



## Original Research Article

## Prospective study on prevalence of aeroallergens in allergic rhinitis in a teaching hospital, Telangana

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## ABSTRACT

**Background:** Allergic rhinitis is an IgE antibody mediated, inflammatory disease.

The most commonly encountered risk factors for allergic rhinitis are presence of atopy, asthma, eczema, and other allergic illnesses. Identification of aeroallergens helps in patient counseling to modify life style and prevent exposure to triggering factors.

**Aim of the study:** To determine the prevalence of aeroallergens in allergic rhinitis.**Materials and Methods:** This was a prospective study done in cases of allergic rhinitis over a duration of one year from January 2019 to December 2019. Complete history taking was followed by ENT examination including Rhinoscopy and endoscopy, peripheral smear examination for eosinophils, absolute eosinophil count testing and Skin prick testing with known allergens and serum IgE level testing.**Results:** A total of 145 cases of allergic rhinitis were studied. The patient age ranged from 11 years to 50 years. The male to female ratio was 0.5:1. Most common allergen causing allergic rhinitis was dust mite which constituted about 44.1% cases. The next common allergen was Mold which accounted for 20.6% cases.**Conclusion:** We conclude that there are numerous aeroallergens that can cause allergic rhinitis and the most common ones are dust mites, molds, house dust, animal dander, pollen and others. Correct identification of the aeroallergen helps in the proper counseling of the patients so as to prevent exposure to those aeroallergens thereby reducing the episodes and severity of allergic rhinitis.

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## 1. Introduction

Allergic rhinitis is an IgE antibody mediated, inflammatory disease that is characterized by one or more of the following symptoms: nasal congestion, rhinorrhea (anterior and posterior), sneezing, and itching.<sup>1,2</sup>

Allergic rhinitis may be classified by<sup>3</sup> temporal pattern and context of exposure to a triggering allergen,<sup>4</sup> frequency and duration of symptoms, and/ or<sup>1</sup> severity. Temporal patterns may be<sup>3</sup> seasonal (eg, pollens),<sup>4</sup> perennial (year-round exposures, eg, house dust mites), or<sup>3</sup> episodic environmental (from allergen exposures not

normally encountered in the patient's home or occupational environment, eg, visiting a home with pets not present in an individual's home.<sup>1,2</sup>

Allergic rhinitis severity can be classified as being mild (when symptoms are present but are not interfering with quality of life) or more severe (when symptoms are severe enough to interfere with quality of life.<sup>1,2</sup> Factors that may lead to a more severe problem include sleep disturbance; impairment of daily, sport, or leisure activities; and impairment of school or work performance.<sup>5</sup>

The most common encountered risk factors for allergic rhinitis are presence of atopy, asthma, eczema, and other allergic illnesses.<sup>6</sup>

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Parental history of allergic illness is also a well-known risk factor. The risk of allergic rhinitis (AR) rises in children of parents with AR, asthma, hay fever and pollen allergies.<sup>7-9</sup>

Factors such as, vitamin D, obesity, exposure to cigarette smoke, amplify overall serum IgE, elevate blood eosinophils and other environmental exposures of urban settings can also contribute to AR.<sup>10,11</sup>

## 2. Aim of the study

To determine the prevalence of aeroallergens in allergic rhinitis.

## 3. Materials and Methods

This was a prospective study done in cases of allergic rhinitis attending the ENT OPD at Maheshwara Medical College, Patancheru, Hyderabad, Telangana. The study period was for one year from beginning of January 2019 to end of December 2020.

There were no ethical issues involved. Informed consent was obtained from all the patients included in the study.

### 3.1. Inclusion criteria

1. Age range from 11 years to 50 years.
2. Both genders.
3. Rhinorrhea.
4. Sneezing.
5. Symptoms of nasal obstruction.

### 3.2. Exclusion criteria

1. Age less than 11 years and more than 50 years.
2. Pregnant women.
3. Patients with chronic respiratory tract infections.

### 3.3. Methodology

A thorough history was taken including age, gender, occupation, history of atopy, etc. Symptoms such as sneezing, rhinorrhoea, nasal itching and nasal congestion were asked and noted thoroughly.

Personal history such as any food allergy or drug allergy was noted. Complete local and general examination was done.

ENT examination was done including anterior rhinoscopy, and diagnostic nasal endoscopy.

Peripheral blood smear examination was done in all cases and eosinophil count was noted.

Absolute eosinophil count was noted and up to 440 cells/mm<sup>3</sup> was taken as normal. Total serum IgE level was measured: It was measured by ELISA and chemiluminescent assay. The upper limit of normal was taken as 150 IU/ml.

Skin prick test (SPT): The patients were tested for few aeroallergens.

The tests were performed according to standard methods with allergens. Glycerinated buffered saline was used as a negative control and histamine diphosphate or dichloride was used as a positive control.

The skin prick reaction was read after 15-20 minutes and considered positive if the reaction wheal diameter was at least 3 mm larger than negative control.

Data was entered into excel sheets for statistical analysis.

## 4. Observations and Results

Total of 145 cases of allergic rhinitis were studied

**Table 1:** Age and gender distribution

Age distribution	Females	Males	No. of cases
11 – 20 years	20	15	35 (24.1%)
21-30 years	26	19	45 (31%)
31 - 40 years	45	10	55 (37.9%)
41 – 50 years	40	60	100 (6.8%)
Total	95(65.5%)	50(34.4%)	145 (100%)

In the present study, age distribution ranged from 11 years to 50 years. Majority of the cases were reported among 31-40 years. Table 1

### 4.1. Gender distribution

There were 95 (65.5%) female patients and 50(34.4%) male patients in the study and the male to female ratio was 0.5:1.

**Table 2:** Distribution based on symptoms

Symptoms	No. of cases	Percent (%)
<b>Only Rhinorrhea</b>	<b>30</b>	<b>20.6%</b>
Nasal obstruction + Sneezing	22	15.1%
<b>Nasal obstruction + Rhinorrhea</b>	<b>35</b>	<b>24.1%</b>
Itching in nose + Rhinorrhea	20	13.7%
Nasal congestion	18	12.4%
Nasal obstruction + Rhinorrhea + Pruritis of eyes	20	13.7%
Total	145	100%

In the present study most of the cases presented with rhinorrhea and/or nasal obstruction. Rhinorrhea.

Out of 145 patients with allergic rhinitis, 55% had history of episodic symptoms, 23% had complaints of aggravation of symptoms due to change of season and 12% had symptoms throughout the year. Table 2

### 4.2. Distribution based on past history

History of atopy was seen in 120(82.7%) and history of food allergy was present in 25(17.2%) cases.

**Table 3:** Distribution based on type of allergen

Allergens	No. of cases	Percent (%)
<b>House dust</b>	<b>20</b>	<b>13.7%</b>
<b>Dust Mite</b>	<b>64</b>	<b>44.1%</b>
Animal dander	10	6.8%
Grass Pollen	11	7.5%
Trees pollen	4	2.7%
Insects	5	3.4%
<b>Mold</b>	<b>30</b>	<b>20.6%</b>
Fungal spores	10	0.6%
Total	145	100%

In the present study, most common allergen causing allergic rhinitis was dust mite which constituted about 44.1% cases followed by Molds and house dust. Table 3

#### 4.3. Distribution of cases based on seasonal variation

Dust mites and dusts were more common during winter season, 74(51%) cases, pollens were more common during summer season 35(24.1%) cases and fungi and insects were common during rainy season 36 (24.8%) cases.

#### 4.4. Distribution based on eosinophil count on peripheral blood smear

In the present study, 32(22%) cases showed eosinophil count <6% and 113(77.9%) cases showed >6% eosinophil count.

#### 4.5. Distribution based on absolute eosinophil count (AEC)

There were 30(20.6%) cases that had AEC <440/cumm and 115(79.3%) cases that had AEC > 440/cumm.

#### 4.6. Distribution based on Serum IgE levels

There were 30(20.6%) cases with serum IgE level of <150 IU/L and 115(79.3%) cases with >150 IU/L serum IgE level.

### 5. Discussion

This was a prospective study to determine the prevalence of allergic rhinitis in hospital visiting patients in Telangana. A total of 145 cases were studied.

#### 5.1. Comparative studies related to age distribution

In the present study, most of the cases (37.9%) of allergic rhinitis were observed among 31–40 years followed by 31% in the 21–30 years age group. Kammili J et al<sup>12</sup> in their study observed that the most common age-group affected was 21–30 years, i.e., 66.66% while only 15% of the patients belonged to the age-group of 31–40 years. Aggarwal D et al<sup>13</sup> observed majority of their patients were in the age

group of 31–40 years (31%) with male to female ratio of 1.5: 1. Wang W et al<sup>14</sup> reported the median age as 19.0 years. Bellamkonda M et al<sup>15</sup> in a similar study observed the youngest patient to be 16 years and the oldest as 45 years. The mean age of their study group was 27 years. Our observations compare well with the above studies.

#### 5.2. Comparative studies related to gender distribution

In the present study, females were predominant i.e. 65.5% (95/145) when compared to males i.e. 34.4 % (50/145). Bellamkonda M et al<sup>15</sup> in their study observed that female patients were slightly more than the male patients with a male to female ratio of 0.935:1 i.e. they had 31 females and 29 males in their study. Kammili J et al<sup>12</sup> observed allergic rhinitis more in males than in females, with 66.66% in males and 33.33% in females. Wang W et al<sup>14</sup> in their study had 2269 males (55.5%) and 1816 (44.5%) females.

#### 5.3. Comparative studies related to Prevalence of sensitisation to aeroallergens

In the present study, most common allergen causing allergic rhinitis was dust mite which constituted about 44.1%. The next common allergen was Mold which occupied 20.6%, followed by house dust 13.7%, animal dander (6.8%), grass pollen 7.5% trees pollen 2.7%, insects 3.4% and fungal spores 0.6%. In Wang W et al<sup>14</sup> study, among the 4085 patients with allergic rhinitis, the prevalence rates of sensitization to aeroallergens were as follows: 84.4% for house dust mites, 23.4% for pet allergens (combination of dog hair and cat dander), 21.1% for cockroaches, 9.1% for mould allergens, 7.7% for mixed tree pollens and 6.0% for mixed weed pollen. In Kammili J et al<sup>12</sup> study, dust mites (20.82%) and dusts (12.49%) were more common during winter season, pollens (17.49%) were more common during summer season, and fungi (4.9%) and insects (5.83%) during rainy season. Most common allergen in their study was dust mite (32.48%) followed by pollens (27.48%), dusts (18.32%), fungi (10.82%), and insect (9.16%). In the study by Aggarwal D et al<sup>13</sup> the most common allergen/irritant causing aggravation of symptoms was dust, which was responsible for 97% of cases, followed by smoke (22%) and the least was pollen (5%). In the study by Nagare P et al<sup>16</sup> dust was the most common risk factor for allergic rhinitis accounting for 82% followed by weather changes in 46% cases.

#### 5.4. Comparative studies related to symptoms

In the present study, majority of the cases presented with nasal obstruction and rhinorrhea i.e. 24.1% cases. Next common symptom was only rhinorrhea and was seen in 20.6% cases whereas, in the study by Bellamkonda M et al<sup>15</sup> the most common nasal symptom was nasal discharge (80%) followed by sneezing (78.34%) and nasal obstruction

(70%). Seven patients (11.67%) had altered sense of smell and headache. The most common ophthalmological symptom associated with allergic rhinitis was congestion in eyes in about 40% of patients followed by itching. Photophobia and foreign body sensation were seen in 1.67% patients, respectively in their study. Our findings correlate well with the above authors.

### 5.5. Comparative studies related to history of comorbidities

In the present study history of atopy was seen in 82.7% cases, and 17.2% had history of food allergy.

Bellamkonda M et al<sup>15</sup> observed in a similar study that a total of 19(31.67%) patients had a positive family history of allergy. Two had history of food allergy; one patient to milk and other to peanuts. One patient had drug hypersensitivity to aspirin.

Nagare P et al<sup>16</sup> observed dust allergy among 50 patients, 5 had family history of allergic rhinitis and 10% had atopy.

### 5.6. Comparative studies related to peripheral blood smear eosinophilia

In the present study, 77.9% cases showed eosinophil count > 6% whereas, in the study by Nagare P et al<sup>16</sup> they observed that eosinophil count in 66% patients was < 5% and in 34% patients it was  $\geq$  5%. Aggarwal D et al<sup>13</sup> observed 49% of patients had raised eosinophils in their peripheral blood smear.

### 5.7. Comparative studies related to AEC

In the present study 79.3% cases showed AEC > 440 cells/cumm. In the study by Bellamkonda M et al<sup>15</sup> the majority of patients (26.6%) had AEC ranging between 301 and 400 cells/cumm followed by 25% patients in range of 400-500 cells/cumm. Aggarwal D et al<sup>13</sup> observed an absolute eosinophil count (AEC) of >440 cells/mm<sup>3</sup> in 50% of patients.

### 5.8. Comparative studies related to Skin prick test

In the present study, the Skin prick test was strongly positive for dust mite in 44.1% cases. The next common allergen was Molds which accounted for 20.6% cases, followed by house dust in 13.7% cases, animal dander in 6.8% cases, grass pollen in 7.5% cases, trees pollen in 2.7% cases, insects in 3.4% cases and fungal spores in 0.6% cases. Aggarwal D et al<sup>13</sup> in their study observed the prevalence of skin prick test was strongly positive for pollens (46.19%), followed by dust (16.4%), dust mites (15.7%), fungus (9.7%), insects (9.24%) and to epithelia (2.77%). Among 68 aeroallergens, most common offending allergen was D-farinae (30%) in their study.

## 6. Conclusion

We conclude that there are numerous aeroallergens that can cause allergic rhinitis and the most common ones are dust mites, molds, house dust, animal dander, pollen and others. Correct identification of the aeroallergen helps in the proper counseling of the patients so as to prevent exposure to those aeroallergens thereby reducing the episodes and severity of allergic rhinitis.

## 7. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

## 8. Source of Funding

None.

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