

Self-reported hand eczema in a hospital population

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Occupational skin diseases are frequent in the healthcare sector. The objective of this study was to obtain baseline data on hand eczema and risk factors for hand eczema in an unselected hospital population. A questionnaire study on hand eczema and risk factors for hand eczema was performed among hospital employees at a middle-size Danish hospital. A total of 1909 employees from all job groups and all departments were included. Response rate was 65.3%. The overall frequency of self-reported hand eczema within the past 12 months was 23%. Divided into job groups, the frequencies varied from 8% to 32% and were significantly higher among assistant nurses (32%), nurses (30%), and nursing aids (27%). For the individual departments, the hand eczema frequencies varied from 7% to 50%, with the highest frequencies reported at medical and surgical wards. Occupational risk factors for hand eczema such as use of protective gloves and hand washing were significantly more frequent among respondents with hand eczema within the past year, which suggests a potential for prevention through workplace interventions. In conclusion, high frequencies of hand eczema were observed among assistant nurses, nurses, and nursing aids. Hand eczema was more frequent among women and in the younger age groups.

Key words: contact dermatitis; hand eczema; health care workers; hospital employees; NOSQ-2002; nurses; occupational exposure; protective gloves; risk factors; wet work. © Blackwell Munksgaard 2007.

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Occupational skin diseases are frequent in the working population. Wet work occupations such as the healthcare sector and the food processing industry have high frequencies of work-related skin diseases. More than 90% of the occupational skin diseases are hand eczema, which are caused by or exacerbated by occupational risk factors (1–7).

In the Danish Work Environment Cohort Study (DWECS) consisting of a random sample of the working population, 13% reported skin problems on hands or forearms within the past 3 months and about half reported that their skin problems occurred primarily in periods when they were at work. Occupational skin exposures were related to high frequency of self-reported skin problems. In the healthcare sector, significantly higher occurrence of skin problems within the past 3 months was observed, with frequencies of 17% on average and 31% for female nurses (2, 5). Although occupational risk factors for hand eczema are well known, more information with regard to risk factors and workplace intervention through implementation of prevention programmes is needed. Especially in the healthcare

sector, glove use, hand disinfection, and hand washing are parts of the hygienic demands. This implies that these risk factors cannot be fully eliminated, although the burden to the skin of the employees can often be influenced by modification of practice and use of less skin irritating products.

The purpose of the present study was to provide baseline data on hand eczema and risk factors for hand eczema in an unselected population of hospital employees at a medium size Danish hospital. The results from the initial survey were used in the planning of intervention activities to prevent hand eczema and other work-related skin problems in the hospital population.

Materials and Methods

Questionnaire

A self-administered questionnaire based on a standardized questionnaire for work-related skin diseases and exposure—the Nordic Occupational Skin Questionnaire (NOSQ-2002) were used (8, 9). The questionnaire included questions on demographics and occupational history, history of

atopy, allergies, skin symptoms, self-reported hand eczema, self-reported contact urticaria, exacerbating factors, exposures, use of protective gloves, hand washing, and use of skin care products, and wherever needed questions were modified to the conditions of hospital work.

The questionnaires were distributed anonymously to all employees by the local safety committees (January 2002), collected in closed envelopes, and returned to the Department of Occupational and Environmental Medicine for data entry (February to March 2002). Data were analysed at the National Research Centre for the Working Environment (until December 2006: National Institute of Occupational Health).

Study population

A total of 1909 employees including all job groups and all departments at the hospital were invited to participate in the study and received the self-administered questionnaires.

The overall response rate was 65.3% (1246 of 1909), varying from 17% to 100% among job groups and from 11% to 100% among departments. The lowest response rates were seen for hospital porters and secretaries. In general, medical and surgical wards had satisfactory response rates from above 50% to 90%, and assisting departments had response rates below 50%.

Characteristics of the study population are shown in Table 1. Women constituted 89.0% of the respondents. The mean age was 42.9 years (women 42.6 years and men 45.6 years), with a range from 17 to 72 years. 40% of the respondents were younger than 40 years, 30% between the ages 40 and 49 years, and 30% older than 50 years.

Due to the anonymous distribution of the questionnaires and problems with obtaining lists of employees from the administration, it was not possible to administer reminders, and no further data on non-responders were available.

The study was approved by the Danish Data Inspectorate, and according to counselling from

the committee secretary, the study was not reported to the regional ethics committee.

Statistical analysis

The chi-squared test was used for testing independence of categorical variables. Probability was recognized as significant if the level of significance was less than 0.05 (10, 11). Confidence intervals (CI) for prevalences have been calculated using the SAS procedure 'Proc freq' with binomial option. The SAS 9.1 was used for data processing.

Results

Among the 1246 respondents, 1125 answered the questions on hand eczema and when they last had hand eczema: 8.7% (95% CI: 7.1–10.4) reported having had hand eczema at the time of study and 17.0% (95% CI: 14.8–19.2) had had hand eczema within the past 3 months. A total of 256 (22.8%; 95% CI: 20.3–25.2) respondents reported having had hand eczema within the past 12 months and eczema ever was reported by 31.8% (95% CI: 29.1–34.5). Women reported significantly higher on hand eczema within the past 12 months compared with men (Table 2).

When the respondents were divided into age groups, a significantly higher frequency of hand eczema within the past 12 months was reported by those younger than 40 years compared with those older than 40 years (30.1%; 95% CI: 26.0–34.2 and 17.4%; 95% CI: 14.5–20.3, respectively; $P < 0.0001$) (Table 2). For the age group below 40 years, no significant sex difference was observed (women 30.9%; 95% CI: 26.5–35.3 and men 23.5%; 95% CI: 11.9–35.2; $P = 0.2788$), and for the group older than 40 years, a nearly significant sex difference was seen (women 18.3%; 95% CI: 15.2–21.5 and men 9.3%; 95% CI: 2.8–15.9; $P = 0.0528$) (Table 2).

Assessed by job groups, the frequencies of hand eczema within the past year varied from 7.9% to 32.1%, with significantly higher frequencies

Table 1. Characteristics of the study population comprising a total of 1246 respondents (% and 95% CI)^a

	Total	Women (n = 1016)	Men (n = 126)	P value
Age				
Mean (in years)	42.9	42.6	45.6	
Range (in years)	17–72	17–66	20–72	
Below 40 years, % (95% CI)	39.5 (36.6–42.4)	40.7 (37.6–43.8)	28.6 (19.9–37.2)	
40 years or older, % (95% CI)	60.5 (57.7–63.4)	59.3 (56.3–62.4)	71.4 (62.8–80.1)	$P < 0.05$
Atopic dermatitis, % (95% CI)	14.5 (12.4–16.6)	15.6 (13.3–17.9)	5.9 (1.7–10.1)	$P < 0.005$
Rhinitis, % (95% CI)	34.0 (31.2–36.7)	33.8 (30.9–36.7)	35.7 (27.4–44.1)	Not significant
Asthma, % (95% CI)	10.7 (8.9–12.5)	10.7 (8.8–12.6)	11.1 (5.6–16.6)	Not significant

^aThe number of answers varies for the different questions.

Table 2. Self-reported hand eczema within the past 12 months among women and men divided on age groups (% and 95% CI)^a

	Total	Women (n = 997)	Men (n = 126)	P value
All ages, % (95% CI)	22.8 (20.3–25.2)	23.7 (21.0–26.3)	15.1 (8.8–21.3)	$P < 0.05$
Age groups, % (95% CI)				
Below 40 years	30.1 (26.0–34.2) ^b	30.9 (26.5–35.3)	23.5 (11.9–35.2)	Not significant
40 years or older	17.4 (14.5–20.3)	18.3 (15.2–21.5)	9.3 (2.8–15.9)	Not significant

^aThe number of answers varies for the different questions.^bSignificant difference between age groups, $P < 0.0001$.

($P < 0.0001$) among assistant nurses (32.1%; 95% CI: 19.5–44.6), nurses (29.7%; 95% CI: 25.0–34.4), and nursing aids (27.1%; 95% CI: 18.2–36.0) (Fig. 1). For the individual departments, the frequencies of hand eczema within the past year varied from 6.7% to 50.0%, with the highest frequencies reported at medical and surgical wards.

Atopic dermatitis was reported by a total of 14.5% (95% CI: 12.4–16.6) respondents and was significantly more frequent among women compared with men (women 15.6%; 95% CI: 13.3–17.9 and men 5.9%; 95% CI: 1.7–10.1; $P < 0.01$). Rhinitis was reported by 34.0% (95% CI: 31.2–36.7) of the respondents and asthma by 10.7% (95% CI: 8.9–12.5), with minor non-significant sex differences (Table 1). The asthma was diagnosed by a doctor in 90.0% of the cases.

Hand eczema within the past 12 months was significantly more frequent among respondents reporting atopic dermatitis, rhinitis, and asthma (Table 3). Among those reporting hand eczema within the past 12 months, 28.7% (95% CI: 23.1–34.3) reported atopic dermatitis compared with 9.8% (95% CI: 7.8–11.9) among those without hand eczema ($P < 0.0001$). Corresponding figures for rhinitis were 44.7% (95% CI: 38.6–50.8) and 30.6% (95% CI: 27.5–33.6), respectively ($P < 0.0001$), and for asthma, it were 16.9% (95% CI: 12.3–21.5) and 9.1% (95% CI: 7.2–11.0), respectively ($P < 0.0001$).

About half of those with hand eczema ever reported consulting a doctor for hand eczema as

an adult. No significant difference was seen among those reporting hand eczema within the past 12 months (48.2%; 95% CI: 42.0–54.4) and among those reporting hand eczema more than a year ago (40.2%; 95% CI: 29.9–50.5). A total of 158 respondents reported consulting a doctor for hand eczema as an adult, and in this group, 121 persons (77.6%) reported hand eczema within the past 12 months, although only about one-third during 2001 and 2002 (i.e. January 2001 to February/March 2002).

Risk factors for hand eczema

Use of *protective gloves* at work at the time of the study was reported by 46.3% (95% CI: 43.0–50.5) of respondents. Among those with hand eczema within the past 12 months, significantly more reported use of protective gloves at present (61.7%; 95% CI: 54.5–68.9; $P < 0.0001$). Skin symptoms from wearing protective gloves were reported by a total of 30.3% (95% CI: 27.2–33.6) respondents and by 62.5% (95% CI: 55.7–69.4) of those with hand eczema within the past 12 months ($P < 0.0001$). A total of 50.9% (95% CI: 44.7–56.4) either changed to a different glove type or ceased using gloves due to skin symptoms, and this was significantly more frequent among those reporting hand eczema within the past 12 months (62.5%; 95% CI: 54.1–70.9; $P < 0.001$) (Table 4).

Hand washing more than 20 times a day was significantly more frequent among those reporting

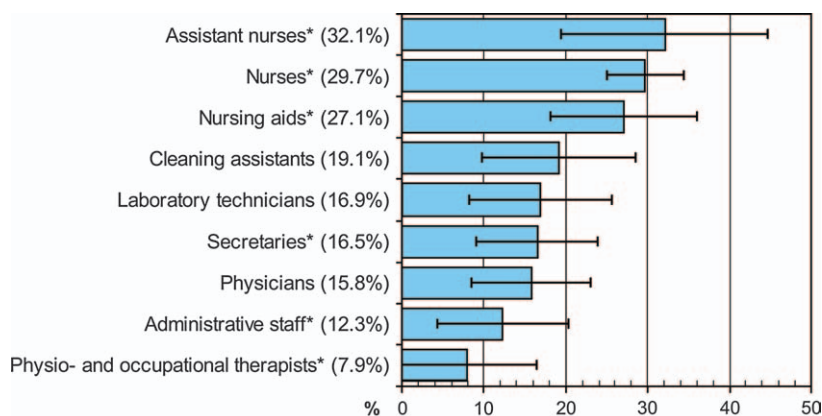


Fig. 1. Self-reported hand eczema within the past 12 months among different hospital job groups (% and 95% CI). *Eczema frequencies significantly different from the mean of 22.8% ($P < 0.0001$).

Table 3. Self-reported atopic dermatitis, rhinitis, and asthma among respondents with and without hand eczema within the past 12 months (% and 95% CI)^a

Hand eczema within the past 12 months	Yes	No	All respondents	P value
Atopic dermatitis, % (95% CI)	<i>n</i> = 251 28.7 (23.1–34.3)	<i>n</i> = 825 9.8 (7.8–11.9)	<i>n</i> = 1076 14.5 (12.4–16.6)	<i>P</i> < 0.0001
Rhinitis, % (95% CI)	<i>n</i> = 255 44.7 (38.6–50.8)	<i>n</i> = 867 30.6 (27.5–33.6)	<i>n</i> = 1122 34.0 (31.2–36.7)	<i>P</i> < 0.0001
Asthma, % (95% CI)	<i>n</i> = 254 16.9 (12.3–21.5)	<i>n</i> = 866 9.1 (7.2–11.0)	<i>n</i> = 1120 10.7 (8.9–12.5)	<i>P</i> < 0.005

^aThe number of answers varies for the different questions.

hand eczema within the past 12 months (59.1%; 95% CI: 53.0–65.1; *P* < 0.0001). The use of *hand disinfectants* daily or weekly did not differ significantly among those with or without hand eczema within the past 12 months (Table 4).

Use of *skin care products* was reported by 77.7% (95% CI: 75.4–80.3) of the respondents and by 85.8% (95% CI: 81.5–90.1) of those reporting hand eczema within the past 12 months (*P* < 0.001).

Discussion

We found an overall frequency of hand eczema within the past 12 months of 22.8% in this unselected group of hospital employees. Eczema frequencies were significantly higher among assistant nurses, nurses, and nursing aids.

A weakness in the present study was the anonymous distribution of the questionnaires without the possibility for sending reminders. Under these conditions, an overall response rate of 65% was considered satisfactory. The job groups expected to have high frequencies of work-related hand eczema showed acceptable response rates. Thus, the eczema frequencies for these groups can be seen as reliable.

In the present study, a nearly double frequency of hand eczema within the past 12 months was

reported by respondents younger than 40 years (30.1%) compared with those older than 40 years (17.4%). Among men below 40 years of age, 23.5% reported hand eczema within the past 12 months, and this was not significantly lower than women in the same age group (30.9%). For the age group above 40 years, a nearly significant sex differences was seen, with men reporting hand eczema half as frequently (9.3%) compared with women (18.3%).

As many medical procedures require use of protective gloves, this risk factor is reported, although measured on a cross-sectional basis. The same goes for frequent hand washing and use of hand disinfectants as they are part of the required hygiene demands. Risk factors for hand eczema such as use of protective gloves and hand washing were significantly more frequent among respondents reporting having had hand eczema within the past 12 months, suggesting a potential for prevention of hand eczema by reduction of the skin burden caused by these exposures.

The reporting of atopic dermatitis, rhinitis, and asthma was significantly higher among respondents with hand eczema within the past 12 months.

Consulting a doctor for hand eczema as an adult was reported by about half of those with hand eczema ever. The majority of those seeking medical advice also reported hand eczema within

Table 4. Self-reported use of protective gloves, skin symptoms, change of protective gloves, hand washing, and use of hand disinfectants among respondents with and without hand eczema within the past 12 months^a

Hand eczema within the past 12 months	Yes	No	All respondents	P value
Use of protective gloves at work at the moment, % (95% CI)	<i>n</i> = 175 61.7 (54.5–68.9)	<i>n</i> = 494 40.9 (36.6–45.2)	<i>n</i> = 669 46.8 (43.0–50.9)	<i>P</i> < 0.0001
Skin problems as a result of wearing protective gloves, % (95% CI)	<i>n</i> = 192 62.5 (55.7–69.4)	<i>n</i> = 584 19.7 (16.5–22.9)	<i>n</i> = 776 30.3 (27.2–33.6)	<i>P</i> < 0.0001
Changed glove type or ceased using gloves due to skin problems, % (95% CI)	<i>n</i> = 128 62.5 (54.1–70.9)	<i>n</i> = 147 40.8 (32.8–48.8)	<i>n</i> = 275 50.5 (44.7–56.4)	<i>P</i> < 0.0005
Hand washing more than 20 times per day, % (95% CI)	<i>n</i> = 254 59.1 (53.0–65.1)	<i>n</i> = 851 39.6 (36.3–42.9)	<i>n</i> = 1105 44.1 (41.4–47.3)	<i>P</i> < 0.0001
Use of hand disinfectants daily or weekly, % (95% CI)	<i>n</i> = 250 56.0 (49.9–62.2)	<i>n</i> = 839 53.8 (50.4–57.1)	<i>n</i> = 1089 54.3 (51.6–57.5)	Not significant

^aThe number of answers varies for the different questions.

the past 12 months, and two-third stated that the last time they consulted a doctor for hand eczema was more than a year ago. These finding suggests that the hand eczemas were rather long lasting.

To the best of our knowledge, data on the occurrence of hand eczema in an unselected hospital population have not been published since a Norwegian hospital population was studied in the mid-80s. In the Norwegian study, 17% reported allergic hand eczema during the preceding 12 months (12, 13). Although not fully comparable because of different wordings of the questions used, it seems that the hospital population in our study had a higher occurrence of hand eczema. Furthermore, in the Norwegian study, no significant differences between hand eczema frequencies in women (17.6%) and in men (15.7%) was observed (12). This is in contrast to the present study where hand eczema within the past 12 months was significantly more frequent among women (23.7%) than among men (15.1%). The 20-year time span may also contribute to these differences as for instance the use of gloves in the healthcare sector has increased tremendously during this period.

The value of questionnaire studies versus clinical examinations in studying hand eczema is often discussed. Clinical examinations allow for a more detailed eczema diagnosis. In contrast, questionnaire studies allow for larger study populations and systematic collection of additional data on, for example exposures and preventive measures. The use of questionnaires in skin disease epidemiology is reviewed in the publications by the NOSQ group, which developed NOSQ-2002 (8, 9). Self-reported eczema was preferred to a symptom-based eczema definition, as studies have shown this to be more consistent with clinical examinations. The validated questionnaire included questions comparable with those used in the present study (14–17). A Swedish study including self-reported current hand eczema and dermatological evaluation found a sensitivity of 87% and specificity of 79%, while the agreement on specific symptoms was lower (14). The specificity of the self-report of hand eczema/dermatitis has been high in the validations (usually more than 90%), while the sensitivity has been lower (less than 70%) (15, 17–19). These validation studies indicate that questionnaire studies are more likely to underestimate than overestimate the true prevalence of hand eczema (8, 9). A study including clinical validation of questionnaire data on dermatitis confirmed current skin problems in all respondents reporting this. Only milder eczema cases were found in the group not reporting skin problems (20). Hence, we believe questionnaire

studies to be valid for studying the potential topics to focus on, in planning prevention activities, and for evaluating the effects of interventions on occupational skin diseases.

The eczema frequencies found in the present study are in accordance with the results for the healthcare sector and nurses in particular in a population study of a representative sample of the Danish work force (DWECS) from 2000 – a study repeated every fifth year since 1990 (2, 5).

The fact that the eczema frequencies vary among hospital employees belonging to different job groups indicates that interventions to reduce occupational skin exposure have a potential to reduce the frequency of occupational skin diseases. Based on data from DWECS, about 70%–72% of skin problems in female nurses have been estimated to be of occupational origin (21). In the present study, association between risk factors (protective gloves and hand washing) and hand eczema was observed, suggesting a potential for prevention through workplace interventions focusing on reduction of exposure and change of work procedures.

Experiences from intervention studies have shown interventions including prevention programs and educational activities to be effective in reducing the frequency of occupational skin diseases, symptoms, or exposures (22–25).

Conclusions

An overall frequency of hand eczema within the past 12 months of 22.8% was seen in this unselected population of hospital employees. High frequencies of hand eczema were observed among assistant nurses, nurses, and nursing aids. Hand eczema was more frequent among women and in the age group below 40 years of age.

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