

## Study on Allergenic Profile of Allergic Rhinitis Patients by Skin Prick Test (SPT): A Cross Sectional Study

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### Original Research Article

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**Abstract:** Allergic rhinitis is the most important public health issues with increasing trend all over the world. Allergen sensitisation is the most important factor causing symptoms in allergic rhinitis. Allergic rhinitis is ubiquitous, significantly impairs the quality of life of affected person; however allergen remain undetected, many times. To study allergenic profile of allergic rhinitis patients by Skin Prick Test (SPT) was the main aim of present study. The objectives of study were 1) To ascertain clinical profile of allergic rhinitis patients 2) To study allergenic profile by skin prick test (SPT). The present cross sectional study was conducted on 40 known cases of allergic rhinitis. Purposive sampling method was used while recruiting cases. Skin pick test using 82 allergens was performed on all patients. The overall detection rate of allergen by skin prick test (SPT) was 92.5%. The most common allergen found in this study was 'mite' followed by 'house fly', dust etc. Present study concluded that; skin prick test (SPT) could be used to detect causes of allergy in allergic rhinitis patients.

**Keywords:** Allergic rhinitis, Skin Prick Test, Allergens, Mite, Dust, Pollen.

### INTRODUCTION

Allergic diseases such as allergic rhinitis, bronchial asthma and atopic dermatitis are dramatically increasing all over world including developing countries like India. Over 20% world population suffers from immunoglobulin E (IgE) mediated allergic diseases and approximately 20% Indian population are suffering from allergic rhinitis [1]. Allergic rhinitis can be characterised as recurrent or chronic allergen specific, IgE-mediated hypersensitive disorder affecting nasal lining.

Usually, allergic rhinitis patients presents with nasal congestion, rhinorrhea, sneezing, nasal itchiness and/or post nasal drip[2]. On physical examination of these patients, typically reveals; conchal hypertrophy, pale colour of mucosa and excessive mucous serous secretion. Allergic rhinitis has been classified as seasonal, perennial and occupational allergic rhinitis based on the period of exposure to the allergen [3].

Allergen sensitisation is the most important factor causing symptoms in allergic rhinitis. While allergy is pre-diagnosed through patient's history and examination; in-vivo skin test or in-vitro serological test, are used in definitive diagnosis. However, among percutaneous allergy tests, skin prick test (SPT) is the one that is most commonly used; for confirming an allergic pathology and to identify the offending allergen [3]. In skin prick test, the response of the skin to the Inge associated allergen is assessed. SPT requires few supplies, it's cost effective, easily administered, less invasive with high degree of adaptability [4,5] Allergic rhinitis is ubiquitous, significantly impairs the quality of life of affected

person; however, it is still under diagnosed and undertreated in many countries[2]. And also, there is seems to no consensus among researchers on the diagnostic accuracy of skin testing for allergen, including allergic rhinitis [5]. With this background; present study was conducted with following aim and objectives;

#### Aim

To study allergenic profile of allergic rhinitis patients by Skin Prick Test (SPT)

#### Objective

- To ascertain clinical profile of allergic rhinitis patients
- To study allergenic profile by skin prick test (SPT)

### MATERIALS AND METHODS

Institutional Ethical Committees (IEC) approval has obtained before commencing the study. The present cross sectional study; was conducted at Ear, Nose and Throat clinic of Parul Sevashram Hospital Limda, Vadodara. In this study 40 known cases of

allergic rhinitis were included after obtaining written informed consent. These patients were consecutively recruited using purposive sampling method. Patients of deviated nasal septum, who are on medication like antihistamine, mast cell stabilisers, corticosteroids; pregnant women and those with dermatographism were excluded from the study. All patients were subjected to detailed history, clinical examination, routine complete blood count and skin prick test (SPT). Nasal smear was taken, stained and studied for the presence of eosinophils. At the same time, AEC was also done, and the severity of symptoms was graded using a visual analogue scoring (VAS) system based on the ARIA criteria. The skin prick test results were graded on scale of 1+ to 4+ according to the Shivpuri classification. Inter and intra observer biases were eliminated by meticulously following standard operative procedures (SOPs), performing and interpreting all SPT by same investigator etc.

#### Skin Prick Test (SPT)

In present study, for skin prick test, kit manufactured by Creative Diagnostic Private Limited, Mumbai was used. Allergens (82), which were common to local community, were used in the study. The allergens included 36 types of pollen, 14 types of fungi, 8 types of epithelia, 2 types of mite and each 11 types of dust and insects. SPT was done on the both the arms of the patients. At the first, both arms were washed thoroughly with soap and water and dried; later they were cleaned by a piece of cotton rinsed in ethyl alcohol. The volar aspect of forearms were marked with dot, 2cm apart from each other and were numbered corresponds to number of allergen tested. Allergens were placed alongside the dots and introduced in to epidermis (intra dermal) with sterile lancet (1mm depth). New lancet was used for each allergen and results were read after 15 minutes. Histamine and buffered saline were used positive and negative control respectively. The order of skin prick test was first histamine followed by negative control then allergen. SPT was considered

positive if the diameter was > 3 mm. Skin prick tests were performed under physician's supervision. Equipment and emergency lifesaving medications were available to handle any anaphylactic reaction.

#### RESULTS

The present study was done on 40 known cases of allergic rhinitis; out of that 57.5% (23) and 42.5% (17) were male and female respectively (Graph 1). All the participants were in between the range of 20 to 65 years of age. The mean age of the participants was 34.80 +/- 3 years. (Table 1) In this study, the most common symptom reported by patients was sneezing (50%) followed by nasal discharge (42.5%), Itching (17.5%) and nasal obstruction (10.0%). Of the 40 patients studied; 17.5% (07) had a history of other allergies, of which 12.5% (05) had bronchial asthma and 5.0% (2) had episode of urticaria. Only 01 (2.5%) participant was reported positive family history of atopy.

Severity of symptoms was assessed according visual analogue scoring (VAS) system; and only 10% (04) had a VAS of 8 implying severe degree of disease. (Table 2) Out of all 40 patients, 65% (26) had severe degree (>20%) of nasal eosinophilia. (Table 3) Majority patients (90%) had absolute eosinophil count less than 600.

On SPT, out of 40 patients; 92.5% (37) tested positive to at least one allergen and only 7.5% (03) showed negative reaction. Out of all who tested positive on SPT, 55% showed positive reaction to mites, followed by 27% to house fly and pollen, 20% to dust etc. In present study least common allergen was found to be fungi or moulds (1%). On statistical analysis significant association was found only in between positive skin prick test cases, severe degree of nasal smear eosinophilia and symptoms severity based on VAS. { $\chi^2 = 18.390$ , d.f=3, P=0.0004 Significant}

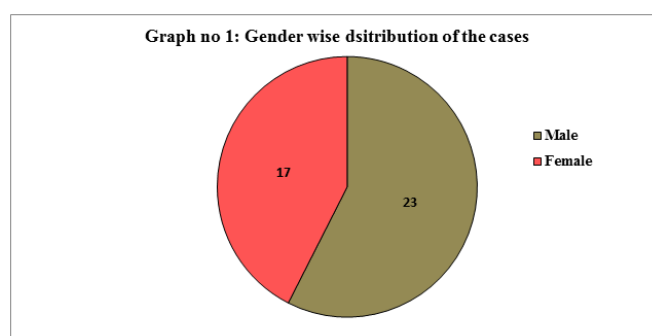


Fig-1: Gender wise distribution of the cases

**Table-1: Age wise distribution of the cases**

Sr.no	Age groups (Yrs)	Frequency (%)
1.	≤ 30	12 (30.00%)
2.	31-40	17 (42.5%)
3.	41-50	06 (15.0%)
4.	51-60	03 (07.5%)
5.	≥ 61	02 (05.0%)
	Total	40 (100.0%)

**Table-2: VAS severity of presenting symptoms**

Sr.no	VAS score	Frequency (%)
1.	4	13 (32.5%)
2.	5	04 (10.0%)
3.	6	16 (40.0%)
4.	7	03 (07.5%)
5.	8	04 (10.0%)
	Total	40 (100.0%)

**Table-3: Nasal Smear Eosinophilia**

Sr.no		Frequency (%)
1.	Rare (<5.0%)	04 (10.0%)
2.	Mild (5-10%)	05 (12.5%)
3.	Moderate (11-20%)	05 (12.5%)
4.	Sever (> 20%)	26 (65.0%)
	Total	40 (100.0%)

**Table 4: Association in between positive SPT, VAS grading & Nasal Smear Eosinophilia (n=37)**

Nasal Smear Eosinophilia	VAS grading	Skin Prick Test (SPT)				Total
		+ 1	+ 2	+3	+4	
Rare (< 5%)	4 to < 6	2	0	0	0	04
	≥ 6 to 8	0	0	2	0	
Mild (5-10%)	4 to < 6	2	0	0	0	05
	≥ 6 to 8	0	2	0	1	
Moderate (11-20%)	4 to < 6	1	3	0	0	05
	≥ 6 to 8	0	0	1	0	
Severe (> 20%)	4 to < 6	5	1	0	0	23
	≥ 6 to 8	0	8	5	4	
$\chi^2 = 18.390, d.f=3, P=0.0004$ Significant						

**DISCUSSION**

Allergic rhinitis is the most common allergic disorder worldwide [6] and many epidemiological studies have revealed a progressive increase in the prevalence during recent decades.<sup>7</sup> In this study, 40 known cases of allergic rhinitis participated; among them 57.5% and 42.5% were male and female respectively. The mean age of the participants was 34.80 +/- 3 years. In a study conducted by Moitra S *et al.* [8]. also shown higher male proportion than female (64/40, 1.5:1). A study conducted on Kashmiri population by Rasool R *et al.*[ 9] showed a higher female population being affected by allergic disorders. In present study, the most common age group involved was 31-40 years (42.5%), a similar

distribution of age was also reported by by Small P *et al.* [10] in his study.

The most common symptom seen in present study was sneezing (50%) followed by nasal discharge (42.5%). Moitra S *et al.* [8] also reported sneezing (87.2%) as most common presentation followed by runny nose (77.4%), itching and nasal congestion (61.8%). In our study only one patient has a positive family history of atopy but study conducted by Moitra S *et al.* [8] reported family history of allergy in 40.19% cases.

In our study, out of 40 participants, 92.5% (37) tested positive to at least one or more

allergen and only 7.5% (03) showed negative reaction. Out of all who tested positive on SPT, 55% showed positive reaction to mites, followed by 27% to house fly and pollen, 20% to dust etc. In present study least common allergen was found to be of fungi or moulds (1%). Study conducted by Prasad R *et al.* [1] reported that, out of 48 patients, 10.41% (05) patients gave negative skin prick test to all the allergen; however 89.6% (43) patients gave positive reaction to one or more allergen. The common offending allergen found in study of Prasad R *et al.* [1]; was insects (21.8%), followed by dust (11.9%), pollen (7.8%) etc. Ibekwe PU *et al.*[2] reported house dust as a most common offender (22.6%)for allergy, followed by tree pollen (16.8%) and weed pollen (7.4%) as least common offender.

### **CONCLUSION**

Present study concluded that; the "mite" was detected as most common allergen for the participants of this study and Skin prick test could be used to detect causes of allergy in allergic rhinitis patients.

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