

## ANALYZING EPIDEMIOLOGICAL PATTERNS OF CONTACT DERMATITIS AMONG PATIENTS FROM BOTH RURAL AND URBAN AREAS: A CROSS-SECTIONAL STUDY.

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### ABSTRACT

#### Background

The number of dermatitis caused by contact cases is on the rise. There is few research on the occurrence and demographic traits of skin allergies in India. The purpose of this study was to determine how common dermatitis is caused by contact and assess the pattern of epidemiology of the condition in rural and urban communities.

#### Methods

Each participant signed an informed agreement, and the study was carried out in a medical school in an eastern Indian semi-urban area. A cross-sectional study was conducted at Darbhanga Medical College & Hospital in Leharisaraï, Bihar, India for a period of 6 months. There were 134 patients in the study group who were seen in the outpatient department (OPD) of dermatology and had lesions that were clinically indicating that contact dermatitis exists. Depending on their address, patients visiting the OPD were separated into rural and urban groups. The statistical techniques used for data analysis were appropriate, standard, and suitable.

#### Results

Participants in the dermatological OPD had a contact dermatitis rate of 4.38%. The prevalence in urban areas was substantially ( $P < 0.05$ ) higher than that in rural areas. More number of patients were observed in the age group of 41-50. Women were more impacted in urban regions than in rural ones. In terms of occupation, there was a difference that was statistically significant ( $P < 0.05$ ) between contact dermatitis patients in urban and rural areas. The urban group had a considerably higher cosmetic history ( $P < 0.05$ ).

#### Conclusion

There was a significant statistical variation in the prevalence of contact dermatitis and patient profiles for some characteristics, between individuals living in rural and urban areas.

#### Recommendation

More study population would be needed at different intervals to validate the study findings and ascertain if these modifications are transient or permanent.

**Keywords:** Allergic Skin Disorder, Dermatitis, Epidemiology, Prevalence

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### INTRODUCTION

Current assessments that describe the global impact of non-communicable illnesses in terms of years lived with an impairment and mortality [1] as well as the financial effect have focused on these disorders [2]. Hyperreactivity in the intestinal tract, lungs, nose, or skin, the target organ- is the hallmark of allergic disorders [3]. Ailments affecting the skin and mucous membranes that arise from inflammatory

illnesses based on aberrant T cell reactivity, humoral reactivity, or other associated pathologies are known as allergic skin disorders. Numerous types of allergic skin conditions exist, including drug allergies, allergic reactions, polymorphic light eruption, atopic dermatitis, seborrheic dermatitis, contact dermatitis, nummular dermatitis, and autosensitization dermatitis [4].

About 30% to 40% of people worldwide currently suffer from one or more allergy problems because of a continuous increase in the number of allergic illnesses [5]. With a rate of 24.50% of all hypersensitivity conditions, dermatitis was the first most common subtype. Within the dermatitis category, contact dermatitis accounts for 17.54% of cases and is the most often diagnosed skin condition. It may serve as a gauge for the community's relative level of development and urbanization [6]. The superficial inflammatory response of the skin brought on by external substances interacting with the skin is known as contact dermatitis. These responses may be inflammatory or allergic.

Although eczematous reactions are the most frequent, one may also experience exanthematous, lichenoid, granulomatous, pigmented, erythema multiforme-like, and photosensitive reactions [7]. One of the most prevalent occupational illnesses in developed nations, contact dermatitis, has a significant macroeconomic impact [6-8]. Between 15% and 20% of people in general are thought to have a contact allergy [8]. A study conducted in India revealed that out of 640 patients, 24.22% had footwear dermatitis [9].

The precise model of skin disease prevalence and the relationship between the supply, demand, and need for dermatological care are unknown to us. Furthermore, the scope of skin disease as a public health issue is unknown to us. This makes conducting epidemiological research extremely important [10]. The prevalence of skin problems must be ascertained to develop the appropriate educational initiatives and preventative measures [11]. On the other hand, not much information is known regarding the frequency of skin conditions in India, particularly in the eastern regions of the country.

The goal of the current study was to determine the prevalence of contact dermatitis and evaluate the epidemiological trends related to the condition in rural as well as urban settings.

## METHODS AND MATERIALS

### Study design

The dermatology and community medicine departments of Darbhanga Medical College & Hospital conducted this cross-sectional study.

### Study settings

The study was carried out in an eastern Indian medical school situated in a semi-urban region for a period of 6 months (1<sup>st</sup> January 2023 to 30<sup>th</sup> June 2023).

### Study size and participants

The study included a total of 134 participants out of 3059 patients, resulting in a prevalence rate of 4.38% for contact

dermatitis. Patients visiting the dermatological outpatient facility (OPD) were categorized as urban or rural based on their place of residence. The inclusion and exclusion criteria were meticulously considered to arrive at the final participant count for the study.

### Inclusion criteria

- i) All patients who were presented with lesions clinically suggestive of contact dermatitis to the dermatological outpatient facility (OPD) were included in the study.
- ii) Patients with contact dermatitis (allergic or irritating)
- iii) Participants who agreed to take part were in the inclusion criteria

### Exclusion criteria

The following conditions had to be met in order to be excluded:

- i) allergic skin conditions other than contact dermatitis
- ii) people who were uncooperative
- iii) those who were extremely unwell
- iv) mad

### Study setting

In addition to ruling out other types of eczema due to their lack of defining clinical characteristics and histories, cases of contact dermatitis were identified based on a thorough history, pertinent clinical examination, and linkage between the two. The following criteria were used to clinically identify the differences between irritating contact dermatitis (ICD) and allergic contact dermatitis (ACD). The research's 134 respondent data sets were processed, collated, and analyzed. Proportion and percentage were used as adequate, standard, and suitable statistical approaches for the analysis.

### Bias

There was a chance that bias would arise when the study first started, but we avoided it by giving all participants the identical information and hiding the group allocation from the nurses who collected the data.

### Statistical tools

The Statistical Package for the Social Sciences (SPSS) version 21 made it feasible to analyze data using the t-test, Chi-square test, and Fisher's exact test. For analysis, two digits were taken after the decimal point. P-values below 0.05 were regarded as highly significant.

### Ethical considerations

The ethical aspects of the research were carefully thought out to preserve patient privacy and confidentiality. Following institutional ethics committee approval, every patient provided signed informed consent.

## Results

**Table 1: Demographic characteristics of study population**

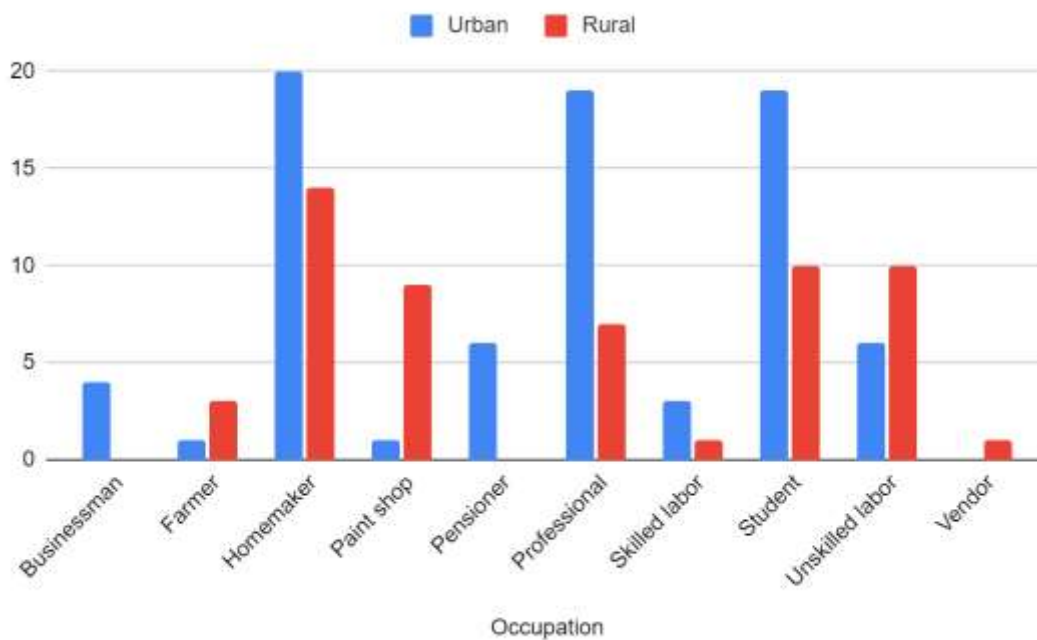
Demographic Characteristic	Urban Patients	Rural Patients
<i>Age (years)</i>		
18-30	12	8
31-45	25	15
46-60	30	20
61+	12	12
<i>Gender</i>		
Male	37	28
Female	42	27
<i>Education</i>		
High School	15	10
College	35	20
Bachelor's Degree	25	15
Master's Degree	4	5
Doctorate	0	2
<i>Smoking Status</i>		
Non-Smoker	60	47
Former Smoker	13	5
Current Smoker	6	3
<i>Annual Income</i>		
Below 30,000	22	18
30,000-50,000	38	22
50,001-75,000	14	10
75,001-100,000	7	3
Above 100,000	8	2

There were 134 patients in all, 79 (59%) of whom were from metropolitan areas and 55 (41%) from rural ones. Male patients made up 47% of all patients, 49% of those in cities, and 51% of those in rural areas. Patients from the urban region outnumbered those from the rural area (67% vs. 33%) were females ( $P = 0.0042$ ). Table 2 and Figure 1 shows the

distribution of patients by occupation. Even though homemakers made up the majority of victims in both categories, there was a significantly different pattern in the distribution of occupations between the urban and rural groups ( $P < 0.0001$ ).

**Table 2: Prevalence of Patients with Contact Dermatitis (n = 134) by Occupational Status (Urban-Rural Contrast)**

Occupation	Urban		Rural	
	No.	%	No.	%
Businessman	4	5%	0	0
Farmer	1	1%	3	5%
Homemaker	20	26%	14	26%
Paint shop	1	1%	9	17%
Pensioner	6	7%	0	0
Professional	19	24%	7	12%
Skilled labor	3	4%	1	2%
Student	19	24%	10	18%
Unskilled labor	6	8%	10	18%
Vendor	0	0	1	2%
Total	79	100%	55	100%



*Figure 1: Occupation status of patients with contact dermatitis*

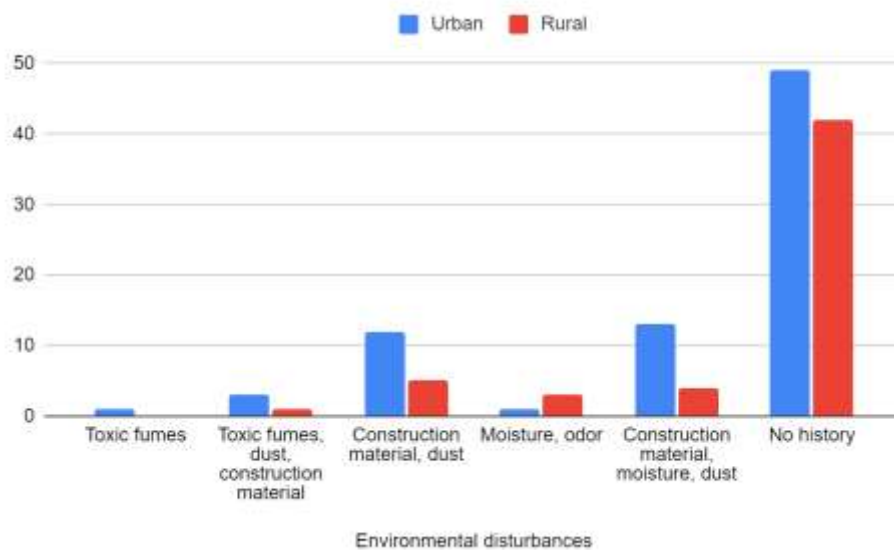
Table 3 and figure 2 indicates that 13 patients from the rural group and 30 patients from the urban group were impacted by the residential environmental disturbance trigger. The main culprits were dampness, dust, and construction

materials working together.  $P = 0.0007$  indicates that there was a statistically significant distinction between the urban and rural living groups

**Table 3: Prevalence of Patients with Contact Dermatitis (n = 134) based on Residential Environmental Pollution**

Environmental disturbances	Urban		Rural	
	n	%	n	%
Toxic fumes	1	1	0	0
Toxic fumes, dust, construction material	3	4	1	2
Construction material, dust	12	15	5	9
Moisture, odor	1	1	3	5
Construction material, moisture, dust	13	17	4	7
No history	49	62	42	77

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*Figure 2: Patients with Contact Dermatitis based on Residential Environmental Pollution*

The highest number of patients had no bearing on allergic history [Table 4], where 53% of patients in cities and 74% of patients in rural areas reported having no allergy history ( $P < 0.0001$ ).

**Table 4: Contact dermatitis patient pattern (n = 134) based on allergic history (urban-rural comparison)**

History	Urban	Urban %	Rural	Rural %
No allergic history	42	53	41	74
Allergic Rhinitis, Allergic Conjunctivitis, Allergic Asthma	6	8	1	3
Medications, Food Allergy, Hay fever, Jewelry, Topical, Metal, Cosmetics	19	24	8	14
Metal, Adhesives, Eczema, Cold Allergy, Jewelry, Allergic Asthma, Allergic Rhinitis	12	15	5	9
Total	79	100	55	100

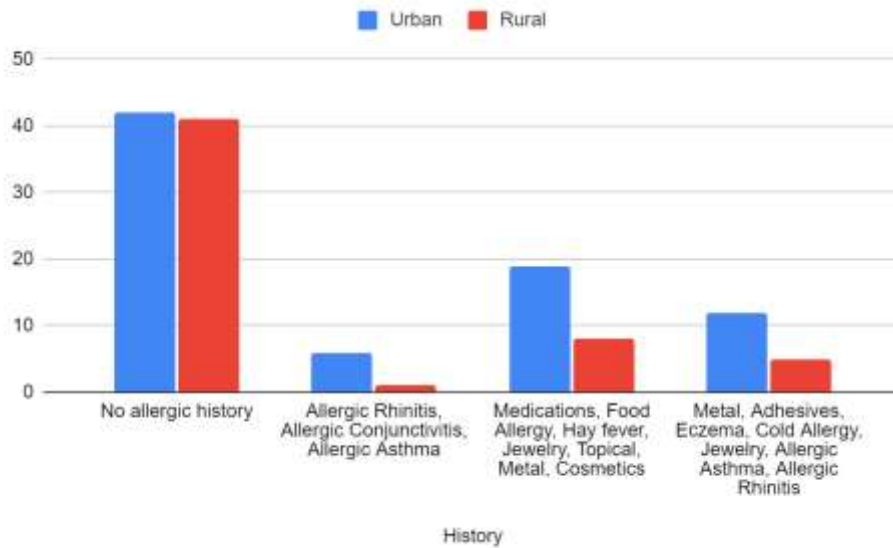


Figure 3: Allergic history of contact dermatitis patient

Table 5 demonstrates that for 39% of urban patients and 75% of rural patients respectively, the history of cosmetic exposure did not significantly affect the outcome ( $P < 0.0001$ ).

**Table 5: Comparing the Urban-Rural Patients with Contact Dermatitis Distributed by Cosmetic History (n = 134)**

Cosmetics	Urban	Urban%	Rural	Rural%
No history	31	39	41	75
Lipstick, nail polish, makeup, body spray, perfume	48	61	14	25
Total	79	100	55	100

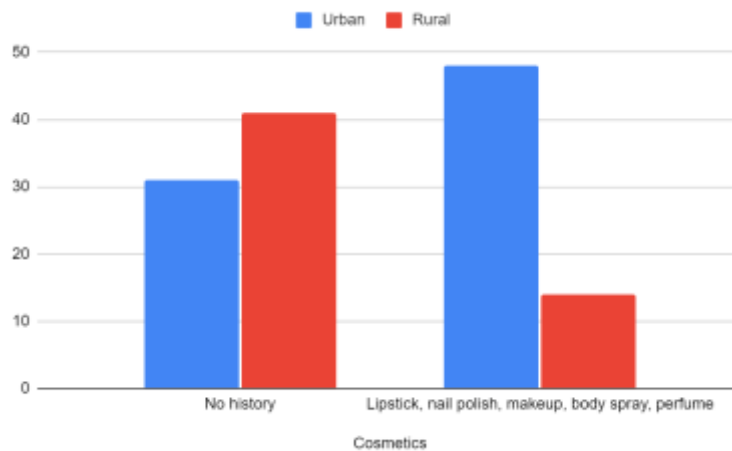


Figure 4: History of cosmetic exposure

## Discussion

In the current study, the prevalence of contact dermatitis was 4.38%, far lower than estimates from the west of 15%-20%. The underlying cause of our setup may have been reduced exposure to more modern synthetic chemicals and reduced industrialization, which could account for the decreased occurrence of dermatitis caused by contact in the study. The prevalence was statistically significantly higher in urban areas than in rural ones. This data additionally validates the frequent incidence of contact dermatitis in affluent backgrounds.

An Indian study found that 45% of people had allergic skin conditions [12], which could be caused by a combination of factors such as easy access to allergens, poor cleanliness, and overcrowding. According to Rao & Kumar's findings [13], the environment, overcrowding, substandard living conditions, and poor cleanliness are the main causes of skin illnesses. Resolving these issues can greatly lower the incidence of dermatoses. Rao et al.'s findings [13] that the fifth decade was the most commonly involved age group are likewise similar to the current study. Analogous age group engagement was also seen in a prior study conducted in Punjab, India [14]. Females are more affected in urban areas than in rural ones, which may be because urban groups are more exposed in the home and workplace than rural ones. The study findings are further supported by the fact that housewives were the most often involved occupation in the aforementioned survey [14]. Their data, however, revealed a far larger engagement of 47.5%, which is significantly lower than the study's 26%. This discrepancy might result from the prior study's exclusive focus on footwear dermatitis. Since the study conducted in Punjab [14] was more narrowly focused on metal allergy than ours, it also showed the most prevalent engagement of housewives, with a larger percentage of women (43.65%).

However, the urban group's cosmetic history was noticeably greater than the rural group's, which may be attributed to the urban area's easy availability to cosmetics and the patients' higher economic backgrounds.

## Generalizability

The results of this study may offer insights that apply to other settings, although their direct applicability hinges on contextual factors. The notably lower prevalence of contact dermatitis in this study compared to Western estimates suggests regional and environmental variations. The higher prevalence in urban areas may reflect the impact of urbanization and increased allergen exposure, making these findings potentially more relevant to urban or semi-urban environments with similar conditions. Age group patterns and the predominance of housewives in dermatitis cases could hold broader relevance in settings with similar demographics and lifestyles. However, the discrepancy in

cosmetic history between urban and rural groups underscores the influence of economic factors, making these findings particularly pertinent to regions with varying economic backgrounds. Overall, while these results provide valuable insights, their generalizability to other settings depends on shared environmental, economic, and lifestyle characteristics, warranting further research in diverse contexts.

## Conclusion

The development of contact dermatitis in individuals was unaffected by an earlier history of allergies. In terms of contact dermatitis between patients, statistically significant difference was observed in rural and urban areas in terms of prevalence and patient profiles for specific components. Furthermore, supporting the frequent incidence of dermatitis caused by contact in wealthy backgrounds is this evidence.

## Limitations

The primary constraint of the current investigation was the selection of participants solely from hospital patients, rather than from the general population. Selection bias was therefore possible. Furthermore, the patients' diagnoses were made only based on their clinical presentation; no additional techniques, such as histology or patch tests, were employed. There was a chance of recall bias because most respondents provided their answers by recalling. Only real data on dermatitis caused by contact in urban and rural settings could be found through field research, as opposed to hospital-based studies, which might be attempted in the future.

## Recommendations

We need more study population at different intervals following to validate our findings and ascertain if these modifications are transient or permanent. It is necessary to investigate the effects of additional potential causes.

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## Conflict Of Interests

No conflicts of interest are disclosed by the authors.

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