

**BLINDED PERCUTANEOUS SKIN TEST RESULTS - HIGH RATE OF LATENT AEROALLERGEN SENSITIZATION IN ASYMPTOMATIC YOUNG ADULTS****Respiratory Medicine**

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ABSTRACT

The Skin Prick Test (SPT) is the standard method for detecting immediate hypersensitivity to aeroallergens and is considered a reliable and quick clinical test. A positive result indicates sensitization, but not necessarily a clinical allergy; diagnosis requires correlating test results with patient history and symptoms. Interpreting percutaneous skin prick test (SPT) results for aeroallergen sensitization involves assessing the size of the wheal and flare reaction at the test site, comparing it to positive and negative controls. A positive result indicates sensitization, but must be correlated with a patient's clinical history for a diagnosis of allergy. Aeroallergen sensitization, a process where the immune system reacts to airborne substances like pollen, dust mites, and cockroach allergens. These findings emphasize preventive awareness and environmental control strategies for early airway disease prevention. **Background:** Aeroallergen sensitization is a key precursor to allergic rhinitis and asthma¹. Baseline sensitization patterns among healthy young adults in India are not well documented. **Objective:** To determine the prevalence and allergen-specific sensitization profile among asymptomatic urban medical students using blinded skin prick testing (SPT). **Methods:** This prospective blinded study included 110 healthy MBBS students. Twelve aeroallergens were tested following standardized SPT methodology^{2,3}. Test validity required histamine ≥ 4 mm, saline ≤ 3 mm. Exclusion criteria included antihistamine usage, dermatographism, basal hyperreactivity, and invalid controls. **Results:** Among 110 participants, 97 (88.2%) had valid SPT outcomes. Sensitization to ≥ 1 allergen occurred in 63/97 (64.9%). The most common sensitizers were *Dermatophagoides farinae* (66.7%) and *D. pteronyssinus* (63.5%), consistent with known high prevalence of dust mite exposure in India^{9,10}. Cockroach sensitization (61.9%) also reflected indoor allergen distribution^{7,13}. Grass (*Cynodon*) and weed pollen (*Prosopis*, *Amaranthus*, *Parthenium*) showed moderate sensitization. Mold sensitization was low. **Conclusion:** Latent aeroallergen sensitization is highly prevalent among asymptomatic young adults, dominated by mite and cockroach allergens. These findings emphasize preventive awareness and environmental control strategies for early airway disease prevention.

KEYWORDS

Aeroallergen; Sensitization; Skin prick test; House dust mite; Cockroach; Young adults; India

INTRODUCTION

Aeroallergen sensitization plays a critical role in allergic rhinitis and asthma pathophysiology^{1,2}. Sensitization often occurs years before disease onset, making "silent sensitized" individuals an important population for preventive studies¹⁵.

Although several Indian studies describe sensitization in symptomatic patients^{3,9,10}, there is limited data on healthy young adults. Baseline sensitization rates in this group reflect environmental exposures and may help predict future allergic disease trends⁷.

Medical students form a relatively homogeneous cohort in terms of living conditions, diet, and urban exposures. This study evaluates allergen-specific sensitization frequencies using a blinded SPT protocol, reducing observer bias².

METHODS**Study Design**

Prospective observational study (November 2025), conducted at AIMSR Hyderabad.

Study Population

110 healthy, asymptomatic MBBS students (18–24 years). None reported acute respiratory symptoms at the time of testing.

Blinding

Allergen identity was masked using coded vials provided by ALLVAC Pharmaceuticals.

Skin Prick Test (SPT) Method

SPT was performed using standard procedures outlined by AAAAI and EAACI^{1,2,15}. Readings recorded at 20 minutes.

Allergen Panel

12 aeroallergens selected to reflect common Indian exposures^{9,10}:

- Mites: *D. farinae*, *D. pteronyssinus*
- Cockroach
- Grass: *Cynodon dactylon*
- Tree: *Prosopis juliflora*
- Weeds: *Amaranthus*, *Parthenium*, *Ricinus communis*, *Chenopodium album*, *Artemisia*
- Mold: *Alternaria*, *Aspergillus fumigatus*

Validity Criteria

Following standard SPT guidelines^{2,15}:

1. Histamine ≥ 4 mm
2. Saline ≤ 3 mm
3. Difference ≥ 3 mm

Exclusion Criteria

- Basal hyperreactivity
- Dermatographism¹¹
- Recent antihistamine intake
- Invalid controls
- Absence at interpretation

Participant Flow

- Recruited: 110
- Excluded: 13 (invalid control = 4; basal hyperreactivity = 8; absent = 1)
- Final analyzed: 97

RESULTS

Overall Sensitization

- Sensitized to ≥ 1 allergen: 63/97 (64.9%)
- Not sensitized: 34/97 (35.1%)

Individual Allergen Frequencies

(House dust mite and cockroach allergens known to dominate Indian exposure patterns^{9, 13}.)

Allergen	% Sensitized
<i>D. farinae</i>	66.7%
<i>D. pteronyssinus</i>	63.5%
Cockroach	61.9%
<i>Cynodon dactylon</i>	36.5%
<i>Prosopis juliflora</i>	34.9%
<i>Amaranthus spinosus</i>	25.4%
<i>Parthenium hysterophorus</i>	25.4%
<i>Ricinus communis</i>	22.2%
<i>Chenopodium album</i>	14.3%
<i>Artemisia</i>	9.5%
<i>Alternaria</i>	7.9%
<i>Aspergillus fumigatus</i>	1.6%

Indoor allergens (mites, cockroach) were the dominant sensitizers, consistent with global and Indian epidemiological data⁸⁻¹³.

DISCUSSION

This study shows a high rate of latent sensitization among young adults without clinical allergy, reflecting strong environmental allergen exposure in Indian urban settings^{9, 10}. The dominance of *Dermatophagoides* allergens aligns with established literature linking house dust mite exposure to early atopy⁸.

Cockroach sensitization (61.9%) mirrors findings from urban indoor allergen surveys in densely populated regions¹³. Weeds (*Parthenium*, *Amaranthus*, *Ricinus*) and grasses (*Cynodon*) showed moderate sensitization, consistent with South Indian aeroallergen studies^{3, 10}.

Low mold sensitization (e.g., *A. fumigatus* 1.6%) suggests minimal fungal contamination in the living environments of medical students.

Strengths

- Blinded SPT protocol
- Homogeneous population
- Strict quality control using internationally accepted criteria^{2, 15}

Limitations

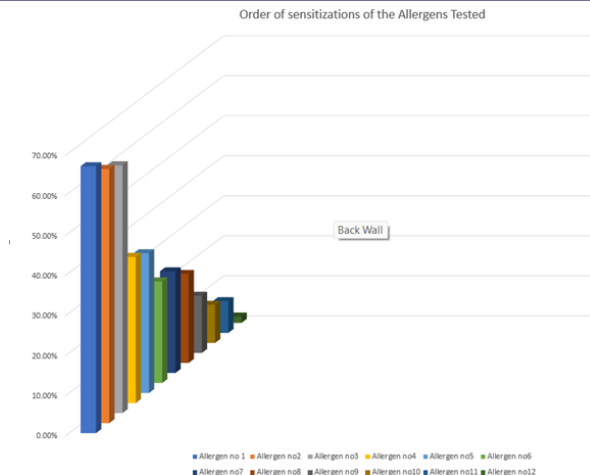
- Single-center study
- No allergen-specific IgE correlation (a recognized limitation)^{3, 18}
- No environmental sampling studies¹³

CONCLUSION

Latent aeroallergen sensitization is highly prevalent among asymptomatic Indian young adults, driven predominantly by indoor allergens such as dust mites and cockroach. Early identification and environmental allergen control may help prevent future allergic airway disease.

TABLES

Allergen No.	Allergen Name	% Sensitized (n=63)
1	House Dust Mite – Df	66.7%
2	House Dust Mite – Dp	63.5%
12	Cockroach	61.9%
4	Cynodon (Grass Pollen)	36.5%
3	Prosopis Juliflora (Tree Pollen)	34.9%
5	Amaranthus Spinosus (Weed Pollen)	25.4%
8	Parthenium (Weed Pollen)	25.4%
9	Ricinus (Weed Pollen)	22.2%
7	Chenopodium (Weed Pollen)	14.3%
6	Artemisia (Weed Pollen)	9.5%
10	Alternaria (Mold)	7.9%
11	Aspergillus Fumigatus (Mold)	1.6%



Author Contributions

Dr Hitesh Billa Lakshmi: Conceptualization; Study design; Supervision; Methodology oversight; Data interpretation; Manuscript drafting and critical revision.

Dr Anshitha V. K: Skin prick testing (SPT) procedure; Data collection; Clinical coordination.

Dr Krishna Priya Meegada: Data organization; Methodology assistance; Data quality assurance.

Dr Keerthana Katragadda: Participant coordination; Data verification; Technical support during SPT.

Dr Raghavendra Rao M V: Reviewed the manuscript

Dr Chennamchetty Vijay Kumar: Edited, and approved the final submitted manuscript.

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