secretions in allergic rhinitis. The effects of drugs, foods, exercise and emotion on the appearance or disappearance of the eosinophils in the nasal secretions need further studies. 14% of normal children had significant nasal neutrophilia and 38% of proven nasal allergy had not neutrophilia in nasal secretions. On the other hand, the absence or presence of neutrophils could not be a diagnostic tool for nasal allergy. The nasal neutrophilia had not significantly associated with age, sex, season or nasal symptoms and signs of nasal allergy except of mucosal swelling ($P < 0.05$). If nasal neutrophilia occurred in allergic rhinitis, there was high significant association with the nasal eosinophilia ($p < 0.001$) and probably with severity of disease. Although superimposed infection may also occur. One of the aims of this study was to evaluate the usefulness of nasal smear as a screening test for nasal allergy. Nasal eosinophilia was present in 62% of children with clinical allergic rhinitis, with specificity of 96%. We used a clinical criterion that was more sensitive than IgE tests (skin test, RAST). Clinical criteria could detect mild or un-noticed nasal allergy. Although, skin test is needed for detection of allergens, it is not always practical in children, because of the adverse effects (discomfort, anxiety and cost).

In children with allergic rhinitis, that history and physical findings may be equivocal; the nasal smear for eosinophils appears to be a reliable diagnostic test with moderately high sensitivity and high specificity. This high valid test can be quickly and easily performed and read. Also, it can serve as a useful adjunct in the diagnosis of allergic rhinitis.

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