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RESEARCH ARTICLE

The Prevalence and Risk Factors of Self-reported Hand Eczema in Health Care *Versus* Non-health Care Workers during the COVID-19 Pandemic in Latvia

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Abstract:

Background:

Frequent contact with soap, water, and disinfectants can lead to irritant contact dermatitis, which can change the integrity of the skin and weaken its natural protective functions. Since the onset of the Coronavirus disease outbreak, there has been a marked increase in the reported prevalence of contact dermatitis in studies conducted in different countries.

Objective:

Investigate practices related to hygiene and skin care, along with the prevalence and symptoms of new-onset hand eczema among the general population of Latvia during the Coronavirus pandemic. Additionally, this study aimed to identify factors that could be associated with the occurrence of hand eczema.

Methods:

This was a descriptive cross-sectional study that encompassed the general population of Latvia aged over or equal to 18 years. To achieve the objective of the study, an online questionnaire comprising 22 questions was distributed through social media applications during the pandemic between January 1 and April 30, 2023. The responses were systematically gathered and recorded in an Excel spreadsheet, which was subsequently imported into SPSS for the purpose of conducting the analysis.

Results:

Data were collected from 257 individuals, of whom 215 (83.7%) were women. The ages of the participants extended from 18 to 82 years. During the pandemic, 96 (37.4%) participants noticed new skin damage. The prevailing symptom identified within the study population was dryness of the hands (34.6%). There was a notable increase in the frequency of handwashing, hand disinfection, moisturising, and rubber glove use compared to pre-pandemic levels. There were statistically significant associations between new-onset hand eczema and age, more frequent handwashing, disinfection, and the use of rubber gloves.

Conclusion:

According to our results, the skin of the study population was negatively affected by precautions for Coronavirus disease. Several factors were statistically significantly associated with new-onset HE, including young age (18-30 years), regular use of gloves in daily life, frequent hand washing, and disinfection.

Keywords: Hand eczema, COVID-19 pandemic, Handwashing, Skin care, Hand hygiene, Disinfectants.

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1. INTRODUCTION

In response to the global outbreak of an infectious disease caused by the SARS-CoV-2 virus, the World Health Organization (WHO) declared a pandemic on 11 March 2020 [1]. To mitigate the spread of Coronavirus infection (COVID-19), significant changes in social behavior were made. The WHO issued guidelines that currently advocate various preventive measures, including maintaining social distance, avoiding touching the face, wearing masks, using disposable gloves, and practising frequent hand hygiene with soap or alcohol-based disinfectants [2]. Frequent contact with

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soap, water, and disinfectants can lead to irritant contact dermatitis, which can change the integrity of the skin and weaken its natural protective functions. These actions can disrupt the epidermal pH, deplete the lipid barrier, and escalate trans-epidermal water loss. Additionally, repetitive use of gloves can potentially lead to irritant contact dermatitis due to the combination of heat and moisture, or result in allergic contact dermatitis due to the skin's sensitivity to the rubber compounds present in the gloves [3 - 5].

Hand dermatitis (HD) or hand eczema (HE) can manifest in various degrees, ranging from mild dryness and itchiness symptoms to more severe forms characterized by the presence of deep-seated vesicles, blisters, fissures, and bleeding on the hands [6]. This type of skin damage significantly impacts an individual's quality of life, as it can be quite painful when interacting with objects using their hands [7]. Previous studies have identified specific factors that increase the risk of HD, including frequent hand washing, use of gloves, history of atopy, and previous HE [5, 8 - 11].

Before the COVID-19 pandemic, studies on the prevalence and incidence of HE among the general population in various European countries revealed that the estimated annual prevalence rates ranged from 6.5% to 17.5% [12]. However, looking retrospectively, from the beginning of the COVID-19 outbreak until nowadays, there has been a noticeable uptrend in the reported prevalence of contact dermatitis in studies conducted in different countries [10, 13 - 15].

To our knowledge, there are insufficient number of local researches conducted to assess the prevalence of HE among the general population in Latvia during the COVID-19 pandemic. Our study aims to broaden the scope of the study population to include both healthcare workers (HCWs) and non-HCWs. This decision was made due to the observation that alterations in hand hygiene routines have been noticeable not only among HCWs but also among the general population [6, 16].

Therefore, the objective of this study was to investigate skincare habits and hand hygiene and to pinpoint the factors that could impact the occurrence of HE, considering the adoption of novel hand hygiene practises and the diverse range of hand hygiene methods used throughout the COVID-19 pandemic. Additionally, this study aimed to determine the associations between new-onset HE and gender, age, occupation, smoking status, personal and family history of atopy, and personal history of HE. We hypothesized that heightened hand hygiene measures could lead to a more frequent occurrence of skin damage among the general population.

2. MATERIALS AND METHODS

2.1. Study Design and Population

This was a descriptive, cross-sectional, survey-based study, spread over a period of 4 months (January 2023 – April 2023) in Latvia. The study included adults aged greater than or equal to 18 years. The study included both – participants from the general population of Latvia and HCWs. The study's sample size was determined using a single proportion formula, considering a 5% margin of error, a confidence level of 95%, and an estimated proportion of 20% derived from the documented prevalence of eczema found in a prior study done by Techasatian *et al.,* in 2021 [5]. According to this, our study necessitated a minimum sample size of 246 participants.

2.2. Study Procedure

Google Forms questionnaire in Latvian language was distributed electronically between January 1 and 30 April 2023, *via* social media (Facebook, Instagram) and social media application (WhatsApp) to the general population. In order to minimize the potential bias of involving respondents with existing HE, we framed the survey as a study focusing on hand hygiene habits and protective measures against COVID-19, deliberately avoiding any mention of HE in the description of the study.

2.3. Data Collection Tools

An adapted questionnaire from previously published studies was used [11, 17 - 19]. The questionnaire was reviewed by two independent dermatologists. It was found to be understandable; thus, no additional modifications were required. The questionnaire consisted of twenty-two questions, segmented into four sections to minimize order bias.

The first section contained sociodemographic data – information regarding gender, age, smoking status, and occupation (HCW or other). Additionally, HCWs had follow-up questions about their position in a hospital and possible daily direct contact with COVID-19 positive patients.

The second section contained questions regarding the medical history of participants and their family members, including prior history of atopy (bronchial asthma, allergic rhinitis, and atopic dermatitis) and HE. Those who had eczema were asked to answer whether their HE worsened during the COVID-19 pandemic or not.

The third section contained the identification of new-onset HE and related symptoms.

The fourth section contained questions regarding hand hygiene habits and the use of gloves before and after the COVID-19 pandemic.

To exclude missing data, the questionnaire was designed using a Multiple Choice Questions (MCQ) format.

This format ensured that participants could not submit incomplete or partially filled questionnaires. If a question was left unanswered, participants were not able to proceed to the next question.

2.4. Data Analysis

Statistical analysis of data was done using SPSS (Statistical Package for Social Sciences) for Windows version 27.0 and Microsoft Excel – 2016. Continuous variables were presented as mean/median and standard deviation (SD)/interquartile range (IQR), while categorical variables were calculated as frequency and percentages. Descriptive statistics were used to summarize the data. The Pearson Chi-square test was used to determine statistically significant associations of socio-demographic variables, personal and family history of atopy,

personal history of HE, handwashing, using disinfec-tants and rubber gloves, and new-onset HE. The Fisher Exact Probability test was used for tables larger than 2x2 with a small sample. The McNemar test was used to analyze the relationship between the matched pairs of data such as handwashing, disinfection, moisturization, and rubber glove use before and during the pandemic. For the statistical analysis, the significance level was set at a p-value less than 0.05, with a confidence interval of 95%.

3. RESULTS

3.1. Study Population Characteristics

Data from 257 individuals were collected. Among them, 42 individuals (16.3%) were male, while the majority, 215 individuals (83.7%), were female. Participants' ages ranged from 18 to 82 years, with a mean age of 32.3 (SD=10.5). The majority of participants (N=167; 65.0%) were aged between 18 and 30 years, while 90 (35.0%) participants were 31 years and older. Among the participants, 178 individuals (69.3%) worked as HCWs, while the remaining 79 individuals (30.7%) were non-HCWs. The largest subgroup of HCWs consisted of physicians, accounting for 137 individuals (77.0%), and among them, 115 individuals (64.6%) reported having daily direct contact with COVID-19-positive patients. The majority of participants, 213 individuals (82.9%), identified as non-smokers. All sociodemographic data are summarized in Tables **1** and **2**.

Table 1. Sociodemographic characteristics, history of atopy-related diseases, and hand eczema of study participants.

Total	n (257)	% (100.0)
Gender	-	-
Male	42	16.3
Female	215	83.7
Age	-	-
18-30	167	65.0
31-82	90	35.0
Occupation	-	-
Health care worker	178	69.3
Non-health care worker	79	30.7
Smoking status	-	-
Smoker	44	17.1
Non-smoker	213	82.9
Personal history of atopy	-	-
Yes	50	19.5
No	207	80.5
Personal history of bronchial asthma	-	-
Yes	24	9.3
No	233	90.7
Personal history of allergic rhinitis	-	-
Yes	23	8.9
No	234	91.1
Personal history of atopic dermatitis	-	-
Yes	22	8.6
No	235	91.4
First-degree family member history of atopy	-	-
Yes	82	31.9
No	175	68.1
First-degree family member history of bronchial asthma	-	-
Yes	50	19.5
No	207	80.5
First-degree family member history of allergic rhinitis	-	-
Yes	31	12.1
No	226	87.9
First-degree family member history of atopic dermatitis	-	-
Yes	21	8.2
No	236	91.8
Personal history of hand eczema	-	-
Yes	47	18.3

(Table 1) contd.....

No	210	81.7
Worsening of hand eczema symptoms during the COVID-19 pandemic	-	-
Yes	25	9.7
No	22	8.6

Abbreviation: COVID, coronavirus disease.

Table 2. Characteristics of health care workers and the prevalence of hand eczema.

-	Hand eczema		Total		P-value
	Present (n=72)	Absent (n=106)	n (178)	% (100.0)	
Position in a hospital					
Physician	56 (77.8)	81 (76.4)	137	77.0	
Nurse	4 (5.6)	7 (6.6)	11	6.2	
Medical assistant	6 (8.3)	12 (11.3)	18	10.1	
Other	6 (8.3)	6 (5.7)	12	6.7	0.821
Daily direct contact with COVID-19-positive patients					
Yes	51 (70.8)	64 (60.4)	115	64.6	
No	21 (29.2)	42 (39.6)	63	35.4	0.833

Abbreviation: COVID, coronavirus disease.

Note: Categorical variables were compared using Pearson's chi-square test. $P < .05$ was accepted as statistically significant.

3.2. History of Atopy-related Diseases and HE

A personal history of atopy was reported by 50 (19.5%) participants; 82 (31.9%) had at least one family member with a history of atopy. Of the total number of participants, 47 (18.3%) had a history of HE. Worsening of HE symptoms was noticed by 25 (53.2%) participants with a previous history of HE during the COVID-19 pandemic (Table **1**).

3.3. Signs and Symptoms of New-onset HE

Symptoms that are associated with new-onset HE are demonstrated in Table **3**. Of the total number of respondents, 96 (37.4%) noticed new skin damage during the COVID-19 pandemic. The most frequently reported symptom found in the study population was hand dryness (34.6%), followed by erythema (24.9%), itching (21.8%), scaling or fissures (21.4%), and burning or pain (13.2%).

Table 3. Symptoms associated with new-onset hand eczema.

Total	n (257)	% (100.0)
New-onset hand eczema during the COVID-19 pandemic		
Yes	96	37.4
No	161	62.6
Symptoms		
Dryness		
Yes	89	34.6
No	168	65.4
Scaling or fissures		
Yes	55	21.4
No	202	78.6
Itching		
Yes	56	21.8
No	201	78.2
Erythema		
Yes	64	24.9
No	193	75.1
Burning or pain		
Yes	34	13.2
No	223	86.8

Abbreviation: COVID, coronavirus disease.

3.4. Comparison between Hand Hygiene Habits, Moisturization, and Rubber Glove Use Before and During the Covid-19 Pandemic

During the COVID-19 pandemic, there was a notable increase in the frequency of handwashing compared to pre-pandemic levels. Prior to the pandemic, only 1.9% of participants reported washing their hands with soap more than 30 times per day. However, during the pandemic, this frequency increased significantly to 8.9% of the participants, additionally, the frequency of hand washing increased from 5 to 10 times a day before the pandemic to 11 -20 times a day during the pandemic by majority, $\chi 2$ (10, N=257) = 171.0, $p<0.001$.

Furthermore, examining the use of hand disinfectant, the majority of participants (68.9%) reported using it less than 5 times a day before the COVID-19 pandemic, but during the pandemic, more than half of the respondents (54.5%) indicated an increased frequency of hand disinfection daily, ranging from 5 to 20 times a day.

Regarding daily frequency of hand moisturizing, and rubber glove use, statistically significant differences were also observed ($p<0.001$) (Table **4**).

3.5. Association Between New-onset Hand Eczema with Sociodemographic Characteristics, Personal and Family History of Atopy, Previous Hand Eczema, Hand Hygiene Measures, Skincare, and Rubber Glove Use

The relationships between new-onset HE and gender, age, occupation, smoking status, personal and family history of atopy, personal history of HE, the frequency of daily handwashing using soap, hand disinfection and moisturization, and weekly use of rubber gloves were shown in Table **2** and Table **5**. Table **5** contains only statistically significant associations.

Table 4. Comparison between hand hygiene habits, moisturization, and rubber glove use before and during the COVID-19 pandemic (n=257) [10].

-	Before COVID-19, n (%)	During COVID-19, n (%)	P-value
Daily frequency of handwashing with soap			
< 5 times	75 (29.2)	16 (6.2)	
5–10 times	122 (47.5)	82 (31.9)	
11–20 times	47 (18.3)	97 (37.7)	
21–30 times	8 (3.1)	39 (15.2)	
> 30 times	5 (1.9)	23 (8.9)	**<0.001**
Daily frequency of hand disinfection			
< 5 times	177 (68.9)	36 (14.0)	
5–10 times	41 (16.0)	66 (25.7)	
11–20 times	25 (9.7)	74 (28.8)	
21–30 times	9 (3.5)	48 (18.7)	
> 30 times	5 (1.9)	33 (12.8)	**<0.001**
Daily frequency of hand moisturizing			
< 5 times	224 (87.2)	156 (60.7)	
5–10 times	25 (9.7)	71 (27.6)	
11–20 times	7 (2.7)	22 (8.6)	
21–30 times	1 (0.4)	8 (3.1)	
> 30 times	0 (0.0)	0 (0.0)	**<0.001**
Rubber glove use			
< 1 time per week	112 (43.6)	66 (25.7)	
1–3 times per a week	54 (21.0)	48 (18.7)	
4 and more times per a week	91 (35.4)	143 (55.6)	**<0.001**

Abbreviation: COVID, coronavirus disease.

Note: Categorical variables were compared using the McNemar test. P < .05 was accepted as statistically significant. Statistically significant P values are highlighted. A McNemar test was performed to compare.

Table 5. Association between new-onset hand eczema with age, hand hygiene measures and rubber glove use [10].

Hand eczema			
Factors	**Present (n=96)**	**Absent (n=161)**	**P-value**
Age			
18-30	74 (77.1)	93 (57.8)	
31-82	22 (22.9)	68 (42.2)	**0.002**

(Table 5) contd.....

Hand eczema			
Daily frequency of handwashing with soap			
< 5 times	5 (5.2)	11 (6.8)	
5–10 times	24 (25.0)	58 (36.0)	
11–20 times	34 (35.4)	63 (39.1)	
21–30 times	20 (20.8)	19 (11.8)	
> 30 times	13 (13.5)	10 (43.5)	**0.048**
Daily frequency of hand disinfection			
< 5 times	7 (7.3)	29 (18.0)	
5–10 times	20 (20.8)	46 (28.6)	
11–20 times	26 (27.1)	48 (29.8)	
21–30 times	27 (28.1)	21 (13.0)	
> 30 times	16 (16.7)	17 (10.6)	**0.004**
Rubber glove use			
< 1 time per week	19 (19.8)	47 (29.2)	
1–3 times per a week	12 (12.5)	36 (22.4)	
4 and more times per a week	65 (67.7)	78 (48.4)	**0.010**

Abbreviation: COVID, coronavirus disease.Note: Categorical variables were compared using Pearson's chi-square test. P < .05 was accepted as statistically significant. Statistically significant P values are highlighted in bold.

Of the total participants, 74 (28.8%) in the age group 18-30 years confirmed new-onset hand dermatitis during the COVID-19 pandemic compared to 22 (8.6%) respondents in the age group 31 years and older, $\chi 2$ (1, N=257) = 9.8, p <0.05. There were no statistically significant associations between new-onset HE and other sociodemographic data, personal and family history of atopy, and personal history of HE.

Regarding hand hygiene measures, the findings showed a statistically significant association between new-onset HE and more frequent handwashing with soap during the pandemic, $\chi 2$ (4, N=257) = 9.6, p <0.05, as well more frequent hand disinfection, $\chi 2$ (4, N=257) = 15.6, p <0.01, and weekly rubber glove use $\chi 2$ (10, N=257) = 9.2, p <0.05.

4. DISCUSSION

The predominant focus of research on hand hygiene since the onset of the COVID-19 pandemic has centered around HCWs [11, 20 - 22]. However, the general population has also experienced the impact of this phenomenon [6, 8].To date, there have been no comparable studies carried out to explore the connection between the prevalence and associated factors of HE among the general population of Latvia throughout the COVID-19 pandemic.

When comparing the overall frequency of soap-based handwashing, disinfectant use, skin moisturizer application, and rubber glove usage before and at the time of the pandemic, this study revealed a remarkable rise in all these practices (p<0.001). The majority of participants (38%) noted, that they washed their hands more than 11–20 times daily at the time of the pandemicConcordant findings were observed in a study conducted in Mecca region and Germany [10, 11]. Furthermore, a significant proportion of our study participants (28.8%) reported using daily disinfection 11-20 times per day during the pandemic. In comparison to research papers, which included only HCWs conducted by Guertler *et al*., (2020) and Reinholz *et al*., (2021) frequency of hand disinfection usage is lower. On the other hand, a population-based study by ZahrAllayali *et al*., (2021) showed that the majority of participants (34%) use hand disinfectant only 5-10 times per day [10, 11, 23]. Regarding the use of rubber gloves, the majority of participants (55.6%) reported using them more than 4 times per week. This was in agreement with a population-based study in Saudi Arabia [10]. Also, our data showed an increased daily use of moisturizers (p<0.001). Before the pandemic, only 12.8% of the total number of participants admitted using skin moisture more than 5 times per day. Meanwhile, during the pandemic, more than a third (39.3%) reported moisturizing at least 5 times per day. Nevertheless, it is important to note that our study does not provide conclusive evidence regarding whether the skin moisturizer application among participants was prompted by therapeutic reasons in response to the development of HE or as a preventive measure.

This study showed an association between the everyday frequency of soap-based handwashing (p<0.05), hand disinfection (p<0.01), weekly usage of rubber gloves (p<0.05), and new-onset HE. Frequent exposure to soap, water, and disinfectants has the potential to modify the skin's integrity. It can compromise the skin's natural defenses by shifting the pH of the epidermis, diminishing the lipid barrier, and augmenting trans-epidermal water loss, ultimately culminating in the development of contact dermatitis [4]. Also, prolonged wearing of gloves may cause maceration and irritant contact dermatitis of the hand skin by over-hydrating the stratum corneum layer [3]. Additionally, wearing latex gloves could develop skin reactions through immunoglobulin E-mediated hypersensitivity to latex, and latex allergy [24]. Around one-third (35.4%) noted, that they washed their hands 11–20 times daily and had HE. A previous study by Alkhalifah *et al*., (2022) showed that washing hands with soaps more than 5 times per day was associated with high odds of developing HE (OR, 3.32; 95% CI, 1.79-6.14; P <0.001) [8]. Similar results have been documented in other research articles [5, 10]. The present study also revealed that the majority of new-onset HE cases (28.1%) were observed in the group of participants who used hand disinfection 21-30 times per day. Many studies confirmed that skin conditions were notably more prevalent among those

individuals who used sanitizers several times per day [6, 23]. Meanwhile, new-onset HE was strongly associated with frequent rubber glove use (more than 4 times per week). Similar results were observed in population-based studies in Saudi Arabia [8] and Thailand [5].

Despite many studies claiming that female gender is a factor that increases the risk of HE [4 - 6, 8, 25], our study did not find any statistically significant association between gender and new-onset HE. That was in agreement with other studies that reported that the prevalence of HE was not associated with gender [26, 27]. Most cases (77.1%) of HE during COVID-19 were reported in the age group 18-30 years ($p<0.05$). Comparable findings were observed in the research conducted by Alkhalifah *et al*., 2022 [8]. A previous study by Park et al., 2016, claimed that HE is more prevalent among people in their 20s and 30s [28], which is consistent with our results. The reason for the early occurrence of HE is likely tied to the fact that individuals with a heightened predisposition, whether they have a history of skin atopy or not, tend to develop hand eczema at a young age when they come into contact with skin irritants and contact allergens [29]. Additionally, between the ages of 20 to 29, many young adults not only encounter occupational exposure but also experience skin irritation on their hands due to wet work activities at home [28].

Surprisingly, there were no statistically significant associations between occupation and new-onset HE in our study. Regarding smoking status, personal, and family history of atopy, personal history of HE, and new-onset HE there were no statistically significant associationseither. Our study showed controversial data compared to similar studies regarding HE-associated risk factors such as atopic dermatitis, allergic rhinitis, and a past history of eczema [5, 8].

This study found that 18.3% of the respondents ever reported HE (atopic dermatitis, allergic contact dermatitis, or irritant contact dermatitis). The prevalence was slightly higher than in the general population of most of Europe before the COVID-19 outbreak, as reported by a review of researches [12]. In particular, 53.2% of the respondents with a history of HE revealed symptoms worsening throughout the pandemic. This number is higher than previously reported worsening cases (31.3%) in a similar study [10].

Regarding new-onset HE, in our study it was found in 37.4% of cases. This finding resembled the results of the prevalence reported in previous population-based studies by Alsaidan *et al*., (2020) and Alkhalifah *et al.,* (2022) 34.8% and 34.2% respectively [6, 8].

Clinically, HE is characterized by signs of erythema, vesicles, papules, scaling, fissures, and symptoms of itch, dryness and pain [30]. Dryness, erythema, and itching (34.6%, 24.9%, and 21.8%, respectively) were the most commonly linked symptoms with HE in this study. Similarly, a prior investigation focusing on the onset of occupational HE among HCWs revealed that the predominant clinical characteristics of skin damage were the same [11].

Considering that the COVID-19 virus is an ongoing issue, maintaining proper hand hygiene remains crucial. However, it is equally important to implement effective strategies to prevent HE.-Identifying alternative methods of hand hygiene that are gentle on the skin, such as using mild, fragrance-free soaps or cleansers, can help minimize the risk of HE. Additionally, moisturizing the hands regularly with appropriate emollients can help restore and maintain the natural protective barrier of the skin. Providing education and awareness about the prevention of HE-can also be beneficial in reducing its occurrence worldwide, including Latvia.

The study has several limitations that should be taken into consideration when interpreting the results. One notable limitation is the reliance on an online survey-based approach, which may introduce sampling bias. By using self-administered questionnaires distributed through social media, the study could inadvertently exclude individuals who lack access to the Internet.Surprisingly, the majority of participants (69.3%) were HCWs, so all participants were not objectively represented. Since individuals had the freedom to choose whether or not to participate in this study, *i.e*. self-select into the study, we have no ability to make generalizations from our sample. As the link was published on social media, the response rate could not be calculated accurately. Another limitation concerns the demographic makeup of the study participants. With a significant majority (more than 80%) of respondents being female, the study may not accurately represent the entire population in terms of sex distribution. One possible interpretation is based on findings related to online survey response patterns, which indicate that women tend to participate in larger numbers compared to men [31]. Additionally, the study's sample size is relatively small, which might limit the robustness and generalizability of the findings. Furthermore, the reliance on self-reported symptoms introduces the possibility of recall bias. Moreover, according to the European Society of Contact Dermatitis guidelines, the diagnosis of HE is based on medical history, clinical examination, and performance of skin tests [32]. As an online survey was conducted, with no dermatologist confirming the diagnosis, reported symptoms may not represent a true diagnosis of eczema.

Given these limitations, it is important to acknowledge that further research is needed to fully understand the topic under investigation.

CONCLUSION

According to our results, the skin of the study population was negatively affected by COVID-19 precautions. The prevalence of new-onset HE during the COVID-19 pandemic was 37.4% which supported our hypothesis about an increase in the prevalence of HE in the general population throughout the COVID-19 pandemic. Therefore, our suggestion is to raise awareness about skin protective methods and promote the adoption of innovative infection prevention strategies in Latvia. This includes emphasizing the importance of regular skin moisturization for hand protection and exploring the potential of using less harsh skin disinfectants.

Several factors were statistically significantly associated with new-onset HE, including young age (18-30 years), regular use of gloves in daily life, frequent hand washing, and disinfection.

Unexpectedly, there was no statistically significant association between new-onset HE and gender, occupation, smoking status, personal and family history of atopy, and lastly personal history of HE.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study design obtained the required ethical approvals of the ethics committee of the Research Ethics Committee at the University Of Latvia Faculty Of Medicine (Approval No. 2022/22).

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committee and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

As participation was voluntary and no personal data were collected, consent was not taken.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data and supportive information are available within the article.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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