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Original Research Article

Skin diseases among tea garden workers of Dibrugarh district, Assam: a cross-sectional study

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ABSTRACT

Background: Skin diseases are one of the most neglected conditions worldwide, but they pose a significant public health concern, particularly among certain groups of populations, like agricultural workers and tea garden workers, due to their occupational and environmental risk factors. Despite its burden, there is limited data regarding the patterns and determinants of such conditions. Hence, the study aims to assess the burden of skin diseases and their risk factors among tea garden workers.
Methods: A community-based cross-sectional study was conducted over one year using a multistage study design. The data collected were sociodemographic characteristics, occupational exposures, personal hygiene and sanitation-related factors. A clinical examination was conducted to diagnose the skin lesions and univariate and multivariate analysis was performed to assess their risk factors.
Results: The study reported a high prevalence of skin diseases which included infectious, pigmentary and inflammatory lesions, with infectious lesions being the most commonly reported. Socio-demographic factors like type of family, number of family members and occupational exposure to chemicals like pesticides and sanitation and hygiene were the significant factors contributed to skin diseases.
Conclusions: An integrated approach is required to reduce the burden of skin diseases, which includes addressing risk factors by improving living conditions, promoting sanitation and hygiene and strengthening workplace safety to reduce occupational exposure.

Keywords: Determinants, Infectious lesions, Occupational exposures, Prevalence, Skin diseases, Tea garden workers

INTRODUCTION

Skin is the largest organ of the human body and a part of the integumentary system. It consists of three main layers: the epidermis, the dermis and the hypodermis, which vary significantly in their anatomy and function.[1] The skin also consists of appendages, which include hair, nails, sweat glands and sebaceous glands. Each component has a distinct structure and function and also acts as the 'body's first line of defense' against infections, UV rays, toxins and mechanical harm.[2,3] Skin disease or dermatosis, encompasses a broad spectrum of human conditions and ranks as the 4th most common disease worldwide, affecting about one-third of the global population, which adds a significant burden to the healthcare system.[4-6]

Skin diseases typically have relatively lower level of mortality rates, but many of them lead to chronic illnesses that cause considerable morbidity and reduce the quality of life. They are among the leading causes of 'Years Lost to Disability' (YLD) globally.[7] According to the 'Global Burden of Disease' (GBD) 2021 Report, 41.94 million years of Disability Adjusted Life Years (DALYs) were caused by skin-related illness, with fungal and bacterial infections being common, along with a considerable

burden of viral infections.[8] Several studies from India indicated that the prevalence of skin diseases ranges from 10%-87%.[6] The North Eastern states of India, including Assam, experience a high prevalence of skin conditions, especially fungal infections, compared to other skin issues, primarily due to the humid climate in this part of the world.[9] Skin conditions can be infectious or non-infectious and may be linked to specific occupations and hence, are known as occupational skin diseases. Workers in sectors like agriculture such as farmers, tea garden workers and florists, are at higher risk, often due to exposure to chemical and irritants like manures, fertilizers and pesticides often without appropriate protective equipment, compounded by poor living conditions.[10,11]

Dibrugarh district is an industrial city in Upper Assam with sprawling tea gardens, having a large proportion of tea garden population, contributing to almost 50% of the country's tea cultivation.[12,13] The research on skin diseases among this vulnerable group of population is abysmally low. Hence, the present study was undertaken to estimate the burden and assess the determinants or risk factors of skin diseases among tea garden workers of Dibrugarh district, Assam.

METHODS

Study design

A community-based cross-sectional study was conducted among the tea garden workers of Dibrugarh district, Assam, from September 2023 to August 2024. The study was conducted in six randomly selected tea gardens.

Sample size

290 tea garden workers were selected, which was calculated based on a prevalence of 40%.[14] Using a 20% relative error and a design effect of 2 and a multistage sampling technique. The steps for selecting study participants were as follows.

Stage 1

Dibrugarh district has 6 health blocks, namely, Barbaruah, Khowang, Lahoal, Panitola, Naharkatia and Tengakhat. So, by simple random sampling Lahoal block was selected.

Stage 2

Out of the total tea gardens under the Lahoal block, six tea gardens were selected by simple random sampling.

Stage 3

The total number of workers was obtained from the 6 selected tea gardens and the number of participants from each tea garden was selected after proportional allocation.

Data collection technique

Tea garden workers presenting with skin lesions were included in the study. Data was collected through house-to-house visits using a pre-tested and pre-designed questionnaire after obtaining informed consent from the participants. Workers who were not present at their homes on three consecutive visits were excluded from the study. Ethical approval was obtained from the institute ethics committee (H) of Assam Medical College and Hospital, Dibrugarh, Assam, India.

The study included variables on sociodemographic characteristics, personal hygiene, occupational characteristics, environmental factors and presenting symptoms of skin lesions.

Data analysis

The collected data were entered and analyzed using IBM SPSS Version 21 software. The data was presented as frequencies and percentages. The association of risk factors with skin diseases was analyzed using univariate and multivariate analysis and p values less than 0.05 was considered statistically significant.

RESULTS

A total of 290 tea garden workers participated in the study, with a mean age of 36.10±9.44 years. The majority of participants belonged to the 20-40 years of age group (64.4%). According to the socio-demographic assessment, the majority were females (60.3%), belonged to the Hindu religion (82.40%), were married (73.1%) and came from nuclear families (58.6%). Most of them had a poor level of education, where the majority were either illiterate (45.50%) or had a primary level of education (33.80%). On socioeconomic assessment, the majority belonged to Class III (43.4%) and Class IV (53.1%) socioeconomic classes of Modified B.G. Prasad's classification.

The overall prevalence of skin disease among the study participants was 36.2%. Most of the participants with skin diseases (53.3%) had infectious lesions, out of which scabies was most common (50%). Acne (44.8%) and pityriasis versicolor (55.6%) were the most common inflammatory and pigmentary skin conditions (Table 1).

The prevalence of skin disease was higher among participants under 40 years of age (58.1%). The risk of having a skin disease was significantly greater among those living in joint families, with more than four family members. The risk was 1.82 times higher among non-pesticide handlers compared to pesticide handlers and this was statistically significant (p=0.03).

The prevalence was higher among individuals with poor personal hygiene, such as those not practicing handwashing with soap and water (66.7%) and sharing

clothes with family members (63.8%), with these differences being statistically significant. The risk of skin disease was significantly lower among those living in kuccha houses.

The prevalence and risk of skin disease were 1.59 times higher among individuals experiencing household overcrowding. Additionally, the risk was significantly higher among those with some form of comorbidities (Table 2). The prevalence of skin disease was higher among those who were employed for more than 5 years (61.9%) and worked more than 8 hours per day (98%). The risk of skin disease was higher among the non-PPE users at work. In multivariate analysis, participants belonging to joint families, higher socioeconomic status, individuals living in households with overcrowding and those not sharing clothes with family members were significantly associated with skin disease (Table 3).

Table 1: Patterns of skin diseases among the participants.

	Number (N)	(%)
Infectious conditions	56	53.3
Herpes	3	5.3
Tinea	22	39.2
Scabies	28	50
Leprosy	2	3.5
Carbuncle/furuncle	1	1.7
Inflammatory dermatoses	29	27.6
Hand eczema	11	37.9
Acne	13	44.8
Urticaria	5	17.2
Pigmentary disorders	9	8.5
Vitiligo	4	44.4
Pityriasis Versicolor	5	55.6
Miscellaneous conditions	11	10.5
Cracked palms and soles	6	54.5
Onychodystrophy (Nail dystrophy)	5	45.4
Total	105	100

Table 2: Prevalence and association of skin disease with different risk factors.

Variables	Category	Skin Disease		Unadjusted Odds Ratio (95% CI)	P value
		Present N (%)	Absent N (%)		
Age (in years)*	<40	61 (58.1)	128 (69.2)	Reference	0.057
	≥40	44 (41.9)	57 (30.8)	0.61 (0.37-1.01)	
Type of family	Nuclear	70 (66.7)	100 (54.1)	Reference	0.03
	Joint	35 (33.3)	85 (45.9)	1.70 (1.03-2.79)	
No. of family members	≤4	69 (65.7)	97 (52.4)	Reference	0.028
	>4	36 (34.3)	88 (47.6)	1.73 (1.05-2.85)	
SES*	Lower	42 (40)	93 (50.3)	Reference	0.09
	Higher	63 (60)	92 (49.7)	0.65 (0.40-1.07)	
Pesticide handler	Yes	29 (27.6)	32 (17.3)	Reference	0.03
	No	76 (72.4)	153(82.7)	1.82 (1.02-3.23)	
Hand washing	Yes	35 (33.3)	86 (46.5)	Reference	0.02
	No	70 (66.7)	99 (53.5)	0.57 (0.35-0.94)	
Sharing clothes	No	38 (36.2)	90 (48.6)	0.59 (0.36-0.97)	0.04
	Yes	67 (63.8)	95 (51.4)	Reference	
Type of house*	Pucca/ semi-pucca	61 (58.1)	132 (71.4)	Reference	0.02
	kuccha	44 (41.9)	53 (28.6)	0.55 (0.33-0.91)	
Overcrowding	Absent	57 (54.3)	79 (42.7)	Reference	0.057
	Present	48 (45.7)	106 (57.3)	1.59 (0.98-2.58)	
Co-morbidities	Absent	40 (38.1)	48 (25.9)	Reference	0.03
	Present	65 (61.9)	137 (74.1)	1.75 (1.05-2.93)	

*Clubbing variables is done for analysis purposes only.

Table 3: Factors associated with skin disease Multiple Logistic regression.

Variable	Category	Adjusted odds ratio	95% Confidence interval		Sig.
			Lower	Upper	
Age (in years)*	<40	Reference	-	-	0.611
	≥40	0.845	0.441	1.619	
Type of family	Nuclear	Reference	-	-	0.003
	Joint	4.508	1.680	12.097	
No. of family members	≤ 4	Reference	-	-	0.073
	>4	2.332	0.925	5.875	
SES*	Lower	Reference	-	-	0.012
	Higher	0.443	0.235	0.834	
Pesticide handler	Yes	Reference	-	-	0.066
	No	1.825	0.962	3.462	
Hand washing	Yes	Reference	-	-	0.160
	No	0.669	0.381	1.173	
Sharing clothes	Yes	Reference	-	-	0.017
	No	0.506	0.290	0.884	
Type of house*	Pucca/semi-pucca	Reference	-	-	0.053
	kuccha	0.567	0.319	1.008	
Overcrowding	Absent	Reference	-	-	0.000
	Present	5.275	2.263	12.293	
Co-morbidities	Absent	Reference	-	-	0.093
	Present	1.799	0.906	3.571	

*Clubbing variables is done for analysis purposes only; Sig.-Significance.

DISCUSSION

In the current study, the prevalence of skin disease was 36.2%, with the majority being infectious conditions. The study conducted by Bashir et al, in Kashmir among agricultural workers, reported a similar prevalence of skin diseases (38.3%).[11] Another study by Chakraborty et al, among tea garden populations in Darjeeling found that the most common skin lesions were infectious, including scabies and tinea infections.[14] Such a high burden of skin disease could be attributed to the vulnerable environment faced by agricultural workers at work.

The prevalence of skin disease was higher among workers of younger age; similar findings were reported by Rahman et al.[15] This may be because a large proportion of the working population belongs to the younger age group, thus increasing their chances of exposure to occupational risk factors. The likelihood of having skin disease was also greater among those living in joint families and families with more than 4 members. Nawaz et al, in Pakistan reported similar findings, where skin diseases like scabies were more common in larger families.

These findings suggest that larger families may lead to overcrowding, which facilitates the easy transmission of skin diseases. The prevalence of skin disease was higher among those who were employed for longer durations in the field. Similar findings were reported by Bashir et al, where extended working hours among agricultural workers were significantly linked to skin diseases.[11] Such findings indicate that long-term exposure to occupational hazards can lead to dermatological conditions. Skin disease was more common among non-pesticide handlers, whereas contrasting findings were reported by Shiva et al conducted in Haryana among agricultural workers exposed to chemicals.[16] The difference in results could be because workers handling pesticides used some form of protection against exposure.

The prevalence of skin disease was higher among those with poor personal hygiene, a finding that aligns with a study conducted by Haradanahalli et al thus highlighting that maintaining good personal hygiene helps reduce skin-related infections.[17] In the current study, the risk of skin disease was higher among individuals living in overcrowded household. A study by Gunathilaka et al, in Sri Lanka also reported a higher prevalence and a significant association between skin disease and overcrowding.[18] The consistency of these findings suggests that household overcrowding may lead to increased skin-to-skin contact, poor hygiene and a greater spread of skin diseases.

The risk of having skin disease was significantly lower among those living in a kuccha house in the current study. Studies by Nawaz et al in Pakistan and Khan et al, in Lucknow, India, reported a higher burden of scabies infection among those living in kuccha houses.[19,20] This difference in findings could be due to the type of study population and in the current study majority of the population resided in pucca or semi-pucca houses provided by the tea garden authorities, resulting in higher

reporting of skin diseases among them. The risk of developing skin diseases was significantly higher among individuals with certain comorbidities or systemic illnesses. Nath et al, reported an increased risk of skin conditions associated with systemic illnesses like diabetes; this finding aligns with the current study.[21]

The limitations of the current study were that it was a cross-sectional study, so causal relationships could not be established. Multiple confounding factors, such as genetics, nutritional deficiencies, geographical conditions and seasonal variations, which may influence the development of skin diseases, have not been thoroughly examined. Additionally, laboratory investigations were not performed and the diagnosis relied on the clinical expertise of the researcher. Since responses were questionnaire-based, there was no mechanism to verify the responses. Future longitudinal studies on this research topic could address these limitations.

CONCLUSION

There is a significant burden of skin diseases among tea garden workers. Factors such as large family sizes, household overcrowding, underlying health conditions, poor personal hygiene and occupational exposures including chemicals like pesticides, lack of protective gear and long working hours were identified as key risk factors for skin diseases. The study highlighted the importance of targeted interventions, such as health education on hygiene and improvements in occupational safety and socio-environmental conditions. Further research could explore the causal relationship of these factors.

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REFERENCES

1. Gerster-Barzanji Z, Woodtli V, Klix M, Biedermann T, Schiestl C. Long-Term Histological Evaluation of a Novel Dermal Template in the Treatment of Pediatric Burns. Bioengineering. 20244;11(12):1270.
2. Yousef H, Alhajj M, Sharma S. Anatomy, Skin (Integument), Epidermis. In: StatPearls. Treasure Island (FL): StatPearls Publishing. 2024.
3. Yousef H, Miao JH, Alhajj M, Badri T. Histology, skin appendages. 2018.
4. Habif TP. Clinical dermatology E-book. Elsevier Health Sciences. 2015.
5. Flohr C, Hay R. Putting the burden of skin diseases on the global map. British J Dermatol. 2021;184(2):189–90.
6. Khurana A, Grover A, Pandhi D, Khaitan B, George R, De D, et al. Development of Indian Council of Medical Research (ICMR) Standard Treatment Workflows for Skin Diseases: A Step Toward Universal Health Coverage. Indian Dermatol J. 2024;15(5):794.
7. Yakupu A, Aimaier R, Yuan B, Chen B, Cheng J, Zhao Y, et al. The burden of skin and subcutaneous diseases: findings from the global burden of disease study 2019. Fronti Public Health. 2023;11:1145513.
8. Li D, Fan S, Zhao H, Song J, Li W, Xu X. Global, regional and national burden of skin and subcutaneous diseases: a systematic analysis of the Global Burden of Disease Study 2021. International Health. 2025;28:70.
9. Bhattacharjee B, Chakravarty A, Dhar Chanda D. Clinico-Mycological Study of Superficial Mycoses in a Tertiary Health Care Centre of Southern Assam. Int J Res Rev. 2021;8(5):438–48.
10. Diepgen TL. Occupational skin diseases. JDDG: Journal der Deutschen Dermatologischen Gesellschaft. 2012;10(5):297-315.
11. Bashir S, Hassan I, Wani RT, Zeerak S, Shah FY. Pattern of Skin Diseases and Occupational Dermatoses among Paddy Field Workers in Kashmir Valley: A Cross-Sectional Study from North India. Indian J Community Med. 2021;46(4):610–3.
12. Saikia SB. Characteristics of surrounding regions of urban centres and its impact on regional development in Dibrugarh and Tinsukia districts, Assam.
13. Baruah S. Lessons of Assam. Economic and Political Weekly. 1986:282-4.
14. Sarkar R, Dasgupta P, Bhattacherjee S. Morbidity pattern of tea garden residents of Darjeeling, India. MRIMS J Health Sci. 2024;12(3):215-8.
15. Rahman MdS, Hasan ABMN, Jahan I, Sharif AB. Prevalence of scabies and its associated environmental risk factors among the Forcibly Displaced Myanmar Nationals living in the Cox's Bazar district of Bangladesh. J Mig Health. 2024;9:100220.
16. Shiva SS, Singh SK. Prevalence of occupational skin diseases among rice field workers in Haryana. Int J Comm Med Publ Heal. 2017(4):1011.
17. Haradanhalli RS, Prashanth RM, Kumari N, Siddhareddy I, Surendran J. Personal hygiene practices and related skin diseases among primary school children of urban poor locality. Int J Community Med Public Health. 2019;6(6):2526.
18. Gunathilaka N, Chandrasena N, Udayanga L. Prevalence of Ectoparasitic Infections and Other Dermatological Infections and Their Associated Factors among School Children in Gampaha District, Sri Lanka. Canadian J Infect Dis Med Microbiol. 2019;2(1):5827124.
19. Nawaz K, Khan S, Bibi A. Insights into scabies prevalence and risk factors. Bull Biol All Sci Res. 2024;2(1):68.
20. Khan M, Arfin I, Mahmood SE, Ahmad A, Bharti R, Ahmad N, et al. Prevalence and risk factors of scabies among school adolescents in urban Lucknow, India. 2022;1:16–9.

21. Nath B, Gupta SD, Kumari R. Assessing risk of skin lesions among people with diabetes: a case-control study from Uttarakhand, India. Iranian J Dermatol. 2022;1;25(2):111–6.

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