

## Hand hygiene practice and hand eczema among healthcare workers during COVID-19 pandemic in a tertiary hospital in Southern Nigeria

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### Abstract

**Background:** Hand eczema is common among those occupationally exposed to intense wet work and chemical irritants such as healthcare workers. The risk may be increased during this coronavirus disease (COVID)-19 period because regular hand hygiene is one of the recommended strategies for curbing the spread of coronavirus. However, overzealous hand washing among healthcare workers may lead to hand eczema and some attendant consequences such as reduced quality of life.

**Aim:** To determine the prevalence of hand eczema amongst healthcare workers and associated factors among healthcare workers in a tertiary hospital in Southern Nigerian.

**Methods:** This was a cross-sectional descriptive study that was done amongst healthcare workers in Nigerian tertiary hospital. Patients were examined for hand eczema after obtaining information on their hygiene practices and symptoms of hand eczema. P value of  $\leq 0.05$  was considered significant.

**Results:** Three hundred and seventeen healthcare workers comprising of 140(44.2%) females and 177(55.8%) males with a mean age of  $34.13 \pm 6.82$  years participated in the study. There was significant increase in the frequency of hand washing in the COVID-19 era ( $p = <0.001$ ). The prevalence of hand eczema amongst healthcare workers was 64.7%. The common skin lesions observed were lichenification [187(59%)], xerosis [182(57.4%)] and scales [70(22.1%)]. There was no significant association between hand eczema and age, profession and gender of the health worker ( $p = >0.05$ ).

**Conclusion:** Hand eczema was highly prevalent among healthcare workers during this COVID-19 era. There is need to regularly educate the general public on proper and rational hand hygiene.

**Keywords:** Hand hygiene, hand eczema, health-care workers

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## INTRODUCTION

The coronavirus disease (COVID-19) outbreak started in Wuhan, China in December 2019, but has spread to many countries.<sup>1</sup> It was declared a pandemic by the World Health Organization (WHO) in March 2020.<sup>2</sup> Since onset of the COVID-19 pandemic, 68,619,110 cases and 1,570,155 deaths have been recorded globally as at 12<sup>th</sup> December, 2020.<sup>3</sup>

The disease presently has no cure and management is mainly supportive. Regular hand washing is one of the key recommendations by WHO to curb the spread of the virus.<sup>4</sup> However, frequent hand washing and overzealous use of hand sanitizers may predispose to hand dermatitis.<sup>5</sup>

A recent study from China showed high prevalence of hand dermatitis (74.5%) among healthcare workers managing patients with COVID-19 and also identified frequent high hygiene as one of the risk factors of hand dermatitis.<sup>6</sup> Overzealous hand hygiene may lead to gradual depletion of surface lipids, resulting in deeper action of detergents in the superficial skin layers.<sup>6</sup> Irritant contact dermatitis is more commonly reported with iodophors, chlorhexidine, chloroxylenol, triclosan, and alcohol-based products, whereas allergic contact dermatitis has been reported with quaternary ammonium compounds, iodine or iodophors, chlorhexidine, triclosan, chloroxylenol, and alcohols.<sup>7</sup>

The overzealous hand hygiene amidst the COVID-19 pandemic may undoubtedly lead to increased cases of hand dermatitis, but it is also postulated that the disrupted skin barrier may facilitate the entry of the coronavirus through the skin. This is because angiotensin-converting enzyme 2 which is the receptor for Severe Adult Respiratory Syndrome-Coronavirus-2 entry is present in large quantities in the blood vessels of the skin, basal layer of the epidermis, and hair follicles.<sup>8</sup> Despite the importance of hand hygiene in mitigation of spread of the COVID-19,<sup>9,10</sup> there is need to adequately educate the healthcare professionals and general public on proper use of sanitizers and hand hygiene. This study aimed to determine the prevalence of hand dermatitis amongst health workers and its associated factors in the COVID period. The findings of this study will help to provide

information to support the need for rational hand hygiene.

## METHODOLOGY

This was a cross-sectional descriptive study that was carried out among health workers in the University of Benin Teaching Hospital, Benin City, Edo State over 3 months between July and September, 2020. The minimum sample size for this study was determined by using 74.5% as prevalence of hand eczema among health care workers from a previous study<sup>6</sup>; 95% confidence interval and a sample error of 5%. The minimum sample size following inclusion of an attrition rate of 5% was 307. A simple random technique was adopted in selecting the participants in this study. Consenting health care workers who did not have history suggestive of hand eczema or diagnosis of hand eczema prior to the COVID-19 pandemic were recruited.

### Data collection

This was done through a self-administered questionnaire which had 2 sections. The first section had questions on socio-demographic characteristics of the participants such as age, gender, level of education, occupation, marital status, religion and ethnicity and monthly income. The second section had questions on frequency of hand hygiene before and during the COVID-19 period, use and type hand sanitizers, symptoms of hand eczema such as rash, scaling, and itching.

The respondents were examined by a dermatologist for features of hand eczema after filling the self-administered questionnaire.

### Ethical consideration

Ethical clearance was obtained from the ethics committee of University of Benin Teaching Hospital, Benin for the study (ADM/E22/A/VOL II/1483059). Permission was subsequently sought from all participants in this study after explaining to them the purpose, drawbacks and benefits of the research. In addition, information received was treated with utmost confidentiality.

### Data analysis

All data generated were analyzed using statistical package for social sciences (SPSS)

version 21.0 (IBM Corp., Armonk, NY, USA). Results were presented in tabular form. Discrete variables were presented as frequency and percentages. Continuous variables were presented as mean and standard deviation. Chi-square was used to determine association between categorical variables.  $P \leq 0.05$  was taken as statistically significant.

## RESULTS

Three hundred and seventeen (317) health workers participated in this study comprising of 177(55.8%) males and 140(44.2%) females. Their mean age was  $34.13 \pm 6.82$  years. One hundred and seventy-nine (56.5%) of the respondents were married (Table 1).

The occupational distribution of the health-care workers was as follows; doctors 181(57.1%), dentist 56(17.7%), nurses 44(13.9%), health assistants 20(6.3%), pharmacist 8(2.5%) and others 8 (2.5%). The prevalence of hand eczema was 205(64.7%) amongst the health workers studied. The mean number of hand washing done daily by the respondents before and during the pandemic was  $4.35 \pm 3.16$  vs  $10.4 \pm 8.67$ ;  $p < 0.001$  (Table 1).

The most frequent hand changes observed by the respondents was dryness 72(22.7%). Other common changes were wrinkling 18(5.67%), and scaling 12(3.8%). The frequency of common skin lesions observed following examination by dermatologist during the study were lichenification [187(59%)]; xerosis [182(57.4%)]; and scaling [70(22.1%)] (Figure 1).

There was no significant association between hand eczema and age, profession and gender of the health worker ( $p > 0.05$ ) (Table 2).

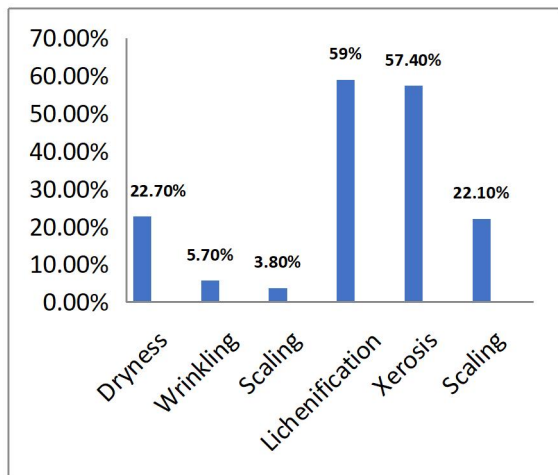
## DISCUSSION

Hand hygiene is a major protective measure in combating the COVID-19 infection. However, excessive hand hygiene may lead to an increase in the number of cases of hand eczema. In our study, respondents reported an increase in hand washing during the COVID-19 pandemic which is similar to some previous reports.<sup>6,11</sup> However, this was not surprising because regular hand hygiene was a recommended effective strategy of preventing the spread of coronavirus by WHO.<sup>4</sup>

**Table 1: Socio-demographic and clinical characteristics of the study population**

Parameter	N=317 n(%) / Mean $\pm$ SD
<b>Age</b>	$34.1 \pm 6.8$ years
<b>Age group</b>	
20-29 years	93(29.3)
30-39 years	153(48.3)
40-49 years	60(18.9)
50-59	11(3.5)
<b>Sex</b>	
Female	140(44.2)
Male	177(55.8)
<b>Marital status</b>	
Single	135(42.6)
Married	179(56.5)
Widow	2(0.6)
Divorced	1(0.3)
<b>Profession</b>	
Doctors	181(57.1)
Dentist	56(17.7)
Nurses	44(13.9)
Health Attendant	20(6.3)
Pharmacist	8(2.5)
Others	8(2.5)
<b>Use of hand sanitizer</b>	
Yes	309(97.5)
No	8(2.5)
<b>Hand eczema</b>	
Present	205(64.7)
Absent	112(35.3)
Mean of number of hand washing per day before pandemic	$4.35 \pm 3.16$
Mean of number of hand washing per day during pandemic	$10.4 \pm 8.67$

The prevalence of hand eczema was 64.7% in our study. This is lower than 74.5% reported amongst health workers by Lan *et al.*,<sup>6</sup> but higher than the prevalence of 21% reported amongst health workers by Ibler *et al.*<sup>12</sup> Some differences in the methodologies of the various studies could partly account for the varied prevalence rates. For instance, the study by Ibler *et al.*<sup>12</sup> with a lower reported prevalence rate was done in the pre-COVID era which was not characterized by frequent hand washing.



**Figure 1: Frequency of the common symptoms and signs of hand eczema among healthcare workers**

**Table 2: Association between hand eczema, age, gender and profession of healthcare workers**

	Presence of hand eczema n(%)	Absence of hand eczema n(%)	P-value
<b>Gender</b>			
Male	114(64.4)	63(35.6)	0.50
Female	91(65.0)	49(35.0)	
<b>Age</b>			
30-39	176(64.7)	96(35.6)	0.55
40-49	29(64.4)	16(35.6)	
≥50			
<b>Profession</b>			
Medical Doctors	112(61.2)	71(38.8)	0.08
Others	93(69.4)	41(30.6)	

The higher prevalence of hand eczema in the study by Lan *et al.*<sup>6</sup> may be due to the fact that they studied health workers who managed COVID-19 patients; hence, they were more likely to undergo more frequent and regular hygiene than respondents in our study. This was also corroborated by the report of Guertler *et al.*<sup>13</sup> who reported symptoms of hand dermatitis in 90.4% of health workers who were directly involved in the management of COVID-19 patients admitted into the intensive care unit.

Hand hygiene has been identified as a risk factor for hand eczema among health workers both in the pre-COVID and COVID period.<sup>6,13,14</sup> Frequent hand washing may cause epidermal barrier disruption, impairment of keratinocytes, release of inflammatory cytokines, activation of the skin immune system, and delayed-type hypersensitivity reactions.<sup>15</sup> Also, prolonged exposure of the hands to water could cause extensive oedema of the horny layer of the skin and interruption of the ultrastructure of the intercellular lipids. This may ultimately lead to increased permeability and sensitivity of the skin to chemical and physical irritants.<sup>16</sup>

The prevalence of hand sanitizer use amongst our respondents was 97.5% and majority used alcohol-based sanitizer. These findings are similar to report by Singh *et al.*<sup>17</sup> where almost all their respondents used hand sanitizers which were mainly alcohol-based during the pandemic. It has been observed that since 2009 when WHO published guidelines on hand hygiene for health workers, there has been a rise in the use of alcohol-based hand sanitizers. The hand rub that has gained the widest commercial success are those that contain isopropyl alcohol. It has been found that it is a potential allergen especially when used directly on skin.<sup>14,18,19</sup>

The most common symptom observed in the respondents was skin dryness occurring in 76.6% of those who noticed changes in their hands. This is similar to the finding of Singh *et al.*<sup>17</sup> who reported that 70.3% of their study participants presented with skin dryness during the COVID-19 pandemic following frequent hand washing. However, this finding is not surprising because frequent hand washing induces various changes in texture of skin with xerosis as a major consequence.

The common signs observed on examination of the hands of our study participants were lichenification (59%), xerosis (57.4%) and scaling (22.1%). These findings are quite different from the observation by Singh *et al.*<sup>17</sup> where erythema, scaling and vesiculation were the common signs elicited by the dermatologist. This difference may be due to the small sample size of the study by Singh *et al.*<sup>17</sup> compared to our study.

There was no significant association between gender and hand eczema in our study which is similar to some previous reports.<sup>17, 20</sup> However, studies on hand eczema in general population reported a significant female preponderance.<sup>14, 18</sup> There was no significant association between profession of health workers and hand eczema in our study which is similar to the report of Ibler *et al.*<sup>12</sup> in a similar study among health care workers. Also, unlike some previous studies,<sup>20</sup> we did not find any association between age and hand eczema in our study. The implication of these findings is that rationale hand hygiene should be encouraged among all health care workers irrespective of their age, profession and gender.

The limitation of this study was that patch test was not used to confirm the diagnosis of irritant allergic dermatitis due to financial constraint. However, this is the first study in Nigeria to the best of our knowledge that studied the effect of hand hygiene on hand eczema following the onset of COVID-19 pandemic.

## CONCLUSION

The study showed that hand eczema was highly prevalent among health workers. This may be related to the overzealous hand hygiene observed amidst the COVID-19 pandemic. Although hand hygiene is of the utmost importance in the fight against COVID-19, there is need to regularly educate the general public on proper and rational hand hygiene.

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## Conflicts of interest

There are no conflicts of interest

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