

Investigation of the prevalence of hand eczema among healthcare professionals in Turkey: a cross-sectional study

Tuğba Falay Gür¹ MD, Sevil Savaş Erdogan¹ MD, Bilal Doğan² MD

¹Department of Dermatology, Health Science University, Sultan 2. Abdulhamid Han Training and Research Hospital

²Department of Dermatology, Maltepe University, Faculty of Medicine

Corresponding author

Tuğba Falay Gür

Department of Dermatology

Sultan 2. Abdulhamid Han Training and Research Hospital

Selimiye Street, 34660, Usküdar/Istanbul

+905056545501

tugbafalay@hotmail.com

Running head: Prevalence of hand eczema in a tertiary hospital

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DR. TUĞBA FALAYGÜR (Orcid ID : 0000-0002-3233-9610)

DR. SEVIL SAVAŞ ERDOĞAN (Orcid ID : 0000-0002-4392-4671)

PROF. BILAL DOĞAN (Orcid ID : 0000-0002-0855-5209)

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Abstract

Background: Hand eczema is one of the common occupational dermatoses, having high prevalence among healthcare professionals (HCP). We found no epidemiological data in the literature concerning the prevalence of hand eczema among HCP in Turkey.

Aims: The aim of the present study was to investigate the prevalence of hand eczema among HCP in Turkey, determine the demographic characteristics and risk factors that cause eczema.

Methods: A clinical assessment- and questionnaire-based cross-sectional study was conducted with 734 HCP working in a tertiary hospital. Demographic characteristics and personal and occupational risk factors were evaluated in terms of the development of hand eczema.

Results: The survey response rate was 81.8%. The point prevalence of eczema was 27.6%, and the 12-month prevalence was 45.9%. Age, occupation, duration of work, atopic diseases, handwashing frequency, dry skin, moisturizing frequency, and presence and

duration of glove use were important factors in the development of hand eczema. Powdered glove reaction was significantly higher in those with hand eczema ($p=0.0001$).

Conclusions: The prevalence of hand eczema is high among HCP in Turkey. Combining self-reported questionnaires with clinical examination findings can provide a more accurate calculation of the prevalence of hand eczema. The availability of epidemiological data on hand eczema can provide guidelines for the prevention and treatment of this condition. Except for situations requiring absolute handwashing, disinfecting hands with alcohol-based lotions and applying a powder-free policy in all healthcare centers will reduce the prevalence of hand eczema among HCP.

Keywords: hand eczema, healthcare professionals, occupational dermatoses, powdered glove, prevalence

Introduction

Hand eczema is an inflammatory disease characterized by itching, burning, stinging, dryness, redness, papules, vesicles, fissures, and discharge.¹ The prevalence of hand eczema among HCP is high due to constant handwashing, wet-work exposure, frequent exposure to disinfectants and cleaning products, and wearing disposable protective gloves for a long time while working.² In various epidemiological studies, this prevalence was found to be between 18 and 57%.^{2,3} This difference is due to the difference in working conditions of HCP, risk factors, and measures taken.

To the best of our knowledge, there is no study providing epidemiological data on the prevalence of hand eczema among HCP in Turkey. Therefore, the current study aimed to investigate the prevalence of hand eczema among HCP in Turkey to determine demographic characteristics and risk factors that cause eczema and investigate factors affecting the severity of this condition.

Materials and Methods

Study population

The clinical assessment- and questionnaire-based, cross-sectional study was conducted between October 2019 and January 2020 with the staff of X Hospital, a tertiary healthcare institution. The survey was administered to all physicians, nurses, clinical technicians,

caregivers, and cleaning staff working in the hospital departments. The survey was delivered to the staff as a printed document. For this purpose, the hospital departments were visited several times to reach almost all employees. The clinical examinations of the staff were also undertaken for the inspection of active hand eczema. The survey was explained in detail to all participants, and information was provided about the findings of hand eczema. The study was approved by the local ethics committee with decision number 2018/21 and protocol number 58. Written consent was obtained from all the participants.

The questionnaire

The questions in our survey were based on the Nordic Occupational Skin Questionnaire (NOSQ-2002), which is a validated scale.⁴ In 2016, Aktas et al. adapted the NOSQ-2002/LONG version to Turkish to be used in high-risk professions.⁵ In our study, the questions of this self-reported hand eczema questionnaire were applied by modifying them to adapt to be suitable for hospital staff.

The survey applied in the current study included questions to inquire about age, gender, department, profession, duration of employment, additional regular jobs, average weekly working hours, smoking status, presence of atopic dermatitis, hay fever, allergic conjunctivitis or asthma history, and history of hand eczema. The group that had previously suffered from hand eczema was also asked about the frequency and duration of eczema, factors that initiated or worsened this condition, whether it affected their lives within the last year, and presence of eczema-related findings within the last year.

The history of contact urticaria, presence of dry skin, and the use of protective gloves while working were questioned in the groups that did and did not have hand eczema before. The types of gloves used while working, mean duration of glove use on a daily basis (number of hours), and whether they had any reaction to protective gloves before, and if yes, the type of glove causing reaction were investigated. Daily wet-work exposure, moisturizer use during the day, duration of non-work activities, frequency of daily handwashing, hand sanitizer use, and stress exposure frequency were also questioned. The duration of non-work activities, such as preparing food, cleaning, and care for children under four years was divided into two groups as ≤ 30 min and > 30 min. The frequency of daily handwashing was recorded as 1-20 times or more than 20 times. The frequency of daily hand disinfectant use

was grouped as 0-10 times and more than 10 times. The frequency of stress exposed was also evaluated in two groups as once a week or less and more than once a week.

Calculation of hand eczema severity

HCP currently having hand eczema were examined, and the Hand Eczema Severity Index (HECSI) was used to quantify the severity of eczema. Briefly, HECSI includes scoring of the morphological symptoms of hand eczema; i.e., erythema, infiltration, vesicles, fissures, scaling, and edema, as well as affected areas on the hands (fingertips, fingers, palms, back of the hand, and wrist).⁶ The HECSI score varies from a minimum of 0 to a maximum of 360. The severity of disease was classified as mild (0-11 HECSI points), moderate (12-27 points) and severe (≥ 28 points) dermatitis.⁷

Statistical analysis

Descriptive analyses (mean, standard deviation, median, range, minimum, and maximum) were used to evaluate the data obtained from the study. In the analysis of continuous data, the normality of distribution was checked using the Kolmogorov-Smirnov test. The t-test and analysis of variance were used when continuous-scale data were suitable for a normal distribution, and the Mann-Whitney U and Friedman tests otherwise. Differences in discrete data were tested with the chi-square analysis. The results were evaluated at a 95% confidence interval and $p < 0.05$ significance level.

Results

Of the 734 HCP working in the hospital, 601 (81.8%), 410 women and 191 men, completed the survey. The mean age was 34.6 (range 19-59) years. Of the 601 HCP, 311 worked in medical units, 133 in surgical units, 86 in anesthesia and intensive care units, and 71 in the laboratory. Furthermore, 238 of the respondents were nurses, 149 were physicians, 89 were clinical technicians, 78 were cleaners, and 47 were caregivers. A history of hand eczema was present in 308 (51%) of the participants while 293 (49%) stated that they had never had hand eczema.

Among the HCP who suffered from hand eczema, the characteristics, symptoms, effective factors, and effects of the condition on professional and social life are summarized in Table 1. According to the response to the question, "When did you last have eczema on your

hands?”, the point prevalence of hand eczema was calculated as 27.6%, the three-month prevalence as 38.6%, and the 12-month prevalence as 45.9%. According to the response to the question, “Have you ever had hand eczema?”, the lifetime prevalence was calculated as 51%.

Table 2 presents the comparison of the demographic characteristics and risk factors in the groups with and without a history of hand eczema. In the group with a history of eczema, the mean age and duration of employment were significantly higher than the non-eczema group ($p = 0.002$ and $p = 0.021$, respectively). The rate of eczema history was higher in those that had worked more than 10 years compared to those that had worked less than five years ($p = 0.021$). The rate of women with a history of eczema was also higher compared to men ($p = 0.024$). The participants who had previously suffered from hand eczema were mostly cleaning workers (62%), followed by nurses (55%) and caregivers (51%). A higher rate of hand eczema history was found in cleaning staff compared to physicians (45.6%), in nurses compared to caregivers, and in caregivers compared to clinical technicians (40%) ($p = 0.021$). The patients with atopic dermatitis, allergic rhinitis, allergic conjunctivitis, and contact urticaria also had a higher rate of eczema history ($p = 0.0001$, $p = 0.0001$, $p = 0.014$, and $p = 0.014$, respectively). In the group with a history of hand eczema, the rates of dry skin ($p = 0.0001$), exposure to wet work for more than two hours a day ($p = 0.0001$) and moisturizer use ($p = 0.009$) were significantly higher compared to the non-eczema group. However, no relationship was found between the frequency of hand sanitizer use and development of hand eczema. Preparation of food for more than 30 min a day affected the development of hand eczema ($p = 0.029$), but there was no relationship between the frequency of stress and duration of other non-work activities in those with and without a hand eczema history (Table 2).

Hand eczema was found to be associated with the use of protective gloves and duration of daily glove use ($p = 0.0001$). Those who had reactions to protective gloves also had a higher rate of hand eczema history ($p = 0.0001$) (Table 1). The use of natural rubber/latex, synthetic rubber/nitrile and plastic/vinyl gloves was higher in the participants with a history of hand eczema than the non-eczema group ($p = 0.001$, $p = 0.002$, and $p < 0.05$, respectively). There was no difference between the two groups in terms of reactions to latex, nitrile and vinyl gloves ($p = 0.41$). A history of powdered latex glove reaction was

present in 124 (40.3%) of the participants that had previously suffered from hand eczema and 35 (11.9%) of those in the non-eczema group, indicating a statistically significantly higher rate in the former ($p = 0.0001$) (Table 3).

The mean eczema severity score of the patients currently found to have eczema during the clinical examination was 11.77 ± 16.82 . Of these patients, 123 (74%) had mild, 27 (17%) had moderate and 16 (9%) had severe eczema. The severity of eczema was higher in those with a handwashing frequency of more than 20 times a day compared to those that washed their hands less than 20 times a day ($p = 0.003$). The duration of gloves use was significantly higher among the participants with severe eczema than in those with moderate and mild eczema ($p = 0.034$). Demographic characteristics and other risk factors did not affect the severity of eczema (Table 4).

Discussion

To the best of our knowledge, there is no study in the literature investigating the prevalence of hand eczema among HCP in Turkey before the COVID-19 pandemic. In the current study, the rate of participation in the study was high (81.8%) as the survey was administered through personal visits to each department of the hospital. Data were collected using NOSQ-2002, which is a widely used and validated questionnaire that has been translated into Turkish.

In our study, the point prevalence of eczema was determined as 27.6%, the three-month prevalence as 38.6%, the 12-month prevalence as 45.9%, and the lifetime prevalence as 51%. In a study conducted among HCP in the Netherlands, the point prevalence was found to be 4.9%, the three-month prevalence was 10%, and the one-year prevalence was 12%.⁸ Using the same questionnaire, Ibler et al.⁹ found the one-year prevalence as 21%, and Flyvholm et al.¹⁰ as 22.8%. The point prevalence was reported to vary between 4.9 and 18% in various studies.^{8,9}

In the current study, the point prevalence and the last 12-month prevalence of hand eczema were higher compared to previous studies. We combined a self-reported survey with the findings of a clinical evaluation of hand eczema performed by a dermatologist. Each hospital department was visited, the presence of hand eczema was determined by a clinical examination, and awareness was raised about the symptoms of this condition. This was to

eliminate the possibility of respondents accepting hand eczema symptoms as normal and inadvertently reporting that they had never experience hand eczema.¹¹ In a study on the clinical validation of the eczema questionnaire data, in addition to skin problems confirmed in participants that reported eczema, there were mild cases of eczema in the group that did not report any skin problem.¹² Since mildly symptomatic hand eczema cases were also detected in our study, we consider that our clinical examination contributed to the more realistic calculation of the true prevalence of the condition.

In previous studies, atopic diathesis^{2,13}, <40 years of age¹⁰, working in the profession for 10 years or longer¹⁰, washing hands for more than 20 times a day^{2,14}, and duration of glove use¹⁵ have been found to be risk factors for the development of hand eczema. Consistently, in our study, the rate of eczema was found to be higher in participants with a history of atopic dermatitis, allergic rhinitis, and allergic conjunctivitis. In our study, the group with a history of eczema also had a higher mean age and contained a higher rate of female participants. Many previous studies have been conducted with nurses.^{2,3,15} Including other professional groups such as cleaners and caregivers in our sample may have resulted in a higher mean age in the group with an eczema history. In addition, the reason for the low mean age of eczema in some studies was attributed to HCP leaving work at an early age due to hand eczema.⁹ However, in Turkey, concerns of finding new jobs make it less likely to leave work at an early age due to hand eczema and there may be a cumulative effect due to exposure with age.

Similar to Gupta et al.¹⁶, we found the frequency and severity of hand eczema to be similar between the different departments of the hospital. When the participants with a history of hand eczema were evaluated in terms of profession; cleaners, nurses, and caregivers were the most affected groups. In another study including nurses, caregivers, and cleaners, it was found that cleaning staff was most affected.¹⁶ This may be due to exposure to wet work and cleaning products, and the higher frequency and duration of glove use among cleaners.

In the current study, hand eczema was determined to be significantly higher among the participants with generalized dry skin, those with a handwashing frequency of more than 20 times a day, those with a wet-work exposure of more than two hours a day. The frequency of handwashing has also been found to be an important factor in the development of hand eczema in previous studies.^{2,14} In our study, we observed that the frequency of disinfectant

use did not affect the occurrence of hand eczema. Contrary to popular belief, alcohol-based hand rubs cause less irritation than handwashing with soap and water. Therefore, HCP are recommended to use disinfectants as long as their hands are not dirty.¹⁷ In addition, in our study, hand eczema was associated with moisturizer use, which is in agreement with the findings of Luk et al.² This can be explained by hand eczema resulting in dry skin, which leads to the increased use of moisturizers. Furthermore, individuals with hand eczema tend to moisturize their hands more often to relieve their symptoms rather than as preventive measures.

Some studies have suggested that wearing gloves is associated with the development of hand eczema, and sweat accumulating inside closed gloves is related to eczema development.¹⁸ Wearing gloves after washing hands with soap and water can increase irritation caused by occlusion of soap residues, which can aggravate hand eczema.¹⁹ However, other researchers reported that the duration of wearing gloves was not associated with hand eczema¹³ and wearing gloves did not damage the skin barrier.²⁰ However, hand eczema sufferers reported to prefer synthetic rubber gloves since they had lower tolerance to natural rubber gloves.¹⁷ In our study, the occurrence of hand eczema was found to be associated with the use of protective gloves and the duration of daily glove use. The use of natural rubber, synthetic rubber and plastic gloves was all higher in the participants that had previously suffered from hand eczema than those without an eczema history. However, there was no difference between these two groups in relation to the types of gloves to which reactions were reported. Nevertheless, powdered glove reaction was significantly higher in those with a history of hand eczema. In addition, the most important factor that initiated and aggravated eczema was reported to be the use of protective gloves.

Latex allergy remains an occupational threat. Moisture trapped in gloves, chemicals added during the latex manufacturing process, and powder are among the causes of glove-associated eczema development.²¹ Glove powder is a vector for latex particles, and in centers where powdered gloves are used. It has been shown that hand eczema and itching on hands significantly decrease after switching to a powder-free policy.²² However, powdered gloves continue to be used in healthcare facilities in Turkey. We consider that in our study, powdered gloves played an important role in the high prevalence of hand

eczema. The implementation of a powder-free policy, the use of non-powdered latex gloves by all HCP, and the use of non-latex gloves by latex-sensitive individuals can reduce the prevalence of hand eczema among HCP.

In our study, the severity of hand eczema was evaluated using HECSI, which is a reliable method. Our rate of mild eczema cases (74%) was higher than reported in previous studies.² This may be because symptoms such as dry skin, redness, and itching may not be considered as eczema by respondents completing self-reported questionnaires; however, these findings are most frequently detected in a clinical examination, which we also performed in our study. As a result, the mild eczema group constituted the majority of individuals in our evaluation. Two factors that determined the severity of eczema were identified as handwashing frequency and duration of glove use.

In the current study, the point prevalence of eczema was calculated as 27.6%. The ongoing COVID-19 pandemic has further increased the risk of hand eczema among HCP since the main preventive measures against contamination are ensuring proper hand hygiene, increasing the use of hand washing and disinfectants, and use of personal protective equipment.²³ Under these conditions, the prevalence of hand eczema among HCP is expected to further increase. In a study conducted with among HCP in Turkey during the ongoing pandemic, the prevalence of hand eczema among those working in COVID-19 patient care units was reported to be 50.4%.²⁴ Although hand hygiene is very important in protecting against COVID-19, it has been shown that frequent handwashing increases hand eczema.²⁵ In order to be minimally affected by the ongoing extraordinary pandemic conditions, it is important to review the factors that trigger hand eczema and take measures to prevent it.

The main limitation of our study is that it was carried out in a single center. Therefore, the data may not equally reflect the situation in all centers. Another limitation is that we did not distinguish between hand eczema of allergic or irritant etiology since a patch test was not performed. The strength of our study is that we combined a self-reported eczema survey with clinical examination findings and verbal information of participants, which increased the detection rate of hand eczema. However, such an examination is time consuming and almost impossible to apply in population-based studies. Other advantages of our study can

be considered as including all healthcare workers from different professions and obtaining a high rate of response to the survey.

In conclusion, combining self-reported questionnaires with clinical examination findings provide a more realistic calculation of the true prevalence of hand eczema. The prevalence of hand eczema is high among HCP in Turkey. The availability of epidemiological data on hand eczema can help determine the frequency and causative factors of the condition and take precautions accordingly. Trainings and guidelines can be developed for the prevention and treatment of hand eczema. Disinfecting hands with alcohol-based lotions, except in cases that require absolute handwashing, can reduce the occurrence of hand eczema. The application of a powder-free policy in all healthcare centers and the use of non-latex gloves by latex-sensitive individuals will also reduce the prevalence of hand eczema among HCP. All measures to be taken can control the increase in the frequency and severity of hand eczema in ongoing pandemic conditions.

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Table 1: Characteristics of eczema and its effect on professional-social life among healthcare professionals with a history of hand eczema (n = 308)

Symptoms within the last 12 months	Number of patients (%)	Triggering and aggravating factors	Number of patients (%)	Effect of eczema on professional and social life	Number of patients (%)
No symptoms	17 (5.5)	Personal hygiene products	60 (19.5)	Occupational work	174 (56.5)
Redness	208 (68.2)	Protective gloves	94 (30.5)	Housework, daily activities	153 (49.7)
Dry skin with scaling/flaking	221 (71.8)	Cleaning products	52 (16.9)	Sport and similar activities	58 (18.8)
Fissures or cracks	176 (57.1)	Handwashing frequency	24 (7.8)	Other hobbies or activities	71 (23.1)
Weeping or crusts	18 (5.8)	Air conditions	29 (9.4)	Sleeping	61 (19.8)
Vesicles	45 (14.6)	Food	11 (3.6)	Traveling	52 (16.9)
Papules	49 (15.9)	Stress	9 (2.9)	Social activities	78 (25.3)
Rapidly appearing itchy wheals/welts	101 (32.7)	Other chemicals, Hobbies	10 (3.2)	Close personal relationships	84 (27.3)
Itching	191 (62)	No idea	19 (6.2)	Sex life	29 (9.4)
Burning, prickling, or stinging	98 (31.8)			Mood	143 (46.4)
Tenderness or pain	87 (28.2)				
Season when eczema mostly develops	Number of patients (%)	Last occurrence of eczema	Number of patients (%)	Frequency of hand eczema	Number of patients (%)
Winter	100 (32.5)	I have it just now	166 (53.8)	Only once and for less than two weeks	45 (14.6)
Spring	13 (4.2)	Not just now but within the past 3 months	66 (21.4)	Only once but for two weeks or more	17 (5.51)
Summer	14 (4.5)	Between 3-12 months ago	44 (14.2)	More than once	193 (62.6)
Autumn	5 (1.6)	More than 12	32 (10.3)	All the time (nearly)	53 (17.2)

		months ago			
No seasonal differences	176 (57.1)				

Table 2: Comparison of demographic characteristics and risk factors between the groups with and without a history of eczema

Characteristic		Groups (n = 601)				P value
		Eczema history (+) (n = 308)		Eczema history (-) (n = 293)		
		Mean ± SD	Median(IQR)	Mean ± SD	Median (IQR)	
Age, years		35.79 ± 9.85	35 (57)	33.37 ± 9.39	30 (39)	0.002
Gender	Female	223 (n)	72.4 (%)	187 (n)	63.8 (%)	0.024
	Male	85 (n)	27.6 (%)	106 (n)	36.2 (%)	
Mean duration of employment in profession, years		9.91±8.86	7(31)	8.28±8.58	4(34)	0.021
Weekly working hours		48.67±12.55	45(76)	47.08±12.67	45(85)	0.12
Duration of daily glove use, hours		4.50±3.06	4(12)	3.31±2.84	3(15)	0.0001
		N	%	n	%	
Department	Anesthesia	41	13.3	45	15.4	0.56
	Surgical	75	24.4	58	19.8	
	Medical	157	51.0	154	52.6	
	Laboratory	35	11.4	36	12.3	
Profession	Physician	68	22.1	81	27.6	0.021
	Nurse	131	42.5	107	36.5	
	Clinical technician	36	11.7	53	18.1	
	Cleaning staff	49	15.9	29	9.9	
	Caregiver	24	7.8	23	7.8	
Duration of employment in profession, years	<5	129	41.9	152	51.9	0.021
	5-10	63	20.5	53	18.1	
	>10	116	37.7	88	30.0	
Regular additional job	Present	23	7.5	17	5.8	0.41
	Absent	285	92.5	276	94.2	
Smoking status	Smoker	93	30.2	104	35.5	0.16
	Non-smoker	215	69.8	189	64.5	
Atopic dermatitis history	Present	121	39.3	25	8.5	0.0001
	Absent	187	60.7	268	91.5	
Allergic rhinitis history	Present	140	45.5	69	23.5	0.0001
	Absent	168	54.5	224	76.5	
Allergic conjunctivitis history	Present	91	29.5	61	20.8	0.014
	Absent	217	70.5	232	79.2	
Asthma history	Present	38	12.3	24	8.2	0.095
	Absent	270	87.7	269	91.8	
Contact urticaria history	Present	76	24.7	21	7.2	0.014

	Absent	232	75.3	272	92.8	
Dry skin	Present	222	72.1	145	49.5	0.0001
	Absent	86	27.9	148	50.5	
Protective glove use	Present	289	93.8	249	85	0.0001
	Absent	19	6.2	44	15	
Daily glove use, hours	≤2	91	29.5	145	49.5	0.0001
	2-5	114	37.0	90	30.7	
	>5	103	33.4	58	19.8	
Protective glove reaction	Present	189	61.4	55	18.8	0.0001
	Absent	119	38.6	238	81.2	
Wet-work exposure > 2 hours	Present	150	48.7	92	31.4	0.0001
	Absent	158	51.3	201	68.6	
Frequency of handwashing	0-20 times/day	173	56.2	212	72.4	0.0001
	>20 times/day	135	43.8	81	27.6	
Frequency of hand disinfectant use	0-10 times/day	184	59.7	189	64.5	0.23
	>10 times/day	124	40.3	104	35.5	
Moisturizer use	Absent	89	28.8	114	38.9	0.009
	Present	219	71.1	179	61	
Exposure to stress	Once a week or less	83	26.9	94	32.1	0.17
	More than once a week	225	73.1	199	67.9	
Non-work activities	Food preparation (>30 min)	146	47.4	113	38.6	0.029
	Cleaning (>30 min)	147	47.7	129	44	0.36
	Childcare under four years (>30 min)	26	8.4	17	5.8	0.21

IQR, interquartile range; SD, standard deviation

Table 3: Comparison of the types of gloves used and the rate of glove reactions between the groups with and without an eczema history

		Groups				p value
		Eczema history (+)		Eczema history (-)		
		N	%	n	%	
Natural rubber/latex use	Yes	277	89.9	236	80.5	0.001
	No	31	10.1	57	19.5	
Synthetic rubber (e.g., nitrile) use	Yes	93	30.2	57	19.5	0.002
	No	215	69.8	236	80.5	
Plastic (e.g., vinyl) use	Yes	95	30.8	67	22.9	<0.05
	No	213	69.2	226	77.1	
Glove reaction	Natural rubber/latex	183	96.8	55	100	0.41
	Synthetic rubber (e.g., nitrile)	2	1.1	0	0	
	Plastic (e.g., vinyl)	4	2.1	0	0	
Reaction to powdered latex gloves	Yes	124	40.3	35	11.9	0.0001

Table 4: Factors affecting the severity of hand eczema in the group currently suffering from eczema (n = 166)

Variables		Severity of Eczema			Variables		Severity of Eczema		
		Mean ± SD	Median (IQR)	p value			Mean ±SD	Median (IQR)	p value
Gender	Female	13.40 ± 19.64	7 (127)	0.21	Dry skin	Yes	12.12 ± 17.82	7 (127)	0.88
	Male	8.55 ± 8.22	6 (34)			No	10.58 ± 12.99	6 (54)	
Department	Anesthesia	12.76 ± 19.57	6 (78)	0.56	Protective glove use	Yes	11.92 ± 17.33	6 (127)	0.33
	Surgery	14.70 ± 19.36	8 (110)			No	9.55 ± 5.97	9 (23)	
	Medical	10.81 ± 16.24	6 (127)						
	Laboratory	7.83 ± 5.42	7 (17)						
Profession	Physician	9.11 ± 9.71	6 (42)	0.12	Wet-work exposure without gloves	<2 hours	11.51 ± 19.63	6 (127)	0.37
	Nurse	16.40 ± 25.72	6 (127)						
	Clinical technician	6.89 ± 6.29	5 (26)			>2 hours	12.00 ± 13.81	6 (79)	
	Cleaning staff	11.53 ± 10.38	8 (38)						
	Caregiver	8.17 ± 6.3	8 (29)						
Smoking status	Smoker	8.49 ± 7.33	6 (34)	0.674	Frequency of handwashing	0-20 times/day	8.52 ± 8.86	6 (41)	0.003
	Non-smoker	13.14 ± 19.33	6 (127)			>20 times/day	15.52 ± 22.28	9 (127)	
Atopic dermatitis history	Present	13.13 ± 20.56	8 (127)	0.15	Frequency of hand disinfectant use	0-10 times/day	10.29 ± 13.74	6 (110)	0.34
	Absent	10.82 ± 13.66	6 (79)			>10 times/day	13.73 ± 20.15	8 (127)	
Allergic rhinitis history	Present	11.52 ± 17.54	6 (110)	0.23	Moisturizer use	No	10.12 ± 10.48	6 (39)	0.42
	Absent	11.96 ± 16.32	8 (127)			Yes	12.45 ± 18.85	9 (41)	
Allergic conjunctivitis history	Present	9.23 ± 9.96	6 (55)	0.504	Exposure to stress	Once a week or less	8.81 ± 9.32	6 (39)	0.23
	Absent	12.68 ± 18.63	6 (127)			More than once a week	12.93 ± 18.88	8 (127)	
Asthma history	Present	10.68 ± 8.95	8 (28)	0.43	Regular additional job	Yes	11.93 ± 11.16	10 (41)	0.57
	Absent	11.93 ± 17.73	6 (127)			No	11.75 ± 17.27	6 (127)	
		Severity of Eczema							

Variables	Mild (n = 123)		Moderate (n = 27)		Severe (n = 16)		P value
	Mean $\pm$ SD	Median (IQR)	Mean $\pm$ SD	Median (IQR)	Mean $\pm$ SD	Median (IQR)	
Age	36.68 $\pm$ 10.29	37 (40)	38.44 $\pm$ 11.83	41 (37)	32.25 $\pm$ 6.64	29 (22)	0.16
Duration of work, years	9.59 $\pm$ 9.00	6 (31)	11.19 $\pm$ 10.18	10 (30)	5.63 $\pm$ 4.19	6 (11)	0.34
Working hours/week	48.10 $\pm$ 12.49	45 (71)	47.81 $\pm$ 13.79	45 (76)	52.81 $\pm$ 13.19	49 (55)	0.089
Duration of glove use, hours/day	4.67 $\pm$ 2.97	5 (12)	4.37 $\pm$ 3.14	4 (12)	6.75 $\pm$ 2.91	8 (7)	0.034

SD, standard deviation; IQR, interquartile range