

## Epidemiological Assessment of Occupational Dermatoses among Rural Farmers

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### Abstract:

**Background:** Occupational dermatoses represent a significant proportion of work-related diseases worldwide and are particularly common among agricultural workers due to continuous exposure to chemicals, plant materials, ultraviolet radiation, and mechanical trauma. In India, epidemiological data on occupational dermatoses among rural farmers remain limited.

**Aim:** To assess the epidemiological profile, clinical pattern, and occupational risk factors associated with occupational dermatoses among rural farmers.

**Materials and Methods:** This observational, multicentric, cross-sectional study. A total of 115 rural farmers aged  $\geq 18$  years with clinically suspected occupational dermatoses were included. Detailed occupational history, clinical examination, and relevant investigations (KOH mount, Gram staining, patch testing where feasible) were performed. Data were analyzed using SPSS version 26.0. Categorical variables were expressed as frequencies and percentages. Chi-square test and logistic regression were applied where appropriate, with  $p < 0.05$  considered statistically significant.

**Results:** Of the 115 participants, 72 (62.6%) were males, and the majority (46.1%) belonged to the 31–50 years age group. Occupational contact dermatitis was the most common condition (38.3%), followed by photodermatoses (22.6%) and infective dermatoses (20.0%). Among contact dermatitis cases, irritant contact dermatitis (63.6%) predominated over allergic contact dermatitis (36.4%). Fungal infections (56.5%) were the most frequent infective dermatoses. Inadequate use of personal protective equipment (71.3%) and pesticide/fertilizer exposure (69.6%) were the most common occupational risk factors.

**Conclusion:** Occupational dermatoses pose a substantial health burden among rural farmers, with contact dermatitis being the predominant condition. Modifiable risk factors, particularly inadequate PPE use and chemical exposure, play a significant role. Strengthening occupational health education and preventive strategies is essential to reduce morbidity in this population.

**Keywords:** Occupational dermatoses; Dermatitis; Rural farmers; Agricultural workers; Epidemiology.

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### Introduction

Occupational dermatoses are among the most frequently reported occupational diseases worldwide and constitute a significant proportion of work-related morbidity. Occupational dermatoses not only affect quality of life but also contribute to work absenteeism, reduced productivity, and economic hardship in rural households [1]. Agricultural workers are continuously exposed to pesticides, fertilizers, plant allergens, soil microorganisms, wet work, mechanical trauma, and prolonged ultraviolet (UV) radiation. Keegel et al., (2012) specifically examined occupational skin disease in agriculture and reported that contact

dermatitis—both irritant and allergic—is the most prevalent dermatological condition among farmers, often linked to agrochemicals and plant materials [2]. Their work provided important epidemiological evidence regarding exposure patterns and preventive gaps in agricultural practice.

In the Indian context, Verma (2012) highlighted the growing burden of occupational skin disorders and pointed out deficiencies in reporting systems, limited occupational dermatology services, and inadequate awareness among workers [3]. This contribution emphasized the need for region-

specific epidemiological assessments in India. Furthermore, Feldmeier and Heukelbach (2009) described the high prevalence of infectious and inflammatory dermatoses in resource-poor settings, attributing the burden to poor hygiene, limited healthcare access, and occupational exposures common in rural populations [4].

Community-based epidemiological evidence further supports the burden of skin diseases in rural settings. Komba and Mgonda (2010), in a population-based study in rural communities, demonstrated a high prevalence of skin disorders and emphasized the influence of occupational and environmental factors on dermatological morbidity [5]. Their findings highlight the importance of community-level screening and preventive health interventions.

In India, agriculture employs a substantial proportion of the rural workforce, yet systematic epidemiological data on occupational dermatoses remain limited. Bashir et al., (2021) documented that 38.3% of paddy field workers in Kashmir Valley exhibited occupationally related skin lesions, with eczematous disorders being most common [6]. Additional Indian studies among fruit and field workers have reported significant proportions of frictional dermatitis, contact dermatitis, fungal infections, and photodermatoses linked to occupational exposure [7]. Poor use of personal protective equipment (PPE), lack of awareness regarding safe pesticide handling, and limited access to occupational health services further aggravate the burden [6,7].

### Aim & Objectives

**Aim:** To assess the epidemiological profile, clinical pattern, and occupational risk factors associated with occupational dermatoses among rural farmers.

### Objectives

- To determine the age and gender distribution of rural farmers affected by occupational dermatoses.
- To evaluate the overall pattern and frequency of different categories of occupational dermatoses.
- To analyze the distribution of specific types of occupational contact dermatitis and infective dermatoses.
- To identify major occupational exposure risk factors and examine their association with various dermatoses using appropriate statistical tests.

### Materials & Methods

**Study Design:** This study will be conducted as an observational, multicentric, cross-sectional epidemiological study designed to assess the prevalence, pattern, and associated risk factors of occupational dermatoses among rural farmers.

**Study Population:** The study population will comprise rural farmers engaged in agricultural activities who present with occupationally related skin lesions at selected rural healthcare centres.

A total of 115 participants will be included in the study.

**Study Place:** The study will be conducted at Department of Skin & V.D, Radha Devi Jageshwari Memorial Medical College & Hospital, Turki, Muzaffarpur, Bihar, India in collaboration with Department of Skin & V.D, Netaji Subhash Medical College, Amhara, Bihta, Patna, Bihar, India. These centres provide primary and secondary dermatological care to agricultural workers from surrounding rural areas.

**Study Period:** The study will be conducted over a period of nine months, from February 2025 to October 2025.

### Ethical Considerations

- Ethical clearance will be obtained from the Institutional Ethics Committee (IEC) prior to commencement of the study.
- Written informed consent will be obtained from all participants.
- Confidentiality of patient data will be strictly maintained.
- Participants will be free to withdraw from the study at any time without affecting their treatment.
- The study will adhere to the ethical principles outlined in the Declaration of Helsinki.

### Inclusion Criteria

- Individuals actively engaged in agricultural or farming activities
- Presence of clinically suspected occupationally related skin lesions
- Age  $\geq 18$  years
- Willingness to provide written informed consent

### Exclusion Criteria

- Non-occupational dermatological conditions
- Pre-existing chronic dermatoses unrelated to occupational exposure
- Individuals unwilling to participate
- Patients with incomplete clinical or exposure history

### Methodology

After obtaining informed consent, participants will undergo:

#### 1. Detailed Interview and History Taking

A pre-structured proforma will be used to collect:

- Demographic details (age, gender, education level)

- Type of agricultural work (pesticide spraying, harvesting, irrigation, etc.)
- Duration of occupational exposure (in years and hours per day)
- Type of chemicals handled
- Use of personal protective equipment (gloves, boots, masks, protective clothing)
- Hygiene practices (frequency of washing, bathing after work)
- History of similar lesions in co-workers

## 2. Clinical Examination

- Complete dermatological examination will be performed.
- Morphology, distribution, and pattern of lesions will be documented.
- Clinical diagnosis will be recorded.
- Photographic documentation will be done where consented.

### Investigations

Diagnostic investigations will be performed wherever clinically indicated:

- **Potassium Hydroxide (KOH) Mount** for fungal infections
- Gram staining for suspected bacterial infections
- Patch testing (where feasible) for suspected allergic contact dermatitis
- Other relevant laboratory investigations as required.

Diagnosis will be primarily clinical and supported by laboratory findings.

### Outcome Measures

#### Primary Outcome

- Prevalence of occupational dermatoses among rural farmers.

#### Secondary Outcomes

- Distribution of types of occupational dermatoses
- Association between duration of exposure and occurrence of dermatoses
- Association between PPE usage and type of dermatoses
- Identification of major occupational risk factors

**Statistical Analysis:** Data will be entered into Microsoft Excel (Microsoft 365 version) and subsequently exported to Statistical Package for the Social Sciences (SPSS) version 26.0 for analysis.

**Data Cleaning and Coding:** All variables will be coded numerically before analysis. Missing data will be checked and managed appropriately.

### Descriptive Statistics:

- Continuous variables (e.g., age, duration of exposure) will be expressed as mean  $\pm$  standard deviation (SD) if normally distributed.
- Non-normally distributed data will be expressed as median and interquartile range (IQR).
- Categorical variables (e.g., gender, type of dermatoses, PPE use) will be expressed as frequencies and percentages.

### Inferential Statistics:

- Chi-square test ( $\chi^2$  test) will be used to assess the association between categorical variables such as:
  - Occupational exposure type vs. type of dermatoses
  - PPE usage vs. occurrence of dermatoses
    - Fisher's exact test will be applied when expected cell counts are  $<5$ .
    - Independent t-test or Mann-Whitney U test will be used to compare continuous variables between two groups.
    - Binary logistic regression analysis will be performed to identify independent predictors of occupational dermatoses. Adjusted Odds Ratios (AOR) with 95% Confidence Intervals (CI) will be calculated.
- **Level of Significance:** A p-value  $<0.05$  will be considered statistically significant.
- **Graphical Representation:** Data will be presented using bar diagrams, pie charts, and frequency tables.

### Results

A total of 115 rural farmers with occupational dermatoses were evaluated. The results are presented under demographic profile, pattern of occupational dermatoses, specific diagnoses, and occupational risk factors.

**Table 1: Age and gender distribution of study population (n=115)**

Age group (years)	Male n (%)	Female n (%)	Total n (%)
18–30	18 (15.7)	10 (8.6)	28 (24.3)
31–50	35 (30.4)	18 (15.7)	53 (46.1)
51–60	12 (10.4)	9 (7.8)	21 (18.2)
>60	7 (6.1)	6 (5.3)	13 (11.4)
<b>Total</b>	<b>72 (62.6)</b>	<b>43 (37.4)</b>	<b>115 (100)</b>

Table 1 shows the age and gender distribution of the study population (n = 115). The majority of participants were males (72; 62.6%), while females constituted 43 (37.4%) of the study population.

The most common age group was 31–50 years, comprising 53 participants (46.1%). Among them, 35 (30.4%) were males and 18 (15.7%) were females. The second most represented age group

was 18–30 years with 28 participants (24.3%), including 18 males (15.7%) and 10 females (8.6%).

In the 51–60 years age group, 21 participants (18.2%) were observed, of which 12 (10.4%) were males and 9 (7.8%) were females. Participants aged more than 60 years constituted 13 (11.4%) of the study population, with 7 males (6.1%) and 6 females (5.3%).

**Table 2: Overall pattern of occupational dermatoses (n=115)**

Disease category	Number (n)	Percentage (%)
Occupational contact dermatitis	44	38.3
Photodermatoses	26	22.6
Infective dermatoses	23	20.0
Mechanical/traumatic dermatoses	15	13.0
Others	7	6.1
<b>Total</b>	<b>115</b>	<b>100</b>

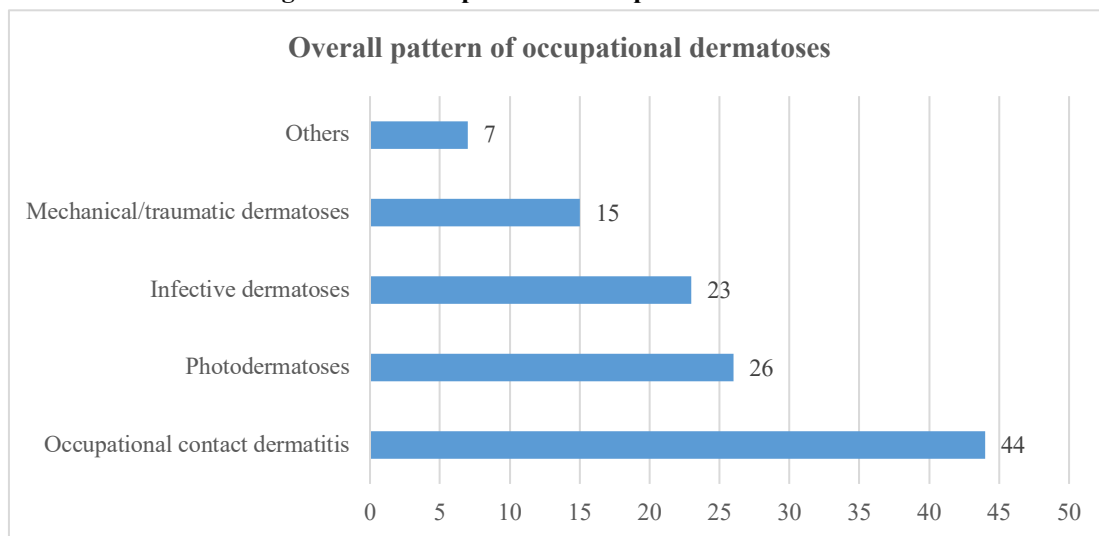
Table 2 and figure 1, shows the overall pattern of occupational dermatoses among the study population (n = 115). The most common condition observed was occupational contact dermatitis, accounting for 44 cases (38.3%).

The second most frequent category was photodermatoses, reported in 26 participants

(22.6%). This was followed by infective dermatoses, which were identified in 23 cases (20.0%).

Mechanical or traumatic dermatoses were observed in 15 participants (13.0%), while other dermatoses constituted the least common category, accounting for 7 cases (6.1%).

**Figure 1: Overall pattern of occupational dermatoses**



**Table 3: Pattern of occupational contact dermatitis (n=44)**

Type	Number (n)	Percentage (%)
Irritant contact dermatitis	28	63.6
Allergic contact dermatitis	16	36.4
<b>Total</b>	<b>44</b>	<b>100</b>

Table 3 shows the pattern of occupational contact dermatitis among affected participants (n = 44). The majority of cases were diagnosed as irritant contact dermatitis (ICD), accounting for 28 cases (63.6%).

Allergic contact dermatitis (ACD) was observed in 16 participants, representing 36.4% of cases.

**Table 4: Pattern of infective occupational dermatoses (n=23)**

Infection type	Number (n)	Percentage (%)
Fungal	13	56.5
Bacterial	7	30.4
Parasitic	3	13.1
<b>Total</b>	<b>23</b>	<b>100</b>

Table 4 shows the pattern of infective occupational dermatoses among affected participants (n = 23). The majority of cases were fungal infections, accounting for 13 cases (56.5%). Bacterial

infections were observed in 7 participants, representing 30.4% of cases. Parasitic infections constituted the least common category, with 3 cases (13.1%).

**Table 5: Occupational exposure profile of study participants**

Risk factor	Number (n)	Percentage (%)
Pesticide/fertilizer exposure	80	69.6
Plant material exposure	73	63.5
Prolonged sun exposure	67	58.3
Mechanical trauma	49	42.6
Inadequate PPE use	82	71.3

Table 5 presents the occupational exposure profile of the study participants (n = 115). The most commonly reported risk factor was inadequate use of personal protective equipment (PPE), observed in 82 participants (71.3%). This was followed by exposure to pesticides and fertilizers, which was reported by 80 participants (69.6%).

Exposure to plant materials, including crops, weeds, and other agricultural products, was documented in 73 participants (63.5%). Prolonged sun exposure was reported by 67 participants (58.3%), reflecting the outdoor nature of farming activities. Mechanical trauma, such as cuts, abrasions, and friction-related injuries, was noted in 49 participants (42.6%).

### Discussion

The present study demonstrates a clear male predominance (62.6%) among rural farmers with occupational dermatoses, with females constituting 37.4% of cases. This gender distribution is consistent with global occupational health patterns in agriculture, where male workers are more frequently involved in pesticide spraying, heavy field labor, and prolonged outdoor activities. The International Labour Organization (2011) reported that men constitute a larger proportion of the agricultural workforce engaged in high-risk tasks involving chemical exposure, thereby increasing susceptibility to occupational skin diseases [8].

The predominance of males in the present study aligns with findings by Keegel et al., (2012), who reported higher rates of occupational contact dermatitis among male agricultural workers in Australia, attributing this to differential task allocation and greater exposure to irritants and allergens [2].

With respect to age distribution, the highest proportion of cases (46.1%) was observed in the 31–50 years age group, followed by the 18–30 years group (24.3%). This suggests that occupational dermatoses predominantly affect individuals in the economically productive age group. Diepgen and Coenraads (1999) emphasized that occupational contact dermatitis is most prevalent among working-age adults, particularly those with cumulative exposure over several years [1]. The increased representation of the 31–50 years age group in the present study may reflect prolonged duration of exposure to pesticides, fertilizers, wet work, and ultraviolet radiation.

Younger workers (18–30 years) also demonstrated a substantial proportion of cases (24.3%), which may indicate early occupational exposure and lack of awareness regarding preventive measures. Lushniak (2004) stressed that insufficient training in occupational safety and limited use of personal protective equipment among younger workers contribute significantly to dermatological morbidity [9].

The relatively lower proportion of cases in the >60 years age group (11.4%) may be attributable to reduced work intensity or partial retirement from physically demanding agricultural tasks. However, chronic cumulative exposure to solar ultraviolet radiation remains a concern in older agricultural workers. Diffey (2004) explained that chronic UV exposure leads to cumulative skin damage, predisposing outdoor workers to photodermatoses and actinic changes over time [10].

Community-based epidemiological data from rural settings also support the age pattern observed in the present study. Komba and Mgonda (2010) reported that skin diseases in rural communities were most prevalent among economically active adults,

correlating with occupational exposure intensity [5]. Furthermore, Feldmeier and Heukelbach (2009) noted that in resource-poor rural environments, occupational and environmental factors disproportionately affect working-age populations due to direct exposure and limited access to preventive healthcare [4].

The present study revealed that occupational contact dermatitis was the most prevalent dermatosis, accounting for 38.3% of cases among rural farmers. This finding is consistent with established occupational dermatology literature, which identifies contact dermatitis—both irritant and allergic—as the leading occupational skin disease globally. Keegel et al., (2012) reported that contact dermatitis is the most common dermatological condition among agricultural workers due to repeated exposure to pesticides, fertilizers, and plant materials [2]. The predominance of contact dermatitis in the present study likely reflects frequent handling of agrochemicals and inadequate use of personal protective equipment (PPE).

Photodermatoses were the second most common category (22.6%) in the current study. Prolonged exposure to solar ultraviolet (UV) radiation is a well-documented occupational hazard among outdoor workers. The International Labour Organization (2011) recognized solar radiation as a significant occupational hazard in agriculture, contributing to dermatological morbidity [8]. The high proportion of photodermatoses in the present study underscores the need for sun-protective measures in farming communities.

Infective dermatoses accounted for 20.0% of cases in this study. Rural agricultural settings often involve exposure to soil, water, animal waste, and humid environments, which predispose workers to fungal and bacterial infections. Feldmeier and Heukelbach (2009) highlighted that infectious skin diseases are common in resource-poor rural settings due to occupational exposure combined with limited hygiene facilities and healthcare access [4].

Mechanical or traumatic dermatoses constituted 13.0% of cases. These conditions may result from repetitive friction, minor injuries, and contact with agricultural tools and plant materials. Verma (2012) noted that mechanical trauma and frictional dermatitis are frequent yet underreported occupational skin conditions in Indian agricultural workers [3]. The lower proportion observed in the present study may indicate either underreporting or overshadowing by more symptomatic inflammatory dermatoses.

In the present study, irritant contact dermatitis (ICD) constituted the majority of occupational contact dermatitis cases (63.6%), while allergic contact dermatitis (ACD) accounted for 36.4%. This

predominance of ICD among rural farmers is consistent with the established understanding that repeated exposure to chemical irritants, wet work, and frictional trauma plays a major role in agricultural settings.

Keegel et al., (2012), in their review of occupational skin diseases in agriculture, also emphasized that irritant mechanisms predominate in farming communities due to direct chemical and mechanical exposure [2]. They highlighted that inadequate use of protective gloves and frequent wet work increase the risk of barrier disruption, supporting the findings of the current study.

Allergic contact dermatitis (36.4%) in the present study remains clinically significant. Agricultural workers may develop sensitization to pesticides, rubber components of gloves, plant allergens, and preservatives. Spiewak (2003), in his epidemiological analysis of occupational dermatoses among farmers, demonstrated that allergic contact dermatitis constituted a substantial proportion of occupational skin diseases, often linked to agrochemicals and plant-derived allergens [11]. Patch-test confirmed sensitization to pesticides has been reported in multiple agricultural cohorts. Guo et al., (1996) found evidence of skin sensitization to commonly used pesticides among fruit farmers, supporting the allergic component observed in agricultural dermatoses [12].

The predominance of ICD over ACD in the present study may also reflect limited access to patch testing facilities in rural settings, potentially leading to underdiagnosis of allergic etiologies. Verma (2012) noted that in India, occupational dermatoses are frequently under-investigated due to limited occupational dermatology services, which may affect the accurate differentiation between irritant and allergic types [3].

The present study demonstrated that fungal infections constituted the predominant category of infective occupational dermatoses (56.5%), followed by bacterial (30.4%) and parasitic infections (13.1%). This pattern is consistent with the occupational profile of rural farmers, who are frequently exposed to humid environments, soil, decaying vegetation, and prolonged occlusion due to protective clothing, all of which predispose to superficial fungal infections.

Fungal infections being the most common infective dermatoses among agricultural workers has been widely reported in the literature. Sharma and Khandpur (2016) observed that dermatophytosis and candidal infections were common among farmers due to continuous exposure to moisture, perspiration, and occlusive footwear in tropical climates [13]. Similarly, Handa et al. (2012) reported a higher prevalence of fungal dermatoses in

rural agricultural populations in North India, attributing it to poor hygiene practices and repeated minor trauma facilitating fungal invasion [14]. In a cross-sectional study among paddy field workers, Mahajan and Sharma (2014) found that fungal infections accounted for more than half of occupational infective dermatoses, reinforcing the role of wet working conditions and maceration [15].

Bacterial infections (30.4%) were the second most common infective dermatoses in the present study. Agricultural activities frequently involve minor cuts, abrasions, and insect bites, which serve as portals of entry for bacteria such as *Staphylococcus aureus* and *Streptococcus pyogenes*. Ghosh et al. (2018) documented a significant proportion of pyoderma and folliculitis among rural laborers, associating these conditions with poor sanitation and delayed treatment [16]. Likewise, Parasitic infections constituted 13.1% of infective dermatoses in the current study. Scabies and cutaneous parasitic infestations are known to occur in overcrowded rural settings with limited access to healthcare. Kuruvila et al. (2015) reported that parasitic infestations, though less frequent than fungal and bacterial infections, remain a persistent problem in rural communities due to close contact living conditions and inadequate hygiene [17]. Hay et al. (2014), in the Global Burden of Disease Study, emphasized that parasitic skin diseases continue to contribute significantly to morbidity in low- and middle-income countries, particularly among agrarian populations [18].

The present study demonstrates that inadequate use of personal protective equipment (PPE) (71.3%) and pesticide/fertilizer exposure (69.6%) were the predominant occupational risk factors among rural farmers. These findings are consistent with recent global and regional evidence highlighting agriculture as a high-risk occupation for occupational dermatoses. John et al. (2022) reported that improper handling of pesticides and low compliance with protective measures were strongly associated with dermatological complaints among rural farming communities in low- and middle-income countries [19].

Recent epidemiological data further support the association between pesticide exposure and occupational skin disorders. Smit et al. (2020) observed that chronic exposure to organophosphates and pyrethroids was linked to increased rates of irritant dermatitis and photosensitive reactions among farm workers.[20] In an Indian context, Sharma and Kaur (2021) documented that more than two-thirds of agricultural workers reported direct skin contact with fertilizers and pesticides, correlating significantly with inflammatory dermatoses.[21]

Plant material exposure (63.5%) observed in the present study is also in agreement with contemporary literature. Warshaw et al. (2020) highlighted that plant allergens, including *Parthenium hysterophorus* and other compositae species, remain common causes of phytodermatitis among agricultural laborers [22]. A multicentric Indian study by Handa et al. (2023) demonstrated a high prevalence of plant-induced contact dermatitis among farmers, particularly during harvesting seasons, emphasizing the occupational relevance of plant allergens in rural settings

Prolonged sun exposure (58.3%) in this study reflects the occupational reality of outdoor agricultural labor. More recently, Schmitt et al. (2022) documented that agricultural workers had a significantly higher risk of UV-induced skin disorders compared to indoor workers, particularly in tropical and subtropical regions [24]. Limited access to photoprotective measures further compounds this risk in rural communities.

Mechanical trauma (42.6%) was another important occupational exposure identified. Recurrent minor trauma disrupts the skin barrier and predisposes individuals to secondary infections and chronic dermatoses. Patel et al. (2024) reported that microtrauma associated with farming tools and crop handling was independently associated with higher rates of infective dermatoses among rural Indian farmers [25].

#### Limitations of the Study

- The study design was observational and cross-sectional in nature; therefore, causal relationships between occupational exposure and dermatoses could not be definitively established.
- The sample size was limited to 115 participants from selected rural healthcare centres, which may limit the generalizability of the findings to other regions.
- Diagnosis was primarily clinical, supported by basic laboratory investigations, and advanced diagnostic modalities such as patch testing were not uniformly performed in all cases.
- Occupational exposure data were largely based on self-reporting, which may introduce recall bias.
- Seasonal variations in agricultural activities were not separately analyzed, which might influence the pattern of dermatoses.

#### Conclusion

The present study, authors found that occupational dermatoses constitute a significant health burden among rural farmers, predominantly affecting males in the economically productive age group of 31–50 years. Occupational contact dermatitis emerged as the most common dermatological condition,

followed by photodermatoses and infective dermatoses. Among contact dermatitis cases, irritant contact dermatitis was more prevalent than allergic contact dermatitis. Among infective dermatoses (n = 23), fungal infections constituted the majority.

A high prevalence of modifiable occupational risk factors was observed, notably inadequate use of personal protective equipment and pesticide/fertilizer exposure. These findings highlight the need for improved occupational health awareness, consistent PPE usage, safe chemical handling practices, and regular dermatological screening among agricultural workers.

Strengthening occupational health education, promoting regular use of PPE, and implementing preventive strategies at the community level are essential to reduce the burden of occupational skin diseases and improve the quality of life of rural farming populations.

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## References

- Diepgen TL, Coenraads PJ. The epidemiology of occupational contact dermatitis. *Int Arch Occup Environ Health*. 1999;72(8):496-506.
- Keegel T, Cahill J, Nixon R. Occupational skin disease in agriculture. *Aust J Dermatol*. 2012;53(2):97-103.
- Verma SB. Occupational skin disorders in India. *Indian J Dermatol*. 2012;57(6):421-423.
- Feldmeier H, Heukelbach J. Skin diseases in resource-poor settings. *Trop Med Int Health*. 2009;14(12):1529-1540.
- Komba EV, Mgonda YM. The spectrum of skin diseases in rural communities: A population-based study. *BMC Public Health*. 2010;10:765.
- 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):610-613.
- Hassan I, Bhat YJ, et al. Profile of dermatological disorders among workers involved in fruit growing industry of Kashmir Valley. *Indian Dermatol Online J*. 2022;13(1):30-35.
- International Labour Organization. Safety and health in agriculture. Geneva: International Labour Office; 2011.
- Lushniak BD. The importance of occupational skin diseases. *Curr Opin Allergy Clin Immunol*. 2004;4(2):115-119.
- Diffey BL. Solar ultraviolet radiation effects on skin. *Phys Med Biol*. 2004;49(1):R1-R23.
- Spiewak R. Occupational dermatoses among Polish private farmers, 1991-1999. *Am J Ind Med*. 2003;43(6):647-655.
- Guo YL, Wang BJ, Lee CC, Wang JD. Prevalence of dermatoses and skin sensitisation associated with use of pesticides in fruit farmers of southern Taiwan. *Occup Environ Med*. 1996;53(6):427-431.
- Sharma VK, Khandpur S. Occupational dermatoses in India. *Indian J Dermatol Venereol Leprol*. 2016;82(4):413-423. p.415-418.
- Handa S, De D, Mahajan R. Occupational dermatoses in rural India: A clinical study. *Indian J Dermatol Venereol Leprol*. 2012;78(5):560-565. p.561-563.
- Mahajan R, Sharma NL. Pattern of occupational dermatoses among agricultural workers. *Indian J Dermatol*. 2014;59(6):632-636. p.633-634.
- Ghosh SK, Bandyopadhyay D, Chatterjee G. Occupational skin diseases among rural workers: A clinico-epidemiological study. *Indian Dermatol Online J*. 2018;9(3):145-150. p.147-148.
- Kuruwila M, Sridhar KS, Kumar P. Prevalence of common skin diseases in rural South India. *Int J Dermatol*. 2015;54(6):e209-e214. p.e211-e212.
- Hay RJ, Johns NE, Williams HC, Bolliger IW, Dellavalle RP, Margolis DJ, et al. The global burden of skin disease in 2010: An analysis of the Global Burden of Disease Study 2010. *J Invest Dermatol*. 2014;134(6):1527-1534. p.1530-1532.
- John SM, Uter W, Schwanitz HJ. Occupational contact dermatitis in agriculture: Current perspectives. *Contact Dermatitis*. 2022;86(4):245-256.
- Smit LA, Heederik D, Kromhout H. Pesticide exposure and dermatologic effects among agricultural workers: A longitudinal study. *Occup Environ Med*. 2020;77(9):604-610.
- Sharma A, Kaur S. Occupational dermatoses among agricultural workers in North India: A cross-sectional study. *Indian J Dermatol Venereol Leprol*. 2021;87(5):654-660.

22. Warshaw EM, Maibach HI, Taylor JS, Sasseville D, DeKoven JG, Zirwas MJ, et al. North American Contact Dermatitis Group patch test results: 2017–2018. *Dermatitis*. 2020;31(1):29–43.
23. Handa S, Mahajan R, De D. Occupational contact dermatitis in Indian farmers: A multicentric observational study. *Indian Dermatol Online J*. 2023;14(3):345–352.
24. Schmitt J, Seidler A, Diepgen TL. Occupational UV exposure and skin disease risk among outdoor workers. *J Eur Acad Dermatol Venereol*. 2022;36(6):892–899.
25. Patel D, Singh R, Kumar P. Occupational skin disorders among rural agricultural workers in India: Emerging trends and preventive strategies. *J Family Med Prim Care*. 2024;13(2):512–518.