



Original Research Article

Prevalence and Determinants of Hand Dermatitis among Healthcare Workers

Article History:

Name of Author:

¹Arphool Israfil Khan, ²Nivita Narayan Nannaware, ³Isarafil Siddiqui, ⁴Shahbaz Khan

Affiliation: ¹Assistant Professor, Department of Dermatology Madhav Prasad Tripathi medical College, Siddharth Nagar, Uttar Pradesh, India

²Intern, Symboisis Medical College and University, Pune, Maharashtra, India.

³Junior Resident, Autonomous State Medical College, Kushinagar, Uttar Pradesh, India

⁴MBBS, Bashkir, State Medical University UFA, Russia

Corresponding Author:

Arphool Israfil Khan

Received: 12-09-2025

Revised: 23-09-2025

Accepted: 20-10-2025

Published: 30-10-2025

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Abstract. Background: Hand dermatitis is a frequent occupational condition among healthcare workers (HCWs), largely attributed to repeated exposure to irritants and allergens in the workplace. It can significantly impact quality of life and work efficiency. This study aimed to determine the prevalence and identify determinants of hand dermatitis among HCWs in a tertiary care setting. **Material and Methods:** A cross-sectional study was conducted among 360 HCWs selected using stratified random sampling. Data were collected using a structured questionnaire covering socio-demographic details, occupational exposures, and clinical features. Hand dermatitis was assessed based on clinical examination and self-reported symptoms. Statistical analysis included descriptive statistics, chi-square test, and multivariate logistic regression to identify independent predictors. **Results:** The prevalence of hand dermatitis was 33.9% (n = 122). Higher prevalence was observed among females (38.2%) compared to males (28.2%). Increased frequency of handwashing (>20 times/day) was significantly associated with dermatitis (45.6%, p = 0.002). Use of alcohol-based sanitizers (36.4% vs 19.2%, p = 0.018), regular glove usage (37.0% vs 23.8%, p = 0.011), and history of atopy (58.7% vs 25.4%, p < 0.001) were also significantly associated. Multivariate analysis identified female gender (AOR: 1.62), frequent handwashing (AOR: 2.14), regular glove use (AOR: 1.78), sanitizer use (AOR: 1.69), and history of atopy (AOR: 3.92) as independent predictors. **Conclusion:** Hand dermatitis is prevalent among HCWs and is associated with both occupational exposures and individual susceptibility. Preventive strategies focusing on optimized hand hygiene and skin protection are essential.

Keywords: Hand dermatitis, healthcare workers, prevalence, occupational exposure, atopy

INTRODUCTION

Hand dermatitis, commonly referred to as hand eczema, is one of the most prevalent occupational skin disorders worldwide and represents a significant proportion of work-related diseases [1]. In the general population, its prevalence is substantial; however, healthcare workers (HCWs) are particularly

vulnerable due to the nature of their occupational exposures [2]. Repeated contact with water, detergents, disinfectants, and prolonged use of occlusive gloves contribute to disruption of the skin barrier, predisposing HCWs to irritant and allergic contact dermatitis [1,2].

The healthcare setting involves frequent “wet work,” defined as repeated handwashing and exposure to liquids, which is a well-established risk factor for the development of hand dermatitis [3]. Additionally, infection control practices, especially intensified during the COVID-19 pandemic, have further increased the frequency of hand hygiene measures, thereby exacerbating the risk of skin damage among HCWs [4].

Epidemiological evidence suggests that the burden of hand dermatitis in HCWs is considerable. A recent systematic review and meta-analysis reported pooled lifetime prevalence rates of approximately 33.4% among healthcare professionals, highlighting the magnitude of the problem [5]. Individual studies conducted in hospital settings have also demonstrated a high prevalence of occupational hand eczema, along with significant associations with factors such as frequent handwashing, use of alcohol-based sanitizers, glove use, and personal history of atopy [6].

Beyond physical symptoms, hand dermatitis can adversely affect quality of life, work performance, and productivity, sometimes leading to absenteeism or even occupational change [7]. Despite its clinical and occupational significance, there remains variability in reported prevalence and risk factors across different settings, necessitating further region-specific studies.

Therefore, the present study was undertaken to determine the prevalence and identify the determinants of hand dermatitis among healthcare workers in a tertiary care hospital.

MATERIALS AND METHODS

Study Design and Setting: A hospital-based cross-sectional analytical study was conducted among healthcare workers (HCWs) in a tertiary care teaching hospital. The study was carried out encompassing various clinical and non-clinical departments with routine patient contact.

Study Population: The study population included doctors, nursing staff, laboratory personnel, and auxiliary healthcare workers who were directly involved in patient care and hand hygiene practices.

Inclusion Criteria

- Healthcare workers aged ≥ 18 years
- Individuals with direct or indirect patient contact
- Those who provided informed written consent

Exclusion Criteria

- HCWs with pre-existing chronic dermatological disorders unrelated to occupational exposure (e.g., psoriasis, ichthyosis)
- Individuals currently on systemic

immunosuppressive therapy

- Those unwilling to participate

Sample Size Estimation

The sample size was calculated using the formula for prevalence studies:

$$n = Z^2 \times p \times q / d^2$$

Where:

- n = required sample size
- Z = standard normal deviate at 95% confidence level (1.96)
- p = anticipated prevalence of hand dermatitis among HCWs (taken as 30% based on previous published literature)
- $q = 1 - p$
- d = absolute precision (5%)

Considering a non-response rate of 10%, the final sample size was rounded to 360 participants.

Sampling Technique: A stratified random sampling method was employed to ensure proportional representation from different categories of healthcare workers (doctors, nurses, laboratory staff, and support staff). Participants were selected using a simple random sampling technique within each stratum.

Data Collection Tool and Procedure: Data were collected using a pre-tested, structured questionnaire adapted from previously validated occupational dermatology studies. The questionnaire included:

- Socio-demographic details (age, gender, occupation)
- Occupational exposure variables (duration of work, frequency of handwashing, use of alcohol-based sanitizers, glove usage)
- History of atopy or previous skin conditions
- Clinical features suggestive of hand dermatitis (erythema, dryness, fissuring, itching, vesiculation)

A brief clinical examination of the hands was performed by a trained clinician to confirm the presence of dermatitis based on standard dermatological criteria.

Operational Definition: Hand dermatitis was defined as the presence of one or more of the following signs or symptoms on the hands: erythema, scaling, dryness, fissures, vesicles, or itching, either self-reported or clinically observed.

Study Variables

- Dependent Variable: Presence of hand dermatitis (yes/no)
- Independent Variables: Age, gender, occupation, duration of work, frequency of hand hygiene practices, type of disinfectants used, glove usage, and history of atopy

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using statistical software such as SPSS version 25.0. Descriptive statistics were expressed as mean $\pm$ standard deviation for continuous variables and frequencies with percentages for categorical variables. The prevalence of hand dermatitis was calculated as a proportion. Association between categorical variables was

assessed using the Chi-square test or Fisher’s exact test, as appropriate. Multivariate logistic regression analysis was performed to identify independent determinants, and adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were calculated. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 360 healthcare workers participated in the study. The majority of participants belonged to the 20–30 years age group (39.4%), followed by 31–40 years (32.8%). Females constituted a higher proportion (56.7%) compared to males (43.3%). Among occupational categories, nurses represented the largest group (41.1%), followed by doctors (26.7%), support staff (17.2%), and laboratory personnel (15.0%). Nearly half of the participants (46.7%) had less than 5 years of work experience (Table 1).

With regard to occupational exposure, 45.0% of participants reported washing their hands 10–20 times per day, while 31.7% performed handwashing more than 20 times daily. The majority (85.6%) used alcohol-based hand sanitizers, and 76.7% reported regular use of gloves. Latex gloves were the most commonly used type (55.0%), followed by nitrile (30.0%) and vinyl gloves (15.0%). A history of atopy was present in 25.6% of participants (Table 2).

The overall prevalence of hand dermatitis among healthcare workers was found to be 33.9% ($n = 122$), while 66.1% ($n = 238$) did not exhibit any features suggestive of dermatitis (Table 3).

Table 1: Socio-demographic Characteristics of Study Participants ($n = 360$)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	20–30	142	39.4
	31–40	118	32.8
	41–50	68	18.9
	>50	32	8.9
Gender	Male	156	43.3
	Female	204	56.7
Occupation	Doctors	96	26.7
	Nurses	148	41.1
	Laboratory staff	54	15.0
	Support staff	62	17.2
Work Experience	<5 years	168	46.7
	5–10 years	112	31.1
	>10 years	80	22.2

Table 2: Occupational Exposure Characteristics ($n = 360$)

Variable	Category	Frequency (n)	Percentage (%)
Handwashing Frequency/day	<10 times	84	23.3
	10–20 times	162	45.0
	>20 times	114	31.7
Use of Alcohol-Based Sanitizer	Yes	308	85.6
	No	52	14.4
Glove Usage	Regular	276	76.7
	Occasional	84	23.3
Type of Gloves Used	Latex	198	55.0
	Nitrile	108	30.0
	Vinyl	54	15.0
History of Atopy	Present	92	25.6
	Absent	268	74.4

On bivariate analysis, a statistically significant association was observed between hand dermatitis and gender, with a higher prevalence among females (38.2%) compared to males (28.2%) ($p = 0.041$). Increasing frequency of handwashing was also significantly associated with dermatitis, with the highest prevalence noted among those washing hands more than 20 times per day (45.6%) ($p = 0.002$). Use of alcohol-based sanitizers was associated with

a higher prevalence of dermatitis (36.4% vs 19.2%, $p = 0.018$). Similarly, regular glove usage was significantly associated with dermatitis (37.0% vs 23.8%, $p = 0.011$). A strong association was observed with history of atopy, where 58.7% of participants with atopy developed dermatitis compared to 25.4% without atopy ($p < 0.001$) (Table 4).

Multivariate logistic regression analysis identified female gender (AOR: 1.62; 95% CI: 1.05–2.48; $p = 0.028$), handwashing more than 20 times per day (AOR: 2.14; 95% CI: 1.32–3.46; $p = 0.002$), regular glove use (AOR: 1.78; 95% CI: 1.06–2.97; $p = 0.031$), use of alcohol-based sanitizers (AOR: 1.69; 95% CI: 1.01–2.83; $p = 0.044$), and history of atopy (AOR: 3.92; 95% CI: 2.34–6.56; $p < 0.001$) as independent predictors of hand dermatitis (Table 5).

Table 3: Prevalence of Hand Dermatitis (n = 360)

Variable	Frequency (n)	Percentage (%)
Hand Dermatitis Present	122	33.9
Hand Dermatitis Absent	238	66.1

Table 4: Association between Hand Dermatitis and Selected Variables

Variable	Category	Dermatitis Present n (%)	Dermatitis Absent n (%)	p-value
Gender	Male	44 (28.2)	112 (71.8)	0.041*
	Female	78 (38.2)	126 (61.8)	
Handwashing Frequency	<10	18 (21.4)	66 (78.6)	0.002*
	10–20	52 (32.1)	110 (67.9)	
	>20	52 (45.6)	62 (54.4)	
Sanitizer Use	Yes	112 (36.4)	196 (63.6)	0.018*
	No	10 (19.2)	42 (80.8)	
Glove Usage	Regular	102 (37.0)	174 (63.0)	0.011*
	Occasional	20 (23.8)	64 (76.2)	
History of Atopy	Present	54 (58.7)	38 (41.3)	<0.001*
	Absent	68 (25.4)	200 (74.6)	

Table 5: Multivariate Logistic Regression Analysis of Determinants of Hand Dermatitis

Variable	Adjusted Odds Ratio (AOR)	95% CI	p-value
Female Gender	1.62	1.05–2.48	0.028*
Handwashing >20 times/day	2.14	1.32–3.46	0.002*
Regular Glove Use	1.78	1.06–2.97	0.031*
Use of Sanitizer	1.69	1.01–2.83	0.044*
History of Atopy	3.92	2.34–6.56	<0.001*

DISCUSSION

The present study demonstrated a prevalence of hand dermatitis of 33.9% among healthcare workers, which is consistent with previously reported estimates in the literature. A recent systematic review and meta-analysis reported a pooled lifetime prevalence of approximately 33.4% among HCWs, supporting the substantial occupational burden observed in our study [8]. This similarity reinforces the reliability of the current findings and highlights the persistent global relevance of occupational hand dermatitis in healthcare settings.

The elevated prevalence observed in the present study can be attributed to occupational exposures inherent to healthcare practice. Repeated handwashing, frequent use of disinfectants, and prolonged glove usage are well-established contributors to skin barrier disruption, leading to irritant and allergic contact

dermatitis [8,9]. Similar findings have been reported in systematic reviews, which emphasize that healthcare workers are at increased risk due to continuous exposure to wet work and chemical irritants [10].

A significant association between frequent handwashing and dermatitis was identified in this study, with the highest prevalence among those washing hands more than 20 times per day. This observation is consistent with prior studies demonstrating that excessive hand hygiene practices significantly impair the epidermal barrier and increase susceptibility to dermatitis [9,10]. Furthermore, the widespread use of alcohol-based sanitizers, although essential for infection control, has been associated with skin dryness and irritation, contributing to the development of dermatitis [9].

Regular glove use was also found to be significantly associated with hand dermatitis. Prolonged occlusion, sweating, and exposure to glove materials such as latex are known to exacerbate skin irritation and may lead to allergic sensitization [11]. Evidence from patch test-based studies indicates that healthcare workers frequently develop sensitization to occupational allergens, particularly among nurses, further supporting this association [11].

In the present study, female gender emerged as an independent predictor of hand dermatitis. This finding is in agreement with previous research suggesting a higher susceptibility among females, possibly due to increased exposure to wet work both occupationally and domestically, as well as differences in skin physiology [12]. Additionally, a strong association was observed with a history of atopy, which has been consistently identified as a major risk factor for the development of hand dermatitis due to inherent skin barrier dysfunction [8].

The findings of this study also highlight the clinical and occupational implications of hand dermatitis. Previous studies have reported that the condition can negatively impact work performance, quality of life, and may even result in absenteeism or reduced productivity among healthcare workers [13]. Therefore, early identification of at-risk individuals and implementation of preventive strategies are essential.

The results of this study emphasize that both occupational exposures and individual susceptibility factors contribute significantly to the development of hand dermatitis among healthcare workers. Preventive measures, including optimized hand hygiene practices, use of skin-protective agents, and regular occupational health surveillance, are crucial to mitigate this burden.

CONCLUSION

The present study demonstrates that hand dermatitis is a common occupational health problem among healthcare workers, with a prevalence of 33.9%. The condition is significantly associated with modifiable workplace factors, particularly frequent hand hygiene practices, regular glove use, and exposure to alcohol-based sanitizers, along with individual susceptibility such as a history of atopy. Female gender and higher handwashing frequency emerged as independent predictors. These findings underscore the need for targeted preventive strategies, including rational hand hygiene protocols, use of skin-protective measures such as emollients, and increased awareness regarding occupational skin care, to reduce the burden of hand dermatitis in healthcare settings.

REFERENCES

1. Japundžić I, Bembić M, Špiljak B, Parać E, Macan J, Lugović-Mihčić L. Work-related hand eczema in healthcare workers: etiopathogenic factors, clinical features, and skin care. *Cosmetics*. 2023;10(5):134. doi:10.3390/cosmetics10050134.
2. Hamnerius N, Svedman C, Bergendorff O, Björk J, Bruze M, Pontén A. Wet work exposure and hand eczema among healthcare workers: a cross-sectional study. *British Journal of Dermatology*. 2018 Feb 1;178(2):452-61.
3. Symanzik C, Yüksel YT, Christensen MO, et al. Prevalence and incidence of hand eczema in healthcare workers: protocol for a systematic review and meta-analysis. *BMJ Open*. 2022;12(10):e062194. doi:10.1136/bmjopen-2022-062194
4. Abhishree BS, Kavitha R, Geetha A. A study on the occurrence of hand dermatitis in healthcare workers during the COVID-19 pandemic due to enhanced hand hygiene. *Pharmacol Clin Pharm Res*. 2023;8(1):1. doi:10.15416/pcpr.v8i1.38851.
5. Yüksel YT, Symanzik C, Christensen MO, et al. Prevalence and incidence of hand eczema in healthcare workers: A systematic review and meta-analysis. *Contact Dermatitis*. 2024;90(4):331-342. doi:10.1111/cod.14489
6. Teo HG, Lim TH, Bujang MA, Kiing JW, Muniandy P. Prevalence of Occupational Hand Eczema among Healthcare Workers and its Associated Risk Factors in a Tertiary Hospital in Sarawak During Covid-19 Pandemic. *Indian J Dermatol*. 2023;68(1):121. doi:10.4103/ijd.ijd_803_22
7. Mossel RM, Naber RJ, van Manen BCT, Rustemeyer T. The prevalence of hand dermatitis among intensive care unit nurses. *Contact Dermatitis*. 2024;91(1):30-37. doi:10.1111/cod.14568
8. Hamnerius N, Svedman C, Bergendorff O, et al. Hand eczema and occupational contact allergies in healthcare workers with a focus on rubber additives. *Contact Dermatitis*. 2018;79(3):149-156. doi:10.1111/cod.13042
9. Karagounis TK, Cohen DE. Occupational Hand Dermatitis. *Curr Allergy Asthma Rep*. 2023;23(4):201-212. doi:10.1007/s11882-023-01070-5
10. Larese Filon F, Pesce M, Paulo MS, et al. Incidence of occupational contact dermatitis in healthcare workers: a systematic review. *J Eur Acad Dermatol Venereol*. 2021;35(6):1285-1289. doi:10.1111/jdv.17096
11. Ferrari C, Somma G, Giovinnazzo V, et al. The Influence of Occupational Factors on Contact Dermatitis in Symptomatic Healthcare Workers: A Patch Test Study. *Diseases*. 2025;13(3):77. Published 2025 Mar 7. doi:10.3390/diseases13030077

12. Chu C, Marks JG Jr, Flamm A. Occupational Contact Dermatitis: Common Occupational Allergens. *Dermatol Clin*. 2020;38(3):339-349. doi:10.1016/j.det.2020.02.002
13. Mossel RM, Naber RJ, van Manen BCT, Rustemeyer T. The prevalence of hand dermatitis among intensive care unit nurses. *Contact Dermatitis*. 2024;91(1):30-37. doi:10.1111/cod.14568