Hand Eczema in Swedish Adults – Changes in Prevalence between 1983 and 1996

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Hand eczema is the most frequent occupational skin disease. Our aim was to study changes in its prevalence in Swedish adults. Cross-sectional studies were performed in 1983 and 1996. Random samples from the population of Gothenburg, Sweden, aged 20–65 y, were drawn from the population register. Data were collected with a postal questionnaire, which was identical in the two studies. The response rate was 83.5% (16,708 out of 20,000) in 1983 and 73.9% (2218 out of 3000) in 1996. The reported 1 y prevalence of hand eczema decreased from 11.8% in 1983 to 9.7% in 1996 (p < 0.01), a large difference being found in the youngest age group. Reported childhood eczema increased from 10.4% to 12.4%, however (p < 0.01). Of those with childhood eczema 27.9% and 25.2% reported hand eczema, compared to 10.0% and 7.5% among those without childhood eczema. In total 76.8% were gainfully employed in 1983 and 68.3% in 1996 (p < 0.001). In 1983 23.0% were employed in “high-risk” occupations for hand eczema compared to 19.4% in 1996 (p < 0.001). Even though the increase in childhood eczema was largest in the youngest group, there was a large decrease in the prevalence of hand eczema in that age group among both sexes. The study indicates that the prevalence of hand eczema in Swedish adults had decreased between 1983 and 1996 despite an increasing prevalence of childhood eczema. Secular changes in reporting hand eczema and childhood eczema may explain some of the changes, but a decreased occupational exposure to skin irritants is a probable cause, implying that occupational factors may be important predictors of hand eczema. Key words: atopy history/epidemiology/occupational exposure. J Invest Dermatol 118:719–723, 2002

Hand eczema is the most frequent occupational skin disease. In many jobs the skin on the hands is subjected to damage caused by contact with skin irritants and contact allergens. A number of studies have investigated the prevalence of hand eczema in the general population (Agrup, 1969; Peltonen, 1979; Menné et al, 1982; Coenraads et al, 1983; Kavli and Førde, 1984; Lantinga et al, 1984; Yngvesson et al, 1997; 2000; Bryld et al, 2000). Differences in selection of the study populations, e.g., regarding age and sex, and in the prevalence measures used often make comparisons difficult. In the 1980s a prevalence study of hand eczema in the general population of Gothenburg (Meding and Swanbeck, 1987) reported a 1 y period prevalence of 11.8%. The female to male ratio was 1.8, with the highest prevalence in young females. A history of childhood eczema was identified as the most important predictive factor for hand eczema (Meding and Swanbeck, 1990). A prevalence ratio of about 3 was found on comparing 1 y prevalence in individuals with and without a history of childhood eczema. An increasing trend regarding the prevalence of atopic dermatitis has been observed, mainly during the 1960s and 1970s, but the reasons for this are unknown (Schultz Larsen, 1996; Schultz Larsen et al, 1996; Diepgen, 2000). Considering atopic dermatitis as an important risk factor for hand eczema, the question arises whether a corresponding increase in hand eczema prevalence has occurred. Hand eczema prevalence in Gothenburg in the 1980s was double that in south Sweden in the 1960s (Meding and Swanbeck, 1990). The main cause was assumed to be the increase in the prevalence of atopic dermatitis. There were some differences between the two studies, however, regarding study populations and methods. The older study was performed mainly in a rural population, with questions about skin changes on the hands and examination in connection with a large general health survey, and only point prevalence was considered. The later study, of hand eczema only, was performed in a large industrial city using a postal questionnaire and subsequent examination. Both 1 y prevalence and point prevalence of hand eczema were studied.

Our aim was to study whether the prevalence of hand eczema in Swedish adults is changing and to explain possible trends. The prevalence was estimated in a cross-sectional study of the general population of Gothenburg, Sweden, in 1996, and compared with data from a similar study in 1983.

SUBJECTS AND METHODS
Two cross-sectional studies were performed, in 1996 and 1983, respectively. Data were collected using the same postal questionnaire on both occasions. Details of methods used in 1983 have been presented previously (Meding and Swanbeck, 1987).

Study populations A simple random sample of 3000 individuals of age 20–65 y was drawn from the population register in Gothenburg in
July 1996. In 1983, a sample of 20,000 persons had been recruited using a similar procedure. In 1996 after up to three reminders answers were obtained from 2218 (73.9%) individuals, 1088 males and 1130 females. Of the 782 nonresponders two were dead, one could not answer because of illness, 15 had moved abroad, 34 refused to answer, and 41 questionnaires were returned without reaching the addressee. In 1983 the response rate was 83.5%.

Questionnaire The questionnaire contained the same 10 questions in 1983 and 1996. The main question was: “Have you during the previous 12 mo had hand eczema on some occasion?” Regarding history of skin atopy the question was: “Did you have childhood eczema?” Any history of asthma and hayfever was also elicited using the questions “Have you ever had asthma?” and “Have you ever had hayfever?” Other questions concerned employment, present occupation, and daily occupational exposure of the hands (solvents, oils, paint, glue, unspecified chemicals, cement, water, detergents, foodstuffs, plants, soil, dust, dry dirt, coins). The respondents were also asked to mark their occupation on a list of occupations adapted from the Scandinavian Occupational Register, published by The Swedish National Labour Market Board (Nordisk yrkesklasifiering. AMS 1978: 131. Arbetsmarknadsstyrelsen, Helsingborg, Sweden). Clinical experience shows that hand eczema is more common in some occupations. Therefore, before the results were analyzed, the list was divided into high-, medium-, and low-risk occupations for hand eczema. Only the high-risk group is shown in the analysis (see Appendix). Statistics For univariate comparison of prevalences $\chi^2$ statistics were used. In the analysis of logistic regression, the PROC LOGIST procedure of SAS was used and the confidence intervals were calculated using Student’s $t$ distribution. The studies were approved by the Ethics Committees of Karolinska Institute, Stockholm, and Gothenburg University.

RESULTS

The age and sex distribution of the respondents is presented in Table I.

One year prevalence of hand eczema In 1996 hand eczema on some occasion during the previous 12 mo (1 y prevalence) was reported by 9.7% of the respondents, women more than men (12.3% vs 7.0%; $p < 0.001$) (Table I). The overall prevalence was significantly lower in 1996 than in 1983 but the differences varied depending on age. A decrease was found for both sexes in the youngest age group (20–29 y), whereas there was almost no difference for men. For older ages the prevalence seems to have decreased in women. For older men there seems to have been no decrease in some ages, but a significant decrease in the age group 40–49 y.

Atopy history Childhood eczema was stated by 12.4% in 1996 compared to 10.0% in 1983 ($p < 0.01$), with the difference mainly among women (Table II). Childhood eczema was reported most frequently by the youngest individuals. In females 20–29 y of age, the cumulative prevalence of childhood eczema was 24.9% in 1996 and 17.5% in 1983 ($p < 0.01$). The corresponding prevalence in males was 13.8% and 13.7% ($p = 0.96$). In total, 34.1% had at least one atopic symptom in 1996 compared to 26.3% in 1983 ($p < 0.001$) and the prevalence was similar among men and women.

Childhood eczema is a strong predictor of adult hand eczema. In 1996, among persons with childhood eczema, 25.2% reported hand eczema during the previous 12 mo, compared to 7.5% ($p < 0.001$) among those without childhood eczema. The corresponding figures for 1983 were 27.9% in persons with childhood eczema and 10.0% in those without ($p < 0.001$).

The 1 y prevalence of hand eczema was 14.2% in 1996 for persons with previous or present asthma and/or hayfever, compared to 8.0% among those without these symptoms ($p < 0.001$). Excluding those who also had childhood eczema, the corresponding prevalences were 10.0% and 6.7% ($p < 0.05$) in 1996 and 12.4% and 9.4% in 1983 ($p < 0.001$).

OCCUPATIONAL EXPOSURE

In total 68.3% of the respondents were gainfully employed (full-time or part-time) in 1996 (males 71.4% and females 65.2%; $p < 0.01$). The corresponding proportion in 1983 was 76.8% ($p < 0.001$). In 1996 there were 11.4% students compared to 5.0% in 1983 ($p < 0.001$), and 6.4% unemployed compared to 1.2% in 1983 ($p < 0.001$).

In 1996, 19.4% of the respondents were employed in “high-risk occupations” for hand eczema (see Appendix for definition), compared to 23.0% in 1983 ($p < 0.001$). The difference was largest in the youngest age group (20–29 y), where 18.9% of the men and 19.0% of the women were in high-risk occupations in 1996, compared to 24.0% and 28.6% in 1983. Among persons in high-risk occupations 15.6% reported hand eczema in 1996 and 14.3% in 1983 ($p = 0.50$). Those classified as having low- or medium-risk occupations had a hand eczema prevalence of 9.2% in 1996 and 11.4% in 1983 ($p < 0.05$).

Table I. Number of respondents and self-reported 1 y prevalence of hand eczema in the 1996 and 1983 studies, by age and sex

<table>
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<tr>
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<tbody>
<tr>
<td>20–29</td>
<td>275</td>
<td>5.5*</td>
<td>2013</td>
<td>9.2</td>
<td>289</td>
<td>15.9</td>
</tr>
<tr>
<td>30–39</td>
<td>300</td>
<td>9.0</td>
<td>2029</td>
<td>9.6</td>
<td>273</td>
<td>16.9</td>
</tr>
<tr>
<td>40–49</td>
<td>208</td>
<td>4.3*</td>
<td>1438</td>
<td>9.2</td>
<td>263</td>
<td>10.7</td>
</tr>
<tr>
<td>50–59</td>
<td>223</td>
<td>8.5</td>
<td>1588</td>
<td>8.7</td>
<td>204</td>
<td>6.9*</td>
</tr>
<tr>
<td>60–65</td>
<td>82</td>
<td>7.3</td>
<td>1016</td>
<td>6.5</td>
<td>101</td>
<td>5.0</td>
</tr>
<tr>
<td>Total</td>
<td>1088</td>
<td>7.0*</td>
<td>8084</td>
<td>8.9</td>
<td>1130</td>
<td>12.3*</td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01 for difference between 1996 and 1983 in each stratum.

Table II. Relative frequency (%) of self-reported atopy symptoms in the 1996 and 1983 studies, by sex

<table>
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</thead>
<tbody>
<tr>
<td>Childhood eczema</td>
<td>8.7</td>
<td>9.4</td>
<td>16.0***</td>
<td>11.3</td>
<td>12.4**</td>
<td>10.4</td>
</tr>
<tr>
<td>Asthma</td>
<td>7.7*</td>
<td>5.9</td>
<td>10.4***</td>
<td>6.0</td>
<td>9.1***</td>
<td>5.9</td>
</tr>
<tr>
<td>Hayfever</td>
<td>24.4***</td>
<td>17.9</td>
<td>24.6***</td>
<td>16.6</td>
<td>24.5***</td>
<td>17.2</td>
</tr>
<tr>
<td>Asthma and/or hayfever</td>
<td>27.2***</td>
<td>20.4</td>
<td>28.9***</td>
<td>19.3</td>
<td>28.0***</td>
<td>19.8</td>
</tr>
<tr>
<td>Any atopic symptom</td>
<td>31.5***</td>
<td>26.0</td>
<td>36.6***</td>
<td>26.6</td>
<td>34.1***</td>
<td>26.3</td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01, ***p < 0.001 for difference between 1996 and 1983 in each stratum.
Daily occupational exposure to any of the options asked for (solvents, oils, paint, glue, unspecified chemicals, cement, water, detergents, foodstuffs, plants, soil, dust, dry dirt, coins) in the questionnaire in 1996 was reported by 41.9% of the respondents. The corresponding proportion in 1983 was 46.7% (p < 0.001). Among persons exposed to any of these substances 13.1% reported hand eczema in 1996 compared to 14.2% in 1983 (p = 0.37).

**Multivariate analysis**  An analysis adjusting for age, occupational exposure, and history of atopy including childhood eczema indicated a higher prevalence of hand eczema in 1983 than in 1996, in both sexes (Table III). Childhood eczema or asthma/hayfever had a similar influence on the risk of hand eczema in men and women. Childhood eczema was a much stronger predictor than asthma/hayfever. Women aged 20–29 y had a higher risk of hand eczema than older women. There was no significant risk variation with age in men. The same logistic regression analysis including age as a continuous variable indicated similar risks for childhood eczema (odds ratio OR = 3.2 and 3.1 for men and women, respectively) and for occupational exposure (OR = 1.7 and 1.3).

**DISCUSSION**

Contact dermatitis on the hands is related to exposure to skin irritants and to contact allergens. During the early 1990s extensive changes occurred in the labor market in Sweden, with an increasing proportion of individuals of working age being unemployed. As much hand eczema is caused or exacerbated through occupational exposure, changes in the labor market may also influence hand eczema prevalence.

The 1 y prevalence of hand eczema found in this study in Gothenburg, 9.7%, was lower than that observed 13 y earlier in a corresponding study (Meding and Swanbeck, 1987) but similar to results obtained in a population-based questionnaire survey of about 11,000 individuals in Stockholm in 1997 (Meding et al., 2001). The self-reported 1 y prevalence of hand eczema in that survey was 8.9% among respondents in the age group 20–65 y.

To identify the reasons for the observed change in prevalence, different causes of hand eczema must be considered.

**Occupational exposure**  Clinical experience and records from occupational injury insurance registers show that occupations including wet work and skin exposure to chemicals, oils, and solvents are high-risk occupations for hand eczema. Epidemiologic data on skin exposure in relation to hand eczema are scanty, however. In this study a smaller proportion of individuals were gainfully employed in 1996, 68.3%, compared to 76.8% in 1983. This reflects extensive changes in the Swedish labor market during this period of rising unemployment. The background rate of gainful employment in Sweden was 71.6% in 1986 and 79.0% in 1983 (Statistics Sweden). A smaller proportion in 1996 was found in “high-risk” occupations for hand eczema. The relative frequency of self-reported daily occupational exposure was accordingly also lower in 1996, 41.9% compared to 46.7%. The relation between reported exposure and hand eczema was the same in the two studies (13.1% vs 14.2%). It is very likely that the lower relative frequency of occupational exposure in the general population affects the prevalence of hand eczema. Information about job title and reports of daily occupational exposure, however, are imprecise measures of exposure, which probably result in underestimation of the relation between exposure and hand eczema.

**History of childhood eczema**  In the previous hand eczema study in Gothenburg a history of childhood eczema was an important predictive factor for hand eczema (Meding and Swanbeck, 1990) resulting in a prevalence ratio of about 3. A high risk of hand eczema in skin atotics has also been found in several other studies (Lammintausta and Kalimo, 1981; 1993; Nilsson et al., 1985; Rystedt, 1985; Coenraads and Diepgen, 1998). An increase in reporting atopic symptoms from the skin and mucous membranes was found between 1983 and 1996 (Table II), and this accords with other observations (Diepgen, 2000). Thus, an increased prevalence of hand eczema would be expected rather than a lower prevalence. The prevalence ratio of hand eczema between persons with a history of childhood eczema and those without was also of the same magnitude: 3.4 in 1996 and 2.8 in 1983. Thus the importance of atopy for developing hand eczema has not changed. Coenraads and Diepgen found in a review that skin atopy at least doubles the risk of hand eczema in occupations where it is a common problem (Coenraads and Diepgen, 1998).

**History of respiratory atopy**  In the two studies a history of asthma/hayfever was associated with an increased risk of hand eczema even when individuals who reported childhood eczema were excluded. The questions used regarding respiratory atopy have not been validated and might result in some misclassification. Whether the observed increase in risk of hand eczema is related to a special atopic skin sensitivity, “atopic skin diathesis” (Lammintausta and Kalimo, 1981), in a fraction of individuals with respiratory atopy is not possible to analyze in this study.

**Age and gender**  Females more often than males reported a history of childhood eczema, and an increase over time was found for females but not for males. Childhood eczema is not totally synonymous with atopic dermatitis. How far influence from environmental factors such as cosmetic use might help explain the sex differences and difference over time is not possible to conclude from this study. A higher prevalence of atopic dermatitis in females has been found also in other studies, however (Schultz Larsen et al., 1996; Williams et al., 1999), and might contribute to the higher prevalence of hand eczema observed in women.

The occurrence of hand eczema was related to age in females but not in males (Table III), with the highest prevalence in females under 40 y (Table I). The female to male ratio was 1.8 in 1996, similar to that in 1983 (1.7). The most likely reason for the sex- and

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### Table III. Logistic multivariate analysis of occurrence of hand eczema

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Coefficient (SE) Males</th>
<th>OR (95% confidence interval) Males</th>
<th>Coefficient (SE) Females</th>
<th>OR (95% confidence interval) Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age class b</td>
<td>-0.14 (0.09)</td>
<td>0.87 (0.7–1.0)</td>
<td>-0.14 (0.09)</td>
<td>0.87 (0.7–1.0)</td>
</tr>
<tr>
<td>Childhood eczema</td>
<td>1.17 (0.10)</td>
<td>3.2 (2.6–3.9)</td>
<td>-0.05 (0.08)</td>
<td>0.87 (0.7–1.0)</td>
</tr>
<tr>
<td>Asthma/hayfever</td>
<td>0.40 (0.09)</td>
<td>1.5 (1.3–1.8)</td>
<td>-0.05 (0.08)</td>
<td>0.87 (0.7–1.0)</td>
</tr>
<tr>
<td>Occupational exposure</td>
<td>0.50 (0.08)</td>
<td>1.7 (1.4–1.9)</td>
<td>-0.05 (0.08)</td>
<td>0.87 (0.7–1.0)</td>
</tr>
<tr>
<td>High-risk occupation</td>
<td>0.01 (0.10)</td>
<td>1.0 (0.8–1.2)</td>
<td>0.05 (0.10)</td>
<td>1.3 (1.0–1.7)</td>
</tr>
<tr>
<td>Time period d</td>
<td>0.26 (0.13)</td>
<td>1.3 (1.0–1.7)</td>
<td>0.05 (0.10)</td>
<td>1.3 (1.0–1.7)</td>
</tr>
</tbody>
</table>

*During the previous year by age, childhood eczema, respiratory atopy, occupational exposure (“any” versus “none”), “high-risk occupation” versus “low-medium risk occupation”, and time period, stratified by sex. Coefficients and corresponding odds ratios.*

Age 20–29 y versus 30–65 y.

1983 versus 1996.
age-related differences in hand eczema prevalence is differences in exposure. Wet work is more frequent in female-dominated occupations and it is probable that wet exposure in the home is an important factor keeping the hand eczema prevalence high in young females. In a study of hospital workers, nursing of children younger than 4 y and absence of a dishwashing machine in the home increased the risk of hand eczema (Nilsson et al, 1985).

Methodologic aspects The same questions were used in the two studies, thus minimizing possible methodologic changes. The disease labels “hand eczema” and “childhood eczema” might be apprehended and admitted differently by the population, however, during different time periods. The possible occurrence and size of such secular changes are hard to estimate. There has been more awareness about allergic diseases during recent years, which might increase the reporting of childhood eczema. It is harder to find reasons for a higher denial of hand eczema in more recent years. Fear of being gainfully employed due to hand eczema may be one reason, but such questions are rarely asked at the time of employment according to our knowledge. Furthermore, the laws protecting employees from being fired due to medical reasons are strong in Sweden during this period. The study population was smaller in 1996, but large enough for comparing hand eczema prevalence. The response rate was lower, 73.9% compared to 83.5% in 1983, but it is improbable that this difference could explain the lower prevalence in 1996. The previous study included a dropout analysis showing that a smaller proportion among the nonresponders reported hand eczema, although the difference between responders and nonresponders was not statistically significant (Meding and Swanbeck, 1987). Assuming a similar tendency in 1996, the “true” difference in prevalence between 1983 and 1996 would be larger, as the response rate in 1996 was lower.

The validity of the question “Have you during the past 12 mo had hand eczema on some occasion?” was recently investigated in three different populations using subsequent interview and clinical investigation (Meding and Barregård, 2001). The sensitivity was 53%–59% and the specificity 96%–99%. A random misclassification of outcome would, instead, decrease the difference between the time periods and relationship to atopy, age, and sex.

Hand eczema is a disease of multifactorial genesis. Atopy history is of great importance, and asking about childhood eczema in a questionnaire is probably an acceptable way of classifying individuals even though recall bias must be considered. Clinical experience shows that exposure to skin irritants and contact allergens is of great importance for hand eczema development but asking about job title or self-reported daily occupational exposure to a number of substances gives an imprecise estimation of the exposure. The lower prevalence of hand eczema found in the 1996 study in comparison with the 1983 study, despite higher figures for atopy, is probably due to the decrease in employment and occupational exposure. To study the relation between exposure and hand eczema more reliably and to estimate the relative importance of different risk factors for hand eczema, more precise measures of skin exposure are desirable. This is an important subject for future research in occupational dermatology.

In summary this study indicates that hand eczema in Swedish adults decreased between 1983 and 1996 despite an increasing prevalence of childhood eczema. Secular changes in reporting hand eczema and childhood eczema may explain some of the changes, but a decreased occupational exposure to skin irritants is a probable cause, implying that occupational factors may be important predictors of hand eczema.

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REFERENCES


APPENDIX: OCCUPATIONS CLASSIFIED AS HAVING HIGH RISK OF HAND ECZEMA

**Medical and nursing work**
Veterinarians
Physicians and surgeons
Dentists
Registered nurses
Midwives
Assistant nurses and hospital aids
Dental assistants
Child minders

**Shoemakers and shoe repairers**
Dental technicians
Jewellery and precious metal workers
Toolmakers, machine-tool setters and operators
Machinery fitters
Machine assemblers and engine mechanics
Car mechanics
Plumbers and pipe fitters
Building painters
Bricklayers
Concrete workers
Printing pressmen
Bakers and pastry cooks
Canning workers
Butchers and meat preparers
Dairy workers
Chemical process workers
Rubber products makers
Plastic products makers
Tanners and fur dressers
Photographic laboratory workers

**Service**
Catering supervisors
Cooks
Kitchen assistants, restaurant workers
Housekeepers, domestic helps
Building caretakers
Cleaners
Hairdressers, beauticians
Launderers and dry-cleaners