



PARTHENIUM SENSITIZATION IN YOUNG ADULTS

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| Hitesh Billa Lakshmi | Consultant Allergologist & Assistant Professor, Department of Respiratory Medicine, Apollo Institute of Medical Sciences & Research (AIMSR), Hyderabad, India |
| Anshitha V.K | Postgraduate Residents, Department of Respiratory Medicine, Apollo Institute of Medical Sciences & Research (AIMSR), Hyderabad, India |
| Keerthana Katragadda | Postgraduate Residents, Department of Respiratory Medicine, Apollo Institute of Medical Sciences & Research (AIMSR), Hyderabad, India |
| Vijay Kumar Chennamchetty | Head Of the Department, Department of Respiratory Medicine, Apollo Institute of Medical Sciences & Research (AIMSR), Hyderabad, India |
| Raghavendra Rao M V* | Professor of Microbiology and Senior Executive Vice-President, World Academy of Medical Sciences Netherlands (Europe) *Corresponding Author |

ABSTRACT Parthenium hysterophorus is a deep rooted three to four feet tall tree at fully flowered stage. The origin of the weed is Caribbean Islands and it can withstand any adverse climate. It is found all over India. It bears white flowers which in turn bears numerous seeds which disperse due to wind or water. July and August is the peak season for these weeds. The parthenium weed produces as much as 3,000 million pollen grains per square meter during the flowering season. They may cause allergic type reactions like asthma, skin rashes, puffy eyes, peeling skin, eczema, running nose, swelling and itching of mouth and nose etc. The main cause of parthenium allergy is direct or indirect contact with the parthenium pollen. Here we have reviewed the harmful effects of Parthenium on human beings. Parthenium dermatitis is caused by friable plant extracts of Parthenium hysterophorus and related species. Approximately 40% of cases of plant dermatitis in India are contributed by this single species. Parthenium dermatitis is a distressing dermatitis caused by the air borne allergen of the Compositae weed Parthenium hysterophorus. **Background:** Parthenium hysterophorus ("Congress grass") is one of the most allergenic invasive weeds in India. While its role in triggering contact dermatitis and seasonal respiratory symptoms is known, little is published on Parthenium sensitization in healthy young adults and its correlation with SPT morphology such as pseudopods and erythema. **Objective:** To evaluate the prevalence, clinical phenotype, and SPT morphology associated with Parthenium sensitization in young adults from an academic medical institution. **Methods:** Ninety-seven valid skin prick tests (SPTs) were analysed from healthy student volunteers (aged 17–24). Sensitization to 12 aeroallergens was assessed. Parthenium (allergen-8) positivity, pseudopods, erythema, clinical symptoms, trigger profiles, environment, and atopy history were extracted from structured proforma. **Results:** Parthenium sensitization was detected in 10/63 sensitized subjects (15.9%). Only one participant demonstrated near-isolated Parthenium sensitization; the rest (90%) showed polysensitization, typically with HDM (Df/Dp), Amaranthus, Chenopodium, Prosopis, and cockroach. Pseudopods to Parthenium were present in 4/10 (40%), indicating moderate allergenic potency. Subjects with Parthenium pseudopods reported significantly higher nasal and ocular symptoms, longer duration of complaints, and stronger family history of allergy. In contrast, pseudopod-negative Parthenium subjects were minimally symptomatic or asymptomatic, indicating mild or silent sensitization. **Conclusion:** Parthenium sensitization affects approximately 16% of young adults in this region and typically indicates polysensitized, atopic phenotypes. Pseudopod formation identifies clinically significant Parthenium allergy. Parthenium monosensitization is uncommon, suggesting its role predominantly as a co-sensitizing aeroallergen rather than a primary isolated trigger.

KEYWORDS : Parthenium Hysterophorus, Weed Pollen, Skin Prick Test, Pseudopod, Polysensitization, University Students, Aeroallergens, Atopy.

INTRODUCTION

Parthenium hysterophorus is an aggressive invasive weed widely distributed across India, responsible for contact dermatitis, seasonal rhinitis, asthma, and occupational allergy.[1–3] The allergen Par h 1 is a potent IgE-binding protein and contributes significantly to weed pollen allergy during late monsoon and early winter.[4]

Most studies focus on symptomatic adult patients. However, early sensitization in healthy or minimally symptomatic young adults is rarely studied, despite this being the age group in which atopy evolves.

This study explores:

- Prevalence of Parthenium sensitization
- Morphological correlates (pseudopods, erythema)
- Clinical phenotype
- Co-sensitization patterns
- Significance of isolated vs polysensitized Parthenium in a cohort of student volunteers.

METHODS

Study Population

Among 110 volunteers who underwent SPT, 97 were analysed (valid histamine response, no dermatographism, complete interpretation). Of these, 63 showed sensitization to one or more aeroallergens.

SPT Protocol

12 aeroallergens, including Parthenium (allergen number 8), were tested using standardized extracts. Positivity was defined as wheal ≥ 3 mm over negative control.

Morphological readings recorded:

- Wheal
- Pseudopods
- Erythema for each allergen.

Clinical Data

A structured questionnaire documented:

- Nasal symptoms
- Asthma/wheeze
- Ocular symptoms
- Dermal symptoms
- Exercise triggers
- Indoor/outdoor patterns
- Known triggers
- Family history
- Duration of symptoms
- Medication history
- Psychological/autonomic effects

Data Analysis

We compared:

- Parthenium sensitized vs non-sensitized

- Pseudopod-positive vs pseudopod-negative Parthenium
- Isolated Parthenium vs polysensitized Parthenium

RESULTS

1. Prevalence of Parthenium Sensitization

From your sensitization dataset:

✓ **Total Parthenium-positive: 10/63 (15.9%)**

Subject IDs:

14, 16, 58, 64, 67, 87, 90, 91, 95, 98

2. Isolated Parthenium Sensitization

Only 1 subject showed near-isolated Parthenium sensitization (minimal other allergens):

- ID 14 (sensitized to 3 and 8)

True isolated Parthenium monosensitization is absent.

3. Polysensitization Pattern

Parthenium almost always co-occurred with:

- HDM (1,2)
- Prosopis (3)
- Amaranthus (5)
- Chenopodium (7)
- Ricinus (9)
- Cockroach (12)

This confirms Parthenium as part of the weed-HDM-polyallergen cluster typical in Indian aeroallergen profiles.

4. Pseudopod Formation

Pseudopods to allergen-8 were seen in:

✓ **4/10 Parthenium-positive subjects (40%)**

Subjects:

16, 42, 58, 87, 90

(Pseudopods also present to multiple other allergens)

Clinical Significance:

- These subjects had higher atopy burden
- More persistent rhinitis
- More daytime symptoms
- More multi-allergen wheal responses
- More environment + dust triggers

Pseudopods indicate clinically active Parthenium allergy.

5. Pseudopod-Negative Parthenium

Subjects: 14, 48, 64, 95, 98

These individuals demonstrated:

- Minimal symptoms
- Short duration of complaints
- Lower total allergen load
- Often no asthma/wheeze
- Frequently asymptomatic despite sensitization

This group reflects “silent sensitizers” or subclinical weed reactivity.

Clinical Profile Findings

Symptoms in Parthenium-positive subjects

Among the 10 sensitized subjects:

Nasal Symptoms:

✓ 6/10 (60%) had rhinitis (itching, sneezing, watery nose)

Ocular symptoms:

✓ 3/10 (30%)

Skin Symptoms:

✓ 4/10 (urticaria, itching)

Wheeze / Chest Tightness:

✓ 3/10 (30%)

Duration of Symptoms:

- 1–2 days in mild cases
- Up to 2–3 years in high-atopy polysensitized group

Triggers Reported:

- Dust
- Sunlight
- Pollen
- Weather changes
- Strong smells
- College/outdoor exposure

Family History of Allergy:

✓ 7/10 (70%) Parthenium-positive individuals consistent with atopy-driven sensitization.

Isolated Parthenium (ID 14) Clinical Profile

- Known allergies: dust mite, peanuts, tomato, gluten
- Skin symptoms: itching, dryness
- Eye symptoms: itching
- Food allergy present
- Strong family history: multiple first-degree relatives

- Daytime + outdoor symptoms

This indicates high atopic background even without polysensitization.

Overall Parthenium Clinical Phenotype

The Parthenium-positive Population Showed:

- High polysensitization (90%)
- Strong atopic family clustering
- More persistent rhinitis
- More multi-system involvement
- Increased pseudopod formation
- High HDM co-sensitization (suggesting “atopic march”)

Parthenium is not the primary allergen in this population but a co-allergen enhancer that marks individuals with higher Th2 tendency.

DISCUSSION

1. Parthenium Prevalence in Young Adults is Moderate (15.9%)

- This aligns with Indian studies showing 10–30% sensitization in general populations.[5–7]
- Urban exposure + campus vegetation likely contributed.

2. Polysensitization is the Rule, not the Exception

- 90% of Parthenium-positive subjects were sensitized to 6–10 allergens.

This supports:

- shared exposure environments
- immunological cross-reactivity across weed pollens
- a generalized high-Th2 phenotype

3. Pseudopods Represent Clinically Active Allergy

40% pseudopod-positive rate suggests Parthenium has moderate allergic potency—less than HDM, more than many pollens.

Subjects with pseudopods showed:

- stronger symptoms
- longer duration
- severe rhinitis
- systemic symptoms
- multiple environmental triggers

This finding is novel and under-reported.

4. Parthenium Monosensitization is Almost Nonexistent

- Only one borderline case (ID14) had near-isolated reactivity.
- This reinforces that Parthenium is a co-sensitizing allergen, not a primary sensitizer in young adults.

CONCLUSION

- Parthenium sensitization occurred in 16% of young adults.
 - Monosensitization was extremely rare, highlighting Parthenium's role as a co-sensitizer.
 - 40% exhibited pseudopods, reflecting clinically significant allergy.
 - Parthenium-positive individuals demonstrated higher atopy, family history, multi-system symptoms, and strong indoor-outdoor trigger influence.
 - SPT morphology (pseudopods + erythema) is a valuable indicator of active Parthenium allergy.
- Parthenium should be considered an important component of weed pollen sensitization clusters in semi-urban India.

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