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Epidemiological Profile of Skin Diseases in Haldwani, District Nainital: A Community Based Cross-Sectional Study

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ABSTRACT

Background: Skin diseases have a major contribution to morbidity, frequently influenced by environmental, socio-demographic, and behavioural factors. Understanding their pattern is essential for early diagnosis and prevention. **Objectives:** To estimate the prevalence and types of skin diseases and analyze their association with socio-demographic and environmental factors in the study population. **Methods:** A community-based cross-sectional study was conducted among 570 participants selected by systematic random sampling. Data on demographic, environmental, and clinical parameters were collected using a pretested questionnaire and physical examination. Statistical analysis included descriptive measures, chi-square tests, and crude odds ratios (OR) with 95% confidence intervals. Data analysis was done through R studio software. **Results:** Skin disease prevalence was 34.9% categorize into non-infectious conditions (69.8%) more common than infectious (30.2%). Eczema (6.1%) and pigmentary disorders (5.6%) were the most frequent non-infectious conditions, while fungal infections (4.5%) led among infectious types. Skin diseases were significantly associated with age ($p<0.001$), sex ($p=0.011$), and occupation ($p=0.006$). Participants aged >60 years had the highest odds (OR: 7.69), and females had 1.58 times higher odds than males. Primary education (OR: 2.50) and poor hygiene (OR: 1.96) also showed higher risk. **Conclusion:** Skin diseases remain a common health issue, particularly among the elderly, females, and those with limited education or hygiene. Targeted education, environmental improvements, and accessible dermatological care are essential for prevention and control.

Keywords: Skin diseases, Epidemiology, Non-infectious dermatoses, Socio-demographic factors, Public health.

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Introduction

The skin, the body's largest organ, serves as a physical barrier and plays essential roles in thermoregulation, immunologic defense, and socio-psychological interaction. It acts as a protective shield and determines a person's physical appearance, which is significant in modern society[1,2]. The prevalence of skin diseases varies widely, ranging from 4.2% to 11.6% in general populations based on hospital-based data[3]. Community-based studies often report even higher figures, with some indicating prevalence as high as 60% [4]. In pediatric populations, dermatological conditions account for a substantial disease burden, with reported prevalence ranging between 30% and 40% [3]. The incidence of skin diseases is influenced by multiple factors, including genetic predisposition, climatic conditions, occupational exposure, hygiene practices, socioeconomic status, and cultural customs[5]. Transmissible skin conditions, such as fungal, bacterial, or parasitic infections, are more prevalent in communities with inadequate sanitation and limited access to healthcare, particularly in rural/lower-income populations [6].

Given that many dermatological disorders are either preventable or controllable, understanding their distribution and determinants at the community level is crucial. Moreover, the social and economic burden of these conditions, including loss of productivity and quality of life, often remains unrecognized. Most existing literature is based on data from tertiary care centers, which may underestimate the true burden due to access disparities, underreporting, and stigma.

To address these gaps, the present community-based epidemiological study was undertaken in the urban field practice area of Government Medical College, Haldwani. This study aims to evaluate the prevalence of skin diseases and examine associated socio-demographic and environmental factors. No such study has previously been conducted in this region, and findings may provide valuable insights into prevention and early intervention strategies for dermatological conditions.

Objectives: To estimate the prevalence and types of skin diseases and analyze their association with socio-demographic and environmental factors in the study population.

Material & Method

Study Design and Setting: This was a community-based cross-sectional study conducted in the urban field practice area of the Department of Community Medicine, Government Medical College (GMC), Haldwani, District Nainital, Uttarakhand. The study was conducted from January 2020 to July 2021.

Sample Size Calculation: A pilot study was conducted on 100 individuals in the Urban Health and Training Centre (UHTC) area during August 2019 to estimate the local prevalence of skin diseases. The prevalence was found to be 26%. Using the formula $n = 4pq / d^2$ with 5% absolute precision and adding a 10% non-response rate, the final sample size came out to be 570.

Sampling Technique: A systematic random sampling method was employed to select households from the defined urban field practice area of the Urban Health and Training Centre (UHTC), Haldwani. A complete household list was first obtained from the health records maintained by the UHTC. Based on the required sample size of 570 individuals, the sampling interval (k=7980/570=14) was considered by dividing the total number of households by the desired number of participants. From a randomly selected starting point within the first **K** households, every kth household was chosen for inclusion in the study. Within each selected household, one individual was selected randomly using a lottery method if more than one eligible adult was present. In cases where the selected individual was unavailable during the first visit, two additional follow-up visits were made. Households with no eligible participant available after repeated visits were replaced by the next household in sequence to maintain sampling integrity and sample size.

Inclusion Criteria: All consenting individuals residing in the selected households.

Exclusion Criteria: Individuals not present at the time of the survey despite two follow-up visits or those who did not consent.

Data Collection Tools: A pre-tested, semi-structured questionnaire was used to collect data on: Socio-demographic details, Environmental factors, Personal hygiene, Dermatological symptoms and history. A clinical examination was carried out for all participants by trained personnel under the supervision of a dermatologist.

Statistical analysis: The data collected from 570 study participants were entered into Microsoft Excel and analyzed using R studio software. Descriptive statistics such as frequencies and percentages were used to summarize socio-demographic variables, environmental conditions and prevalence and patterns of skin diseases. To assess associations between the presence of skin diseases and various categorical variables, the Chi-square test (χ^2) was employed. A p-value < 0.05 was considered statistically significant.

Result

Table-1 shows most represented age group was 31–40 years (23.9%), closely followed by those aged 21–30 years (22.1%), while the youngest group, aged 5–10 years, made up just 5.4% of the sample. Women comprised a slight majority at 54%, with men accounting for 46%. The majority of participants were Hindu (89.2%), with Muslims representing 8.2% and other religions accounting for 2.6%. Most participants were married (63.7%), while 17.5% were unmarried, 14.8% were minors, and only 4% were widowed, widowers, separated, or divorced. A large proportion of the study population was literate (93.9%), with

the highest number of respondents having completed graduation or above (26.2%), followed by those with an intermediate level of education (20%). Homemakers made up the largest occupational group (34.4%), followed by students (25.8%). Unemployment was low, at just 1.6% of participants. Regarding family structure, nearly three-fifths of the respondents lived in nuclear families (57.2%), with the remaining 42.8% living in joint families. Socio-economic status was predominantly middle class, with nearly half the participants in social class II (48.5%). This was followed by class I (27.4%), and smaller proportions in classes III (14.4%), IV (7.2%), and V (2.5%).

Furthermore, age showed a strong and statistically significant association with skin disease prevalence ($p < 0.001$). Compared to the reference group (5–10 years), the odds of skin disease were significantly lower among adolescents aged 11–20 years (OR: 0.02; 95% CI: 0.01–0.07), young adults aged 21–30 years (OR: 0.13; 95% CI: 0.06–0.30), and those aged 31–40 years (OR: 0.06; 95% CI: 0.03–0.17), indicating reduced burden in these age groups. Conversely, older adults above 60 years had significantly elevated odds (OR: 7.69; 95% CI: 0.91–64.51).Sex was also significantly associated with skin disease status ($p = 0.011$). Females had 1.58 times higher odds of having skin diseases compared to males (OR: 1.58; 95% CI: 1.11–2.25). Regarding marital status ($p = 0.041$), minors (<18 years) had nearly double the odds of skin disease (OR: 1.94; 95% CI: 1.17–3.22) compared to married individuals. Although higher odds were observed among widowed/divorced/separated participants (OR: 1.65). Occupation was significantly associated with skin disease occurrence ($p = 0.006$). Skilled workers showed significantly reduced odds (OR: 0.50; 95% CI: 0.28–0.88) compared to homemakers (reference group), while students and professionals did not have significantly different odds compared to the reference group. Although religion ($p = 0.482$), family type ($p = 0.498$), house type ($p = 0.235$), ventilation ($p = 0.437$), dampness ($p = 0.715$), and overcrowding ($p = 0.289$) did not show statistically significant associations, individuals living in Class IV socioeconomic status had significantly lower odds of skin disease (OR: 0.40; 95% CI: 0.17–0.91) compared to Class I. The association between education and skin disease approached significance ($p = 0.085$), with those having only primary education showing higher odds (OR: 2.50; 95% CI: 1.12–5.59) compared to illiterates.

Lastly, individuals with poor personal hygiene had nearly twofold increased odds of skin disease (OR: 1.96; 95%, CI: 0.97–3.97), though this was not statistically significant ($p = 0.183$). The strength and direction of these associations underscore the importance of age, sex, occupation, and hygiene in the epidemiology of skin diseases in this population.

The dashboard visualization presents in Figure-1 showed burden and distribution of skin diseases among the study population (N = 570). Of the 570 participants, 199 (34.9%) were diagnosed with a skin disease, while 371 (65.1%) exhibited no dermatological condition. Among those affected, non-infectious skin conditions predominated, accounting for 24.4% of the total population, whereas infectious skin diseases were observed in 10.5%. The subtype-wise horizontal bar chart demonstrates that eczema (6.1%), pigmentary disorders (5.6%), and benign skin tumours (3.9%) were the most frequently observed non-infectious skin disorders. In contrast, fungal infections (4.5%) were the most common infectious condition, followed by parasitic (2.3%), viral (1.9%), and bacterial (1.4%) infections. Less frequent disorders included sexually transmitted infections (0.4%), lichen plan us (0.4%), and photo dermatoses such as polymorphic light eruption (0.8%). The associated donut chart indicating that non-infectious skin diseases constituted nearly 70% of all skin disease cases.

Table-1: Association of skin diseases with various socio-demographic and environmental factors (N=570)

Variable	Subgroup	Skin Disease				Total		Crude OR	(95% CI)	p-value
		Present		Absent						
		No.	%	No.	%	No.	%			
Age (years)	5–10 (Ref)	26	83.9	5	16.1	31	5.4	1		<0.001
	11–20	3	3.2	92	96.8	95	16.7	0.02	(0.01–0.07)	
	21–30	40	31.7	86	68.3	126	22.1	0.13	(0.06–0.30)	
	31–40	15	11.0	121	89.0	136	23.9	0.06	(0.03–0.17)	
	41–50	19	24.7	58	75.3	77	13.5	0.17	(0.07–0.38)	
	51–60	32	80.0	8	20.0	40	7.0	0.83	(0.24–2.86)	
	>60	64	98.5	1	1.5	65	11.4	7.69	(0.91–64.51)	

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Variable	Subgroup	Skin Disease				Total		Crude OR	(95% CI)	p-value
		Present		Absent						
		No.	%	No.	%	No.	%			
Sex	Male (Ref)	77	29.4	185	70.6	262	46.0	1		0.011
	Female	122	39.6	186	60.4	308	54.0	1.58	(1.11–2.25)	
Marital Status	Married (Ref)	117	32.2	246	67.8	363	63.7	1		0.041
	Unmarried	32	32.0	68	68.0	100	17.5	0.99	(0.62–1.58)	
	Widow/Widower/ divorced/ Separated	10	43.5	13	56.5	23	4.0	1.65	(0.72–3.76)	
	Minor	40	47.6	44	52.4	84	14.7	1.94	(1.17–3.22)	
Religion	Hindu (Ref)	178	35.0	330	65.0	508	89.1	1		0.482
	Muslim	14	29.8	33	70.2	47	8.2	0.79	(0.42–1.53)	
	Others	7	46.7	8	53.3	15	2.6	1.62	(0.59–4.42)	
Education	Illiterate (Ref)	10	28.6	25	71.4	35	6.1	1		0.085
	Primary (1–5)	39	50.0	39	50.0	78	13.7	2.50	(1.12–5.59)	
	Secondary (6–8)	18	32.1	38	67.9	56	9.8	1.18	(0.45–3.09)	
	High School	31	30.4	71	69.6	102	17.9	1.09	(0.45–2.60)	
	Intermediate	40	35.1	74	64.9	114	20.0	1.35	(0.57–3.17)	
	Graduate & above	52	34.9	97	65.1	149	26.1	1.34	(0.57–3.14)	
	Professional	9	25.0	27	75.0	36	6.3	0.83	(0.29–2.34)	
Occupation	Home maker (Ref)	78	39.8	118	60.2	196	34.4	1		0.006
	Skilled worker	20	24.7	61	75.3	81	14.2	0.50	(0.28–0.88)	
	Unskilled worker	21	27.3	56	72.7	77	13.5	0.57	(0.32–1.02)	
	Unemployed	0	0.0	9	100.0	9	1.6	--		
	Professional	9	25.7	26	74.3	35	6.1	0.52	(0.23–1.18)	
	Retired	8	32.0	17	68.0	25	4.4	0.71	(0.28–1.81)	
	Student	63	42.9	84	57.1	147	25.8	1.14	(0.71–1.82)	
Type of Family	Nuclear (Ref)	110	33.7	216	66.3	326	57.2	1		0.498
	Joint	89	36.5	155	63.5	244	42.8	1.13	(0.80–1.61)	
Socioeconomic Status	Class I (Ref)	64	41.0	92	59.0	156	27.4	1		0.075
	Class II	88	31.8	189	68.2	277	48.6	0.67	(0.44–1.02)	
	Class III	31	37.8	51	62.2	82	14.4	0.87	(0.50–1.52)	
	Class IV	9	22.0	32	78.0	41	7.2	0.40	(0.17–0.91)	
	Class V	7	50.0	7	50.0	14	2.5	1.44	(0.49–4.18)	
Type of House	Kutcha (Ref)	4	44.4	5	55.6	9	1.6	1		0.235
	Semi-pucca	15	25.4	44	74.6	59	10.4	0.43	(0.11–1.61)	
	Pucca	180	35.9	322	64.1	502	88.1	0.72	(0.22–2.34)	
Dampness	Present (Ref)	80	34.0	155	66.0	235	41.2	1		0.715
	Absent	119	35.5	216	64.5	335	58.8	1.07	(0.76–1.51)	
Ventilation	Adequate (Ref)	122	36.2	215	63.8	337	59.1	1		0.437
	Inadequate	77	33.0	156	67.0	233	40.9	0.87	(0.61–1.25)	
Overcrowding	Present (Ref)	77	33.7	127	62.3	204	35.8	1		0.289
	Absent	122	33.3	244	66.7	366	64.2	0.98	(0.68–1.41)	
Personal Hygiene	Good (Ref)	95	33.9	185	66.1	280	49.1	1		0.183
	Average	88	34.1	170	65.9	258	45.3	1.01	(0.70–1.46)	
	Poor	16	50.0	16	50.0	32	5.6	1.96	(0.97–3.97)	

Note: *Parenthesis shows row-wise percentage. @Column-wise percentage. Odds ratios are calculated for each subgroup versus the first subgroup (=reference) in that variable. P-value shown for the overall association (Chi-square test) within a parameter.*

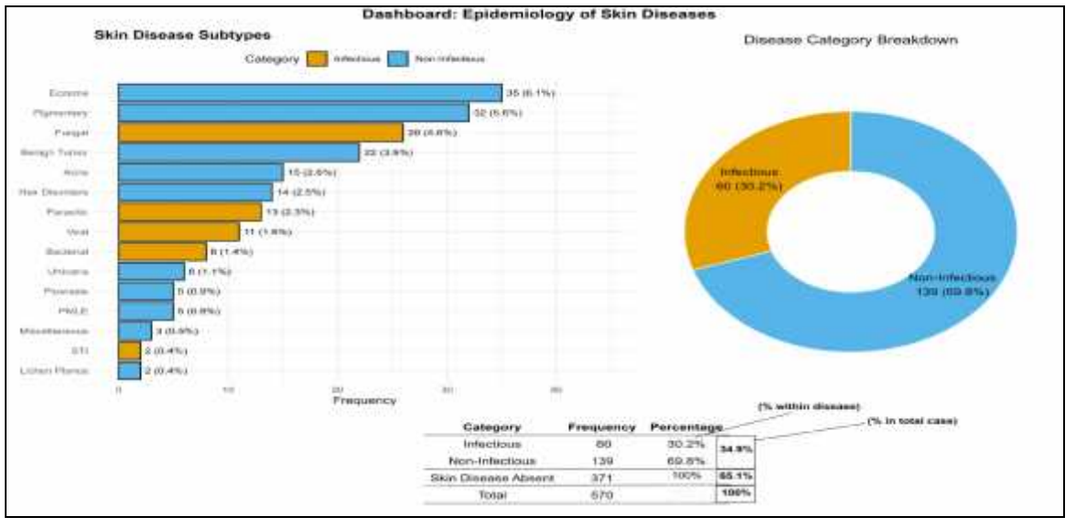

Figure- 1: "Dashboard Visualization of the Prevalence and Distribution of Skin Diseases (N=570)"

Discussion

Skin diseases are known to cause significant morbidity, while contributing minimally to mortality. Their occurrence and pattern are influenced by a multitude of factors including environmental conditions, socioeconomic status, literacy levels, race, and cultural practices. The pattern and prevalence of dermatological conditions vary widely, not only between countries but also across regions within a country.

In the present study, the overall prevalence of skin diseases was 34.9%, which aligns with previous studies conducted by Burman et al. (2020)[7], Kohli M et al. (2019)[8], Ali KBM (2012)[9], and Grills N et al. (2012)**[10]**. However, a higher prevalence was reported in studies conducted by Sahmeena et al. (2017)[11], Jain S et al. (2016)[4], Basti BD et al. (2016)[12], Villa LK (2016)[2], Yaseen U et al. (2013)[13], and Bissek et al. (2012)[14], suggesting that geographic and methodological differences may influence prevalence estimates.

The current study observed a higher proportion of non-infectious skin diseases (69.85%) compared to infectious skin diseases (30.15%). This trend is consistent with findings from Saini S et al. (2020)**[15]**, Sood S et al. (2020)[16] in Rajasthan, Bommakanti J et al. (2017)[17] in Telangana, Agarwal S et al. (2011)**[18]** in Uttarakhand, and Asokan N et al. (2009)[19] in Kerala. The relatively lower burden of infectious skin diseases in the current study could be attributed to better hygiene conditions, lower overcrowding, and improved access to healthcare services, as the majority of participants resided in urban areas.

The study also found that females had a significantly higher prevalence of skin diseases (39.6%) than males (29.4%). Similar gender-based patterns were reported by Jain S et al. (2016)[5] and Basti BD et al. (2016)[12]. This disparity may be due to a larger proportion of female participants in the study, many of whom were homemakers exposed to prolonged water contact in kitchens and laundry areas, predisposing them to conditions such as eczema and fungal infections.

Skin disease prevalence was higher among participants living in joint families compared to those in nuclear households. This may be due to overcrowding and shared personal items, facilitating the spread of contagious dermatological conditions. Similarly, a higher prevalence was observed among residents of kutcha houses (44.4%) and those with poor personal hygiene (50%), reaffirming findings by Basti BD et al. (2016)[12], who reported poor hygiene in 78.4% of affected children.

Conclusion

The present study reported a skin disease prevalence of 34.9% among the population studied. Non-infectious conditions (69.85%) such as eczema (25.2%) and pigmentary disorders (23%) were more common than infectious conditions

(30.15%), among which fungal infections (43.3%) were most prevalent. Significant associations were found between skin disease prevalence and age group (notably higher among those aged >60 years), sex (higher among females), and occupation (particularly among students and homemakers). While associations with marital status, religion, education level, family type, socioeconomic status, housing type, overcrowding, and personal hygiene were not statistically significant, a higher prevalence was still observed in disadvantaged subgroups, indicating important public health implications.

***Recommendations*:** There is a need to conduct community-based diagnosis of skin diseases, which can provide valuable information for planning targeted health interventions. Based on the findings of this study, policymakers must strengthen local healthcare services and integrate skin health promotion into community health programs. Additionally, administrative support to improve environmental conditions can help reduce the overall burden of skin diseases in urban populations.

Approval of Institutional Ethical Committee: Yes (Ref. No. 511/GMC/IEC/2019/Reg. No.468/ IEC/R-17-12-2019)

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