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Occupational hand eczema among nurses: Prevalence and contributing factors in northern West Bank

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Abstract

Background: Occupational hand eczema (OHE) is highly prevalent among nurses, especially in ICUs. The COVID-19 pandemic worsened this, yet data from Palestine remains scarce.

Objectives: This study aimed to assess the prevalence of OHE and identify its associated risk factors among nurses working in ICUs and NICUs in governmental hospitals in the northern region of the West Bank.

Methods: A cross-sectional study was conducted among nurses with over one year of experience in the ICU and NICU departments of governmental hospitals in the northern West Bank. Data on demographics, work-related characteristics, and hand eczema symptoms were collected using a self-administered questionnaire modeled after the validated Nordic Occupational Skin Questionnaire (NOSQ-2002). Of the 215 questionnaires distributed, 153 were completed and returned, yielding a response rate of 71.1%.

Results: The study included 153 nurses (51.6% female) with a mean age of 31.7 (±6.6) years and a mean professional experience of 7.7 (±5.9) years. The point prevalence of self-reported hand eczema was 17.6%. Bivariate analysis identified significant associations ($p<0.05$) between hand eczema and a family history of eczema, prolonged protective glove use, pre-existing medical skin conditions, lack of emollient availability at the workplace, non-use of moisturizing products, occupational exposure to irritant materials, and skin-irritating hobbies. No significant relationship was found with age, years of experience, or handwashing frequency. Multivariate logistic regression confirmed these as independent predictors, with the highest odds ratios for prolonged glove use (OR = 6.18, 95% CI: 1.25–30.56), medical skin conditions (OR = 5.32, 95% CI: 1.29–21.88), and family history of eczema (OR = 4.39, 95% CI: 1.38–13.93). Absence of workplace emollients (OR = 3.75), non-use of moisturizers (OR = 3.04), exposure to irritants (OR = 2.63), and skin-irritating hobbies (OR = 2.48) were also significant independent risk factors.

Conclusion: Hand eczema is a common occupational problem among ICU and NICU nurses in the Northern West Bank. The findings underscore a multifactorial aetiology, involving both personal susceptibility (e.g., genetic predisposition, pre-existing skin conditions) and modifiable occupational exposures (e.g., prolonged glove use, lack of skin care resources). This highlights an urgent need for targeted workplace interventions, including the provision of emollients, educational programs on proper skin care, and policies to mitigate irritant exposure, to protect the skin health of this vital workforce.

Keywords: Hand eczema, Healthcare workers, Prevalence, Risk factors, Intensive Care Unit.

Introduction

Occupational hand eczema (OHE) is an inflammatory skin condition affecting the hands, clinically characterized by symptoms such as itching, burning, erythema, dryness, fissures, and vesicles.[1,2] Its aetiology is multifactorial, arising from a complex interplay between exogenous exposures to irritants and allergens, and endogenous factors such as atopic predisposition [3]. Beyond the physical discomfort, OHE imposes a significant burden, leading to psychological distress, reduced quality of life, and impaired work performance, thereby representing a major occupational health concern.[4,5]

Globally, skin diseases rank among the most prevalent health conditions and constitute a leading cause of non-fatal disease burden, measured by years lived with disability.[6] Within this spectrum, occupational contact dermatitis is predominant, with hand eczema accounting for up to 80% of all cases [7]. While the lifetime prevalence in the general population is estimated between 2-10%, and hand dermatitis is responsible for up to 35% of all dermatitis, certain professions face a disproportionately higher risk.[8,9] Healthcare workers, particularly nurses, are a highly vulnerable group due to their constant exposure to a unique combination of risk factors inherent to the clinical environment.[10,11] These include frequent handwashing, extensive use of disinfectants, and prolonged wear of occlusive gloves -collectively classified as "wet work"- which can compromise the skin's barrier function and initiate or exacerbate eczema.[7,12]

The COVID-19 pandemic has dramatically intensified these occupational hazards. The universal adoption of enhanced hand hygiene protocols and the increased frequency of glove use, while crucial for infection control, have led to a documented global surge in hand dermatitis among healthcare professionals.[13,14] Studies from various countries reported a significant increase in the prevalence and severity of OHE during this period, highlighting the critical need for concurrent skin protection strategies alongside infection control measures.[15-18] This recent evidence underscores that the risk of OHE is not static but can be amplified by public health crises, making ongoing surveillance and proactive prevention in high-risk groups like nurses more urgent than ever.

International research has consistently documented a high prevalence of OHE among nurses, though with considerable regional variation. Reported rates range from 27.6% to 45.9% in Turkey, 34% in Saudi Arabia, and 33.1% in Korea, influenced by local work conditions, cultural practices, and the implementation of preventive skin care programs.[19-21] Key risk factors identified across these studies include a personal or family history of atopy, high frequency of wet work, inadequate use of moisturizers, and failure to provide emollients in the workplace.[22-24] However, despite this global body of evidence and the recognized high-risk setting of intensive care units (ICUs) and neonatal intensive care units (NICUs), where exposure to irritants is intense and relentless, a critical knowledge gap persists regarding the specific situation in Palestine. To date, there are no published data on the prevalence and determinants of OHE among Palestinian nurses, even within these highly vulnerable subgroups.

Objectives

This study aimed to determine the prevalence of OHE among ICU and NICU nurses in Northern West Bank hospitals, identify its associated risk factors, and evaluate the protective role of glove use and moisturization.

Methods

Study design and setting

A descriptive cross-sectional study was conducted to investigate the prevalence and associated risk factors of OHE among nurses working in ICUs and NICUs. The study was set in governmental hospitals in the northern West Bank, specifically Rafidia Surgical Hospital, Jenin Governmental Hospital, Thabet-Thabet Governmental Hospital, Darwish Nazzal Hospital, and Turkey Governmental Hospital, which were selected due to their large catchment populations and high patient turnover. Data were collected between August 2024 and January 2025.

Population and sampling

The target population comprised all registered nurses with over 12 months of continuous employment in the ICU or NICU departments of the selected hospitals. The total population size was 484 nurses. The required sample size was calculated as 215 participants, using the Raosoft® sample size calculator with a 95% confidence level and a 5% margin of error. To account for potential non-response, all 215 questionnaires were distributed. A total of 153 nurses completed the survey, yielding a response rate of 71.1%. A convenience sampling method was employed for logistical feasibility. While this method is efficient, we acknowledge its limitations, including potential selection bias and limited generalizability.

Inclusion and exclusion criteria

Inclusion criteria were: 1) being a registered nurse, 2) employed in an ICU or NICU of the included hospitals,

and 3) having at least 12 months of experience in that unit. Nurses with less than 12 months of experience, nursing students, those who declined to participate, and those who returned incomplete questionnaires were excluded.

Data collection tool and procedure

Data were collected using a self-administered, paper-based questionnaire. The instrument was adapted from the widely used and validated Nordic Occupational Skin Questionnaire (NOSQ-2002/Long version), a reliable tool for screening occupational skin diseases in epidemiological studies.[25] The questionnaire was translated into Arabic through a forward-backward translation process to ensure conceptual equivalence and cultural appropriateness. A pilot study involving 10 ICU nurses (not included in the final sample) was conducted to assess clarity, comprehension, and time required for completion; minor adjustments were made based on the feedback.

The questionnaire encompassed several domains:

Sociodemographic and medical history: Age, sex, personal and family history of eczema, and other medical conditions affecting the skin.

Occupational characteristics: Years of nursing experience, specialty ward (ICU/NICU), number of shifts and working hours per week, average daily handwashing frequency, and duration of protective glove use per day.

Skin care practices and workplace environment: Application of emollients after wet work, use of personal moisturizing products, and availability of emollients at the workplace.

Exposure and outcome assessment: Self-reported exposure to irritant materials or chemicals at work, engagement in skin-irritating hobbies or activities at home, and a detailed checklist of hand skin symptoms experienced in the past 12 months (e.g., itching, redness, dryness, fissures, vesicles). The primary outcome, "hand eczema," was defined as the self-report of one or more characteristic symptoms on the hands within the previous 12 months, consistent with the NOSQ-2002 criteria. While no clinical examination was performed, the NOSQ-2002 has demonstrated good validity for identifying hand eczema in healthcare worker populations.[26,27] Participants were also asked about the work-relatedness of their symptoms.

Validity and reliability

To ensure content and face validity, the initial questionnaire was reviewed by a panel of experts in dermatology and occupational health nursing. The experts evaluated the items for clarity, relevance, and comprehensiveness. As the instrument primarily consisted of binary and categorical items designed to collect factual data on exposures and symptoms, conventional internal consistency metrics like Cronbach's alpha were not applicable. Instead, reliability was strengthened through the use of a standardized, validated core instrument (NOSQ-2002), straightforward language, and consistent administration procedures to minimize interpretation variability.

Ethical considerations

The study protocol received ethical approval from the Institutional Review Board (IRB: MUC007\2024) of Modern University College and was granted administrative permission by the Palestinian Ministry of Health. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from all participants after explaining the study's purpose and procedures. Anonymity was guaranteed by not collecting any personally identifiable information. All data were kept confidential, stored securely, and presented only in aggregate form.

Statistical analysis

Data analysis was performed using SPSS version 26. Descriptive statistics were computed for all variables; frequencies and percentages were used for categorical data, while means and standard deviations were used for continuous variables. The prevalence of hand eczema was calculated as the proportion of participants reporting symptoms in the past 12 months. Bivariate analyses were conducted to assess associations between hand eczema and independent variables: Chi-square test (or Fisher’s exact test for expected cell counts <5) was used for categorical variables, and the independent samples t-test was used for continuous variables. All reported p-values were two-tailed, and a value of <0.05 was considered statistically significant. All variables that showed a significant

association ($p<0.05$) in the bivariate analyses were subsequently entered into a multivariate binary logistic regression model to identify independent predictors of hand eczema, controlling for potential confounders. The results are presented as adjusted odds ratios (OR) with their corresponding 95% confidence intervals (CI). The model's goodness-of-fit was assessed using the Hosmer-Lemeshow test and the Nagelkerke R^2.

Results

The study included 153 ICU and NICU nurses from governmental hospitals in the northern West Bank. The sample was nearly evenly distributed by gender, with 51.6% (n=79) female and 48.4% (n=74) male participants. The mean age of the respondents was 31.68 years (±6.60), with an average professional experience of 7.73 years (±5.88). The distribution between ICU (48.3%) and NICU (51.7%) wards was also balanced.

Regarding occupational skin care practices, the vast majority of nurses (81.0%) reported using protective gloves during work. However, only 64.7% applied emollients after wet work, and merely half (50.3%) confirmed that emollients were available at their workplace. A small proportion of participants reported a personal or family history of hand eczema (12.4%) or eczema on other body parts (11.8%). Handwashing frequency varied, with the largest group (30.1%) washing their hands 6-10 times per day [Table-1].

The mean daily duration of protective glove use was 2.88 hours (±2.08). Other continuous variables are summarized in Table 2.

Prevalence and associated characteristics of hand Eczema

The point prevalence of self-reported hand eczema in the past 12 months was 17.6% (n=27). Several factors related to exposure and skin care were prevalent in the cohort: 50.3% of nurses reported using moisturizing products, 22.2% were exposed to irritant materials or chemicals at work, and 41.8% engaged in skin-irritating hobbies or activities. Furthermore, 10.5% had an underlying medical condition affecting the skin. Notably, among those with eczema, 21.6% reported that their condition improved when away from work [Table-3].

Table-1. Sociodemographic and occupational characteristics of participants (n=153)

Variable	Category	Frequency(%)
Gender	Female	79 (51.6)
	Male	74 (48.4)
Personal or family history of hand eczema	No	134 (87.6)
	Yes	19 (12.4)
Ward	ICU	74 (48.3)
	NICU	79 (51.7)
Using protective gloves	No	29 (19.0)
	Yes	124 (81.0)
Application of emollient after wet work	Yes	99 (64.7)
	No	54 (35.3)
Availability of emollient at workplace	Yes	77 (50.3)
	No	76 (49.7)
Handwashing frequency (times/day)	0–5	35 (22.9)
	6–10	46 (30.1)
	11–20	40 (26.1)
	>20	32 (20.9)
Eczema on other body parts	No	135 (88.2)
	Yes	18 (11.8)

Table-2. Descriptive statistics for continuous variables (n=153)

Variable	Mean± SD
Age (years)	31.68±6.601
Experience (years)	7.73±5.883
Using protective gloves (hours/day)	2.88±2.077

Table-3. Prevalence of Eczema and associated characteristics (n = 153)

Variable	Category	Frequency(%)
Eczema	No	126 (82.4)
	Yes	27 (17.6)
Using moisturizing products	No	76 (49.7)
	Yes	77 (50.3)
Exposure to irritant materials/chemicals	No	119 (77.8)
	Yes	34 (22.2)
Skin-irritating hobbies/activities	No	89 (58.2)
	Yes	64 (41.8)
Medical conditions affecting skin	No	137 (89.5)
	Yes	16 (10.5)
Eczema improves away from work	No	120 (78.4)
	Yes, sometimes	29 (19.0)
	Yes, usually	4 (2.6)

Clinical presentation of hand Eczema

The most frequently reported symptoms among all participants were redness (30.1%), itching (19.6%), and pain/aching (18.3%). Dry skin or scaling was reported by

15.7% of nurses. Less common symptoms included fissures (6.5%) and vesicles (5.9%). It is important to note that 43.1% of the sample reported no hand skin symptoms in the preceding 12 months [Table 4].

Table 4. Symptoms of hand Eczema reported in the past 12 months (n = 153)

Symptom	Frequency (%)
No symptoms	66 (43.1)
Redness	46 (30.1)
Itching	30 (19.6)
Pain/aching	28 (18.3)
Dry skin/scaling	24 (15.7)
Itchy wheals (urticaria)	14 (9.2)
Fissures/cracks	10 (6.5)
Vesicles	9 (5.9)
Tenderness	8 (5.2)
Burning/stinging	6 (3.9)
Weeping/crusts	5 (3.3)
Papules	3 (2.0)

Bivariate and multivariate analyses of risk factors

Bivariate analysis revealed several significant associations with hand eczema [Table-5]. Key factors included a family history of eczema (p=0.028), use of protective gloves (p=0.02), pre-existing medical skin conditions (p=0.009), lack of emollient availability at the workplace (p=0.003), non-use of moisturizing products (p=0.012), exposure to irritant materials (p=0.014), and engagement in skin-irritating hobbies (p=0.01). No significant associations were found between hand eczema and gender, ward assignment, handwashing frequency, or eczema on other body parts. Furthermore, no significant correlations were found between eczema and the continuous variables of age, years of experience, or handwashing frequency [Table-6].

Table-5. Bivariate analysis of categorical variables associated with hand Eczema (n = 153)

Variable	Category	No Eczema (n=126)	Eczema (n=27)	P value
Gender	Female	63 (50.0%)	16 (59.3%)	0.25
	Male	63 (50.0%)	11 (40.7%)	
Family history of hand eczema	No	114 (90.5%)	20 (74.1%)	0.028
	Yes	12 (9.5%)	7 (25.9%)	
Using protective gloves	No	29 (23.0%)	0 (0.0%)	0.02
	Yes	97 (77.0%)	27 (100.0%)	
Medical conditions affecting skin	No	117 (92.9%)	20 (74.1%)	0.009
	Yes	9 (7.1%)	7 (25.9%)	
Emollient available at workplace	Yes	64 (50.8%)	13 (48.1%)	0.003
	No	62 (49.2%)	14 (51.9%)	
Using moisturizing products	No	61 (48.4%)	15 (55.6%)	0.012
	Yes	65 (51.6%)	12 (44.4%)	
Exposure to irritant materials	No	103 (81.7%)	16 (59.3%)	0.014
	Yes	23 (18.3%)	11 (40.7%)	
Skin-irritating hobbies	No	77 (61.1%)	12 (44.4%)	0.01
	Yes	49 (38.9%)	15 (55.6%)	

Table-6. Correlation between Eczema and continuous variables (n = 153)

Variable	Pearson correlation	Sig. (2-tailed)
Age	0.017	0.832
Experience (years)	0.036	0.656
Time of handwashing	0.043	0.599

All significant variables from the bivariate analysis were entered into a multivariate logistic regression model to identify independent predictors. The model demonstrated a good fit (Nagelkerke R^2=0.42; Hosmer-Lemeshow p=0.61). The analysis confirmed seven independent predictors [Table-7]. The strongest predictors were prolonged use of protective gloves (Adjusted OR=6.18, 95% CI: 1.25–30.56), medical conditions affecting the skin (aOR=5.32, 95% CI: 1.29–21.88),

and family history of eczema (aOR=4.39, 95% CI: 1.38–13.93). Furthermore, the absence of workplace emollients (aOR=3.75), non-use of moisturizing products (aOR=3.04), exposure to irritants (aOR=2.63), and skin-irritating hobbies (aOR=2.48) significantly increased the odds of developing hand eczema.

Table-7. Multivariate logistic regression analysis of factors associated with hand Eczema (n = 153)

Variable	β	SE	Adjusted OR	95% CI	P value
Family history of hand eczema	1.48	0.59	4.39	1.38 – 13.93	0.012
Using protective gloves	1.82	0.81	6.18	1.25 – 30.56	0.026
Medical conditions affecting skin	1.67	0.72	5.32	1.29 – 21.88	0.021
No emollient at workplace	1.32	0.56	3.75	1.26 – 11.14	0.018
Not using moisturizing products	1.11	0.52	3.04	1.10 – 8.38	0.032
Exposure to irritant materials	0.97	0.48	2.63	1.03 – 6.72	0.043
Skin-irritating hobbies	0.91	0.44	2.48	1.05 – 5.88	0.039
Constant	-2.84	0.89	0.06	-	0.001

Model fit: Nagelkerke $R^2 = 0.42$; Hosmer–Lemeshow p = 0.61

Discussion

This cross-sectional study provides the first comprehensive analysis of the prevalence and risk factors for OHE among ICU and NICU nurses in the Northern West Bank. The findings illuminate a significant occupational health issue, revealing a complex interplay between individual susceptibility, workplace practices, and environmental exposures. The point prevalence of self-reported hand eczema in our cohort was 17.6%. This figure positions the Palestinian nursing population within the mid-to-lower range of the global spectrum reported in the literature. It is notably lower than the rates reported in Saudi Arabia (32.7%) and Korea (33.1%),[19,21] but aligns closely with studies from other regions, such as the 17.9% found by Piapan et al.,[18] among apprentice nurses and the 12% reported by Van der Meer et al.[28] This variation can be attributed to several factors, including differences in climate, the specific types of disinfectants and glove materials used, the stringency and quality of institutional skin prevention programs, and genetic predispositions within different populations.[9,10] The most common symptoms reported in our study -redness (30.1%), itching (19.6%), and pain (18.3%)- are classic signs of irritant contact dermatitis, which is the predominant type of OHE in wet-work professions.[1] The relatively lower reporting of severe fissuring or weeping may suggest a higher proportion of mild to moderate cases in our sample, or it could reflect underreporting of more severe symptoms.

A cornerstone finding of our study is the powerful role of individual susceptibility. A family history of eczema was a strong independent predictor of OHE (aOR=4.39), a result that is highly consistent with a vast body of literature confirming atopic diathesis as the most significant endogenous risk factor for developing hand eczema.[29,30] This genetic predisposition compromises the skin's barrier function, making it more vulnerable to the assault of irritants. Furthermore, the presence of a pre-existing medical condition affecting the skin was the second strongest predictor in our model (aOR=5.32). This aligns with recent understandings that various dermatological conditions can prime the skin for developing OHE. Interestingly, the COVID-19 pandemic has been associated with a surge in atopic and other inflammatory skin conditions, potentially creating a larger pool of susceptible healthcare workers.[13] Our findings underscore that occupational health screenings should proactively identify nurses with such predispositions to provide them with targeted education and prophylactic resources. The results clearly delineate how standard protective measures in healthcare can paradoxically become risk factors if not managed correctly. The most potent risk factor identified was the prolonged use of protective gloves (aOR=6.18). While essential for infection control, occlusive gloves create a humid environment that leads to skin maceration, increases friction, and can concentrate irritants on the skin surface. This phenomenon, well-documented in studies during the COVID-19 pandemic, highlights the critical difference between merely wearing gloves and practicing

safe glove use, which includes using the appropriate type (e.g., hypoallergenic when possible), changing them regularly, and ensuring hands are completely dry before donning them.[14,23] Our finding reinforces that duration of wear is a key metric of risk, beyond simple use versus non-use.

Contrary to some studies that identify high-frequency handwashing as a primary risk factor,[7] we found no significant association in our multivariate model. This does not negate the irritant potential of repeated washing, but rather suggests that in our cohort, the quality of post-exposure skin care and individual susceptibility may be more determinative of outcomes than the frequency of exposure alone. This perspective is supported by Hamnerius et al.,[31] who emphasized that the implementation of effective skin care practices can mitigate the risks associated with wet work. Our analysis powerfully demonstrates that preventive behaviors and institutional support are modifiable pillars of OHE prevention. The non-use of moisturizing products was a significant independent predictor (aOR=3.04). Emollients and moisturizers are fundamental for repairing and maintaining the skin barrier, counteracting the drying effects of soaps and disinfectants.[32] More importantly, the unavailability of emollients in the workplace was an even stronger predictor (aOR=3.75). This crucial finding shifts responsibility from the individual nurse to the institutional level. If emollients are not readily accessible at sinks and workstations, even the most motivated nurse is unlikely to apply them consistently during a busy shift. This aligns with interventional studies, such as the SCIN trial, which demonstrated that providing emollients at the point of care is a key component of successful prevention programs.[33]

Our study adds to a growing body of evidence that OHE is not solely determined within the workplace. Engagement in skin-irritating hobbies (aOR=2.48) was a significant independent risk factor. Activities such as gardening, cooking with harsh detergents, or certain crafts can contribute to the cumulative irritant load on the skin, leaving it less resilient to occupational exposures.[34] This highlights the need for holistic patient education that addresses skin protection in all aspects of life, not just during clinical duties. Similarly, reported exposure to irritant materials at work was a confirmed risk factor (aOR=2.63), underscoring the continuous assault on the skin barrier from various chemicals and substances present in the clinical environment.

The collective findings from this study carry clear and actionable implications. First, institutional commitment is paramount. Hospitals must ensure the consistent and convenient availability of approved, high-quality emollients at all hand hygiene stations and in break rooms. Second, comprehensive education is needed. Training programs must move beyond simple hand hygiene protocols to include modules on the anatomy of the skin barrier, the mechanism of irritant dermatitis, the principles of safe glove use (including duration), and the non-negotiable importance of regular moisturizing.[10,35] Third, a proactive, targeted approach should be considered. Implementing voluntary skin health screenings for new hires, especially those with a history of atopy, could allow for early intervention. Finally, clear organizational policies should be established regarding glove use, specifying when different types are required and encouraging "glove-free" periods when tasks permit, to allow the skin to recover.

Conclusions

This study establishes that occupational hand eczema is a prevalent problem among ICU and NICU nurses in the Northern West Bank, with a point prevalence of 17.6%. The etiology is multifactorial, driven by a convergence of intrinsic factors (genetic predisposition, pre-existing skin conditions) and extrinsic factors (prolonged glove occlusion, lack of workplace emollients, non-use of moisturizers, and irritant exposures both at work and home). The findings underscore that effective prevention requires a dual-focused strategy: mitigating occupational exposures through better practices and policies, and strengthening individual skin resilience through consistent care and targeted support for at-risk individuals. Several limitations must be considered when interpreting these results. The cross-sectional design precludes the establishment of causal relationships between the identified risk factors and hand eczema. The

reliance on self-reported data is susceptible to recall and social desirability bias. The use of a convenience sample, while practical, may limit the generalizability of the findings to all Palestinian nurses or to other healthcare contexts. Furthermore, we did not assess several potential confounding variables, such as the specific chemical composition of hand sanitizers and detergents used, the material of gloves (e.g., latex vs. nitrile), or psychosocial stress levels, all of which could influence the risk of developing OHE. Future longitudinal studies incorporating clinical examinations and more detailed exposure assessments would be valuable to confirm these associations and elucidate causal pathways.

Practical point(s) in Preventive/Complementary Medicine:

► Preventing occupational hand eczema in nurses requires a dual approach: institutions must provide emollients at point-of-care and enforce safe glove-use policies to limit occlusion. Individually, nurses with a personal or family history of eczema should consistently use moisturizers and minimize irritant exposure from hobbies, forming a essential complementary strategy to workplace protections.

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Competing interests

The authors declare that they have no competing interests.

Abbreviations

Occupational Hand Eczema: OHE; Intensive Care Unit: ICU; Neonatal Intensive Care Unit: NICU; Coronavirus disease 2019: COVID-19; Institutional Review Board: IRB; Statistical Package for the Social Sciences: SPSS; Odds Ratio: OR; Confidence Interval: CI; Adjusted Odds Ratio: aOR; Nordic Occupational Skin Questionnaire: NOSQ.

Authors' contributions

Every author contributed significantly to the work reported, whether it was in the conception, study design, execution, data acquisition, analysis, and interpretation, or all of these areas; they all participated in the article's drafting, revision, or critical review. All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

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Availability of data and materials

The data used in this study are available from the corresponding author on request.

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. Institutional Review Board approval (code: MUC007\2024) was obtained. The present study did not interfere with the process of diagnosis and treatment of patients and all participants signed an informed consent form.

Consent for publication

By submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

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