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Association between Environmental, Hygienic, and Lifestyle Factors with Common Skin Disorders among the Rural Elderly Population of Bangladesh

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Abstract
Background: *Skin diseases are highly prevalent worldwide and contribute substantially to disability, particularly among older adults. Environmental, hygienic, and lifestyle factors, including housing conditions, bathing and cleansing practices, contact with animals, and sun exposure, are known to influence the occurrence of common infectious and inflammatory dermatoses. This study aimed to determine the prevalence and clinical pattern of common skin disorders and to assess their association with environmental, hygienic, and lifestyle factors among the rural elderly population of Bangladesh.*
Methods: *This community-based cross-sectional study was conducted among 175 adults aged ≥50 years residing in selected rural villages in Bangladesh for at least 1 year (from start to end). Participants were recruited purposively, and data were collected through face-to-face interviews using a pretested, structured questionnaire that captured sociodemographic, anthropometric, medical, lifestyle, environmental, and hygienic variables. All participants underwent a systematic clinical skin examination under adequate lighting, and skin disorders were diagnosed according to standard clinical criteria and grouped into major diagnostic categories. Data were analyzed using SPSS (version 26.0), with descriptive statistics used to summarize the findings, and $p < 0.05$ considered statistically significant.*
Results: *Among 175 rural elderly participants (mean age 66.7 years), most had low education, were jobless, and over one third were underweight or overweight/obese; hypertension and diabetes were each present in about one third of the sample. Overall, 160 participants (91.4%) had at least one skin disorder, most commonly fungal infections (37.5%), scabies (30.6%), and eczematous or dermatitis-type conditions (about 20% combined), with lesions predominantly affecting the legs, arms, and back. Skin conditions were frequently chronic, with over 80% lasting more than 1 month, and were mainly moderate to severe, with itching in 93.8%. Only 7.5% had a prior physician diagnosis, and 4.4%had been referred for specialist care, despite almost all requiring follow-up. None of the environmental, hygienic, or lifestyle factors showed a statistically significant association with skin disorders, although soap use showed a borderline protective trend.*
Conclusion: *This community-based study demonstrates a very high burden of predominantly infectious, chronic, and symptomatic skin disorders among rural elderly adults in Bangladesh, with minimal prior diagnosis or specialist referral. None of the environmental, hygienic, or lifestyle factors showed statistically significant associations with skin disorders.*
Keywords: *Skin Disorders, Geriatric Dermatology, Rural Elderly, Environmental and Hygienic Factors.*

I. INTRODUCTION

Skin diseases are among the most frequent human illnesses, ranking within the leading causes of non-fatal disease burden globally and accounting for substantial disability-adjusted life years across all ages [1-3]. Analyses from the Global Burden of Disease project show that common inflammatory and infectious dermatoses such as eczema, fungal infections, scabies, bacterial skin infections, and pruritus contribute disproportionately to years lived with disability [1-4]. These inequities are particularly relevant in low and middle-income countries, where climate, overcrowding, poverty, and limited access to dermatological care amplify the burden of otherwise preventable or easily treatable skin disorders [2,3]. Ageing of the global population adds a further layer of complexity. Structural and functional changes in ageing skin, including epidermal thinning, impaired barrier function, reduced lipid content, and diminished immune responsiveness, increase susceptibility to xerosis, eczema, infections, pressure-related injury, and neoplasia among older adults [5]. Reviews of skin health in older age and recent scoping syntheses on community-dwelling older people highlight a high prevalence of multiple

concurrent skin conditions, under-recognition in primary care, and limited evidence on effective prevention in real-world community settings [5,6]. Recent work on skin barrier dysfunction in older adults also suggests that modifiable factors, such as bathing practices, indoor low humidity, and inappropriate skin cleansers, can exacerbate barrier impairment and dryness [7]. Clinically, pruritus, xerosis, eczematous dermatoses, and superficial infections are common problems in the geriatric population, affecting sleep, mobility, social interaction, and overall quality of life [8,9]. Hospital-based studies from South Asia and other regions report that a large majority of elderly dermatology patients present with pruritus, eczemas, xerosis, and infectious dermatoses, often in the context of multimorbidity and polypharmacy [9]. A Bangladeshi tertiary-hospital study among patients aged 60–80 years found that three-quarters had pruritus, along with high rates of dermatitis, xerosis, eczema, and bacterial and fungal infections, underscoring the clinical and public health importance of geriatric skin disease in this setting [10]. Environmental, hygienic, and lifestyle determinants strongly shape the distribution of common skin disorders. Community-based studies in low-resource settings link poor personal hygiene, infrequent bathing with soap, sharing of clothes and towels, and close contact with domestic animals to higher odds of scabies, tinea, pyoderma, and other communicable dermatoses [11]. Broader environmental changes, including rising temperatures, humidity extremes, crowding, and climate-related migration, are increasingly recognized as drivers of infectious and inflammatory skin diseases, especially where housing, sanitation, and occupational protections are inadequate [12]. These exposures interact with age-related skin changes, nutritional status, and chronic illnesses, suggesting that older people in rural, resource-constrained environments may be particularly vulnerable. Bangladesh is undergoing a rapid demographic transition, with a growing proportion of the population aged 60 years and above, most of whom reside in rural areas with constrained health and social protection systems [13-15]. Studies in rural Bangladeshi elderly populations consistently report high multimorbidity, low income, limited formal education, and substantial barriers to care seeking, especially among older women [13-15]. Dermatology outpatient data indicate that skin diseases constitute a significant share of morbidity in Bangladeshi hospitals, with a substantial proportion of cases originating from rural communities [11]. In this context, there is a clear need for community-based epidemiological data linking modifiable environmental, hygienic, and lifestyle factors with the occurrence of common skin disorders in the rural elderly population of Bangladesh. Therefore, the present study aimed to determine the association between ecological, hygienic, and lifestyle factors and common skin disorders among the rural elderly population of Bangladesh.

II. METHODS

This community-based cross-sectional study was conducted among elderly residents of selected rural villages in Bangladesh to assess the association between environmental, hygienic, and lifestyle factors and common skin disorders. Individuals aged 50 years or older who had lived in the study area for at least 1 year were eligible for inclusion. Those with severe cognitive impairment, acute critical illness, or inability to provide informed consent were excluded. A total of 175 participants were enrolled using a purposive approach, maintaining approximate proportional representation from the selected villages. Data collection was carried out over one year from (start) to (end).

Data were collected using a pretested, structured questionnaire, administered through face-to-face interviews in the local language. The tool captured sociodemographic information, including age, gender, marital status, occupation, and educational level, as well as anthropometric measurements, from which body mass index was calculated and categorized as underweight, normal, overweight, or obese. Medical history included the presence of chronic diseases such as hypertension, diabetes, cardiovascular disease, chronic kidney disease, other chronic illnesses, any known immunosuppressive condition, regular medication use, and family history of skin disease. Lifestyle variables comprised smoking history, classified as never, former, or current smoker, and alcohol consumption, categorized as never or occasional. Environmental and hygienic factors included type of housing, presence of pets or livestock, access to clean water for bathing, frequency of bathing, use of soap or cleansers, daily duration of sun exposure, and use of sunscreen or protective clothing.

All participants underwent a systematic clinical skin examination in adequate daylight or clinical lighting. Common skin disorders were identified and recorded based on morphology, distribution, and standard clinical diagnostic criteria. They were grouped into categories such as fungal infections, scabies, dermatitis, eczema, psoriasis, vitiligo, and others. For those with skin conditions, additional information was collected on symptom duration, perceived severity, presence of itching or discomfort, prior treatment, response to treatment, physician diagnosis, referral status, and follow-up requirements.

Data were entered and analyzed using standard statistical software (SPSS, V-26.0). Descriptive statistics were used to summarize frequencies, percentages, means, and standard deviations. Associations between environmental, hygienic, and lifestyle factors and the presence of skin disorders were examined using chi-square or Fisher's exact tests, as appropriate, with p-values < 0.05 considered statistically significant.

III. RESULTS

The study population consisted predominantly of older adults aged 60–69 years (44.57%), followed by those aged 70–79 years (24.57%). The mean age was 66.7 years. Gender distribution was almost equal, with males accounting for 50.29%. More than half of the participants had normal BMI (53.71%), although 12% were underweight and 34.28% were overweight or obese combined. A large majority were married (99.43%) and jobless (64%), while educational attainment was generally low, with 51.43% having no formal education.

Table 1. Sociodemographic Characteristics of the Rural Elderly Participants (N=175)

Variable	Category	n	%
Age group (years)	50–59	30	17.14
	60–69	78	44.57
	70–79	43	24.57
	≥80	24	13.71
	Mean ± SD	66.7 ± 10.3	
Gender	Male	88	50.29
	Female	87	49.71
BMI category	Underweight (<18.5)	21	12.00
	Normal (18.5–24.9)	94	53.71
	Overweight (25.0–29.9)	52	29.71
	Obese (≥30.0)	8	4.57
	Mean ± SD	23.2 ± 4.2	
Marital status	Married	174	99.43
	Widowed	1	0.57
Occupation	Jobless	112	64.00
	Housewife	27	15.43
	Farmer	20	11.43
	Business	12	6.86
	Retired	3	1.71
	Teacher	1	0.57
Educational level	No formal education	90	51.43
	Primary	56	32.00
	Secondary	26	14.86
	Higher education	3	1.71

Hypertension (32%) and diabetes (33.14%) were the most common chronic diseases among participants, while 41.14% reported other chronic illnesses. Nearly one-third had an immunosuppressive condition (29.14%), and 72.57% reported regular medication use. Additionally, 34.86% had a family history of skin diseases, indicating a meaningful hereditary or shared environmental component.

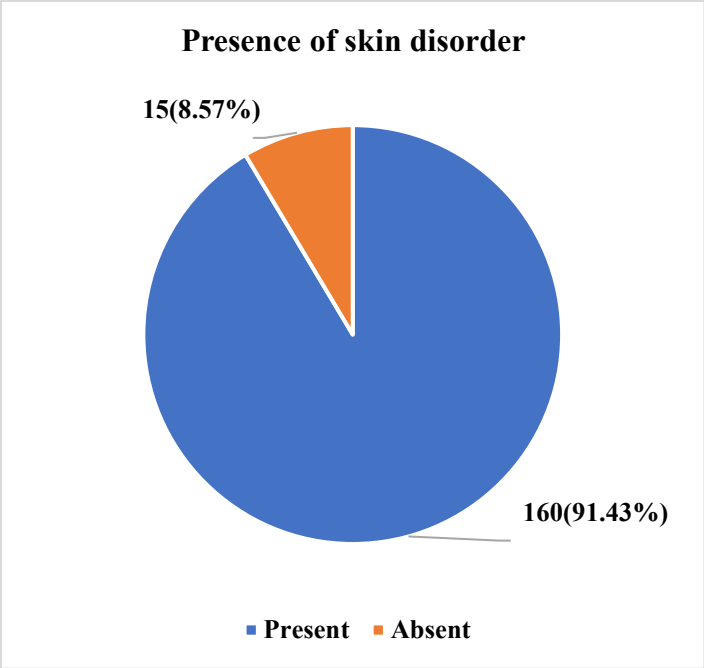
Table 2. Distribution of Chronic Diseases and Relevant Medical History among Participants (N=175)

Variable	n	%
Chronic disease		
Hypertension	56	32.00
Diabetes	58	33.14
Cardiovascular disease	24	13.71
Chronic kidney disease	13	7.43
Other chronic disease	72	41.14
Immunosuppression, medication use, family history		
Any immunosuppressive condition	51	29.14
Regular medication use	127	72.57
Any family history of skin disease	61	34.86

Most participants had never smoked (69.14%), although 28.57%were former smokers. Current smoking was rare (2.29%). Alcohol consumption was almost absent, with 94.29% reporting never drinking and only 5.71% drinking occasionally.

Table 3. Lifestyle and Behavioral Characteristics of the Study Population (N=175)

Variable	Category	n	%
Smoking history	Never smoked	121	69.14
	Former smoker	50	28.57
	Current smoker	4	2.29
Alcohol consumption	Never	165	94.29
	Occasionally	10	5.71
	Regularly	0	0.00



A very high proportion of participants were found to have at least one skin disorder, with 91.43% affected compared with only 8.57%who were free from any skin condition.

Fungal infections were the most common skin condition (37.5%), followed by scabies (30.63%) and dermatitis (10.63%). Eczema accounted for 10%, while psoriasis and vitiligo were less frequent at 5% and 1.88%, respectively. Lesions were most commonly located on the legs (83.13%), arms (63.75%), and back (58.13%), suggesting extensive skin involvement, whereas the face (11.88%) and scalp (15.63%) were less frequently affected.

Table 4. Types and Anatomical Distribution of Skin Disorders among Affected Participants (N=160)

Variable	n	%
Type of skin condition		
Fungal infection	60	37.50
Scabies	49	30.63
Dermatitis	17	10.63
Eczema	16	10.00
Other	19	11.88
Psoriasis	8	5.00
Vitiligo	3	1.88
Skin ulcers	0	0.00
Location of lesions		
Legs	133	83.13
Arms	102	63.75
Back	93	58.13
Hands	85	53.13

Chest	74	46.25
Scalp	25	15.63
Face	19	11.88
Other sites	12	7.50

Skin conditions were often persistent, with 42.5% lasting 1–6 months and 40.63% lasting more than 6 months. Most cases were moderate in severity (58.75%), and 36.88% were severe. Itching was reported by 93.75%. A large proportion had received previous treatment (80%), although most reported no improvement (80.63%). Only 7.5% were diagnosed by a physician, and 4.38% were referred to specialist care, despite 98.75% requiring follow-up, reflecting significant gaps in dermatological service access.

Table 5. Clinical Profile, Severity, Treatment History, and Follow-up Needs of Participants with Skin Disorders (N=160)

Variable	Category	n	%
Duration of skin condition	<1 month	27	16.875
	1–6 months	68	42.5
	>6 months	65	40.625
Severity of skin condition	Mild	6	3.75
	Moderate	94	58.75
	Severe	59	36.875
	Not specified	1	0.625
Itching or discomfort	Yes	150	93.75
	No	10	6.25
Previous treatment taken	Yes	128	80
	No	32	20
Response to previous treatment	Improved	28	17.5
	No change	129	80.625
	Worsened	3	1.875
History of skin cancer	No	160	100
Diagnosed by a physician	Yes	12	7.5
	No	148	92.5
Referral for specialist care	Yes	7	4.375
	No	153	95.625
Follow-up required	Yes	158	98.75
	No	2	1.25

No environmental, hygienic, or lifestyle variable demonstrated a statistically significant association with skin disorders. Sun exposure, bathing habits, and housing type showed similar distributions between the affected and unaffected groups, with p-values> 0.05. Use of soap approached significance ($p = 0.065$), with higher usage among those without skin disorders (93.3%). Smoking history, alcohol use, and family history of skin disease also showed no significant associations, although former smoking was proportionally higher in the skin-disorder-absent group (46.7% versus 28.8%).

Table 6. Association of Environmental, Hygienic, and Lifestyle Factors with the Presence of Skin Disorders

Factor	Category	Skin disorder present (n=160), n (%)	Skin disorder absent (n=15), n (%)	p value
Sun exposure duration per day	<1 hour	119 (74.4)	10 (66.7)	0.328
	1–3 hours	34 (21.3)	3 (20.0)	
	>3 hours	7 (4.4)	2 (13.3)	
Use of sunscreen or protective clothing	Yes	6 (3.8)	2 (13.3)	0.296
Access to clean water for bathing	Yes	148 (92.5)	14 (93.3)	1
Frequency of bathing	Daily	139 (86.9)	14 (93.3)	0.747
	Every other day	21 (13.1)	1 (6.7)	
Use of soap or cleansers	Yes	107 (66.9)	14 (93.3)	0.065

Type of housing	Mud house	20 (12.5)	2 (13.3)	0.953
	Tin house	67 (41.9)	6 (40.0)	
	Concrete house	70 (43.8)	7 (46.7)	
	Other	3 (1.9)	0 (0.0)	
Presence of pets or livestock at home	Yes	7 (4.4)	0 (0.0)	0.887
Smoking history	Never smoked	114 (71.3)	7 (46.7)	0.112
	Former smoker	46 (28.8)	7 (46.7)	
	Current smoker	3 (1.9)	1 (6.7)	
Alcohol consumption	Never	150 (93.8)	15 (100.0)	0.674
	Occasionally	10 (6.3)	0 (0.0)	
Family history of skin disease	Yes	58 (36.3)	3 (20.0)	0.296

IV. DISCUSSION

The present community-based study among rural older adults in Bangladesh found an extremely high burden of dermatological morbidity, with 91.4% of participants exhibiting at least one clinically identifiable skin disorder. This near-universal prevalence is consistent with evidence that skin disease is almost ubiquitous in later life when systematically screened, both in hospital cohorts and in community-living older populations [10,16,17]. Kottner et al identified a wide range of dermatoses affecting community-dwelling older adults internationally, highlighting that skin conditions represent a substantial, but often under-recognized, component of geriatric morbidity [18]. Our findings reinforce this conclusion in a low-resource rural South Asian context. In terms of diagnostic pattern, infectious and infestation-related dermatoses predominated, with fungal infections (37.5%) and scabies (30.6%) accounting for more than two-thirds of all skin conditions. This profile is broadly comparable to recent data from rural and semi-urban Indian settings, where infections and infestations comprised 38–45% of pathological dermatoses among geriatric outpatients [18,19]. In comparison, Agarwal et al. and Simin et al. reported infections in approximately 30–38% of geriatric attendees in Northern India and Kerala [20,21]. Hospital-based Bangladeshi studies have reported pruritus, dermatitis, xerosis, and eczema as leading diagnoses with lower proportions of overt infection [10,16]. In contrast, our community sample shows a greater prevalence of fungal infections and scabies. This pattern is closer to data from Eastern Turkey, where Bilgili et al found infections as the largest diagnostic group among geriatric patients [22]. It may reflect climatic factors, barefoot walking, close contact with soil and animals, and crowding in rural households. Inflammatory eczematous conditions were also common in our cohort, with dermatitis and eczema together affecting about one-fifth of participants. Eczematous dermatitis is the most frequent diagnosis (35.7%) among Thai geriatric outpatients [23]. At the same time, another study found eczema and infections as the top two categories in Upper Egypt [24]. Our results, therefore, align with the broader literature, showing that infectious and eczematous disorders constitute the core disease burden in older adults, although the balance tips more toward infections in this rural Bangladeshi setting. Most lesions in our study involved the lower limbs and other exposed or weight-bearing sites, especially the legs (83.1%) and arms (63.8%). This distribution is similar to reports from Indian and African geriatric cohorts, where lower limb involvement is frequent due to chronic venous disease, xerosis, callosities, and trauma, often superimposed on infections [16,19,20]. We examined several environmental, hygienic, and lifestyle variables, including sun exposure duration, bathing frequency, soap use, housing type, presence of domestic animals, smoking, and alcohol intake. None showed a statistically significant association with skin disease, although soap use approached significance. By contrast, studies from Thailand and Turkey have identified associations between specific diagnoses and factors such as age group, season, comorbidities, and sometimes smoking [22,23,25]. A recent scoping review of community-living older people also highlighted extrinsic determinants, such as ultraviolet exposure, nutrition, mobility limitations, and medication use, as important contributors to skin morbidity [18]. The absence of strong associations in our analysis likely reflects limited statistical power due to the small non-diseased comparison group and the relatively homogeneous exposures in this rural population, where nearly all participants shared similar water sources, hygiene practices, and outdoor activity patterns. Comorbid conditions were common in our sample, with roughly one third reporting hypertension and one third diabetes, similar to the prevalence of cardiovascular and metabolic diseases reported in geriatric dermatology cohorts from Bangladesh, India, and Egypt [10,19,20,24]. Although our study was not powered to examine causal links, existing evidence indicates that diabetes, cardiovascular disease, and polypharmacy increase susceptibility to infections, xerosis, ulcers, and pruritus in the elderly. The coexistence of high NCD burden and high dermatological morbidity in this rural cohort underscores the need for integrated chronic disease and skin care in primary health services. Taken together, our findings contribute to the growing literature showing that most older adults, particularly in low- and middle-income settings, live with one or more untreated or undertreated skin disorders [17,18,26,27].

Limitations of the study: This study was limited by its cross-sectional design, single rural setting, and relatively small sample, all of which restrict generalizability and causal interpretation. Clinical diagnosis without routine dermoscopic or histopathological confirmation and reliance on self-reported exposures may have introduced misclassification and recall bias. In addition, the minimal number of participants without skin disorders reduced statistical power to detect significant associations.

V. CONCLUSION

This community-based study among rural elderly adults in Bangladesh revealed an alarmingly high prevalence of clinically identifiable skin disorders, predominantly fungal infections and scabies, with most cases being chronic, symptomatic, and of moderate to severe intensity. Despite this substantial burden, very few participants had received a formal diagnosis or specialist referral, highlighting significant gaps in access to dermatological care at the primary-care level. Although no environmental, hygienic, or lifestyle factors showed statistically significant associations with skin disorders, the uniformly high exposure to shared rural living conditions suggests that structural and contextual determinants play an important role. Overall, the findings underscore the need to integrate routine skin examination, simple diagnostic algorithms, and low-cost management strategies into community and primary health services for the rural elderly population.

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