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Prevalence of Hand Eczema among Healthcare Workers in A Tertiary Care Hospital in the Post-COVID Era of Hand Hygiene: A Cross-Sectional Study

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Abstract

Hand eczema (HE) is an inflammatory condition characterized by dryness and irritation of hands, which commonly affects healthcare workers due to contact with allergens because of frequent handwashing and the use of gloves. Long-standing eczema can significantly affect the quality of life; hence better understanding is needed for prevention, especially in healthcare workers. To determine the prevalence of hand eczema in healthcare workers in the post-COVID-19 era and assess the relationship with other variables, like socio-economic status. The prospective cross-sectional observational study was conducted. One hundred and eight healthcare workers with hand eczema were asked to fill out a questionnaire regarding hand eczema and were examined for clinical signs of hand eczema. The data was interpreted, and an association was made with the HECSI score, Modified Kuppuswamy score and Y-BOCS score for OCD (obsessive compulsive disorder). There were statistically significant differences in the methods of hand sanitizing used across the socio-economic categories defined by the Modified Kuppuswamy Scale. Additionally, there was a significant difference in HECSI scores across different Y-BOCS categories. This study demonstrates significant differences in hand sanitizing practices and HECSI scores among hospital workers post-COVID-19, influenced by socioeconomic factors and OCD.

Keywords: *COVID-19, Hand Eczema, HECSI Score, Socio-Economic Status.*

Introduction

Hand eczema (HE) is a common inflammatory condition characterized by dryness, itching and irritation of the hand. Hand eczema is described as "dermatitis, which is largely confined to the hands, with none or only minor involvement of other areas [1]. It is a multi-factorial disease influenced by both external and internal factors. The most common internal or endogenous factor is the history of atopy. External or exogenous factors include irritants like soaps, detergents, food proteins, rubber, trauma and allergens like nickel, chromium, and drugs [2]. It is a common form of occupational dermatitis frequently affecting healthcare workers (HCWs) due to frequent handwashing and contact with various allergens and irritants. In a systematic review and meta-analysis of literature published from 2020-2022 on the prevalence of hand eczema in healthcare workers, it was found that the pooled lifetime, 1-year and point prevalence of self-reported HE in HCWs were 33.4%, 27.4% and 13.5%, respectively [3]. Both socio-economic and psychosocial factors are playing a role in the development of hand eczema, and a reverse

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fashion, HE can impose socio-economic as well as psychological burden on patients with HE. Several studies in the literature supported this association as well [4, 5]. There is an increased risk for the development of occupational dermatitis in individuals with atopic dermatitis associated with a loss-of-function mutation of filaggrin [6], and more than half of atopic patients develop hand eczema. To the best of our comprehension, there is a scarcity of studies that document the hand hygiene practices post-COVID-19 and the link between atopy, socio-economic status and the psycho-social aspects. Our study aims to determine the prevalence of hand dermatitis among healthcare workers (HCWs) in the post-COVID period and to identify the risk factors.

Materials and Methods

The prospective observational, cross-sectional hospital-based study was conducted in the Department of Dermatology, Venerology and Leprosy at a tertiary care centre in Chennai. The institutional ethics committee approval was obtained for the same. The study duration was five months (from July 2022 to November 2022). Universal sampling was done. The inclusion criteria were healthcare workers above the age of 18, diagnosed with hand eczema, and the exclusion criteria were the unwillingness to participate in the study. A total of 108 healthcare workers, including doctors, nurses, allied health sciences professionals and housekeeping staff working in the hospital during the study period with a diagnosis of hand eczema, were selected for the study. Written informed consent was obtained from all participants of the study, and a custom questionnaire adapted from the Nordic Occupational Skin Questionnaire 2002 (NOSQ-2002) was filled out by the patients. The modified questionnaire included questions regarding demographic details, history of atopy, the type of product used to wash or sanitise hands, duration of handwash, number of times of hand wash, symptoms, site of involvement and emotional aspects of his/her condition. The patients were examined for clinical signs of HE like erythema, papules, vesicles, fissures, scaling, crusting, oedema, lichenification and hyperkeratosis. The data was interpreted, and an association was made with the HECSI score, Modified Kuppuswamy score (2022) and Y-BOCS score for OCD. Analysis was performed with an independent sample t-test, and a p-value<0.05 was statistically significant. The data was analysed using the IBM SPSS 21.0 software.

Results

A total of 108 healthcare workers participated in the study, out of which 68 (63%) were male and 40 (37%) were female, with a male-to-female ratio of 1.7:1. The mean age of the participants was 32.78±10.70 years. There were 51(47.2%), 33 (30.6%), 14 (13%), and 10 (9.3%) participants in the age groups 20-29 years, 30-39 years, 40-49 years and 50-60 years age groups, respectively. A total of 34 (31.5%) doctors, 33 (30.6%) nurses, 17 (15.7%) AHS professionals and 24 (22.2%) housekeeping staff participated in the study (Table 1).

Table 1. Frequency Distribution of Study Participants among Hospital Workers during COVID-19 in a Tertiary Care Centre

Demographic variables	**Frequency**	**Percentage (%)**
Designation		
Doctors	34	31.5
Nurses	33	30.6
AHS Professionals	17	15.7
Housekeeping Staff	24	22.2
Modified Kuppuswamy Scale	**Frequency**	**Percentage (%)**
Upper Class	32	29.6

Upper Middle Class	20	18.5
Lower Middle Class	15	13.9
Upper Lower Class	17	15.7
Lower Class	24	22.2
Hand sanitizing parameter	**Frequency**	**Percentage (%)**
Hand washing duration (N = 57)		
<30 seconds	25	43.9
30 seconds – 1 minute	12	21.1
1 – 2 minutes	10	17.5
>2 minutes	10	17.5
Number of Times Hand washing (N= 57)		
<5 Times/Day	27	47.4
5 - 10 Times/Day	12	21.1
10 -20 Times/Day	10	17.5
>20 Times/Day	8	14
Number of times hands sanitized (N =51)		
< 10 Times/Day	33	64.7
10 -20 Times/Day	10	19.6
>20 Times/Day	8	15.7

A history of atopy was found to be positive in 21 (19.4%) of the participants, while 87 (80.6%) did not have a history of atopy.

The participants were classified based on their socio-economic status using the Modified Kuppuswamy scale and 32 (29.6%) belonged to the upper class, 20 (18.5%) to the upper middle class, 15 (13.9%) to the lower middle class, 17 (15.7%) to the upper lower class and 24 (22.2%) to the lower class.

Regular soap was used by three (2.8%) of the participants, anti-septic soap by five (4.7%), regular hand wash by 13 (12 %), anti-septic hand wash by 27 (25%), hand sanitizer by 51 (47.2%) and detergent by nine (8.30%) respectively (Figure 1). The nine patients using detergents belonged to the housekeeping category of healthcare workers.

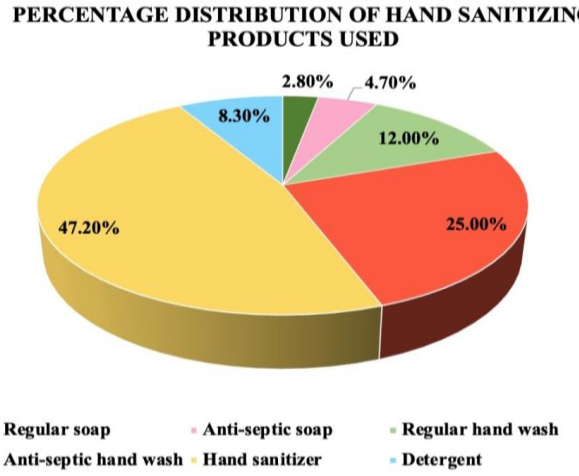

Figure 1. Frequency Distribution of Products used for Sanitizing Hands among Hospital Workers Post-COVID-19 in a Tertiary Care Centre

The data showed that hand washing was done for less than 30 seconds by 25 (43.9%), 30 seconds to one minute by 12 (21.1%), one to two minutes by ten (17.5%) and for more than two minutes by ten (17.5%) of the participants, respectively. The majority of participants who washed their hands for more than 2 minutes were doctors.

Hand washing was done less than five times per day by 27 (47.4%), five to ten times per day by 12 (21.1%), ten-20 times per day by ten (17.5%) and more than 20 times per day by eight (14%) of the participants, respectively. All participants who washed their hands more than 20 times per day were doctors.

Out of the participants using a hand sanitizer, 33 (64.7%) of them used it less than ten times per day, ten (19.6%) of them used it ten to 20 times per day, and eight (15.7%) of them used hand sanitizer more than 20 times per day, respectively.

The participants were asked to fill in the details of their symptoms, and itching was the most common symptom experienced by 56 (51.9%) of them. The other symptoms were dryness present in 40 (37%) of them, 39 (36.1%) had peeling of the skin, a burning sensation was seen in 22 (20.4%), cracking was seen in 11 (10.2%), ten (9.3%) had oozing and seven (6.5%) had bleeding.

The participants were clinically assessed for any clinical signs of hand eczema, and it was found that the most common sign was xerosis, seen in 45 (41.7%), followed by erythema, which was seen in 20 (18.5%) of the participants. Lichenification was present in 15 (13.9%), scaling in 13 (12%), crusting in 12 (11.1%), papules in 12 (11.1%), hyperkeratosis in ten (9.3%), fissuring in seven (6.5%), oedema in five (4.6%) and vesicles in two (1.8%) of the participants respectively.

The most commonly involved site was the interdigital space, seen in 46 (42.6%), followed by the palmar aspect of hands in 44 (40.7%), then by fingers in 32 (29.4%), and the dorsal aspect of hands in 16 (14.8%) of the participants, respectively.

The Hand Eczema Severity Index (HECSI) was calculated for all participants, and a score of '0' was assigned as clear, one-16 as almost clear, 17-37 as moderate, 38-116 as severe and more than or equal to 117 as very severe [7]. A clear score was seen in 38 (35.2%), an almost clear score in 25 (23.1%), moderately clear in 28 (26%), severe in ten (9.2%) and very severe in seven (6.5%), respectively (Table 2).

The Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) score was assessed, and a score of zero-7 was deemed to be subclinical, 8-15 as mild symptoms, 16-23 as moderate symptoms, 24-31 as severe symptoms, and 32-40 as extreme symptoms [8]. Sub-clinical symptoms were seen in 95 (88%), mild symptoms in nine (8.3%) and moderate symptoms in four (3.7%). None of the participants had severe or extreme symptoms (Table 2).

Table 2. Frequency distribution of HECSI and Y-BOCS Score among Hospital Workers Post-COVID-19 in a Tertiary Care Centre

HECSI Score	**Frequency (N)**	**Percentage (%)**
Clear	38	35.2
Almost Clear	25	23.1
Moderate Clear	28	26
Severe	10	9.2
Very Severe	7	6.5
Y-BOCS SCORE FOR OCD	**Frequency (N)**	**Percentage (%)**
Sub-Clinical	95	88
Mild	9	8.3

Moderate	4	3.7
Severe	0	0
Extreme	0	0

Hand sanitizer was the most commonly used method across all socio-economic classes, with the highest prevalence in the upper class (87.5%) (Table 3). The use of hand sanitizers decreased with lower socio-economic classes, reaching 12.5% in the lower class. Anti-septic hand wash was also frequently used, especially in the upper middle class (40%) and lower class (33.3%), while regular hand wash was more commonly seen in the upper lower and lower middle classes (29.4% and 26.6% respectively). Regular soap and anti-septic soap were the least used methods, with a minimal presence across all groups. Interestingly, detergent was used exclusively by the lower class (37.5%). There was a significant association between socio-economic status and the method of hand sanitizing used by hospital workers ($p < 0.0001$).

The upper class had the highest proportion of workers with clear HECSI scores (53.2%), followed by the upper middle class (50%). As the socio-economic status decreased, the proportion of workers with clear scores decreased, with only 8.3% of the lower class achieving a clear score. The almost clear category was notably high in the upper class (31.2%) and upper middle class (25%), but it decreased significantly in lower classes, reaching only 16.7% in the lower class. Moderate clear scores were more evenly distributed across all classes, with a slight increase in the upper lower (35.4%) and lower classes (29.2%). The severe and very severe categories saw a disproportionate increase in the lower class, with 25% of the lower class being classified as severe, and 20.8% in the very severe category. In contrast, no workers in the upper class were classified as severe or very severe. The distribution of HECSI scores also varied significantly across socio-economic classes ($p < 0.0008$) (Table 3).

Table 3. Comparison of Modified Kuppuswamy Scale and Method of Hand Sanitizing, HECSI Score among Hospital Workers Post-COVID-19 in a Tertiary Care Centre

Method of Hand sanitizing & HECSI score	**Modified Kuppuswamy Scale (2024)**						**p-value**
	Upper Class N =32 N (%)	**Upper Middle N =20 N (%)**	**Lower Middle N =15 N (%)**	**Upper Lower N =17 N (%)**	**Lower class N =24 N (%)**	**Total N =108 N (%)**	
Method Of Hand Sanitizing							
Regular soap	0	0	01 (6.7)	01 (5.8)	01 (4.2)	03 (02.8)	**<0.0000****
Antiseptic Soap	0	0	01 (6.7)	02 (11.8)	02 (8.3)	05 (04.7)	
Regular Hand wash	0	03 (15)	04 (26.6)	05 (29.4)	01 (4.2)	13 (12.0)	
Antiseptic Hand Wash	04 (12.5)	08 (40)	03 (20)	04 (23.6)	08 (33.3)	27 (25.0)	
Hand Sanitizer	28 (87.5)	09 (45)	06 (60)	05 (29.4)	03 (12.5)	51 (47.2)	
Detergent	0	0	0	0	09 (37.5)	09 (08.3)	
Total	**32 (100)**	**20 (100)**	**15 (100)**	**17 (100)**	**24 (100)**	**108**	
HECSI SCORE							
Clear	17 (53.2)	10 (50)	06 (40)	03 (17.6)	02 (8.3)	38 (35.2)	**0.0007832**

Almost Clear	10 (31.2)	05 (25)	03 (20)	03 (17.6)	04 (16.7)	25 (23.1)	
Moderate Clear	5 (15.6)	05 (25)	05 (33.3)	06 (35.4)	07 (29.2)	28 (26.0)	
Severe	0	0	01 (6.7)	03 (17.6)	06 (25)	10 (09.2)	
Very Severe	0	0	0	02 (11.8)	05 (20.8)	07 (06.5)	
Total	**32 (100)**	**20 (100)**	**15 (100)**	**17 (100)**	**24 (100)**	**108**	

Table 4 shows the distribution of handwashing duration across the different Y-BOCS score categories. A statistically significant association was found between handwashing duration and Y-BOCS scores ($p < 0.005$). The majority of workers in the Subclinical category (51%) washed their hands for less than 30 seconds. As handwashing duration increased, the proportion of workers with higher Y-BOCS scores also increased. Specifically, 50% of those in the mild category and 100% of those in the moderate category washed their hands for more than 2 minutes. The results suggest a correlation between longer handwashing duration and higher severity of OCD symptoms.

A significant relationship was found between the frequency of handwashing and the Y-BOCS score ($p = 0.0024$). The subclinical category showed the highest frequency of handwashing, with 54% washing their hands fewer than five times a day. As the frequency of handwashing increased, the proportion of workers with higher Y-BOCS scores also increased. 40% of workers in the mild category washed their hands between 10 to 20 times, and 40% of workers in the moderate category washed their hands more than 20 times. This trend indicates that those with more severe OCD symptoms tend to wash their hands more frequently.

Table 4 further examines the use of hand sanitizers, revealing a statistically significant difference in the frequency of hand sanitizer use across Y-BOCS categories ($p < 0.0005$). A significant proportion (73.3%) of workers in the subclinical category used hand sanitizer fewer than ten times per day. In contrast, higher frequencies of use were observed in the mild and moderate categories, with 50% of workers in both categories using hand sanitizer between ten to 20 times. Furthermore, all workers in the moderate category used hand sanitizer more than 20 times. These findings suggest that workers with more severe OCD symptoms exhibit higher use of hand sanitizer.

Table 4. Comparison of Y- BOCS Score for OCD and Method of Hand Sanitizing and HECSI Score among Hospital Workers Post-COVID-19 in a Tertiary Care Centre

Method of Hand sanitizing & HECSI score	**Categories of Y-BOCS score**				**p-value**
	Sub Clinical N (%)	**Mild N (%)**	**Moderate N (%)**	**Total N (%)**	
Handwashing Duration					
<30 sec	25 (51)	0	0	25 (43.9)	**0.004690**
30 sec – 1 min	11 (22.5)	1 (16.7)	0	12 (21.1)	
1 – 2 min	8 (16.3)	2 (33.3)	0	10 (17.5)	
>2 min	5 (10.2)	3 (50)	2 (100)	10 (17.5)	
Total	**49 (100)**	**6 (100)**	**2 (100)**	**57 (100)**	
No. Of Times of Handwashing					
<5 times	27 (54)	0	0	27 (47.4)	**0.002438**
5 – 10 times	11 (22)	1 (20)	0	12 (21.1)	
10 -20 times	8 (16)	2 (40)	0	10 (17.5)	
>20 times	4 (8)	2 (40)	2 (100)	8 (17.5)	

Total	**50 (100)**	**5 (100)**	**02 (100)**	**57 (100)**	
No. At Times, Hand Sanitizer Is Used					
< 10 times	33 (73.3)	0	0	33 (64.7)	**0.0004675**
10 -20 times	8 (17.8)	2 (50)	0	10 (19.6)	
>20 times	4 (8.9)	2 (50)	2 (100)	8 (15.7)	
Total	**45 (100)**	**4 (100)**	**2 (100)**	**51 (100)**	
HECSI Score					
Clear	38 (38.8)	0	0	38 (35.2)	**0.0003351**
Almost Clear	24 (24.5)	1 (14.3)	0	25 (23.1)	
Moderate Clear	24 (24.5)	4 (57.1)	0	28 (26)	
Severe	8 (8.1)	1 (14.3)	1 (33.3)	10 (9.2)	
Very Severe	4 (4.1)	1 (14.3)	2 (66.7)	07 (6.5)	
Total	**98 (100)**	**7 (100)**	**3 (100)**	**108 (100)**	

A strong association was observed between the HECSI score and the Y-BOCS score ($p = 0.00033$). The subclinical group had the highest proportion of workers with clear HECSI scores (38.8%), while the mild and moderate categories had fewer workers achieving clear scores, with none in the mild and only a few in the moderate category. As OCD severity increased, workers were more likely to have very severe HECSI scores, with 66.7% of those in the moderate category falling into the very severe category. This suggests that workers with higher Y-BOCS scores were associated with poorer hand hygiene and sanitation practices, as indicated by higher HECSI scores.

Discussion

While a significant number of articles have already been published on the prevalence of hand eczema, many of them fail to correlate variables such as socioeconomic status, HECSI score and Y-BOCS scores, which are crucial for a more comprehensive understanding of the issue [9-13]. Our study found that hand sanitizer was the most commonly used hand hygiene method across all socio-economic classes, with the highest prevalence in the upper class (87.5%). This finding aligns with existing literature that suggests higher socio-economic groups have more access to resources such as hand sanitizers, which are often considered more convenient and portable than soap and water [14]. However, there was a marked decrease in hand sanitizer usage as socio-economic status decreased, with only 12.5% of the lower class using it. This disparity could be attributed to differences in access, affordability, and awareness of hygiene products across different socio-economic groups [15, 16].

The study also found a statistically significant association between socioeconomic status and hand hygiene practices, with lower socio-economic classes exhibiting fewer adherences to recommended hand hygiene methods ($p < 0.0001$).

A notable aspect of the study was the correlation between OCD symptom severity, as measured by Y-BOCS scores, and both the duration and frequency of handwashing. Workers in the moderate and severe OCD categories were more likely to engage in prolonged and frequent handwashing, with 100% of those in the moderate category washing their hands for more than two minutes. This is consistent with the findings of previous research, which indicates that individuals with OCD tend to exhibit excessive and ritualistic hand-washing behaviours [17, 18]. OCD-related compulsions often manifest through an exaggerated need for cleanliness, with individuals engaging in handwashing rituals far beyond recommended hygiene practices.

In addition to handwashing, the use of hand sanitizers also showed a significant association with Y-BOCS scores. Workers in the moderate OCD category used hand sanitizer more frequently, with all workers in this group reporting usage more than 20 times per day. This suggests that as OCD severity increases, there may be a greater reliance on sanitizers, potentially due to the perceived efficacy of hand sanitizers.

We observed a clear pattern: workers with higher Y-BOCS scores had more severe hand eczema, as indicated by higher HECSI scores. Specifically, a large proportion of those in the moderate OCD category fell into the very severe HECSI category (66.7%), suggesting that higher OCD symptom severity may contribute to developing more severe hand eczema. This may be due to the contamination fears [19-22].

These findings have significant implications for healthcare settings, where proper hand hygiene is critical in preventing the spread of infections [23-25]. The variation in hand hygiene practices based on socio-economic status and OCD severity suggests that tailored interventions may be needed to address these factors [26-29]. For example, healthcare workers in lower socio-economic classes may benefit from increased access to hand sanitizers and educational campaigns on the importance of proper hand hygiene [30-31]. Similarly, healthcare workers with severe OCD symptoms may require specialized support to manage their compulsions and improve their adherence to effective hand hygiene practices [32-33].

Conclusion

In conclusion, this study demonstrates significant differences in hand sanitizing practices and HECSI scores among hospital workers post-COVID-19, influenced by socioeconomic factors. These disparities underscore the importance of addressing healthcare worker needs based on socioeconomic status, ensuring equitable access to resources, and reinforcing the essential role of proper hand hygiene in preventing hospital-acquired infections and the prevention of hand eczema.

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Conflict of Interest

The authors hereby declare that there is no conflict of interest in this study.

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