Original Article

To Determine the Prevalence Pattern of Aeroallergens in Patients of Bronchial Asthma and Allergic Rhinitis Reporting to a Tertiary Care Centre in North India

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Background : Allergens have been associated with diseases such as Bronchial Asthma (BA) and Allergic Rhinitis (AR) which are of most concern, among the patients visiting the chest physicians. Exposure to various aeroallergens has direct impact on pathogenesis as well as outcome of BA and AR.

Materials and Methods : It is a prospective study in which a cohort of 20 patients were assessed who were diagnosed as a case of BA or AR clinically or by pulmonary function test. These patients were subjected to skin prick test after taking written and informed consent.

Results : Most common allergen were Suaeda fruticosa, Mucormucedo, House Fly, Locust, House Dust, Buffalo Dander, Cat Dander and Silk.

Conclusion : The study concludes that most of patients of BA and AR had polysensitization. Majority of patients were female and belonged to the younger age group, 20-29 years followed by 0-19 age group. The patients who were found to be allergic should be educated regarding avoidance of allergens help in reduction of symptoms and morbidity and increasing the overall health status.

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Key words : Aeroallergens, Asthma, Rhinitis, Polysensitization.

Allergens have been associated with diseases such as Asthma and Allergic Rhinitis (AR) which are two of the most common pathologies of pulmonolgy. Exposure to various aeroallergens has direct impact on pathogenesis as well as outcome of Asthma and AR. Both asthma and AR frequently co-exist and are now thought to be a continuum of inflammation involving one common airway[1]. Asthma may be characterized by recurrent episodes of wheezing, breathlessness chest tightness and coughing particularly in morning and night[2]. Asthma is characterized by widespread narrowing of the bronchial airways which changes its severity over short periods of time either spontaneously or under treatment. Allergic rhinitis is an inflammatory condition of nasal mucosa characterized by the symptoms of pruritus, sneeze, discharge, and stuffiness induced by an Immunoglobulin-E (IgE) – mediated response[4]. Common risk factors for Asthma and AR include allergens such as house dust mite, animals with fur, Cockroaches, Pollens, Moulds, Chemical irritants, Tobacco smoke which contains

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> **Editor's Comment :**
> - Skin prick testing, when performed by experienced tester is a simple and rapid test to identify atopic status.
> - Relevance of allergen exposure and its relation to symptoms must be confirmed by patients history.
> - Most Common age of presentation of allergic rhinitis and bronchial asthma is 20-29 years with significantly positive family history.

more than 1000 different components have been suggested to cause allergy. Allergens responsible for respiratory allergies (Asthma & AR) are found to be different from place to place as echoed in various Indian and international studies[5-7]. This study was done in tertiary care hospital in north India to find out the major prevailing aeroallergens leading to respiratory distress.

AIMS AND OBJECTIVES

To determine the prevalence pattern of aeroallergens in patients of Asthma and Allergic Rhinitis reporting to Tertiary Care Centre in North India

Inclusion Criteria :

(1) Patients with :

    (a) Allergic rhinitis/ Allergic Rhinoconjunctivitis/ Allergic Rhinosinusitis, (b) Asthma.

(2) Age group : 18 years and above.

Exclusion Criteria :

(1) Nonspecific skin rash without allergic/atopic characteristics.

(2) Chronic urticaria in the absence of allergic features on history

(3) Specific food allergies and intolerance

(4) Assessment of the effectiveness of allergen immunotherapy

(5) Chronic fatigue without allergic features

(6) Psychiatrically unstable patients

(7) Severe and unstable asthma

(8) Pregnancy (because of the small risk of anaphylaxis with hypotension and uterine contractions)

(9) Babies, infants and children

(10) Patients on Beta Blocker

MATERIALS AND METHODS

It was a prospective study in which a cohort of 20 patients were assessed who were diagnosed as a case of Asthma or Allergic rhinitis clinically or by pulmonary function test. Diagnosis of Asthma was made based on variable respiratory symptoms and confirmed variable airflow restriction. Allergic Rhinitis was diagnosed based on clinical symptoms and skin prick tests.

These patients were subjected to skin prick test after taking written and informed consent.

Concentration of allergens used were :

- Pollens   - 1:10
- Fungi   -   1:10
- Insects   - 1:10
- Dusts   -   1:10
- Dander   - 1:10
- Fabric and Feathers - 1:10
- House Dust Mite - 1: 100 (A mixture of D Farinae and Pteronyssinus in ratio 3:1)

RESULTS

(1) Sex Distribution

Male   :   35% ; Female :   65%

Table 1 — Age Distribution

Age Group	Male	Female	Total	Percentage
0-19	0	4	4	20%
20-29	2	5	7	35%
30-39	3	3	6	30%
40-49	0	0	0	0%
50-59	1	1	2	10%
60 and Above	1	0	1	5%
Total	7	13	20	

Table 2 — Allergenicity to Pollens (Total – 47)

Age group	Positive	Negative	P Value
0-19	29 (61.7%)	18 (38.2%)	0.02
20-29	45 (95.7%)	2 (4.2%)	<0.001
30-39	46 (97.8%)	1 (2.1%)	<0.001
40-49	0	0	0
50-59	27 (57.4%)	20 (42.5%)	0.14
60 and above	12 (25.5%)	35 (74.4%)	<0.001
MC - Suaedafruticosa			

Table 3 — Allergenicity to Fungi (Total – 18)

Age group	Positive	Negative	P Value
0-19	17 (94.4%)	1 (5.5%)	<0.001
20-29	16 (88.8%)	2 (11.1%)	<0.001
30-39	16 (88.8%)	2 (11.1%)	<0.001
40-49	0	0	0
50-59	9 (50%)	9 (50%)	1
60 and above	2 (11.1%)	16 (88.8%)	<0.001
MC - Mucormucedo			

Table 4 — Allergenicity to Insects (Total – 15)

Age group	Positive	Negative	P Value
0-19	14 (93.3%)	1 (6.6%)	<0.001
20-29	15 (100%)	0	0
30-39	15 (100%)	0	0
40-49	0	0	0
50-59	15 (100%)	0	0
60 and above	4 (26.6%)	11 (73.3%)	0.008
MC - House Fly, Locust (Female)			

Table 5 — Allergenicity to Dusts (Total – 11)

Age group	Positive	Negative	P Value
0-19	9 (81.8%)	2 (18.1%)	0.003
20-29	11 (100%)	0	0
30-39	9 (81.8%)	2 (18.1%)	0.003
40-49	0	0	0
50-59	7 (63.6%)	4 (36.3%)	0.20
60 and above	5 (45.4%)	6 (54.5%)	0.67
MC - Grain Dust Bajra, House Dust			

Table 6 — Allergenicity to Dander (Total – 6)

Age group	Positive	Negative	P Value
0-19	6 (100%)	0	0
20-29	6 (100%)	0	0
30-39	1 (16.6%)	5 (83.3%)	0.02
40-49	0	0	0
50-59	4 (66.6%)	2 (33.3%)	0.25
60 and above	2 (33.3%)	4 (66.6%)	0.25
MC - Buffalo Dander, Cat Dander			

Table 7 — Allergenicity to Fabrics and Feathers (Total – 6)

Age group	Positive	Negative	P Value
0-19	3 (50%)	3 (50%)	1
20-29	5 (83.3%)	1 (16.6%)	0.02
30-39	4 (66.6%)	2 (33.3%)	0.25
40-49	0	0	0
50-59	0	0	0
60 and above	2 (33.3%)	4 (66.6%)	0.25
MC - Silk (Raw)			

The above results conclude to the following findings:

(1) Maximum number of patients according to sex having allergenicity were females which was statistically significant.

(2) The maximum load of allergenicity to pollens was found in age group 20-29 years (p value <0.001 significant) and the most common allergens was Sueda fruticosa.

(3) The maximum load of allergenicity to fungi was found in age group 0-19 years (p value <0.001 significant) and the most common allergens was Mucor mucedo.

(4) The maximum load of allergenicity to insects was found in age group 20-29 years and 30-39 (p value 0) and the most common allergens were house fly and locust (female).

(5) The maximum load of allergenicity to dusts was found in age group 20-29 years (p value) and the most common allergens were Grain Dust Bajra, House Dust.

(6) The maximum load of allergenicity to dander was found in age group 0-19 years and 20-29 (p value 0) and the most common allergens were Buffalo Dander, Cat Dander.

(7) The maximum load of allergenicity to fabrics and feathers was found in age group 20-29 years (p value 0.02) and the most common allergens was Silk (Raw).

Common Allergens

Saueda Fruticosa, Mucor mucedo, House fly, Locust, Bajra, Animal Dander, House dust, Silk (Raw), House Dust Mite

DISCUSSION

In the age group 20-30 years maximum number of the patients had Asthma followed by mixed disease and allergic rhinitis.

Our result has been in accordance with some other studies, where nasobronchial allergy has been found to be at its peak in age group 20-30 years as stated by Kumar R, *et al* and Singhal P, *et al* in Delhi.. similar results were observed by Rasool R, *et al*[7] and Sritipsukho P[8].

Maximum number of patients with symptoms having seasonal variation had asthma, followed by allergic rhinitis and mixed disease.

In this study it was observed that the major bulk of the patient had age of onset of nasobronchial disease between 15-20 years (28.57%) and least in 1-5 years (3.57%) and 5-10 years (3.57%).

Majority of the patients had positive family history with more predominance of paternal family history.

In our study majority of the patients (n=38; 67.86%) belonged to the urban class. Similar results were seen in most of the other studies.

In our study it was observed that maximum patients (n=32; 57.14%) of nasobronchial allergies owned pets which was statistically significant. Most of the patients (75%) that owned pets had Asthma.

In another study done by Gruchalla RS[9], *et al* in Dallas showed that nearly 34.4% of the nasobronchial allergic patients owned pets and most of them had moderate to severe asthma.

In our study the most prevalent aeroallergen among patients with nasobronchial allergy was House dust mite (71.43%), followed by insects (65.71%), followed by pollens and dusts (39.13% respectively), followed by fungi (30.16%), followed by dander (27.38%) and least by fabrics and feathers (26.19%). A significant correlation among all the groups of allergen was seen.

In our study house dust mite (71.43%) was found to be the most prevalent allergen among patients with nasobronchial allergies.

This was in accordance with the observation made by Hendrick DJ[10], *et al* (1975) which showed that house dust mite was the most prevalent allergen (82%). Most of the other studies found dust mites to be the most common aeroallergens in asthma and allergic rhinitis.

The insect group was the second most prevalent (65.71%) aeroallergen among the patients with nasobronchial allergy

House fly (78.57%) was the most prevalent insect followed by Ants, Honey Bee, Locust (female) and Mosquito. Mosquito showed highest positivity (67.86%) with skin prick test.

The next most prevalent aeroallergen was pollens (39.13%). Among pollens the highest prevalent allergen was Suaeda fruticosa (71.43%), followed by Gynandropis gynadra (67.85%), Cynodon dactylon (57.14%), Cassia occidentalis (53.57%). Among them

markedly positive reaction were seen by Cassia occidentalis and Cratava nurvala (35.71% respectively).

The next most prevalent group of aeroallergen in our study was dusts (39.13%). Among the dust group, the most prevalent allergens were Grain dust bajra and house dust (53.57% respectively), followed by Grain dust rice (50%), Grain dust Jowar (42.85%). Among the Dust group the highest positivity was seen with Grain dust bajra (46.43%).

The other common allergens were animal dander, fabric and feathers.

CONCLUSION

The study concludes that most of the allergic patients belong to female gender.

The frequency of allergenicity was maximum in youger age groups and maximum in 20-29yrs followed by 0-19 years.

Most of the patients had polysensitisation.

The most common allergens causing allergic respiratory diseases concluded from study are Suaeda fruticosa, Mucor mucedo, House fly, Locust (Female), Grain Dust Bajra, House Dust, Buffalo Dander, Cat Dander and Silk (Raw).

The patients who were found to be allergic should be educated regarding avoidance of allergens help in reduction of symptoms and morbidity and increasing the overall health status.

Sensitization is an important precursor of clinical allergic disease and further studies to unravel the complex gene-environment interactions of aeroallergen sensitization in different environments are needed.

Limitation of the study : The sample size used for bronchial asthma was small

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