Burden of dermatological manifestations across various age groups of a Hilly State in North India

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Abstract

Background: The dermatological condition accounts for an important public health problem of the global load of disease in low and middle-income countries and places significant pressure on primary healthcare centers. There is heterogeneity in the frequency of diverse skin conditions between different areas (1). Most of the knowledge presently available about various aspects of skin diseases is based on observations made and data collected from secondary and tertiary level hospitals (2). Information on community-based prevalence and pattern of skin diseases would be a better measure of burden due to skin diseases in general population in order to assist in the planning of possible intervention strategies (3). Aims & Objectives: To find out the prevalence, distribution, and determinants of various dermatological manifestations at the community level in Doiwala block of district Dehradun. Material & Methods: This cross-sectional study was conducted over a period of 12 months, the study subjects comprised of individuals of all age groups. A sample size of 834 (416 males & 418 females) was calculated by using current prevalence of skin disease in the study area. With 95% confidence level and margin of error of 4.5%, the sample size was adjusted and increased by 4% to account for the non-response rate. The data collected was subjected to statistical analysis using SPSS Version 20. The prevalence of various types of dermatoses and factors related to the prevalence are presented. Results: Nearly half of the studied population (45.8%) had some type of dermatological manifestations. It was slightly higher in females (47.1%) than males (44.5%). Out of 382 symptomatic respondents, 247 (64.7) had infective dermatoses followed by 124 (32.5%) non-infective, 6 (1.5%) others and 5 (1.3%) nutritional deficiency dermatoses. The gender-wise distribution of various types of dermatoses was found to be statistically significant ($\chi^2$-15.225, df-3, p-0.002). Conclusions: The prevalence of dermatological conditions in district Dehradun is fairly high with increased prevalence in the younger age group that might be an indicator to the fact that the burden of skin diseases may go to rise in the future.

Keywords

Dermatological; Community; Skin diseases
Introduction
Skin is the largest organ of the human body, covering an area of approximately 2m² and accounting for 16% of adult body weight (4). Due to its exposure to the outside world and involvement in almost all of the systemic diseases, skin diseases is one of the most common health issue (5). The pattern of dermatoses in a specific area is determined by many factors such as geographical location including environmental and climatic factors, socio-economic situations of the peoples, literacy levels, psychological, cultural and racial factors (6). Up to 80% of the population suffering from skin problems may not seek medical help. Thus, it shows ‘iceberg phenomenon’ large burden remains hidden due to low concern or priority (7).
Information on community-based prevalence and pattern of skin diseases would be a better measure of burden due to skin diseases in general population in order to assist in the planning of possible intervention strategies (8).
In Uttarakhand, a study was done in the hilly area of Garhwal showing 45.3% prevalence of dermatological skin disorders which is consistent with other South Asian prevalence studies (1). In Uttarakhand, skin diseases are a common problem in the community but limited studies have been done to find out the prevalence of skin diseases in community settings.

Aims & Objectives
1. To find the prevalence of dermatological manifestations among all age groups at the community level in district Dehradun.
2. To study the distribution of dermatological manifestations in a community setting.

Material & Methods
The study was conducted to find out the prevalence, distribution, and determinants of various dermatological manifestations at the community level in Doiwala block of district Dehradun over a period of 12 months, i.e., 1st July 2016 to 30th June 2017. The study subjects comprised of individuals of all age groups. A written informed consent was obtained from every subject participating in the study (in case of children <14 years of age, the ascent was obtained from their parent). Type of Study: Community based-descriptive cross-sectional study. Sample size and sampling methods- The study universe comprised of a population of six Community Developmental Blocks of District Dehradun. One out of six Community Developmental Blocks i.e. Doiwala block was randomly selected. Doiwala block has five Nyaya Panchayatas, Markham Grant Nyaya Panchayata was again randomly selected. All the villages in Markham Grant Nyaya Panchayata were included in the study.
A sample size of 834 (416 males & 418 females) was calculated by using current prevalence of skin diseases (43.7% in males & 44.7% in females) in Uttarakhand (1), with a margin of error at 5% (standard value of 0.05). As per census 2011 data, by using percentage of different age groups as per Probability Proportional to Size (PPS) method, sample size was again divided into different age groups i.e. 84 (42 males & 42 females) for under 5, 79 (39 males & 40 females) for 5 to 9 years, 90 (45 males & 45 females) for 10 to 14 years, 511(255 males & 256 females) for 15 to 59 years and 68(34 males & 34 females) for 60 years or above.
The multistage random sampling method was employed and a sample size of 834 study subjects with 7154 Households was covered during the survey and every 8th household was visited as a part of Systematic random sampling. One individual from each selected household was visited.
Selection of Subject:

Inclusion Criteria
- Persons of either sex of any age with or without skin lesion(s).
- Residents of the study area for last one year.

Exclusion Criteria
- Persons not giving consent.
- Individuals with mental illness, physical or developmental disabilities.

Structured study instruments were used to generate data and certain investigations (10% KOH, microscopy for fungus and scabies etc.) were carried out wherever necessary for confirmation of diagnosis.
Before the beginning of the study, orientation training of the investigator was carried out in the Department of Dermatology, Himalayan Institute of Medical Sciences, Jolly Grant, Dehradun, to enable him to diagnose basic dermatological lesions in the community setting.
Investigations related to fungal dermatitis i.e. 10% KOH etc. were carried out either at field laboratory under RHTC, Kurkawala or at a laboratory under Skin Department of Himalayan Institute of Medical Sciences, Dehradun. In a situation where the
diagnosis was doubtful, the opinion of the dermatologist of the institute was taken. In such situations expenses (if any) were borne by the investigator and patients were not charged for the same.

Ethical clearance was obtained from the Institutional Ethics committee prior to the start of the study. Interpretation and analysis of obtained results were carried out using statistical software (e.g. SPSS version 20) by application of descriptive methods of epidemiology in terms of rates, ratios, proportions etc. and using non-parametric (Chi-square) test for significance of the association between socio-demographic variables amongst study group and dermatological manifestations among them.

**Results**

Out of 834 study subjects, 416(49.9%) were males and 418(50.1%) were females. The respondents were distributed in age groups of <5, 5-9, 10-14, 15-59 and 60 years or above. Majority of the respondents in the study were in the age group 15-59 years (61.2%), followed by 10.8% of respondents in 10-14 years age group, 10.1% in below 5 years age group, 9.5% in 5-9 years age group and 8.4% in 60 or above years age group. The pattern was almost same for both males and females (Table-1).

The mean age of the respondents in years was 29.82 ± 18.56 years (1 year to 80 years), in males, it was 30.63 ± 18.74years and 29.01 ± 18.35years for females.

Nearly half of the studied population (45.8%) had some type of dermatological manifestations. It was slightly higher in females (47.1%) than males (44.5%) (Table-2).

Out of 382 symptomatic respondents, 247(64.7) had infective dermatoses followed by 124(32.5%) non-infective, 6(1.5%) others and 5(1.3%) nutritional deficiency dermatoses. Among 185 symptomatic males, 135(73.0%) had infective dermatological disorders followed by 43(23.2%) non-infective, 4(2.2%) nutritional deficiency dermatological disorders and 3(1.6%) other dermatological disorders. Among 197 symptomatic females, 112(56.9%) had infective dermatological disorders followed by 81(41.1%) non-infective, 3(1.5%) other dermatological disorders and 1(0.5%) nutritional deficiency dermatological disorders. This gender-wise distribution of various types of dermatoses was found to be statistically significant ($\chi^2$=15.225, df-3, p-0.002) (Table-3).

Out of 28 symptomatic respondents in under five years age group, three fourth 21 (75.0%) had infective dermatoses and rest one fourth had non-infective dermatoses. Out of 37 symptomatic respondents in 5-9 years age group, majority 24(64.9%) had infective dermatoses followed by 10(27.0%) non-infective dermatoses, 2(5.4%) nutritional deficiency dermatoses and 1(2.7%) other dermatoses. Out of 47 symptomatic respondents in 10-14 years age group, more than half 26(55.3%) had infective dermatoses followed by 19(40.4%) non-infective dermatoses and 2(4.3%) nutritional deficiency dermatoses. Out of 234 symptomatic respondents in 15-59 years age group, more than two-third 164(70.1%) had infective dermatoses followed by nearly one fourth 65(27.8%) non-infective dermatoses, 4(1.7%) other dermatoses and 1(0.4%) nutritional deficiency dermatoses. Out of 36 symptomatic subjects in geriatrics age group, more than two-third 23(69.9%) had non-infective dermatoses followed by one third 12(33.3%) infective dermatoses and 1(2.8%) other dermatoses.

Age-wise distribution of various types of dermatoses was found to be statistically highly significant ($\chi^2$=33.827, df-12, p-0.001) (Table-4).

**Discussion**

Dermatological manifestations in the community as a research problem has been largely undermined in developing nations like India. Not enough research has been done on skin diseases at the community level, as opposed to communicable diseases which constitute a major cause of morbidity and mortality in such countries. Hence, the present study aims to address this research gap by focusing on the prevalence and distribution as well as determinants of skin diseases at the community level in district Dehradun.

As there is a paucity of community-based studies on skin diseases, therefore the hospital-based studies have been taken up for comparison of findings and as an indirect indicator of the community-based skin disease pattern.

Socio-demographic details of all the members of the household were recorded. All the study participants were interviewed irrespective of dermatological manifestations. In our study the individuals of all age groups, i.e.<5years, 5-9years, 10-14years, 15-59 years, and 60 years or above whether having any type of visible skin lesion(s) or not were interviewed till the desired
sample size was achieved. These age group categories are similar to other studies viz. Grills et al., in rural mountainous north India (1), Bilal K et al., in rural Erbil, Iraq (9) and Karn D et al., in Nepal (5). The mean age of respondents in our study was 29.82 ± 18.56 years (1 to 80 years) which is similar to studies conducted by Hassan I et al., in Kashmir (6), Juno JJ et al., in Mangalore (7) and Shrestha DP et al. in Nepal (10).

In the present study, the prevalence of dermatological manifestations was found to be 45.8%. The findings are comparable to a study conducted by Grills et al., in Garhwal region of Uttarakhand who found the community-based prevalence of dermatological conditions to be 45.3% (1). The prevalence of skin diseases was found to be 47.6% in a Sri Lankan suburban population (11), 62% in a study of Nepali villages in the plain areas (12). However, a study conducted by Bilal K et al. (9) in a village called "Henara" in Erbil Governorate, Kurdistan region, Iraq shows that the overall prevalence of skin diseases was 36.3% that is lower than our community-based prevalence of skin diseases.

In the present study, a total of 382 respondents have self-reported one or any other form of skin disease. Out of these 44.5% were males and 47.1% were females. This shows the preponderance of females as compared to males in skin diseases. Similar findings of female preponderance have been reported in the hospital-based studies conducted by various researchers viz. Juno JJ et al. (52%), in rural India (7), Memon KN et al. (58.4%) in Pakistan (13), Kuruvilla M et al. (56.36%) in Dakshina Kannada (14), Yusuf AK et al. (53.6%), in Bangladesh (15) also supported the dominance of females in the skin diseases.

Moreover, Atraide DD et al. (16), hospital-based study in Nigeria have also revealed female dominance i.e. 60.9% of females reported skin diseases while only 39.1% males reported the same. Raddadi AA et al. (17), at King Khalid National Guard hospital in Saudi Arabia, Symvoulakis EK et al. (18), at Mediterranean Island, El-Khateeb EA et al. (19), in Egypt, these researchers around the globe have also reported female dominance in their findings.

However, few other published studies conducted in this regard. viz. Rao GS et al. (20), in their village-based study have reported the preponderance of males in skin diseases as 63.41% compared to 36.59% females. Khan WA et al. (21), in Bombay, Al Shobaili HA in Saudi Arabia (22) and Kathem K et al. (23), in Iraq have also revealed male dominance in their study.

In the present study, the highest proportion of skin diseases (28.0%) were reported in the subjects of 15-59 years of age. Symyoulakis EK et al. (18), reported it is highest (38%) in 21-40 years of age. It was followed by the children from birth to 14 years with 13.3% and geriatrics 60 years or above with a percentage of 4.3%. In a study by Memon KN et al., (13) on the pattern of skin diseases in patients visiting a tertiary care health facility at Pakistan reported that 82.5% of the patients visiting the health service facility are children below 10 years of age.

Moreover, Karthikeyan K et al. (24), the study also revealed that 30% of all the outpatient visit to dermatologist involve children (<14 years of age). Atraide DD et al. (16), in their study on the pattern of skin disorders in a Nigerian tertiary hospital, revealed that more than three-quarter of total cases were occurred above 16 years of age, while one quarter only belongs to below 16 years of age.

Since above studies are hospital-based and usually parents are more concerned about children regarding their morbidities in this age group, so such cases are more reported in hospitals while at community level minor dermatological manifestations in adults remain unreported. In the present study, we found that infective type of skin diseases was 64.7% and non-infective type was 32.5%.

It is refuted by Rao GS et al. (20), reported in a study on the pattern of skin diseases in an Indian village where major cause of skin diseases was non-infectious dermatoses which were 57.07% compared to 43.40% of skin diseases of infectious origin.

In contrast to our community-based study, Asokan N et al. (25), in their study on pattern of skin diseases among patients attending a tertiary care teaching hospital in Kerala, reported the proportion of infective skin diseases (35.19%) as compared to non-infective skin diseases (64.81%). Similarly, Bijayanti et al. (26), in Imphal, Jaiswal AK et al. (27) in Kashmir, Nair PS et al. (28), in Trivandrum, had also reported higher noninfective etiology of skin diseases in their hospital-based research studies. Moreover, Atraide DD et al. (18), have also reported in their retrospective four-year data analysis of hospital patients attending dermatological clinic found the infective type of skin disorders (23.8%). Lastly, a
study by Kuruvilla M et al. (14) conducted in Dakshina Kannada, also supports the dominance of non-infective type compared to the infective type of skin disorders.

**Conclusion**

It can be concluded from our study that the prevalence of dermatological conditions in district Dehradun is fairly high. Its increasing prevalence in the younger age group is a pointer to the fact that the burden of skin diseases is going to rise in the near future. Therefore, it is pertinent to recommend effective and sound measures for prevention of dermatological conditions in the given community.

**Authors Contribution**

All authors have contributed equally in this study.

**References**

### Tables

#### TABLE 1 AGE AND GENDER-WISE DISTRIBUTION OF RESPONDENTS IN THE STUDY AREA

<table>
<thead>
<tr>
<th>Age group in years</th>
<th>Male (N=416)</th>
<th>Female (N=418)</th>
<th>Total (N=834)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>&lt;5</td>
<td>42</td>
<td>10.1</td>
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<tr>
<td>5-9</td>
<td>39</td>
<td>9.4</td>
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<td>10-14</td>
<td>45</td>
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<tr>
<td>15-59</td>
<td>255</td>
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<td>256</td>
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<td>60 or above</td>
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<tr>
<td>Total</td>
<td>416</td>
<td>100</td>
<td>418</td>
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#### TABLE 2 GENDER-WISE DISTRIBUTION OF DERMATOSES AMONG RESPONDENTS IN THE STUDY POPULATION

<table>
<thead>
<tr>
<th>Variable</th>
<th>Male (N=416)</th>
<th>Female (N=418)</th>
<th>Total (N=834)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Dermatoses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>185</td>
<td>44.5</td>
<td>197</td>
</tr>
<tr>
<td>Absent</td>
<td>231</td>
<td>55.5</td>
<td>221</td>
</tr>
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#### TABLE 3 GENDER-WISE DISTRIBUTION OF VARIOUS TYPES OF DERMATOSES IN SYMPTOMATIC RESPONDENTS IN THE STUDY POPULATION

<table>
<thead>
<tr>
<th>Type of Dermatoses</th>
<th>Males (N=185)</th>
<th>Females (N=197)</th>
<th>Total (N=382)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Infective</td>
<td>135</td>
<td>73.0</td>
<td>112</td>
</tr>
<tr>
<td>Non-infective</td>
<td>43</td>
<td>23.2</td>
<td>81</td>
</tr>
<tr>
<td>Nutritional deficiency</td>
<td>4</td>
<td>2.2</td>
<td>1</td>
</tr>
<tr>
<td>Others (insect bites, keloids)</td>
<td>3</td>
<td>1.6</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>100</td>
<td>197</td>
</tr>
</tbody>
</table>

χ²=15.225, df-3, p-0.002

#### TABLE 4 AGE-WISE DISTRIBUTION OF VARIOUS TYPES OF DERMATOSES IN SYMPTOMATIC RESPONDENTS IN THE STUDY POPULATION

<table>
<thead>
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<th>Type of dermatoses</th>
<th>Age group in years</th>
</tr>
</thead>
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<tr>
<td></td>
<td>&lt;5 (N=28)</td>
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<td></td>
<td>n</td>
</tr>
<tr>
<td>Infective</td>
<td>21</td>
</tr>
<tr>
<td>Non-infective</td>
<td>7</td>
</tr>
<tr>
<td>Nutritional deficiency</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
</tr>
</tbody>
</table>

χ²=33.827, df-12, p-0.001