Section: Miscellaneous

Original Research Article

# ASSESSING THE PREVALENCE OF OCCUPATIONAL DERMATITIS AND ASSOCIATION RISK FACTORS AMONG BUILDING CONSTRUCTION WORKERS IN KALABURAGI KARNATAKA

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ABSTRACT

**Background:** Occupational contact dermatitis is one of the most common work-related skin disorders, particularly among construction workers who are frequently exposed to chemical and physical irritants. Despite rapid infrastructural growth in India, region-specific data on occupational dermatitis among construction workers remain limited. The objective is to assess the prevalence of occupational dermatitis and identify associated occupational and behavioral risk factors among building construction workers in Kalaburagi, Karnataka.

**Materials and Methods:** A cross-sectional study was conducted among 100 construction workers employed at various building and civil construction sites in Kalaburagi from May to July 2025. Data were collected using a structured questionnaire covering demographic details, occupational exposure, hygiene practices, PPE usage, and skin-related symptoms. Data were analyzed using Microsoft Excel and IBM SPSS version 22.0. Categorical variables were expressed as frequencies and percentages, and associations were assessed using the Chi-square test with a significance level of $p<0.05$.

**Results:** The prevalence of occupational dermatitis was 34%. Higher prevalence was observed among painters (53.85%), welders (44.44%), and supervisors (41.67%). Younger workers (18–30 years), those with longer work experience, and males showed higher prevalence. Inconsistent use of PPE, inadequate hand hygiene practices, and prolonged exposure to irritants were significantly associated with dermatitis. Common symptoms included redness, itching, pain, blistering, and cracking, with hands and legs being the most commonly affected sites.

**Conclusion:** Occupational dermatitis is a significant yet preventable occupational health problem among construction workers in Kalaburagi. Strengthening PPE compliance, improving hygiene facilities, and implementing regular occupational health surveillance are essential to reduce disease burden.

**Keywords:** Occupational dermatitis; Construction workers; Contact dermatitis; Personal protective equipment; Occupational health; Kalaburagi.

## INTRODUCTION

Occupational skin diseases (OSDs) are among the most frequently reported work-related health problems worldwide, particularly in occupations involving continuous exposure to chemical and physical agents. Among these conditions, occupational contact dermatitis (OCD) constitutes the majority, accounting for nearly 90% of all occupational skin disorders, and is a major cause of morbidity, work absenteeism, and reduced productivity among affected workers.[1,2] The burden

of occupational dermatitis is disproportionately higher in developing countries due to inadequate occupational safety regulations, limited access to health care, and poor surveillance mechanisms.[3]

The construction industry is recognized as a high-risk occupation for occupational dermatitis because of regular exposure to cement, lime, chromates, paints, solvents, adhesives, resins, and metal dusts. Construction workers are routinely engaged in activities such as mixing cement, plastering, painting, welding, and plumbing, which result in repeated and prolonged skin contact with irritant and allergenic substances capable of disrupting the skin barrier and inducing inflammatory reactions.[4–6] Inadequate and inconsistent use of personal protective equipment (PPE) further increases the risk of dermatitis in this occupational group.

Occupational contact dermatitis is broadly classified into irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD). ICD occurs due to cumulative skin damage following repeated exposure to irritants, while ACD results from immunological sensitization to specific allergens such as hexavalent chromium present in cement and chemicals used in paints and adhesives.[7–9] In construction workers, both forms often coexist due to mixed and continuous exposure to multiple agents at the workplace.

The reported prevalence of occupational dermatitis varies depending on geographic region, occupational setting, and diagnostic criteria. Global estimates suggest prevalence rates ranging from 5% to 20% among general working populations; however, studies among construction workers have documented substantially higher rates, often exceeding 30%.[10–12] Indian studies have highlighted inadequate PPE usage, poor hygiene practices, and lack of awareness as key contributors to the high burden of occupational skin diseases among construction workers.[7,8]

Environmental factors such as high temperature, humidity, excessive sweating, and dust exposure, commonly observed in tropical regions, further compromise skin integrity and enhance susceptibility to dermatitis.[10] Despite the availability of preventive measures such as gloves, boots, barrier creams, and proper hygiene practices, compliance remains suboptimal among construction workers due to discomfort, lack of training, and poor enforcement of safety norms.[5,6]

In India, the construction sector is one of the largest employment-generating industries and plays a vital role in infrastructure development and economic growth. Nevertheless, occupational health issues, particularly skin disorders, remain under-recognized and under-reported. Most construction workers belong to socio-economically disadvantaged groups, are employed in the informal sector, and have limited access to occupational health services and regular medical screening.[13-15]

Kalaburagi district in Karnataka has experienced rapid infrastructural growth in recent years, leading to an expanding construction workforce. However, region-specific data on the prevalence of occupational dermatitis and its associated risk factors in this area are scarce. Assessing the magnitude of occupational dermatitis and identifying modifiable risk factors is essential for planning targeted preventive strategies, improving workplace safety, and strengthening occupational health policies.

Therefore, the present study was undertaken to assess the prevalence of occupational dermatitis and its associated risk factors among building construction workers in Kalaburagi, Karnataka, with the objective of generating evidence to support effective occupational health interventions and policy formulation.

## MATERIALS AND METHODS

This study was a cross-sectional observational study conducted to assess the prevalence of occupational dermatitis and its associated risk factors among building construction workers.

The study was carried out in Kalaburagi district, Karnataka, encompassing multiple active building and civil construction sites across the city.

The study was conducted over a period of three months, from 14 May 2025 to 30 July 2025.

The study population comprised building construction workers employed at various construction sites in Kalaburagi, Karnataka. Workers engaged in different construction activities such as cement handling, masonry, welding, painting, plumbing, and general labor were included. Priority was given to workers with direct and frequent contact with materials known to cause skin irritation or sensitization.

**Inclusion Criteria**

- Active construction workers currently employed at the selected construction sites
- Workers exposed to potential occupational skin irritants such as cement, chemicals, solvents, paints, or adhesives

**Exclusion Criteria**

- Workers with pre-existing or diagnosed skin diseases unrelated to occupational exposure
- Part-time or temporary workers not regularly exposed to construction activities

**Sample Size Calculation**

The sample size was calculated based on a previous Indian study by Agrawal et al. (2019), which reported a 38% prevalence of occupational skin diseases among construction workers.[1] Using this prevalence as the reference, the minimum required sample size was calculated to be 91 participants.

To account for possible non-response or incomplete data (10% attrition), the sample size was adjusted as follows: 91 + 10% of 91 ≈ 100, Thus, the final sample size was 100 construction workers.

**Sampling Technique**

A convenience sampling method was employed. Eligible workers were selected from multiple construction sites in Kalaburagi after obtaining

informed consent. Workers representing diverse occupational roles such as masons, painters, welders, plumbers, electricians, and laborers were included to ensure adequate representation of exposure patterns.

**Study Tool and Data Collection**

Data were collected using a structured, pre-designed questionnaire administered through face-to-face interviews. The questionnaire was designed to capture information on:

**A. Demographic Details**

- Age
- Gender
- Years of experience in construction work

**B. Exposure-Related Information**

- Type of construction work and job role
- Materials frequently handled (cement, adhesives, chemicals, paints, solvents)
- Duration and frequency of exposure
- Hand hygiene practices at the workplace
- Use of personal protective equipment (PPE)

**C. Skin Health Assessment**

- Self-reported history of occupational dermatitis
- Symptoms experienced (redness, itching, pain, cracking, blistering, dryness)
- Duration of symptoms
- Affected body sites
- History of any previous medical consultation for skin problems

**Statistical Analysis:** The collected data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics for Windows, Version 22.0. Descriptive statistics were used to summarize the data, with categorical variables expressed as frequencies and percentages. Data were presented in tabular form and illustrated using bar and pie charts. The association between occupational risk factors and the presence of occupational dermatitis was assessed using the Chi-square test. A p-value of $<0.05$ was considered statistically significant.

## RESULTS

[Table 1] presents the demographic characteristics of the study participants. The majority of construction workers belonged to the 31–45 years age group (41%), followed by 18–30 years (32%) and 46–60 years (27%), indicating that most workers were in the economically productive age group. The study population was predominantly male (87%), reflecting the male-dominated nature of construction work, while females constituted 11% and other genders 2%. Regarding religion, Hindus formed the largest group (51%), followed by Christians (34%) and Muslims (15%). Although religion has no direct biological association with dermatitis, it may influence hygiene practices and health-seeking behavior.

**Table 1: Demographic profile of study population (n=100)**

| Parameters | Frequency | Percentage |
|---|---|---|
| Age (years) | | |
| 18–30 | 32 | 32% |
| 31–45 | 41 | 41% |
| 46–60 | 27 | 27% |
| Gender | | |
| Male | 87 | 87% |
| Female | 11 | 11% |
| Other | 2 | 2% |
| Religion | | |
| Christian | 34 | 34% |
| Hindu | 51 | 51% |
| Muslim | 15 | 15% |

[Table 2] describes the occupational distribution, work experience, working hours, and type of construction work among the study participants. Masons (23%) formed the largest occupational group, followed by plumbers (18%) and painters (13%), all of whom are frequently exposed to cement, chemicals, and solvents. Most workers had 5–10 years of experience (40%), indicating prolonged occupational exposure. More than half of the workers (55%) worked ≤8 hours per day, while 45% worked for more than 8 hours. A majority of workers (72%) were involved in complex construction activities, which generally involve multiple hazardous exposures and may increase the risk of occupational dermatitis.

**Table 2: Occupational Characteristics and Work Profile of Construction Workers**

| Parameters | Frequency | Percentage |
|---|---|---|
| Occupation | | |
| Tiles & Plastering | 7 | 7% |
| Electrician | 8 | 8% |
| Labourer | 10 | 10% |
| Mason | 23 | 23% |
| Painter | 13 | 13% |
| Plumber | 18 | 18% |
| Supervisor | 12 | 12% |
| Welder | 9 | 9% |
| Experience | | |

| | | |
|---|---|---|
| < 5 years | 27 | 27% |
| 5 – 10 years | 40 | 40% |
| 11 – 15 years | 10 | 10% |
| > 15 years | 23 | 23% |
| Working Hours | | |
| ≤ 8 hours | 55 | 55% |
| > 8 hours | 45 | 45% |
| Type of Construction | | |
| Complex | 72 | 72% |
| Simple | 28 | 28% |

[Table 3] highlights hand hygiene practices, sources of water used for handwashing, and PPE utilization. Only 25% of workers practiced handwashing before, during, and after work, while others followed incomplete hygiene routines, potentially compromising skin barrier integrity. Tap water (57%) was the most commonly used water source, though a substantial proportion relied on wells (30%) and ponds (13%), which may affect hygiene quality. PPE usage was inconsistent, with only 39% always using PPE, while 43% used it sometimes and 18% never used PPE, indicating a major gap in occupational safety practices.

**Table 3: Hygiene Practices and Use of Personal Protective Equipment among Construction Workers**

| Parameters | Frequency | Percentage |
|---|---|---|
| Hand Hygiene Practice | | |
| During breaks | 23 | 23% |
| After work | 24 | 24% |
| Before work | 28 | 28% |
| All three | 25 | 25% |
| Water Source for Handwashing | | |
| Well | 30 | 30% |
| Tap | 57 | 57% |
| Pond | 13 | 13% |
| Use of PPE | | |
| Always | 39 | 39% |
| Sometimes | 43 | 43% |
| Never | 18 | 18% |

[Table 4] shows the prevalence and clinical characteristics of occupational dermatitis. Contact dermatitis was present in 34% of workers, indicating a substantial occupational health burden. Commonly reported symptoms included redness (14%), pain (13%), itching (12%), and blistering (11%), while cracking (17%) suggested more chronic or severe disease. Most affected workers experienced symptoms for 1–6 months (70.6%), indicating ongoing exposure. The legs (12%) and hands (11%) were the most commonly affected body sites, consistent with direct contact during construction activities.

**Table 4: Prevalence, Clinical Features, and Pattern of Occupational Dermatitis**

| Parameters | Frequency | Percentage |
|---|---|---|
| Contact Dermatitis | | |
| No | 66 | 64% |
| Yes | 34 | 34%% |
| Symptoms | | |
| Pain | 13 | 13% |
| Redness | 14 | 14% |
| Blistering | 11 | 11% |
| Cracking | 7 | 17% |
| Itching | 12 | 12% |
| Dryness | 9 | 9% |
| Duration Symptoms | | |
| 1–6 months | 24 | 70.60% |
| 7–12 months | 7 | 20.60% |
| > 12 months | 2 | 5.90% |
| Area Affected | | |
| Arms | 4 | 4% |
| Face | 4 | 4% |
| Hands | 11 | 11% |
| Legs | 12 | 12% |
| Ankel & Foot | 9 | 9% |

[Table 5] depicts the distribution of occupational dermatitis across various demographic and occupational variables. The highest prevalence was observed among painters (53.85%), followed by

welders (44.44%) and supervisors (41.67%), reflecting higher exposure to chemical irritants and fumes. Males showed a higher prevalence (35.63%) compared to females (27.27%). Dermatitis prevalence was highest in the 18–30 years age group (37.5%), possibly due to heavier workloads and lower safety awareness. Workers with 11–15 years of experience (40%) and those working ≤8 hours showed notable prevalence, suggesting cumulative exposure effects. Interestingly, workers who sometimes used PPE (39.53%) had higher prevalence than those who always used PPE, indicating improper or inconsistent use.

**Table 5: Prevalence of Occupational Dermatitis According to Socio-Demographic and Occupational Factors**

| Parameter | Total workers | Affected workers | Percentage affected (%) |
|---|---|---|---|
| Occupation | | | |
| Tiles & Plastering | 7 | 2 | 28.57% |
| Electrician | 8 | 1 | 12.50% |
| Labourer | 10 | 3 | 30% |
| Mason | 23 | 6 | 26.09% |
| Painter | 13 | 7 | 53.85% |
| Plumber | 18 | 6 | 33.33% |
| Supervisor | 12 | 5 | 41.67% |
| Welder | 9 | 4 | 44.44% |
| Gender | | | |
| Male | 87 | 31 | 35.63% |
| Female | 11 | 3 | 27.27% |
| Age | | | |
| 18–30 Years | 32 | 12 | 37.50% |
| 31–45 Years | 41 | 13 | 31.71% |
| 46–60 Years | 27 | 9 | 33.33% |
| Year of Experience | | | |
| < 5 years | 27 | 7 | 25.93% |
| 5 – 10 years | 40 | 14 | 35% |
| 11 – 15 years | 10 | 4 | 40% |
| > 15 years | 23 | 9 | 39.13% |
| Working Hours | | | |
| ≤ 8 hours | 55 | 20 | 36.36% |
| > 8 hours | 45 | 14 | 31.11% |
| Use of PPE | | | |
| Always | 39 | 14 | 35.90% |
| Sometimes | 43 | 17 | 39.53 |
| Never | 18 | 3 | 16.67% |

**Figure 1: Contact dermatitis at different sites of body**

## DISCUSSION

Occupational contact dermatitis is one of the most common occupational skin diseases worldwide and remains a major cause of morbidity among workers exposed to chemical and physical irritants. The present cross-sectional study assessed the prevalence and associated risk factors of occupational dermatitis among construction workers in Kalaburagi, Karnataka, and revealed a prevalence of 34%, indicating a substantial occupational health burden in this vulnerable workforce. This finding is comparable with several Indian studies reporting prevalence ranging from 30% to 40% among construction workers.[12,16]

**Demographic Profile and Occupational Exposure**

The majority of workers in this study belonged to the 31–45 years age group, representing the most economically productive population. However, the highest prevalence of dermatitis was observed in the 18–30 years age group (37.5%), suggesting that younger workers may be more susceptible due to heavier workloads, limited experience, and inadequate awareness regarding occupational hazards and protective measures. Similar age-related trends have been reported by Sharma and Khandpur and Singh et al., who attributed higher prevalence in

younger workers to improper PPE usage and poor safety training.[7,17]

The study population was predominantly male (87%), consistent with the male-dominated nature of the construction industry in India. Males also demonstrated a higher prevalence of occupational dermatitis (35.63%) compared to females (27.27%), which may be explained by greater involvement of males in high-risk construction activities such as masonry, welding, and painting. Comparable findings have been reported in earlier Indian and international studies.[7,8]

**Occupational Role and Risk of Dermatitis**

Occupation-specific analysis revealed that painters (53.85%), welders (44.44%), and supervisors (41.67%) had the highest prevalence of dermatitis. Painters are frequently exposed to solvents, resins, and pigments, while welders encounter metal fumes and heat-related skin injury. Supervisors, despite limited manual labor, may still experience intermittent exposure without consistent PPE use. Similar occupational patterns have been documented by Liden and Dickel et al., who highlighted the strong association between chemical exposure and allergic or irritant contact dermatitis in construction-related jobs.[18,19]

Workers with 11–15 years of experience (40%) and those with more than 15 years of experience (39.13%) showed higher prevalence, supporting the concept of cumulative exposure and chronic skin barrier damage. However, even workers with less than 5 years of experience showed considerable prevalence (25.93%), indicating that dermatitis can develop early in the absence of adequate preventive practices. These findings align with those of Agrawal et al. and Mahler and Diepgen, who emphasized cumulative as well as early occupational exposure as important determinants.[12,14]

**Hygiene Practices and PPE Utilization**

Hand hygiene practices among workers were suboptimal, with only 25% practicing handwashing before, during, and after work. Poor hygiene contributes to prolonged retention of irritants on the skin, increasing the risk of dermatitis. Although tap water was the most common water source, reliance on wells and ponds by a significant proportion raises concerns regarding water quality and effective cleansing. Similar hygiene-related risk factors have been highlighted in studies by Agner and Johansen and Ghasemi et al.[20,21]

PPE utilization was inconsistent, with only 39% always using PPE, while 43% used it sometimes and 18% never used PPE. Interestingly, workers who reported intermittent PPE use showed the highest prevalence of dermatitis (39.53%), suggesting incorrect usage, poor-quality equipment, or false reassurance leading to continued exposure. This paradoxical finding has been previously noted in studies by Dickel et al. and HSE guidelines, emphasizing that improper PPE use offers inadequate protection.[5,19]

**Clinical Pattern of Occupational Dermatitis:** The clinical presentation observed in this study is consistent with occupational contact dermatitis. The most commonly reported symptoms were redness, pain, itching, blistering, and cracking, indicating both acute and chronic inflammatory changes. Cracking, reported by 17% of workers, suggests chronicity and repeated exposure. The majority of affected workers experienced symptoms for 1–6 months, reflecting ongoing exposure without adequate intervention.

The hands and legs were the most commonly affected body sites, which is expected due to direct contact with irritants and lack of protective gloves or footwear. Similar site distribution has been documented in earlier studies from India and Europe.[4,9]

**Public Health and Occupational Health Implications:** The findings of this study highlight that occupational dermatitis among construction workers is common, preventable, and largely under-recognized. Factors such as poor hygiene, inconsistent PPE use, prolonged exposure, and lack of awareness significantly contribute to disease burden. International bodies such as WHO and ILO have emphasized the importance of occupational health surveillance, worker education, and enforcement of safety regulations to reduce work-related skin diseases.[22]

The high prevalence observed in Kalaburagi underscores the need for regular dermatological screening, mandatory PPE enforcement, and targeted health education programs at construction sites. Addressing occupational dermatitis not only improves worker health and quality of life but also enhances productivity and reduces economic losses.

## CONCLUSION

This study demonstrates that occupational dermatitis is a common occupational health problem among construction workers in Kalaburagi, with a prevalence of 34%. Higher occurrence was observed among painters, welders, supervisors, younger workers, and those with longer work experience, indicating a strong association with occupational exposure. Inconsistent use of personal protective equipment, inadequate hygiene practices, and prolonged contact with irritants were identified as key contributory factors. The findings highlight that occupational dermatitis among construction workers is largely preventable through improved awareness, consistent PPE use, better hygiene facilities, and regular health surveillance. Strengthening workplace safety measures and occupational health interventions is essential to reduce disease burden and improve worker well-being.

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