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## Common allergens causing Naso bronchial allergy in patients attending a tertiary care centre in South India

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### Abstract

**Introduction:** Patients who seek medical care because of the symptoms of naso bronchial allergies are increasing. The distribution of allergens and its effect on the population differs in different parts of India. For the management and effective treatment of allergen induced respiratory illnesses, it is very important to find out the specific allergens responsible. To determine the common allergens causing naso-bronchial allergy in atopic patients.

**Materials and Methods:** Atopic patients who attended a tertiary care centre as outpatients for an year with symptoms of naso-bronchial allergy for more than a year who were not responding to regular medications were selected for the study after taking a detailed history. An intradermal allergy test was done in the volar aspect of the patients arm and forearm with antigens of the common allergens prevalent in south India.

**Results:** Out of 51 patients tested by 39 allergens, 47 persons turned positive for at least one antigen. Among pollen antigens, Acacia species showed highest number of positive reactions. Among dust, house dust and wheat dust showed higher positivity. Among antigens of animal origin, house fly was highest and among fungal origin, *Aspergillus fumigatus* showed high positivity.

**Conclusion:** The commonest antigen identified was that of house dust followed by house fly.

**Keywords:** Naso-bronchial allergy, allergens, intradermal antigen test, respiratory system

### Introduction

The population of India is estimated to be at 1.3 billion during the mid-year of 2020 according to UN data and it accounts for 17.7% of world population. More than 300 million of the world's population suffer from allergic diseases <sup>[1]</sup>. Chronic respiratory diseases were responsible for 10.9% (95% UI 10.0–12.0) of the total deaths and 6.4% (5.8–7.0) of the total DALYs in India in 2016 <sup>[2]</sup>. Respiratory symptoms were the most common cause of presentation to a physician in 51% of all patients included in the study and in 65% of paediatric age group, and obstructive airways disease was as one of the most common diagnosis reported <sup>[3]</sup>. Allergens play an important role in triggering of naso-bronchial allergy and subsequent flaring up of chronic respiratory diseases. The incidence of atopy is estimated to be 28.96% in a randomised survey of the Indian population <sup>[4]</sup>. Respiratory allergy sometimes causes difficulty in completing day to day chores and thereby reducing the quality of life. According to previous studies conducted in different parts of India; house dust, pollen grains, fungal spores, insect allergens, animal dander etc were found to be the most important allergens which trigger naso-bronchial allergy. For the management and its effective treatment, it is very important to find out the specific allergens responsible for the allergy

### Materials and Methods

#### Study design and settings

The study was designed as a prospective study. Atopic patients those who attended the Respiratory Medicine department as our patients for 6 months (February 2019 to the last day of July 2019) suffering from symptoms of naso-bronchial allergy for more than a year who were not responding to regular medications were selected for the study after taking a detailed history.

#### Inclusion criteria

- Patients with serum IgE level more than 150

### Exclusion criteria

- Age less than 10 years and above 60 years.

### Procedure

After obtaining informed written consent, data was entered in a questionnaire and an intradermal test was done with common allergens. 39 common allergens which patients come across in day to day life were selected for the sensitivity study. It included allergenically important pollens in the southern part of the India, fungal, dust and few allergens of animal origin. Patients were directed to stop taking anti histamines and corticosteroids 72 hours prior the test.

### Procedure of intradermal testing

The aqueous solution of allergen was taken in different 1 ml disposable tuberculin syringes and 0.1ml of each antigen was injected intradermally with hypodermic needle in the volar aspect of the patient's arm and forearm in a continuous manner in two rows, 2cm apart. The concentration of allergens was between the ranges of 1:500 to 1:5000. Buffered saline was used as negative control. After waiting for 20 minutes, the measurement was taken with the help of a scale which came along with the antigen. Each injection site was observed and interpreted according to Sivpuri's criteria [5]. A positive result was considered as a wheal which is more than twice that of the negative control.

### Statistical analysis

Data was entered into the Microsoft Excel sheets. Mean, median and percentages were calculated. Statistical association between selected variables were calculated using Chi square test using Statistical Package for Social Sciences (SPSS 20.0) version software, *p* value less than 0.05 considered statistically significant at 95% confidence interval.

### Results

The study subjects included 33 males and 18 females. The age of the study subjects ranged between 14 and 58 years. The mean age was observed as 37.86 with a standard deviation of 12.43. 47.0% the study subjects were from urban area whereas 53.0% were from rural area. Among the study participants 20 were housewives. 8 persons were students, 21 persons were working in government offices, private firms or as labourers for daily wages. Out of 51

study subjects, 31 had family history of allergy (Table-1). Out of the 51 study subjects, 47 had at least one positive reaction from the total of 39 allergens tested. 35 persons were tested positive for one to five numbers of antigens, whereas 12 persons tested positive for more than 5 antigens (Table-2). The highest number of antigens which came positive was eight. The reaction pattern of the study subjects is summarised in Table 3. The highest number of positive reactions was for house dust which was 41%. House fly allergen became positive for 37% of study subjects. Wheat grain dust came third with a positivity rate of 23%. Among the pollen grains, Acacia species topped as the main allergen with 17% of study subjects turning positive. *Carica papaya*, *Amaranthus spinosus* and *eucalyptus* species was positive in 7% of study subjects. None became positive for *cocos nucifera*, *ricinus communis* and *cassurinae quisetifolia*. Grocery dust and mosquitos also turned out to be a main allergen with 17.0% of study subjects turning positive. 15.0% of study subjects turned positive for ration shop dust, rice dust, house dust mite and cockroaches. Chicken feather, cotton dust and hay dust was positive in 9.0% of study subjects. Among the fungal allergens, 7.0% of study subjects turned positive for *aspergillus fumigatus*.

**Table 1:** Distribution patients based on the socio-demographic status

Socio-demographic status	Number	Percentage (%)
<b>Gender</b>		
Male	21	41.2
Female	30	58.8
<b>Family history of allergy</b>		
No	31	60.8
Yes	20	39.2
<b>Occupation</b>		
Student	8	15.7
House wife	20	39.2
Private firm	5	9.8
Government service	7	13.7
Others	11	21.6

**Table 2:** Distribution table showing positivity of reactions in study subjects

Number of positive reactions	Number	Percentage (%)
0	4	7.8
1-5	35	68.6
More than 5	12	23.5

**Table 3:** Frequency table showing positive reactions for each antigen

Antigens tested	Number of persons positive	Percentage (%)
Pollen		
<i>Acacia sp</i>	9	17.6
<i>Amarantus spinosus</i>	4	7.8
<i>Areca catechu</i>	1	2
<i>Azadirachta indica</i>	1	2
<i>Carica papaya</i>	4	7.8
<i>Cassia siamea</i>	1	2
<i>Cassia occidentalis</i>	1	2
<i>Cassuarinaequisetifolia</i>	0	0
<i>Cenchrus ciliaris</i>	1	2
<i>Clerodendron</i>	2	3.9
<i>Cocos nucifera</i>	0	0
<i>Cynodondactylon</i>	1	2
<i>Eucalyptussp</i>	4	7.8
<i>Heteropogoncontortus</i>	2	3.9

<i>Oridoxa</i>	1	2
Parthenium	2	3.9
<i>Peltoforumpterocarpum</i>	3	5.9
<i>Phoenix dactylifera</i>	1	2
<i>Ricinus communis</i>	0	0
Fungal origin		
<i>Aspergillus fumigatus</i>	4	7.8
<i>Aspergillus mixed</i>	2	3.9
<i>Aspergillus niger</i>	2	3.9
<i>Candida</i>	3	5.9
<i>Penicillium</i>	2	3.9
Dust		
Cotton dust	5	9.8
Hay dust	5	9.8
Paper dust	4	7.8
House dust	21	41.2
Rice dust	8	15.7
Wheat grain dust	12	23.5
Grocery dust	9	17.6
Ration shop dust	8	15.7
Animal origin		
Cockroaches	8	15.7
Ants	7	13.7
Mosquitos	9	17.6
House dust mite	8	15.7
House fly	18	35.3
Dog dander	4	7.8
Chicken feather	5	9.8

## Discussion

In our study, the number of females was more when compared to males who had more than five allergens turning positive. Two females turned positive for 8 allergens. Those with seven allergens positive comprised of one male and four females. In a study done in Mumbai by Shaikh WA *et al.*, males outnumbered females i.e., 53.05% versus 46.95%; 89.17% of the patients were adults and 10.83% were children. More than 80.0% of the patients were young, below 40 years of age. The house dust mite *D. farina* showed the highest incidence (77.13%) of positive reactions<sup>4</sup>. In our study *Amaranthus spinosus* came second among pollen grains, first being *Acacia species*. In a study done in Lucknow by Prasad R *et al.*, the most common allergen was found to be the pollen of *Amaranthus spinosus* (39.58%)<sup>[6]</sup>. In a study conducted at Kochi housefly was the most common allergen observed 53.26% followed by rice grain dust 47.5%<sup>[7]</sup>. A study conducted by Anand Patel and Sushmita Choudhary in Gujarat on prevalence of allergen sensitivity showed that insect group of allergens were more predominant. Most predominant allergen was moth (41.67%) followed by yellow wasp (37.5%), housefly (37.5%) and mosquito (33.33%). Amongst pollen group of allergens, most predominant allergens were *Cassia Siamea* (29.17%) followed by *Morus Alba* (25%) and *Ricinus Communis* (25%). Amongst dust group of allergens, most predominant allergens were Grain dust wheat (20.83%) and house dust (20.83%)<sup>[8]</sup>. In our study the highest number of positive reactions was for house dust which was 41.0%. House fly allergen became positive for 37.0% of study subjects. Wheat grain dust came third with a positivity rate of 23.0%. In a study conducted in south India by Chogtu *et al.*, the most common offending allergen is reported as rice grain dust<sup>[9]</sup>. A study conducted by Raseela Karunakaran *et al.*, in Thiruvananthapuram found out that the highest positivity among animal origin was for being house dust mite (27.25%). The major dust antigen was cotton dust

(25.12%). Among pollen antigens, *Cynodondactylis* showed maximum number of positive reaction (12.99%), while *Aspergillus flavus* and *Aspergillus niger* were the most common fungal antigens (both 4.44%)<sup>[10]</sup>. Another study done by Agarwal RL *et al.*, in Allahabad reported house dust mite as the commonest allergen (78.0%) followed by dust and other insects<sup>[11]</sup>. There were no statistically significant association found with occupation or place or rural urban difference when compared with number of positive reactions

## Conclusion

In our study the highest number of positive reactions was for house dust followed by house fly allergen and then by wheat grain dust. The pattern of positive reactions for allergens is different in various studies done in different parts of the country as well as in other countries.

## Limitations

Number of study subjects was less. Patients with urticaria were not included in the study.

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**Conflict of interest:** Nil

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