

Hand eczema among Hong Kong nurses: a self-report questionnaire survey conducted in a regional hospital

Nai-Ming T. Luk^{1,5}, Hau-Chi S. Lee¹, Chi-Kong D. Luk², Yuk-Yin A. Cheung³, Mang-Chi Chang³, Vai-Kiong D. Chao⁴, Shun-Chin Ng⁵ and Leung-Sang N. Tang⁶

¹Faculty of Medicine, Dermatology Research Centre, The Chinese University of Hong Kong, Shatin, Hong Kong, ²Department of Paediatrics and Adolescent Medicine, United Christian Hospital, Kowloon, Hong Kong, ³Nursing Services Division, United Christian Hospital, Kowloon, Hong Kong, ⁴Department of Family Medicine and Primary Health Care, Kowloon East Cluster, Hospital Authority, Kowloon, Hong Kong, ⁵Department of Health, Social Hygiene Service, Centre for Health Protection, HKSAR, Hong Kong, and ⁶Faculty of Medicine, Department of Chemical Pathology, The Chinese University of Hong Kong, Shatin, Hong Kong

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Summary

Background. Hand eczema is common in the nursing profession, and has been reported widely in various parts of the world.

Objectives. The aim of this study was to determine the prevalence and severity of hand eczema among nurses working in a regional hospital in Hong Kong, as well as its psychosocial impact and any possible associated risk factors.

Patients/materials/methods. The study took the form of a self-report questionnaire survey; 1240 nurses in a regional hospital were asked to participate in the survey by completing the questionnaire and returning it anonymously within 2 weeks.

Results. Seven hundred and twenty-four nurses returned the questionnaire (a response rate of 59%). The prevalence of hand eczema among the respondents was 22.1% (160/724). More than 90% had moderate to severe hand eczema. Itchiness and dryness were the most common symptoms. Occupational work, housework, mood, social activities and sleep were particularly affected. Multinomial logistic regressions showed that a personal or family history of atopy and a hand washing frequency of >20 times per day were independent risk factors for hand eczema.

Conclusions. Hand eczema is common and severe among Hong Kong nurses. The results of this study suggest that hand eczema is an important problem for nurses and that preventive measures should be emphasized.

Key words: epidemiology; hand eczema; Hong Kong; nurse; risk factors.

Hand eczema is an inflammatory condition of the hands characterized by symptoms of itching, burning, prickling, or stinging, and signs of erythema, dryness, scaling, fissuring, weeping, crusting, vesicles, papules,

and lichenification. Some authors have adopted erythema and papules/vesicles or erythema and scaling and fissures/lichenification as diagnostic criteria for hand eczema (1). The causes of hand eczema can be due to endogenous factors (atopy) or exogenous factors (contact with irritant or allergens). Hand eczema is a common occupational skin disease (2). Workers at risk include bakers, hairdressers, mechanics, and nurses (3–6). Contact with irritants or allergens at work (7), frequent wet work and wearing rubber gloves increase the risk of hand eczema (7, 8), which affects sufferers' quality of life (QoL). Individuals with severe hand eczema may take sick leave or consider changing

Correspondence: Nai-Ming T. Luk, Department of Otorhinolaryngology, Head and Neck Surgery, The Chinese University of Hong Kong, Room 84026, 6/F Clinical Sciences Building, Prince of Wales Hospital, Shatin, New Territories, Hong Kong. Tel: 26321407; Fax: 21458876. E-mail: tommymluk@gmail.com

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their jobs (7, 8), and a defective epidermis may predispose individuals to being affected by a variety of infectious agents (8).

Nurses constitute one of the high-risk groups for hand eczema (9–11). Owing to the nature of their job, nurses have to wash their hands frequently, have frequent contact with detergents and disinfectants during work, and wear protective synthetic/natural rubber gloves for prolonged periods of time. All of these factors contribute to the high prevalence of hand eczema among nurses, which has been shown to range from 18% to 57% (12–18). This range of prevalence could reflect differences in nursing practices, study methods, or subspecialty fields.

To date, no study of hand eczema prevalence among nurses working in Hong Kong has been conducted. According to the Occupational Safety and Health Statistics Bulletin, 2010 (<http://www.labour.gov.hk/eng/osh/pdf/Bulletin2010.pdf>), published by the Hong Kong Government, there were 125 cases of confirmed occupational dermatitis between 2000 and 2009. The types of occupation are not specified; however, as the listed allergens or irritants include organic compounds, fragrances, massage oils, and hair dyes, it is inferred that those involved could have been mechanics, hairdressers, and massage workers.

The aims of this study were to determine the point prevalence and severity of self-reported hand eczema among hospital nurses in Hong Kong and to report correlations between their demographic and atopy characteristics as well as the nursing work duties that might predispose the individual to develop hand eczema. The results of this study form the basis for future comparisons for similar studies, and the identified risk factor(s) can be considered for preventive measures.

Materials and Methods

The study hospital, United Christian Hospital (UCH), is an acute general hospital that provides a wide range of services, including inpatient, day-patient, outpatient and community care services, to a population of 1 million living in the East Kowloon territory of Hong Kong.

The questions in our survey were mostly based on the Nordic Occupational Skin Questionnaire (NOSQ-2002) (19). The original English-language version was translated into Chinese by a medical translator, and evaluated for clearness and precision by a panel of Chinese dermatology experts. It was then translated back into English before being re-checked by the original translator. In cases where ambiguity arose, consensus was sought from the panel. The questionnaire covered the following aspects:

- (1) Basic demographics: age and sex, and personal and family history of atopy.
- (2) The labelling of a respondent with a diagnosis of atopy was dependent on the answers to the following questions; any positive response would label the respondent with the diagnosis of 'atopy':
 - (a) Have you ever had an itchy rash that has been coming and going for at least 6 months and at some time has affected skin creases?
 - (b) Have you ever had 'hay fever' or other symptoms of nasal allergy, for example from pollens or animals?
 - (c) Have your eyes ever shown allergic symptoms, for example from pollens or animals?
 - (d) Have you ever had asthma?
- (3) Symptoms: the presence of itching (burning, prickling, or stinging), soreness, redness, dry skin, scaling, fissures, weeping or crusts, vesicles and papules in the past 12 months, and the duration and frequency of exacerbation (less than one per week, one or more per week).
- (4) The psychosocial effects (no effect, slight effect, moderate effect, or large effect) of hand eczema on the following activities: occupational work, housework and daily activities, sport and similar activities, other hobbies or activities, sleep, getting about or travelling, social activities, close personal relations, sex life, and mood.
- (5) Nursing work characteristics: number of nursing years, subspecialty field, hand washing frequency per day, wearing of gloves during work, application of emollient after wet work, and the availability of emollient at the workplace.

The respondents were asked whether they thought they had hand eczema, and, if yes, whether it was job-related. They also had to grade their eczema of their worst condition on a scale from 1 to 10, corresponding to very mild to extremely bad. Furthermore, they were asked whether they had taken any sick leave in the past 12 months and ever considered changing their job because of hand eczema.

The questionnaires were distributed through appointed nurses to all nursing staff in the hospital in June 2009. The participants were asked to return the questionnaire anonymously in a closed envelope within 2 weeks. The study was approved by the ethical committee of the Kowloon East Cluster, Hospital Authority of Hong Kong.

Study population

A total of 1240 nurses working in various units of the study hospital were invited to participate in the study and

received the self-report questionnaire. The questionnaire was returned by 724 subjects, giving an overall response rate of 59% (724/1240). Among the respondents, there were 100 (13.8%) male and 624 (86.2%) female nurses. Five hundred and twenty-seven (72.8%) respondents were below age 40 years, and 197 (27.2%) respondents were aged 40 years or above. As this was an anonymous study, we were not able to trace the non-responders (Table 1).

Statistical analysis

The Statistical Package for Social Science (SPSS™ version 15; Chicago, IL, USA) was used for analysis. Descriptive statistics were used for frequency counts. The chi-square test was employed to correlate individual risk factors with the occurrence of hand eczema and with hand eczema severity and symptoms. Multinomial logistic regression with the 'Enter' method was used to establish the independent risk factors. In the model, hand eczema was used as the dependent variable, and sex, age below 40 years, personal or family history of atopy, hand washing > 20 times per day, serving subspecialty, wearing of gloves for most of the time during wet work, nursing duration and application of emollient after wet work were used as independent variables. A *p*-value of <0.05 was considered to be statistically significant.

Results

The demographic and atopy characteristics of the respondents are shown in Table 1. Of the 724 respondents, 160

(22.1%) claimed to have hand eczema, and 564 (77.9%) not to have it. There were no differences in age or sex between the hand eczema and non-hand eczema groups. Two hundred and seventy-seven (38.3%) respondents had a personal history of atopy, and 125 (17.3%) had a family history of atopy. Among those in the hand eczema group, 70.6% and 33.1% had a personal and family history of atopy, respectively, as compared with 29.1% and 12.8%, respectively, among their non-hand eczema counterparts. There were statistically significant differences between the two groups in terms of their atopy characteristics.

From Table 2, it can be seen that itchiness and dryness were the most common symptoms, occurring in 79.4% and 80.6%, respectively, of respondents with hand eczema. The symptom frequency of <1 exacerbation per week occurred in 30 (18.8%) respondents, and 130 (81.2%) respondents had ≥1 exacerbations per week. In terms of symptom duration, 7.8%, 47.1%, 21.6%, 11.8%, 7.2% and 4.6% of patients had symptoms lasting for <1 year, 1–5 years, 6–10 years, 11–15 years, 16–20 years, and >20 years, respectively.

Regarding the number of years of service in nursing, 15.7% of respondents had worked for <5 years, 12.3% of respondents had worked for between 6 and 10 years, 36.0% of respondents had worked for between 11 and 15 years, 14.2% of respondents had worked for between 16 and 20 years, and 21.7% of respondents had worked for >20 years (Table 3). Concerning the subspecialty

Table 1. Demographic and atopy characteristics of the study population

Variables	Total no.	Hand eczema, no. (%)	Non-hand eczema, no. (%)	<i>p</i> -value*
Entire sample	724	160 (22.1)	564 (77.9)	—
Sex				
Male	100	21 (21.0)	79 (79.0)	0.775
Female	624	139 (22.3)	485 (77.7)	—
Age (years)				
<40	527	120 (22.8)	407 (77.2)	0.477
≥40	197	40 (20.3)	157 (79.7)	—
Personal history of atopy				
Yes	277	113 (40.8)	164 (59.2)	<0.001*
No	447	47 (10.5)	400 (89.5)	—
Family history of atopy				
Yes	125	53 (42.4)	72 (57.6)	<0.001*
No	599	107 (17.9)	492 (82.1)	—

**p*-value of <0.05 is regarded as significant.

Table 2. Hand eczema symptoms, frequency of exacerbation, and duration

Symptoms, signs	No. (%)
Itching	127 (79.4)
Burning, prickling, or stinging	25 (15.6)
Soreness	31 (19.4)
Redness	58 (36.3)
Dry skin	129 (80.6)
Scaling	86 (53.8)
Fissures	65 (40.6)
Weeping or crusts	21 (13.1)
Vesicles	55 (34.4)
Papules	47 (29.4)
Symptom exacerbation frequency	
<1/week	30 (18.8)
≥1/week	130 (81.2)
Symptom duration (years)	
<1	12 (7.8)
1–5	75 (47.1)
6–10	35 (21.6)
11–15	19 (11.8)
16–20	12 (7.2)
>20	7 (4.6)

Table 3. Nursing work characteristics

Variables	Total no.	Hand eczema, no. (%)	Non-hand eczema, no. (%)	<i>p</i> -value
Entire sample	724	160 (22.1)	564 (77.9)	—
Number of nursing years				
1–5	114	19 (16.7)	95 (83.3)	0.401
6–10	89	25 (28.1)	64 (71.9)	—
11–15	261	60 (23.0)	201 (77.0)	—
16–20	103	23 (22.3)	80 (77.7)	—
>20	157	33 (21.0)	124 (79.0)	—
Specialty category ^a				
1	81	19 (23.4)	62 (76.5)	0.486
2	455	100 (22.0)	355 (78.0)	—
3	166	39 (23.5)	127 (76.5)	—
4	22	2 (9.1)	20 (90.9)	—
Hand washing frequency per day				
≤20	347	68 (19.6)	279 (80.4)	0.119
>20	377	92 (24.4)	285 (75.6)	—
Wearing gloves most of the time during work				
Yes	492	100 (20.3)	392 (79.7)	0.094
No	232	60 (25.9)	172 (74.1)	—
Applying emollient after wet work				
Yes	113	33 (29.2)	80 (70.8)	0.048*
No	611	127 (20.8)	484 (79.2)	—
Emollient provided at workplace				
Yes	537	114 (21.2)	423 (78.8)	0.339
No	187	46 (24.6)	141 (75.4)	—

**p*-value of <0.05 is regarded as significant.

^aSpecialty categories: category 1, extended or intensive care unit; category 2, specialty wards; category 3, outpatient unit or day centre; category 4, others including nursing school and diagnostic unit.

fields, 81 (11.2%) respondents worked in extended or intensive care units, 455 (62.8%) worked in specialty wards, 166 (22.9%) worked in outpatient or day centre units, and 22 (3.0%) worked in diagnostic units or nursing schools. Over half of the respondents (52.2%) washed their hands >20 times per day. The majority (68.0%) said that they wore gloves at work for most of the time, whereas 32.0% did not. An even larger majority (84.4%) said that they did not apply an emollient immediately after washing their hands, even though it was available in 74.2% (*n* = 611) of the workplaces. There were significant differences in the application of an emollient after wet work between the hand eczema and non-hand eczema groups, although there were none in the other nursing tasks.

As noted previously, 160 nurses (22.1%) reported having hand eczema, the majority of whom (91.2%) thought that it was job-related. The percentages of respondents with mild, moderate and severe symptom severity were 7.5% (*n* = 12), 48.1% (*n* = 77), and 44.4% (*n* = 71), respectively, based on the visual analogue scale (VAS) score of the worst conditions. Only 13 (8.1%)

had taken sick leave in the previous year, and 21 (13.1%) had considered changing their job because of hand eczema. More than 20% of respondents with hand eczema claimed that it had a moderate to large effect on their occupational work, housework, mood, sleep, and social activities, whereas it had a moderate to large effect on sports activities, hobbies, travel, interpersonal relationships and sex life in <20%.

The chi-square test was used to examine the individual risk factors, namely, age <40 years, sex, personal or family history of atopy, duration of nursing job, subspecialty field, hand washing frequency of >20 times per day, and application of an emollient after wet work. Only a personal or family history of atopy and application of an emollient after wet work were found to be significantly correlated with self-reported hand eczema (Tables 1 and 3). However, in the multinomial logistic regression models, we found a hand washing frequency of >20 times per day to be an independent risk factor, in addition to a personal or family history of atopy (Table 4).

Discussion

To the best of our knowledge, this is the first study of hand eczema among nurses in Hong Kong. Its aim was to determine the point prevalence and severity of self-reported hand eczema among hospital nurses in Hong Kong, and to report correlations between their demographic and atopy characteristics as well as the nursing work duties that might predispose the individual to develop hand eczema. We consider our study to be reflective of the prevalence and characteristics of hand eczema among nurses in Hong Kong, as we had a large sample size (1240 subjects) and a reasonable response rate (59%), and the respondents included nurses from different subspecialty fields. The validity of the type of questionnaire survey that we adopted has been established in the literature (20).

We found hand eczema to be prevalent among hospital nurses in Hong Kong, although, as compared with international studies, the prevalence was rather low (21.1%). In Australia, for example, Smith et al. found an average hand eczema prevalence of 50% among hospital nurses (21). In Japan, 53.3% of clinical nurses reported having hand eczema (12). In a US study, the prevalence of hand eczema among inpatient nurses was found to be 55% (13). More recently, a study carried out in Taiwan found 22% of university hospital nursing staff to have hand eczema (14), which is in line with our findings. Two studies in Germany recorded fairly low percentages of self-reported hand eczema: 13.4% (15) and 18.0% (16). The use of different methodologies (personal interviews versus

Table 4. Multinomial logistic regressions of variables for patients with self-reported hand eczema as dependent variable

Variables	<i>B</i>	Standard error	Wald	df	Sig	Exp (<i>B</i>)	95% confidence interval for Exp (<i>B</i>)
Personal history of atopy	1.531	0.215	50.666	1	0.000*	6.622	3.032–7.044
Family history of atopy	0.524	0.240	4.78	1	0.029*	1.688	1.056–2.700
Hand washing >20 times per day	0.411	0.206	3.988	1	0.046*	1.508	1.008–2.256
Wearing gloves for most of the time during work	−0.345	0.214	2.59	1	0.108	0.708	0.466–1.078
Application of emollient after wet work	0.41	0.258	2.533	1	0.111	1.507	0.909–2.498
Subspecialty	−0.169	0.162	1.085	1	0.298	0.844	0.614–1.161
Age (<40 years)	−0.24	0.277	0.747	1	0.387	0.787	0.457–1.355
Nursing duration	0.051	0.096	0.282	1	0.595	1.053	0.871–1.271
Sex	−0.064	0.29	0.049	1	0.825	0.938	0.531–1.657

d.f., degrees of freedom.

**p* < 0.05.

questionnaires), the different ethnic groups involved, the different sample sizes and response rates, the geographical locations of the studies (temperate versus tropical) and study timing are all likely to have contributed to the differences in prevalence.

Our study also found that more than 90% of the affected patients had moderate to severe hand eczema. Comparison with other studies is difficult, as there are at least 45 different methods available to assess the severity of hand eczema (17), and only the Hand Eczema Severity Index, the Manuscore and the Osnabrück Hand Eczema Severity Index have been validated. In our study, hand eczema symptom severities were reported by patients for their worst conditions, and they scored the severity according to a VAS ranging from 1 (minimal) to 10 (most severe). On the basis of the scores, we classified their severity as mild (VAS 1–3), moderate (VAS 4–7), and severe (VAS 8–10). With this classification, the percentages of our patients with mild, moderate and severe eczema were 7.5%, 48.1%, and 42.5%, respectively. Although our division was made arbitrarily, we believe that it is a reliable measure of severity, as it correlates well with the number and frequency of symptoms (Table 5). Bearing in mind that discrepancies do exist between patients' and physicians' assessments, we agree with Cvetkovski et al. (18) that this type of self-rated assessment by patients is a valid measure. It would also be very difficult for physicians to assess a large number of subjects for such a study.

Hand eczema, without doubt, affects patients' QoL. A review of studies on contact dermatitis and impaired health-related QoL found an association between the two in all of those published before 2003 (22). Our study did not use standard instruments such as the Dermatology Quality of Life Index (DQLI), Dermatology-Specific Quality of Life, or Skindex-29, and hence we cannot provide a QoL score. Instead, we asked patients about the effects (none, slight, moderate, or large) of hand eczema

Table 5. Correlation between hand eczema severity and number and frequency of symptoms

	Hand eczema severity			Total	<i>p</i> -value
	Mild	Moderate	Severe		
No of symptoms					
1–4	7	39	22	66	0.04*
5–7	4	33	29	65	—
8–12	1	5	20	26	—
Frequency of symptom exacerbation					
<1/week	5	19	6	30	0.004*
≥1/week	7	58	65	130	—

**p*-value of <0.05 is regarded as significant.

on their activities, moods, and personal relationships. The impact of hand eczema was more prominent on respondents' occupational work, housework, mood, sleep, and social activities, and less prominent on sports activities, hobbies, travel, interpersonal relationship, and sex life. Furthermore, our study revealed a lower sick-leave rate (8.1%) in the previous year than the 12.4% reported in a Danish study (23).

In the literature, there are a number of risk factors reportedly associated with hand eczema among nurses: an atopic diathesis (13, 24, 25), age <40 years (10), hand washing >20 times per shift (10), and nursing for 10 years or more (14). Also, certain nursing subspecialty fields have reported increased risk (13, 26).

In our multiple logistic regression, we found a personal or family history of atopy and hand washing frequency of >20 times per day to be independent risk factors for hand eczema. The role of atopic diathesis in contributing to hand eczema is supported by the large general population study conducted by Lerbaek, who showed that positive patch test results and atopic dermatitis are associated with an increased risk of hand eczema (27). Our study also showed that hand eczema is associated with moisturizer

application after wet work, which seems counterintuitive at first glance. However, an association does not equate to a cause-and-effect relationship, and our finding could simply indicate that those with hand eczema had a greater tendency to apply an emollient after wet work. As is the case for most patients with hand eczema, an emollient was used as a therapeutic rather than a preventive measure (28).

An unexpected finding was the lack of any correlation between the frequency of hand washing and occurrence of hand eczema in the initial chi-square test, as frequent hand washing had been reported in some studies to be a risk factor (10, 26). However, in the multinomial logistic regressions, hand washing frequency of >20 times per day was shown to be an independent risk factor. We surmised that the effect of hand washing frequency was confounded by the personal and/or family history of atopy. We further analysed the effect of hand washing frequency by excluding these possible confounding factors in turn. After exclusion of those with a personal history of atopy, a strong correlation was found between a hand washing frequency of >20 times per day and the occurrence of hand eczema ($p = 0.024$), as shown in Table 6. Thus, our inability to show a significant effect in the chi-square test could be explained.

Also, we could find no correlation between subspecialty fields and the occurrence of hand eczema, despite the fact that the frequency of contact with irritants varied by subspecialty, possibly because of the following factors. First, nurses in some fields were regularly rotated. For example, nurses working in the obstetrics ward are often rotated to the obstetrics outpatient department. Second, we asked respondents only about their current subspecialty, not their previous subspecialties. Third, there may have been other confounding factors in the evaluation of the impact of subspecialty field, namely, the number of nursing years and the frequency of hand washing, etc.

There are limitations to this study. It was anonymous, and hence non-responders could not be traced. We adopted a self-rated symptom severity assessment for hand eczema, which was easy to carry out, but photographic supplementation would have improved accuracy.

Table 6. Effect of hand washing frequency after exclusion of atopy history

	No.	Hand eczema, total (%)	No hand eczema, total (%)	p-value
Patient without personal history of atopy				
≤20 ^a	212	15 (7.1)	197 (92.9)	0.024*
>20	235	32 (13.6)	203 (86.4)	—
Patient with personal history of atopy				
≤20	135	53 (39.3)	82 (60.7)	0.612
>20	142	60 (42.3)	82 (57.7)	—
Patient without family history of atopy				
≤20	286	46 (16.1)	240 (83.9)	0.277
>20	313	61 (19.5)	252 (80.5)	—
Patient with family history of atopy				
≤20	61	22 (36.1)	39 (63.9)	0.162
>20	64	31 (48.4)	33 (51.6)	—

*Chi-square test, p -value <0.05 is regarded as significant.

^aHand washing frequency per day.

Finally, the use of a more structured QoL instrument, such as the DQLI, would have enabled comparison with similar studies.

In conclusion, the findings of this study reveal hand eczema to be prevalent among hospital nurses working in Hong Kong, with most reported cases being moderate to severe. Hand eczema has a significant impact on nurses' daily activities and mood, although only a small number of those surveyed in this study took sick leave because of it or considered changing jobs. Finally, we found a personal and family history of atopy and hand washing frequency of >20 times per day to be significant independent risk factors for hand eczema among hospital nurses; thus, pre-enrolment counselling or post-enrolment education on hand protection should be considered.

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