Abstract

Background: There is a trend of increase in number of contact dermatitis cases. Studies on the prevalence and epidemiological pattern of allergic skin disorders in Indian scenario are not much available. The present study was designed to assess the epidemiological pattern of contact dermatitis in rural and urban areas in a peripheral district in eastern India. Aims and Objectives: This study was undertaken to find the prevalence of contact dermatitis and to assess the epidemiological pattern of contact dermatitis both in rural and urban community. Materials and Methods: The study was conducted in a medical college located at a semi-urban area in eastern India with written informed consent obtained from each participant. This hospital-based cross-sectional study was done from May 2017 to April 2018. Study population consisted of patients attending the dermatology OPD and having lesions clinically suggestive of contact dermatitis and there were 268 such patients. Patients attending the OPD were divided into urban and rural as per their address. Data analysis was done using suitable, standard, and appropriate statistical methods. Results: The prevalence of contact dermatitis was 4.38% among the dermatology OPD attendees. Urban prevalence was statistically significantly ($P < 0.05$) higher than rural prevalence. Contact dermatitis was common in the age group of 41–50 years. In urban areas, females were more affected than those in rural areas. Occupationally, the difference between urban and rural patients of contact dermatitis was statistically significant ($P < 0.05$). Cosmetic history in the urban group was significantly more ($P < 0.05$). Conclusions: Contact dermatitis prevalence and patient profile in certain factors showed a statistically significant difference between urban and rural patients.

Key Words: Allergic skin disorder, contact dermatitis, epidemiology, prevalence, urban and rural

Introduction

Non-communicable diseases have been highlighted in recent reports describing the global burden in terms of mortality and disability-adjusted life years\(^1\) and also their economic impact.\(^2\) Allergic diseases are manifested as hyper-responsiveness in the target organ, whether skin, nose, lung, or gastrointestinal tract.\(^3\) Allergic skin disorders are defined as ailments present in the skin and mucous membrane resulting from inflammatory disorders based on abnormal humoral reactivity, T cell reactivity, or other related pathology. There are various types of allergic skin diseases like atopic dermatitis, contact dermatitis, urticaria, polymorphic light eruption, drug allergy, nummular dermatitis, seborrheic dermatitis, autosensitization dermatitis, etc.\(^4\) A steady increase in the prevalence of allergic diseases globally has occurred with about 30%–40% of the world population now being affected by one or more allergic conditions.\(^5\)

Dermatitis occupied the first most common subgroup within the hypersensitivity diseases with a rate of 24.50% of the total. Among the dermatitis group, contact dermatitis (17.54% of the total) is the most commonly detected skin disease and may represent an indicator of the relative development and urbanization of the community.\(^6\)

Contact dermatitis is defined as the superficial inflammatory reaction of the skin induced by exogenous
chemicals interacting on the skin. These reactions can be allergic or irritant. The most common reaction is an eczematous type but other types, such as erythema multiforme like, exanthematous, lichenoid, granulomatous, pigmented, and photosensitivity reactions may also be encountered.\[7\]

In industrialized countries, contact dermatitis is one of the common occupational diseases and has a great socioeconomic impact. An estimated 15%–20% of the general population suffers from contact allergy.\[8\] An Indian study showed that the proportion of footwear dermatitis was 24.22% among a total of 640 patients.\[9\]

We are unaware of the specific model of prevalence of skin diseases and the association between the need, supply, and demand for dermatological care. Moreover, we are not aware of the extent of skin disease as a public health problem. For this reason, performing epidemiological studies is very crucial.\[10\] It is important to determine the prevalence of skin disorders so that necessary educational programs and preventive measures may be formulated.\[11\]

However, there are very minimal data available on the prevalence of skin diseases in the population in India, especially in eastern India.

The present study was undertaken to find out the prevalence of contact dermatitis and to assess the epidemiological pattern of contact dermatitis both in rural and urban communities.

**Materials and Methods**

After having ethical clearance from the Institutional Ethics Committee, the study was undertaken in a medical college located in a semi-urban area in eastern India. Written informed consent was obtained from each patient.

This hospital-based cross-sectional study was done in departments of dermatology and community medicine from May 2017 to April 2018. All the patients coming to dermatology outpatient department (OPD) having lesions clinically suggestive of contact dermatitis were included in the study.

The total number of patients having contact dermatitis during the above-mentioned period was 268 out of 6118 patient making the prevalence of 4.38%. Patients attending the OPD have been divided into urban and rural depending on their address of residence.

Inclusion criteria were: i) Patients suffering from contact dermatitis (allergic or irritant); ii) those who were willing to participate. The exclusion criteria included: i) Allergic skin diseases other than cases of contact dermatitis; ii) non-cooperative individuals; iii) seriously ill persons; and iv) insane. Cases of contact dermatitis were diagnosed by detailed history, relevant clinical examination and through their correlation as well as by excluding other forms of eczema by the absence of their characteristic history and clinical features. Clinical differentiation between the irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD) was made on the following points: i) Marked pruritus (usually) in ACD; ii) pronounced pain and burning (usually) in ICD; iii) presence of vesicles (commonly) in ACD; and iv) presence of pustules (commonly) in ICD.\[7\]

Data of 268 respondents collected from the study were processed, compiled, and analyzed. Analysis was done using suitable, standard, and appropriate statistical methods in the form of percentage and proportion. Fisher’s exact test, Chi-square test, \( t\)-test were availed for data analysis using Statistical Package for the Social Sciences (SPSS) version 21. Two digits after the decimal point were taken for analysis. \( P \) value of less than 0.05 was considered statistically significant.

**Results**

The total number of patients identified was 268 of which 156 (59%) were from urban and 111 (41%) were from rural areas. Male comprised of 47% of total patients and 49% of urban and 51% of rural patients. Among females, more patients were from the urban area than from the rural area (67% vs. 33%) (\( P = 0.0042 \)).

The age distribution of the patients is given in Figure 1. Figure 1 shows that people in the age group of 41–50 years (19%) was maximum followed by the patients in the age group of 21–30 years (16%). A similar prevalence (14%) was observed in the age group of 11–20 and 31–40 years with a minimum (1%) in the age group of 81–90 years. The mean age of the total population was 37.26 ± 18.23 years (range 3–81 years). Among the urban population,
the mean age was 37.15 ± 19.07 years (range 3–81 years). In the rural population, the mean age was 37.42 ± 17.06 (range 5 to 70 years). The difference in the age distribution between the two groups was significant ($P = 0.0006$).

Occupation-wise distribution of patients is depicted in Table 1. Though the most common victim was homemaker in both the groups, the difference between urban and rural groups in the distribution of occupation was statistically significant ($P < 0.0001$).

Regarding trigger by residential environmental disturbance, Table 2 shows that 100 patients from the urban group and 86 patients from the rural group were affected by this factor. Dust, moisture, and construction materials in a combined way were the main culprit. The difference between urban and rural groups was also statistically significant ($P = 0.0007$). As per allergic history [Table 3], the maximum number of patients had no relevance; 53% of urban and 74% of rural patients did not report any history of allergy ($P < 0.0001$). Table 4 shows that the history of cosmetic exposure had no significant impact on 39% of urban and 75% of rural patients ($P < 0.0001$).

### Discussion

Prevalence of contact dermatitis was 4.38% in the present study, which was much less than western estimates of 15%–20%. Less industrialization and less exposure to newer synthetic chemicals in our set up may be the underlying reason for less prevalence of contact dermatitis in our study. Urban prevalence was higher than rural prevalence and the difference was statistically significant. This information also further confirms the common occurrence of contact dermatitis in an economically advanced background.

The prevalence of allergic skin diseases was found to be 45% in an Indian study,[12] which may be due to overcrowding, poor hygiene, and easy exposure to allergens. Rao et al.[13] concluded that environment, overcrowding, poor living conditions, and poor hygiene were found to be the major factors of skin diseases and correction of these conditions shall significantly reduce the occurrence of dermatoses.

In the study by Chowdhuri and Ghosh,[9] females [61.94% ($n = 96$)] were commonly affected than males [38.06% ($n = 59$)], which is conforming largely to our study (67% vs. 33%). One study on contact dermatitis from Ludhiana, Punjab also showed female preponderance.[14] Contact dermatitis in our study was common in the age group of 41–50 years and least in the age group of 81–90 yrs. This is also similar to the above study[9] showing that predominantly involved age group was the fifth decade. A previous study[14] from Punjab also showed similar age group involvement. The reason for which may be explained by the facts of immunosenescence and less exposure to chemicals due to less activity of life process in the latter age group. In urban area, females are more affected than the rural area, which may be related to increased occupational and household exposure in the urban group than the rural.

In the said study[9], occupation-wise housewives were most commonly involved, which is also supporting our findings. However, their data showed much higher involvement of 47.5%, which is comparatively low in our study (26%). This difference may originate from

### Table 1: Distribution of Contact Dermatitis Patients ($n=268$) according to the Occupational Status (Urban—Rural Comparison)

| Occupation          | Urban   | Rural   |
|---------------------|---------|---------|
|                     | No.     | Percentage | No.     | Percentage |
| Professional        | 38      | 24%      | 14      | 12%        |
| Pensioner/Retired   | 11      | 7%       | -       | -          |
| Homemaker           | 41      | 26%      | 29      | 26%        |
| Student             | 38      | 24%      | 20      | 18%        |
| Businessman         | 7       | 5%       | -       | -          |
| Skilled Laborer     | 6       | 4%       | 2       | 2%         |
| Farmer              | 2       | 1%       | 5       | 5%         |
| Paint shop          | 1       | 1%       | 19      | 17%        |
| Unskilled Laborer   | 13      | 8%       | 20      | 18%        |
| Vendor              | -       | -        | 2       | 2%         |
| Total               | 157     | 100%     | 111     | 100%       |

$P<0.0001$

### Table 2: Distribution of Contact Dermatitis Patients ($n=268$) according to the Residential Environmental pollution

| Environmental Disturbances | Urban $n$ | Urban Percentage | Rural $n$ | Rural Percentage |
|----------------------------|-----------|------------------|-----------|------------------|
| No history                 | 100       | 62%              | 86        | 77%              |
| Dust + Moisture + Construction Material | 26 | 17% | 7 | 6% |
| Odor + Moisture            | 2         | 1%                | 6         | 5%               |
| Dust + Construction Material | 23 | 15% | 10 | 9% |
| Toxic Fumes                | 1         | 1%                | 1         | 0.9%             |
| Toxic Fumes + Dust + Construction Material | 6 | 4% | 2 | 2.1% |
| Total                      | 157       | 100%             | 111       | 100%             |

$P=0.0007$
the fact that the previous study was limited to only footwear dermatitis. The study from Punjab[14] also depicted the most common involvement of homemakers with a higher number of female involvement (43.65%) compared to ours as that was a focused study on metal allergy.

Occupation-wise homemakers were the commonest sufferer for the obvious reasons of exposure to various domestic materials. The use of soaps and cleansers and wet work are the main reasons behind increased incidence among homemakers. Vegetables (garlic and onion) were the commonest suspected contactants (50%) followed by soap and detergents (40%) and condiments (10%) as shown in the study[15] of contact dermatitis on housewives from northern India. Thus, the pattern of work executed by the homemakers may differ from place to place and this depends on the socioeconomic status of the females. Occupationally, the difference between urban and rural patients of contact dermatitis was statistically significant, which may be explained by the different occupational patterns in two setups.

A previous history of allergy in contact dermatitis patients did not influence the course of the disease. However, cosmetic history in the urban group was significantly more than that in the rural group, which may be due to easy accessibility of cosmetics in the urban area and better economic background of these groups of patients.

**Conclusions**

Regarding contact dermatitis, prevalence and patients’ profile in certain factors showed a statistically significant difference between urban and rural patients.

The main limitation of the present study was that the patients were selected from those attending the hospital and not from the community. As such, there was a chance of selection bias. In addition, the patients were diagnosed with clinical presentation only and no confirmatory methods, such as patch tests or histopathology were used. However, patch test has no role in diagnosing irritant contact dermatitis, which is usually diagnosed clinically. In most cases, respondents answered by recalling, so there was a possibility of recall bias. Field study rather than the hospital-based study can only detect actual data on contact dermatitis in the urban and rural set up, which may be attempted in the future.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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