



PATCH TESTING WITH THE INDIAN STANDARD SERIES IN 691 SUSPECTED ALLERGIC CONTACT DERMATITIS PATIENTS FROM RAJASTHAN: A 7-YEAR RETROSPECTIVE ANALYSIS

Dr. Dinesh Mathur

MD, Former Professor & Head, Department Of Dermatology, Jnuimsr, Jaipur, India. Head, Skin Centre, Rajasthan Hospital, Jaipur, India.

Dr. Vikarn Garg

MD, Assistant Professor, Department Of Dermatology, Venereology, And Leprosy, JNUIMSRC, Jaipur, India.

ABSTRACT

Background: Allergic contact dermatitis (ACD) is a prevalent dermatological condition influenced by regional and occupational exposures. Understanding local sensitization patterns is essential for effective management. **Objectives:** To analyze the prevalence and gender-wise distribution of allergen sensitization using the Indian Standard Series (ISS) over a 7-year period in Rajasthan. **Methods:** A retrospective observational study was conducted on 691 patients with suspected ACD who underwent patch testing with the ISS between 2017 and 2024. Patch testing followed ICDRG protocols, with results documented at 48 and 96 hours. **Results:** Of the 691 patients, 57.6% were female. The most common allergens identified were Fragrance Mix (48.3%), Paraphenylenediamine (PPD) (38.6%), Parthenium (37.1%), and Nickel Sulphate (26.2%). Gender-specific patterns revealed higher sensitivity to Fragrance Mix and Nickel in females, while males showed increased reactivity to Parthenium and Potassium Dichromate. **Conclusion:** The study underscores the utility of patch testing in identifying regionally and gender-relevant allergens. These findings support targeted preventive strategies and updates to allergen panels reflecting local exposure profiles.

KEYWORDS : Allergic Contact Dermatitis, Patch Testing, Indian Standard Series, Fragrance Mix, Nickel, Parthenium, Rajasthan, Gender Differences

INTRODUCTION

ACD is classified as a delayed type IV hypersensitivity reaction following topical exposure to sensitizing agents¹. Geographical, economical and educational parameters affect the prevalence and etiology of ACD². The Contact and Occupational Contact Dermatoses Forum of India has recommended the Indian Standard Series (ISS) as the standard patch test series³.

India is a country with diverse socio-religious and cultural practices which often leads to a range of skin diseases that may be missed due to a lack of awareness among dermatologists⁴. This study evaluates sensitization trends in 691 patients tested over seven years at a tertiary dermatology center in Jaipur, providing valuable insight into regional and gender-specific allergen profiles.

MATERIALS AND METHODS

Study Design And Setting:

This retrospective study was conducted at the Skin Centre, Rajasthan Hospital, Jaipur. Data from January 2017 to December 2024 were analyzed.

Participants:

A total of 691 patients aged 14–78 years with clinically suspected ACD were included. Exclusion criteria were active dermatitis at test site, pregnancy, and ongoing systemic immunosuppressive therapy.

Patch Testing Protocol:

Patients were tested with the ISS (20–25 allergens; Chemotechnique Diagnostics, Sweden) using Finn Chambers on Scanpor tape applied to the upper back. Readings were recorded at 48 and 96 hours according to International Contact Dermatitis Research Group (ICDRG) criteria.

Statistical Analysis:

Data were analyzed using SPSS version 25. Frequencies and percentages of positive reactions were calculated, including gender-specific comparisons.

RESULTS

Demographic Profile:

Out of 691 patients, 398 (57.6%) were female and 293 (42.4%) were male. The mean age was 39.4 years (range: 14–78 years).

Table 1:

| Allergen | Total Positive | Males Positive | Females Positive |
|----------------------|----------------|----------------|------------------|
| Fragrance Mix | 351(48.3%) | 198 | 153 |
| Paraphenylenediamine | 280 (38.6%) | 147 | 133 |
| Parthenium | 269 (37.1%) | 116 | 153 |
| Potassium Dichromate | 200 (28.9%) | 80 | 120 |

| | | | |
|--------------------------------|-------------|-----|----|
| Benzocaine | 189(27.3%) | 101 | 88 |
| Nickel Sulphate | 181 (26.2%) | 125 | 56 |
| Colophony | 174 (25.2%) | 105 | 69 |
| Neomycin Sulphate | 169 (24.5%) | 93 | 76 |
| Chlorocresol | 168(24.3%) | 90 | 78 |
| Black Rubber Mix | 163 (23.5%) | 87 | 76 |
| Cobalt Sulphate | 157 (22.7%) | 84 | 73 |
| Epoxy Resin | 153 (22.1%) | 68 | 85 |
| Formaldehyde | 147 (21.3%) | 92 | 55 |
| Thiuram Mix | 143 (20.7%) | 60 | 83 |
| Parabens Mix | 130 (18.8%) | 67 | 63 |
| Peru Balsam | 121(17.5%) | 64 | 57 |
| Mercaptobenzothiazole | 112 (16.2%) | 49 | 63 |
| Nitrofurazone | 108 (15.6%) | 49 | 59 |
| Wool Alcohol | 99 (14.3%) | 39 | 60 |
| Vaseline (White Soft Paraffin) | 28 (4.0%) | 13 | 15 |

The gender specific trends showed that the female predominant sensitizers were fragrance mix, nickel sulphate, and colophony while male predominant sensitizers were parthenium, potassium dichromate and thiuram mix.

DISCUSSION

Our findings indicate a persistently high rate of sensitization to common allergens in the ISS panel, particularly Fragrance Mix and PPD which was similarly seen in a study by Handa et al⁵. These allergens are commonly found in cosmetics and hair dyes, which may explain the higher sensitization rates in women. Nickel allergy also shows significant female preponderance, consistent with earlier studies⁶.

Parthenium and Potassium Dichromate were more common in males, likely due to occupational exposure in farming and construction, which was seen in similar studies^{7,8}. The high number of positive reactions to benzocaine, black rubber mix, and formaldehyde also highlight the need to monitor commonly used pharmaceutical and rubber-based products.

Comparative Insight:

The 26.2% prevalence of nickel sensitivity in this study mirrors trends from urban centers in South and North India. However, the relatively high positivity to Parthenium in males from Rajasthan underscores a continued challenge in rural and semi-urban areas⁹.

CONCLUSION

Patch testing with the Indian Standard Series remains a cornerstone in diagnosing allergic contact dermatitis. This 7-year dataset from Rajasthan highlights prevalent sensitizers and their gender-specific distribution, serving as a useful guide for clinicians, product

manufacturers, and policymakers. The study reinforces the need for public awareness, safer alternatives, and occupational precautions.

Limitations

- Retrospective and single-center design
- No clinical relevance scoring for positive reactions
- ISS panel may miss locally relevant allergens not included in the series

Recommendations

1. Conduct awareness programs for at-risk occupational groups (e.g., construction workers, farmers).
2. Periodically update the ISS to include region-specific allergens.
3. Promote clear labeling and encourage the use of hypoallergenic products in the cosmetic and pharmaceutical industries.

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