

The risk of hand eczema in healthcare workers during the COVID-19 pandemic: Do we need specific attention or prevention strategies?

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Coronavirus disease-2019 (COVID-19) caused a global pandemic following the first identified case in China in late 2019. Apart from the respiratory droplets, contact transmission was announced to play an important role both in the spreading of the disease. Therefore, hand hygiene became an important building block for prevention; WHO has recommended using water and soap, or alcohol-based hand disinfectant before and after the contact with patients and/or their body fluid.¹ Independent from COVID 19, healthcare workers (HCW) have an increased risk for hand eczema (HE).^{2,3} Skin damage due to intensive hand hygiene measures during the COVID-19 pandemic in HCW has recently been reported,^{4,5} as well as HE among HCW during the pandemic.⁵ Therefore, we aimed to investigate the frequency, risk factors, and clinical features of HE among healthcare workers during the COVID-19 pandemic.

Methods

Between May 15 to 25, 2020, a total of 107 HCW involved in COVID-19 patient care units of our hospital were enrolled to the study. All individuals were examined by a team of dermatologists. Demographic and clinical findings were filled in a detailed form. Hand Eczema Severity Index (HECSI) scoring system was used in the standardization of HE severity.⁶

Results

HE was detected in 54 of 107 (50.5%) participants. The overall demographic and clinical parameters, and the comparison of these parameters between groups with and without HE are summarized in Online supplemental Table 1a and 1b. In the group with HE, female gender ($P=.033$), age ($P=.003$), work years ($P<.001$), generalized dry skin ($P=.006$), history of HE in the past year ($P>.001$), additional housework at home ($P<.001$), handwashing frequency >20 per day ($P=.04$) were significantly over-represented. On the other hand, the frequency of moisturizing cream use after hand

washing at the workplace ($P=.002$) and at daily life ($P<.001$) were significantly lower (Online supplemental Table 1a and 1b). Multivariate logistic regression analysis summarized in Online supplemental Table 2 showed that the use of moisturizing hand cream in daily life (OR: 22.1; 95%CI: 6.33-77.0), a history of HE within the past year (OR: 18.5; 95%CI: 3.82-89.9), and a handwashing frequency >20 per day (OR: 3.28; 95%CI: 0.995-10.8) were independently associated with a high risk of HE.

Online supplemental Table 3 summarized clinical features of individuals with HE. The most common clinical type, morphology, and affected area were irritant contact dermatitis (96.3%), erythematous-squamous morphology (75.9%), and hand dorsum (85.2%), respectively. The median HECSI score was 24 (3-84) among individuals with HE. Hand eczema was severe in 21 (38.9%), moderate in 20 (37%), and mild in 13 (24.1%) patients (Table 3).

Moisturizing hand cream was used in 26 (57.8%) patients before, and in 36 (80%) patients after the development of HE. Topical corticosteroids were used only in 16 (35.6%) after HE has developed. The frequency of handwashing and the use of alcohol-based disinfectants did not change before and after HE (Table 1b).

Discussion

The frequency of HE was 50.4% among healthcare workers at COVID-19 patient care units in this study. The HE prevalence in pre-COVID-19 era varied between 12%-50%.^{2,7} Lan et al reported a high share of 70.4% hand skin damage due to frequent hand hygiene and longer times of using gloves in healthcare workers managing COVID-19.⁴ Recently, Guertler et al published a questionnaire-based study among healthcare workers at COVID-19 units. The vast majority of the study population (90.4%) reported symptoms associated with acute hand dermatitis whereas the prevalence of self-reported HE was only 14.9%.⁵

Previous reports have demonstrated that personal or familial atopy, >20 handwashing per day, using occlusive gloves, and long working years are independent risk factors for HE.³ On the other hand, HE frequency was lower in individuals using moisturizers, and the use of moisturizers has been recommended for preventing HE.^{3,8} The increased risk of HE with frequent handwashing >20 per day was in line with the literature from pre COVID-19 era. In contrast to the literature, however, the increased use of moisturizing hand cream was independently associated with HE in the present study. This might suggest that patients with HE used moisturizing creams with a therapeutic intent after the development of HE, rather than for prevention. It was interesting that only 1/3 of patients used topical corticosteroids after the development of HE, and that a majority (80%) increased the frequency of moisturizer use instead. Although the use of moisturizers before HE development was reported as 57.8% among patients with HE, we cannot assume whether the moisturizers had been used appropriately.

The limitation of this study was its small sample size. However, the diagnosis of HE based on dermatological examination during COVID-19 pandemic was the strength of the study. In conclusion, because hand hygiene is one of the key factors to prevent COVID-19 transmission, preventive strategies are rapidly needed in order to reduce HE risk related to hand hygiene.

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Online supplemental Tables

Online supplemental Table 1a. The description of the overall demographics and the comparison of demographical parameters between groups. Categorical variables were compared using chi square test and non-parametric continuous variables were compared using Mann Whitney U test. $P < .05$ was accepted as statistical significant.

NA: not applicable

Demographic features	Total number of patients (n=107)	Patients with hand eczema (n=54)	Patients without hand eczema (n=53)	P-value
Patients with hand eczema, n (%)	54 (50.5)	54 (100)	0 (0)	NA
Gender				.033
Male, n (%)	35 (32.7)	12 (22.2)	23 (43.4)	
Female, n (%)	72 (67.3)	42 (77.8)	30 (56.6)	
Age, median (range)	28 (21-48)	29 (21-46)	27 (21-48)	.003
Mean	29.6±6.3	30.5±5.7	28.6±6.8	
Profession				
Physician, n (%)	47 (43.9)	24 (44.4)	23 (43.4)	
Nurse, n (%)	48 (44.9)	23 (42.6)	25 (47.2)	.41
Medical caretaker, n (%)	2 (1.9)	2 (3.7)	0 (0)	
Other, n (%)	10 (9.3)	5 (9.3)	5 (9.4)	
Workplace				
Inpatient clinic, n (%)	93 (86.9)	45 (83.3)	48 (90.6)	
Intensive care unit, n (%)	5 (4.7)	5 (9.3)	0 (0)	.028
Emergency unit, n (%)	9 (8.4)	4 (7.4)	5 (9.4)	
Work years, median (range)	3 (0.5-29)	5 (0.5-25)	2 (0.5-29)	<.001
Weekly work hours, median (range)	45 (24-80)	42.5 (24-80)	45 (24-80)	.44
Length of stay at COVID-19 units (day), median (range)	45 (7-90)	50 (10-70)	42 (7-90)	.99
History of personal atopy, n (%)	42 (39.3)	25 (46.3)	17 (32.1)	.19
Atopic dermatitis and/or atopic skin, n (%)	32 (29.9)	19 (35.2)	13 (24.5)	.32
History of familial atopy, n (%)	25 (23.4)	15 (27.8)	10 (18.9)	.39
History of metal allergy, n (%)	16 (15.0)	11 (20.4)	5 (9.4)	.19

History of glove allergy (Type 4), n (%)	13 (12.1)	6 (11.1)	7 (13.2)	.97
Generalized dry skin, n (%)	39 (36.4)	27 (50.0)	12 (22.6)	.006
History of hand eczema in the past year, n (%)	32 (29.9)	29 (53.7)	3 (5.7)	<.001
Additional housework at home, n (%)	58 (54.2)	41 (75.9)	17 (32.1)	<.001
Smoking status				
Nonsmoker, n (%)	68 (63.6)	35 (64.8)	33 (62.3)	.94
Smoker (current or ex-smoker), n (%)	39 (36.4)	19 (35.2)	20 (37.7)	

Online supplemental Table 1b. The descriptives of hand hygiene practices of the study population at workplace and at daily life and the comparison of two groups. Categorical variables were compared using chi square. $P < .05$ was accepted as statistically significant.

NA: not applicable

Hand hygiene practices	Total number of patients (n=107)	Patients with hand eczema (n=54)	Patients without hand eczema (n=53)	P-value
At workplace				
Frequency of hand washing				.023
<5 times a shift, n (%)	5 (4.7)	3 (5.6)	2 (3.8)	
5-10 times a shift, n (%)	9 (8.4)	1 (1.9)	8 (15.1)	
11-20 times a shift, n (%)	29 (27.1)	12 (22.2)	17 (32.1)	
>20 times a shift, n (%)	64 (59.8)	38 (70.4)	26 (49.1)	
Frequency of use of alcohol-based disinfectant				.84
<5 times a shift, n (%)	11 (10.3)	5 (9.3)	6 (11.3)	
5-10 times a shift, n (%)	27 (25.2)	13 (24.1)	14 (26.4)	
11-20 times a shift, n (%)	24 (22.4)	11 (20.4)	13 (24.5)	
>20 times a shift, n (%)	45 (42.1)	25 (46.3)	20 (37.7)	
Frequency of glove use				.13
<5 times a shift, n (%)	9 (8.4)	4 (7.4)	5 (9.4)	
5-10 times a shift, n (%)	12 (11.2)	3 (5.6)	9 (17.0)	
11-20 times a shift, n (%)	26 (24.3)	17 (31.5)	9 (17.0)	
>20 times a shift, n (%)	60 (56.1)	30 (55.6)	30 (56.6)	
Frequency of use of moisturizing creams after hand washing				.002
Never, n (%)	31 (29.9)	9 (16.7)	22 (41.5)	
<50%, n (%)	45 (42.1)	21 (38.9)	24 (45.3)	
50%, n (%)	21 (19.6)	16 (29.6)	5 (9.4)	
>50%, n (%)	7 (6.5)	5 (9.3)	2 (3.8)	
Always, n (%)	3 (2.8)	3 (5.6)	0 (0)	
At daily life				
Frequency of hand washing				.088
<5 times a day, n (%)	6 (5.6)	1 (1.9)	5 (9.4)	
5-10 times a day, n (%)	35 (32.7)	14 (25.9)	21 (39.6)	
11-20 times a day, n (%)	45 (42.1)	27 (50.0)	18 (34.0)	
>20 times a day, n (%)	21 (19.6)	12 (22.2)	9 (17.0)	
Frequency of use of alcohol-based disinfectant				.11
<5 times a day, n (%)	86 (80.4)	45 (83.3)	41 (77.4)	
5-10 times a day, n (%)	14 (13.1)	9 (16.7)	5 (9.4)	
11-20 times a day, n (%)	5 (4.7)	0 (0)	5 (9.4)	

>20 times a day, n (%)	2 (1.9)	0 (0)	2 (3.8)	
Frequency of use of moisturizing creams after hand washing				<.001
Never, n (%)	46 (43.0)	6 (11.1)	40 (75.5)	
<50%, n (%)	33 (30.8)	23 (42.6)	10 (18.9)	
50%, n (%)	16 (15.0)	15 (27.8)	1 (1.9)	
>50%, n (%)	5 (4.7)	4 (7.4)	1 (1.9)	
Always, n (%)	7 (6.5)	6 (11.1)	1 (1.9)	
Preventive and therapeutic measures in patients with hand eczema (n=45)				
Use of moisturizing creams before the development of hand eczema, n(%)				
Yes	26 (57.8)	26 (57.8)	NA	NA
No	19 (42.2)	19 (42.2)	NA	
Frequency of use of moisturizing creams after the development of hand eczema, n(%)				
More frequent	36 (80)	36 (80)	NA	NA
Not changed	8 (17.8)	8 (17.8)	NA	
Less frequent	1 (2.2)	1 (2.2)	NA	
Frequency of handwashing and use of alcohol-based disinfectant after hand eczema, n(%)				
More frequent	4 (8.9)	4 (8.9)	NA	NA
Not changed	28 (62.2)	28 (62.2)	NA	
Less frequent	13 (28.9)	13 (28.9)	NA	
Use of topical corticosteroid for hand eczema treatment, n(%)				
Yes	16 (35.6)	16 (35.6)	NA	NA
No	29 (64.4)	29 (64.4)	NA	

Online supplemental Table 2. Multivariate analysis for identifying independent risk factors associated with hand eczema. Logistic regression analysis was used to define independent risk factors. OR: Odds ratio, 95%CI: 95% confidence interval.

Variables	<i>P</i> -value	OR	95%CI
Female gender	.89	0.90	0.20-4.12
Age >28	.11	2.68	0.80-8.93
Working years >3	.62	1.46	0.33-6.48
Generalized dry skin	.91	1.10	0.24-4.92
Hand washing >20 per day at work	.051	3.28	0.995-10.8
Use of moisturizing hand cream at work	.18	2.49	0.66-9.30
Use of moisturizing hand cream at daily life	<.001	22.1	6.33-77.0
Houseworking	.75	1.26	0.31-5.15
History of hand eczema in the past year	<.001	18.5	3.82-89.9

Online supplemental Table 3. Clinical characteristics of hand eczema

□ According to patient's history of a confirmed diagnosis by patch testing in the past

HECSI: Hand eczema severity index

§HECSI 0-11 points: mild eczema, 12-27 points: moderate eczema, >27 points: severe eczema

Clinical features	n=54
One hand, n (%)	2 (3.7)
Both hand, n (%)	52 (96.3)
Clinical type	
Irritant contact dermatitis, n (%)	52 (96.3)
□ Allergic contact dermatitis, n (%)	2 (3.7)
Morphology	
Dyshidrotic/vesicular, n (%)	3 (5.6)
Erythema-squamous, n (%)	41 (75.9)
Hyperkeratotic/rhagadiform, n (%)	7 (12.9)
Combined morphology, n (%)	3 (5.6)
Localizations	
Palm, n (%)	11 (20.4)
Dorsum, n (%)	46 (85.2)
Finger webs, n (%)	10 (18.5)
Sides of finger, n (%)	4 (7.4)
Fingertips, n (%)	8 (14.8)
Hand and wrist, n (%)	4 (7.4)
Periungual eczema and nail eczema, n (%)	2 (3.7)
Pruritus, n (%)	39 (72.2)
HECSI, median (range)	24 (3-84)
§Eczema severity	
Mild, n (%)	13 (24.1)
Moderate, n (%)	20 (37.0)
Severe, n (%)	21 (38.9)

Online supplemental Tables

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NA: not applicable

Demographic features	Total number of patients (n=107)	Patients with hand eczema (n=54)	Patients without hand eczema (n=53)	P-value
Patients with hand eczema, n (%)	54 (50.5)	54 (100)	0 (0)	NA
Gender				.033
Male, n (%)	35 (32.7)	12 (22.2)	23 (43.4)	
Female, n (%)	72 (67.3)	42 (77.8)	30 (56.6)	
Age, median (range)	28 (21-48)	29 (21-46)	27 (21-48)	.003
Mean	29.6±6.3	30.5±5.7	28.6±6.8	
Profession				.41
Physician, n (%)	47 (43.9)	24 (44.4)	23 (43.4)	
Nurse, n (%)	48 (44.9)	23 (42.6)	25 (47.2)	
Medical caretaker, n (%)	2 (1.9)	2 (3.7)	0 (0)	
Other, n (%)	10 (9.3)	5 (9.3)	5 (9.4)	
Workplace				.028
Inpatient clinic, n (%)	93 (86.9)	45 (83.3)	48 (90.6)	
Intensive care unit, n (%)	5 (4.7)	5 (9.3)	0 (0)	
Emergency unit, n (%)	9 (8.4)	4 (7.4)	5 (9.4)	
Work years, median (range)	3 (0.5-29)	5 (0.5-25)	2 (0.5-29)	<.001
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History of metal allergy, n (%)	16 (15.0)	11 (20.4)	5 (9.4)	.19
History of glove allergy (Type 4), n (%)	13 (12.1)	6 (11.1)	7 (13.2)	.97
Generalized dry skin, n (%)	39 (36.4)	27 (50.0)	12 (22.6)	.006
History of hand eczema in the past year, n (%)	32 (29.9)	29 (53.7)	3 (5.7)	<.001
Additional housework at home, n (%)	58 (54.2)	41 (75.9)	17 (32.1)	<.001
Smoking status				.94
Nonsmoker, n (%)	68 (63.6)	35 (64.8)	33 (62.3)	
Smoker (current or ex-smoker), n (%)	39 (36.4)	19 (35.2)	20 (37.7)	

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11-20 times a shift, n (%)	29 (27.1)	12 (22.2)	17 (32.1)	
>20 times a shift, n (%)	64 (59.8)	38 (70.4)	26 (49.1)	
Frequency of use of alcohol-based disinfectant				.84
<5 times a shift, n (%)	11 (10.3)	5 (9.3)	6 (11.3)	
5-10 times a shift, n (%)	27 (25.2)	13 (24.1)	14 (26.4)	
11-20 times a shift, n (%)	24 (22.4)	11 (20.4)	13 (24.5)	
>20 times a shift, n (%)	45 (42.1)	25 (46.3)	20 (37.7)	
Frequency of glove use				.13
<5 times a shift, n (%)	9 (8.4)	4 (7.4)	5 (9.4)	
5-10 times a shift, n (%)	12 (11.2)	3 (5.6)	9 (17.0)	
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>20 times a shift, n (%)	60 (56.1)	30 (55.6)	30 (56.6)	
Frequency of use of moisturizing creams after hand washing				.002
Never, n (%)	31 (29.9)	9 (16.7)	22 (41.5)	
<50%, n (%)	45 (42.1)	21 (38.9)	24 (45.3)	
50%, n (%)	21 (19.6)	16 (29.6)	5 (9.4)	
>50%, n (%)	7 (6.5)	5 (9.3)	2 (3.8)	
Always, n (%)	3 (2.8)	3 (5.6)	0 (0)	
At daily life				
Frequency of hand washing				.088
<5 times a day, n (%)	6 (5.6)	1 (1.9)	5 (9.4)	
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50%, n (%)	16 (15.0)	15 (27.8)	1 (1.9)	
>50%, n (%)	5 (4.7)	4 (7.4)	1 (1.9)	
Always, n (%)	7 (6.5)	6 (11.1)	1 (1.9)	
Preventive and therapeutic measures in patients with hand eczema (n=45)				
Use of moisturizing creams before the development of hand eczema, n(%)				
Yes	26 (57.8)	26 (57.8)	NA	NA
No	19 (42.2)	19 (42.2)	NA	
Frequency of use of moisturizing creams after the development of hand eczema, n(%)				
More frequent	36 (80)	36 (80)	NA	NA
Not changed	8 (17.8)	8 (17.8)	NA	
Less frequent	1 (2.2)	1 (2.2)	NA	
Frequency of handwashing and use of alcohol-based disinfectant after hand eczema, n(%)				
More frequent	4 (8.9)	4 (8.9)	NA	NA
Not changed	28 (62.2)	28 (62.2)	NA	
Less frequent	13 (28.9)	13 (28.9)	NA	
Use of topical corticosteroid for hand eczema treatment, n(%)				
Yes	16 (35.6)	16 (35.6)	NA	NA
No	29 (64.4)	29 (64.4)	NA	

Online supplemental Table 2. Multivariate analysis for identifying independent risk factors associated with hand eczema. Logistic regression analysis was used to define indepent risk factors. OR: Odds ratio, 95%CI: 95% confidence interval.

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Morphology	
Dyshidrotic/vesicular, n (%)	3 (5.6)
Erythema-squamous, n (%)	41 (75.9)
Hyperkeratotic/rhagadiform, n (%)	7 (12.9)
Combined morphology, n (%)	3 (5.6)
Localizations	
Palm, n (%)	11 (20.4)
Dorsum, n (%)	46 (85.2)
Finger webs, n (%)	10 (18.5)
Sides of finger, n (%)	4 (7.4)
Fingertips, n (%)	8 (14.8)
Hand and wrist, n (%)	4 (7.4)
Periungual eczema and nail eczema, n (%)	2 (3.7)
Pruritus, n (%)	39 (72.2)
HECSI, median (range)	24 (3-84)
§Eczema severity	
Mild, n (%)	13 (24.1)
Moderate, n (%)	20 (37.0)
Severe, n (%)	21 (38.9)