An analysis of gender differences in patients with hand eczema – everyday exposures, severity, and consequences

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Summary

Background. Hand eczema is often related to high-risk occupations and aggravating exposures in everyday life. The disease is twice as frequent in women as in men, partly because of diverse exposure patterns. Other gender differences may be relevant for treatment and prevention.

Objectives. To gain insights into the common features and differences between men and women with hand eczema.

Methods. The clinical disease severity of patients (n = 306) attending for dermatological treatment at two settings was assessed with the Hand Eczema Severity Index (HECSI). Self-reported medication adherence, aggravating factors, hand eczema-related consequences and quality of life were obtained from a questionnaire.

Results. Men and women had equal clinical severities of disease, with an overall median HECSI of 43. Self-reported medication adherence was equal between the genders, but, among patients aged > 40 years, more reported higher adherence. The impact of disease was larger in women than in men. Women reported significantly more aggravating factors and sick leave. Also, women had a more impaired quality of life than men at equal levels of disease severity, and this could be associated with the higher number of aggravating factors.

Conclusion. Gender differences in hand eczema need to be considered in the dermatological treatment and counselling of patients.

Key words: aggravating factors; allergic contact dermatitis; irritant contact dermatitis; occupational; patient counselling; treatment.

Hand eczema has a 1-year prevalence in the Danish population of 10–14% (1, 2). Hand eczema has a multifactorial aetiology, shows wide variations in morphology, and is often accompanied by itching and pain (3). Successful disease management involves removal of the cause(s), if possible (3, 4). Often, many factors aggravate the eczema regardless of the specific cause. These exposures in everyday life need to be identified, and continuous skin protection and skin care should be adopted by the individual (5).

Hand eczema is twice as frequent in women as in men (1). This supposedly relates to exposure patterns rather than to individual susceptibility (6). A higher prevalence of atopic dermatitis among women may also contribute (1). The disease severity is not necessarily higher among women (7). In contrast, the severity was higher among men in a multicentre study of hand eczema patients (8).
this study, no gender differences in dermatology-specific quality of life were seen. In other studies, more impaired quality of life among women than among men has been reported (9, 10).

Hand eczema is often related to high-risk occupations. However, in research, little attention is given to the fact that the labour market is highly gender-segmented. In a recent study of occupational contact dermatitis, the absolute highest ranking female risk profession, that is, hairdressing, was not even among the top 10 risk occupations for men (11).

Also, self-management of hand eczema may be influenced by gender. A cross-sectional survey found that more women than men sought medical attention because of their hand eczema (2). In general, gender has been found to influence health maintenance behaviour, such as everyday activities to protect and improve health (12). Presumably, women also have higher medication adherence (13). Women with contact dermatitis have been found to be more frequent users of conventional medicine (14), as well as complementary and alternative medicine (15). Conversely, a Swedish study suggested that, among patients with psoriasis or atopic dermatitis, men are offered more advanced therapy than women, in spite of similar disease severity (16).

Hand eczema often becomes chronic and results in lower quality of life, sick leave, job change, or early retirement (8, 17, 18). Recent evidence from The Netherlands and Germany suggests that integrated care programmes, although expensive, are superior to usual dermatological care (19–22). As part of a clinical trial (23), we explored some aspects of hand eczema from a gender perspective, focusing on exposures, severity, and consequences, as well as medication adherence and treatment, in a cohort of patients. The aim was to gain insights into gender differences that need to be considered in the treatment and counselling of patients with hand eczema.

Materials and Methods

We conducted a prospective dual-setting study comprising a cohort of patients (n = 306) referred for treatment at either an outpatient care clinic in Gentofte Hospital, University of Copenhagen (a tertiary referral centre) or a private dermatology practice in the northern region of Denmark (a secondary referral centre). Approval of the study was obtained from the Danish Data Protection Agency and the Ethics Committee of the Capital Region (H-2-2011-007).

Eligible patients (referred because of hand eczema, aged between 18 and 70 years, and capable of replying to questionnaires in Danish) were enrolled consecutively into the study. The majority of patients were diagnosed and tested according to their patterns of exposure, and they were prescribed topical and/or other treatment. Some conditional differences between the two settings appeared. Only patients treated in the hospital were tested for filaggrin mutations (24) when appropriate, and Grenz ray therapy was only offered in private practice.

Assessment of the clinical severity of hand eczema

At the first medical consultation, the principal investigator or one of four specially trained nurses assessed the clinical severity of hand eczema by use of the Hand Eczema Severity Index (HECSI) (25). The HECSI evaluates the presence of clinical symptoms and the area involved. The deduced total index score has a range from 0 to 360. No minimum disease severity was required in the study.

Demographics, susceptibility, and dermatological treatment

Demographic variables, history of atopic dermatitis, data on filaggrin mutations and information on prescribed treatment were obtained from the medical files. Prescribed treatment, such as Grenz ray therapy, ultraviolet (UV)B/TL01 light therapy, or potassium permanganate baths, was allocated to a variable labelled ‘on-site treatment’. These treatments were given as managed care, as opposed to topical steroid treatment or systemic pharmaceuticals administered by the patient.

Self-reported data on medication adherence, exposures, consequences, and quality of life

A questionnaire was handed to the participants at the time of inclusion. One reminder including a new questionnaire was sent to non-responders after 2–3 weeks. The overall response rate was 90% (women, 174/190; men, 91/104).

Data on self-reported medication adherence were obtained with the Danish version of the Medication Adherence Report Scale (DMARS-4), which has been validated in cancer pain patients. The generic scale covers whether respondents avoid, forget, alter or discontinue the prescribed medication. Measurement of the four items is on a five-point Likert scale (26).

Information on exposures and aggravating factors were obtained as modified items from the Nordic Occupational Skin Questionnaire (NOSQ-2002) (27). We asked the patients which factors, both work-related and in leisure time, aggravated their eczema. In contrast to NOSQ-2002 (question F3), we merged some factors in order to include hand sweating and physical friction.
Also, we included eczema on the hands or wrists as one entity, and the patients could report every aggravating factor. The questionnaire also addressed the frequency of symptoms during the past year, the burden of eczema disease measured on a visual analogue scale (VAS) from 0 (no eczema) to 10 (excessive eczema), and a possible occupational component.

The questionnaire included the widely used Dermatology Life Quality Index (DLQI) (28, 29). This was supplemented by items concerning the degree (from 0 to 10) of itching, scratching and fatigue within the last 4 weeks. These questions were from the Impact of Chronic Skin Disease on Daily Life, which so far has been validated in patients with atopic dermatitis and psoriasis (30). Additional items from NOSQ-2002 (question C1) gave data about consequences of the disease (27).

**Sample size estimation**

Sample size calculation was performed as part of the overall clinical trial, and an estimated group size of 87 was needed to detect a difference of 30% in HECSI between two groups (23). General estimations of sample size requirements when health behaviour and quality of life are examined refer to minima of 60–71 participants in comparison groups (31, 32).

**Statistical analysis**

By the use of IBM SPSS™ Statistics version 19.0 for Windows™, categorical data were analysed with the chi-square test and logistic regression. The HECSI values were tested according to the normal distribution, and turned out to be non-normal. However, after square root transformation, the data showed a satisfactory normal distribution (Shapiro–Wilks test: $p = 0.073$ for women and $p = 0.985$ for men). The DLQI also turned out to be non-normally distributed. Accordingly, when comparing the HECSI and the DLQI between groups, we used the median value and the Mann–Whitney $U$-test. All $p$-values presented are two-sided, and a $p$-value of <0.05 was considered to be significant.

**Results**

A total of 389 patients were eligible according to the inclusion criteria, and 306 individuals consented to participate. No differences with regards to age and gender distribution were found between the non-participants and the included patients. A few patients ($n = 4$) had their diagnosis changed to psoriasis, and 8 patients withdrew their consent. Hence, a total of 294 patients were included, of whom the hospital provided 190 patients and the private practice provided 104 patients. The patients had an age range of 18–69 years. One hundred and four were male and 190 were female.

One-third of the women (65/190) had a history or current atopic dermatitis, as compared with only 15% (16/104) of the male patients ($p < 0.001$). A tendency for more women than men to have mutation(s) in filaggrin genes was found, with 12 of 47 tested women having a mutation as compared with only one of 19 men (Fisher’s exact test, $p = 0.088$). Approximately 60% reported habitually having dry skin, with no gender differences being seen. We found no statistically significant gender differences in onset, previous history, or frequency of hand eczema.

**Disease severity**

Analyses of clinical disease severity showed only small differences in the HECSI between men and women (Table 1).

In an analysis of trends, we found an increase in clinical severity related to higher age among both women ($p = 0.003$) and men ($p < 0.001$), as measured by linear-by-linear association. Figure 1 shows the age-related distribution of the HECSI ($n = 294$).

The worst-case burden of disease measured on a scale from 0 to 10 was different between the genders. Moreover, women reported significantly more eczema-related itching, scratching and fatigue within the last 4 weeks than men (Table 1).

More women (49.1%) than men (17.6%) reported itching or stinging immediately after handling foods, as an indication of secondary contact urticaria. This difference was highly significant [odds ratio (OR) 5.69; 95% confidence interval (CI) 2.98–10.86; $p < 0.001$].

**Exposures and aggravating factors**

The patients were asked whether they experienced improvement when absent from work. We found no gender differences, as 44.3% of the women and 47.4% of the men reported an occupational relationship ($n = 236$).

Overall, women reported more aggravating factors than men, with median numbers of four and three, respectively (Mann–Whitney $U$-test: $p < 0.001$, $n = 260$). Table 2 shows the gender differences in factors reported as aggravating.

We also asked the patients about their daily handwashing and use of emollients. Women reported significantly higher frequencies of handwashing, both
Table 1. Clinical and subjective disease severity between gender groups

<table>
<thead>
<tr>
<th></th>
<th>Women n</th>
<th>Men n</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HECSI</td>
<td>39.0 (18.0–72.5)</td>
<td>46.0 (23.0–81.25)</td>
<td>0.161</td>
</tr>
<tr>
<td>Clinical symptomsa</td>
<td>17.0 (9.0–26.0)</td>
<td>19.0 (12.0–27.0)</td>
<td>0.194</td>
</tr>
<tr>
<td>Extent (area)b</td>
<td>8.0 (4.0–11.0)</td>
<td>8.0 (5.0–12.0)</td>
<td>0.669</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Women n</th>
<th>Men n</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worst-case eczema</td>
<td>8.48 (1.57)</td>
<td>7.97 (1.48)</td>
<td>0.0122</td>
</tr>
<tr>
<td>Itching within 4 weeks</td>
<td>5.82 (2.76)</td>
<td>4.15 (2.80)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Scratching within 4 weeks</td>
<td>5.19 (2.88)</td>
<td>4.31 (2.91)</td>
<td>0.014</td>
</tr>
<tr>
<td>Fatigue within 4 weeks</td>
<td>3.18 (3.16)</td>
<td>1.94 (2.37)</td>
<td>0.004</td>
</tr>
</tbody>
</table>

HECSI, Hand Eczema Severity Index; IQR, interquartile range; SD, standard deviation; VAS, visual analogue scale, where 0 equates to no eczema or no complaints, and 10 equates to worst-case eczema or excessive complaints. HECSI values are presented as medians and IQR; other values are presented as means and SD. Mann–Whitney U-test independent groups were used for non-normal data, unless otherwise stated. Bold type indicates statistical significance.

aPossible range 0–90.
bPossible range 0–20.
cT-test independent groups.

Fig. 1. Clinical disease severity [Hand Eczema Severity Index (HECSI)] according to gender and age groups (n = 294). Plots show median (horizontal dotted line), interquartile range (box), and range of values (whiskers); numbers in boxes are the numbers of patients within age groups; dots and stars represent individual outliers in the study population.

Treatment and medication adherence

In the trial, 102 of 294 patients (34.7%) were prescribed on-site treatment, with no gender differences in the frequencies. We then analysed prescribed on-site treatment according to quartile-based severity groups. Patients with moderate–severe eczema (HECSI 43–75) were prescribed on-site treatment twice as often (OR 2.11; 95% CI 1.09–4.09; p = 0.027) and patients with severe hand eczema (HECSI > 76) were prescribed on-site treatment seven times as often (OR = 7.15; 95% CI 3.10–16.49; p < 0.001) as those with mild hand eczema (HECSI < 20).

Overall, the genders had equally high self-reported medication adherence (n = 260), with mean sum scores of 17.3 among women and 17.4 among men (score range from 4 to 20). The sum score was dichotomized into low (4–15) and high (16–20) adherence. In a logistic regression with imputation of dichotomized age (±40 years), patients aged >40 years reported high medication adherence as compared with younger patients, with an OR of 3.29 (95% CI 1.77–6.11; p < 0.001).

Consequences of hand eczema and quality of life

Thirty-six (24.5%) of 147 women reported eczema-related sick leave within the last 12 months. This was a significantly higher proportion than among the men [9/84 (10.7%)] (OR 2.70; 95% CI 1.23–5.94; p = 0.013). In a logistic regression, the number of aggravating factors was predictive of sick leave among women (p = 0.001) but not among men (p = 0.315). We also addressed the need to use protective gloves, changes in work tasks, change of job, difficulties in getting a job, experiences of

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Table 2. Self-reported aggravating factors for hand eczema, with number (%) of patients answering 'yes' for the factor in question

<table>
<thead>
<tr>
<th>What are the most important influences on or off work that aggravate your eczema?</th>
<th>Men, n (%)</th>
<th>Women, n (%)</th>
<th>Odds ratio (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soap, hygiene products</td>
<td>41 (46.1)</td>
<td>106 (61.6)</td>
<td>1.88 (1.12–3.16)</td>
<td>0.017</td>
</tr>
<tr>
<td>Detergents and laundry products</td>
<td>32 (36.0)</td>
<td>110 (64.0)</td>
<td>3.16 (1.85–5.37)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Handling of food</td>
<td>15 (16.9)</td>
<td>82 (47.7)</td>
<td>4.50 (2.39–8.44)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Wet hands/handwashing</td>
<td>20 (22.5)</td>
<td>64 (37.2)</td>
<td>2.04 (1.14–3.67)</td>
<td>0.017</td>
</tr>
<tr>
<td>Protective gloves</td>
<td>14 (15.7)</td>
<td>45 (26.2)</td>
<td>1.90 (0.98–3.69)</td>
<td>0.059</td>
</tr>
<tr>
<td>Sweaty hands</td>
<td>25 (28.1)</td>
<td>42 (24.4)</td>
<td>0.83 (0.46–1.48)</td>
<td>0.520</td>
</tr>
<tr>
<td>Physical friction</td>
<td>28 (31.5)</td>
<td>2 (1.2)</td>
<td>0.03 (0.01–0.11)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Machine maintenance, oils</td>
<td>20 (22.5)</td>
<td>16 (9.3)</td>
<td>0.35 (0.17–0.72)</td>
<td>0.004</td>
</tr>
<tr>
<td>Construction work, painting, etc.</td>
<td>18 (20.2)</td>
<td>49 (28.5)</td>
<td>1.57 (0.85–2.90)</td>
<td>0.149</td>
</tr>
<tr>
<td>Gardening, handling plants</td>
<td>4 (5.0)</td>
<td>12 (7.0)</td>
<td>3.26 (0.71–14.91)</td>
<td>0.127</td>
</tr>
<tr>
<td>Infections (colds, influenza, fever)</td>
<td>14 (15.9)</td>
<td>77 (44.5)</td>
<td>2.23 (1.15–4.30)</td>
<td>0.017</td>
</tr>
<tr>
<td>Mood, stress, hormonal changes</td>
<td>89</td>
<td>172</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

CI, confidence interval.

*Patients were encouraged to tick off several factors; items were modified according to NOSQ-2002 question F3 (27).

bLogistic regression.

Bold type indicates statistical significance.

Table 3. Patterns of daily handwashing

<table>
<thead>
<tr>
<th>How many times do you wash your hands during work?</th>
<th>0–5/day</th>
<th>6–10/day</th>
<th>11–20/day</th>
<th>&gt;20/day</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women (n = 153)</td>
<td>59 (38.6)</td>
<td>37 (24.2)</td>
<td>22 (14.4)</td>
<td>35 (22.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Men (n = 80)</td>
<td>49 (61.3)</td>
<td>19 (23.8)</td>
<td>4 (5.0)</td>
<td>8 (10.0)</td>
<td>–</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How many times do you wash your hands during leisure time?</th>
<th>0–5/day</th>
<th>6–10/day</th>
<th>11–20/day</th>
<th>&gt;20/day</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women (n = 165)</td>
<td>60 (36.4)</td>
<td>86 (52.1)</td>
<td>15 (9.1)</td>
<td>4 (2.4)</td>
<td>&lt;0.018</td>
</tr>
<tr>
<td>Men (n = 88)</td>
<td>47 (53.4)</td>
<td>33 (37.5)</td>
<td>8 (9.1)</td>
<td>0 (0.0)</td>
<td>–</td>
</tr>
</tbody>
</table>

χ²-test linear-by-linear association.

Bold type indicates statistical significance.

colleagues’ negative attitudes, effect upon occupational choice, decrease in income, job loss, retirement, and other consequences. There was a tendency for more women (77.8%) than men (68.1%) to report overall consequences related to their hand eczema (Pearson χ², p = 0.088).

In analyses of the DLQI, we found a much more impaired quality of life among women, with a mean of 7.38 [standard deviation (SD) 6.11], than among men, with a mean of 4.49 (SD 3.76) (p < 0.001). The only subscale without gender differences was that of impact on leisure activities (Table 4).

A linear regression of clinical severity measured with the HECSI and the overall DLQI established that the HECSI level could statistically significantly predict the DLQI for both genders (Fig. 2a). The results of this regression are shown in Table 5a. The HECSI accounted for 36.0% and 16.7% of the explained variability in the DLQI for women and men, respectively.

The DLQI measures the effect of disease within the past week. However, the questionnaire was self-administered with some delay in response; hence, a lag effect could bias the association of the HECSI and DLQI. Although men tended to have later responses than women (means of 18.7 and 14.9 days, respectively), this difference was not statistically significant (t-test, p = 0.102). In the questionnaire, the participants assessed the current burden of their hand eczema on a scale from 0 to 10. The participants presumably filled out the whole questionnaire within a time frame of 1 day; therefore, to address a potential lag effect, a linear regression of the current burden of eczema and the DLQI was performed (Fig. 2b). This analysis showed, similarly to the analysis of the HECSI and DLQI, that the level of current burden of eczema could significantly predict the DLQI for both genders. The results of these analyses are shown in Table 5b. The current burden of eczema accounted for 39.7% and 23.0% of the explained variability in the
Table 4. Analyses of the Dermatology Life Quality Index subscales according to gender differences

<table>
<thead>
<tr>
<th>Subscale (possible score)</th>
<th>Women</th>
<th>Men</th>
<th>p-value&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean&lt;sup&gt;a&lt;/sup&gt;</td>
<td>No. of patients</td>
<td>Mean&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Symptoms/feelings (0–6)</td>
<td>2.77</td>
<td>171</td>
<td>2.09</td>
</tr>
<tr>
<td>Daily activity (0–6)</td>
<td>1.32</td>
<td>172</td>
<td>0.58</td>
</tr>
<tr>
<td>Leisure (0–6)</td>
<td>0.81</td>
<td>169</td>
<td>0.55</td>
</tr>
<tr>
<td>Work and school (0–3)</td>
<td>0.98</td>
<td>171</td>
<td>0.66</td>
</tr>
<tr>
<td>Personal relationships (0–6)</td>
<td>1.00</td>
<td>173</td>
<td>0.53</td>
</tr>
<tr>
<td>Treatment (0–3)</td>
<td>0.70</td>
<td>172</td>
<td>0.29</td>
</tr>
</tbody>
</table>

<sup>a</sup>The values are presented as means because these are most descriptive of the gender differences, given the limited space. However, analyses were performed as crosstabs of ordinal scales.

<sup>b</sup>χ²-test linear-by-linear association.

Bold type indicates statistical significance.

Discussion

Our study examined, and found, some gender differences in a cohort referred for dermatological treatment because of hand eczema. We obtained both objective data (HECSI and on-site treatment) and subjective data (burden of disease, aggravating factors, medication adherence, and consequences, including quality of life). The gender distribution in the study population was representative of the well-known gender ratio of 2:1, with a predominance of women.

Gender commonalities in clinical disease severity, treatment, and medication adherence

The overall clinical disease severity in the cohort, with a median of 4.3.0, was high as compared with the other studies, for example the mean HECSI of 19.9 in the study of Hald et al. (7) or the median HECSI of 17.0 in a multicentre study reported by Agner et al. (8). However, our findings were in line with the baseline HECSI values, with reported means of 43.9 and 36.5 in a recent intervention study (19). We consecutively included patients throughout the course of 1 year, but most patients were included from October to April. This could give a relative increase in the overall severity in the cohort, but it should not affect differences between the groups of men and women.

In contrast to previous findings (8), we found no differences in the HECSI between women and men. Women had a marginally lower disease severity, but also they appeared to have more variability in severity than men. Disease severity increased with higher age in both groups, which has been found previously (8).

Our findings do not confirm that men are given managed treatment more often than women. On the contrary, we found that the HECSI scores could predict the prescription of managed treatment. This opposes previous findings that significantly more men than women receive UV treatment for psoriasis or eczema. The Laundry Bag Project’s study (16) had a retrospective design and assumed a similar disease severity, whereas we could directly impute a clinical severity measurement in a logistic regression.

Although women presumably adhere to prescribed medication more than men, our results did not support this. Overall, our cohort reported rather high medication adherence. DMARS-4 is only validated in Denmark in cancer pain patients, who reported a similarly high score (26). However, our finding that self-reported high adherence was related to higher age is consistent with previous studies of topical therapy for psoriasis (13).

Gender differences with regard to exposures and aggravating factors

The analyses of self-reported exposures and aggravating factors showed many gender differences. Although these factors do not equate to the occurrence of exposures, they may be interpreted as conditions in everyday life that need to be addressed in the treatment of hand eczema. Some of the factors mentioned relate typically to one gender, such as the maintenance of machines and hormonal changes, but the differences also indicate the
gender segmentation of both work-related and leisure-related tasks. More women than men work within ‘wet-work’ occupations (34). This could explain the differences in some of the aggravating factors (Table 2) and the work-related patterns of daily handwashing (Table 3). However, women also reported more frequent handwashing during leisure time, in agreement with other studies (35).
Table 5. Linear regression analyses within gender groups of (a) the Hand Eczema Severity Index (HECSI) and the Dermatology Life Quality Index (DLQI), (b) current burden of disease [visual analogue scale (VAS)] and the DLQI, and (c) number of aggravating factors and the DLQI; (d) ANCOVA tests of differences in regression slopes between gender groups.

<table>
<thead>
<tr>
<th></th>
<th>β (95% CI)</th>
<th>Adjusted R²</th>
<th>F (d.f.)</th>
<th>p-valuea</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(a) HECSI and DLQI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women (n = 166)</td>
<td>0.24 (0.19–0.29)</td>
<td>0.36</td>
<td>93.94 (1, 164)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Men (n = 87)</td>
<td>0.14 (0.07–0.20)</td>
<td>0.17</td>
<td>18.24 (1, 85)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>(b) VAS and DLQI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women (n = 163)</td>
<td>0.27 (0.22–0.32)</td>
<td>0.40</td>
<td>107.55 (1, 161)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Men (n = 86)</td>
<td>0.21 (0.13–0.29)</td>
<td>0.23</td>
<td>26.38 (1, 84)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>(c) Aggravating factors and DLQI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women (n = 165)</td>
<td>0.22 (0.14–0.31)</td>
<td>0.14</td>
<td>26.57 (1, 163)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Men (n = 84)</td>
<td>0.15 (0.06–0.24)</td>
<td>0.11</td>
<td>11.50 (1, 82)</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>(d) ANCOVA tests</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender × HECSI interaction</td>
<td>5.89 (1)</td>
<td>0.016</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>HECSI and DLQI (gender-adjusted)</td>
<td>–</td>
<td>–</td>
<td>28.23 (1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender × VAS interaction</td>
<td>1.64 (1)</td>
<td>0.202</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>VAS and DLQI (gender-adjusted)</td>
<td>–</td>
<td>–</td>
<td>18.63 (1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender × aggravators interaction</td>
<td>1.18 (1)</td>
<td>0.279</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Aggravators and DLQI (gender-adjusted)</td>
<td>–</td>
<td>–</td>
<td>7.86 (1)</td>
<td>0.005</td>
</tr>
</tbody>
</table>

CI, confidence interval; d.f., degrees of freedom; β, slope of regression.
HECSI and DLQI data were square root-transformed.
aTest of null hypothesis within groups.
bTest of homogeneity of slopes by use of interaction variable.
cTest of null hypothesis between gender groups. Bold type indicates statistical significance.

On the basis of questionnaire data, we do not know why these significant behavioural differences are present. Perhaps the threshold of perceived dirty hands lowers when one is used to complying with high hygienic standards at work. We actually found that those patients who reported handwashing > 10 times/day at work were more likely to also report handwashing > 10 times/day privately, with an OR of 2.46 (Pearson’s χ², p = 0.047). Ibler et al. found frequent handwashing to be the most important behavioural risk factor for hand eczema in a survey of healthcare workers (36). However, this pattern would possibly be the same in both genders, and even within the same job women have been found to be more exposed than men to water (35). Perhaps some of these behavioural differences originate as gender-conditioned habits in childhood, and may only be reversed by deliberately addressing the issue in the course of treatment. This area needs further research.

We found that more women than men reported daily use of emollients. This may contribute to the women in general having a non-significant but lower clinical disease severity than men, in spite of more aggravating factors.

Gender differences in subjective disease severity, consequences, and quality of life

We found statistically significant gender differences, with women having a higher mean score for worst-case burden of eczema. The degree of itch and eczema-related fatigue possibly contributed to this, as women also reported significantly more itching and fatigue than men. The results are in agreement with a recent study of patients with chronic pruritus. That study reported gender differences in the localization and quality of itching as well as influencing factors, with women having an overall higher mean VAS score for itching (37), as did another recent study (38).

We found a very large gender disparity in the DLQI, with means of 7.38 among women (previously clinically interpreted as a moderate effect) and 4.49 among men (a small effect) (39). The latter value is unexpectedly low as compared with other studies (8, 37). Disease severity and the DLQI have previously been found to correlate moderately in patients with occupational contact dermatitis (38, 40). In our study, we found gender differences in quality of life associated with hand eczema severity. The two linear regressions in Fig. 2a,b show directly that women have a more impaired quality of
life than men with equal hand eczema severity, whether this severity is objectively assessed or self-reported. An explanation could be that women find it more difficult to perform protective behaviour and risk avoidance, given the differences in aggravating factors, as indicated in Fig. 2c. In everyday life, patients with hand eczema find it very tiresome to deal with the preventive regimen (41). Also, women with hand eczema have been found to have a higher level of anxiety than men (38), and this may decrease the individual’s coping ability.

More women than men reported sick leave within the past year, and the number of aggravating factors could predict sick leave among women but not among men. The prevalence of sick leave may be directly associated with the extent of exposure at work as an unavoidable consequence, if temporary changes in occupational tasks are not possible. General gender differences in sick leave frequencies may also contribute, but these are complex and beyond the scope of this study.

Strengths and weaknesses of the study

Our study has some limitations. We included patients consecutively in two very different settings, in terms of both region and place within healthcare. The patients who consented to participate constitute a selected group who may be different from non-participants, especially according to the self-reported data. As always with questionnaire data, recall bias may have influenced the results. Moreover, the questionnaire was administered as part of a clinical trial, and patients may have over-reported good behaviour; that is, there may have been a social desirability bias. However, we had clinical severity data for all participants as well as data on susceptibility and prescribed treatment. Also, our study population is representative of the general population with hand eczema, according to gender and age distribution. Our cohort of patients was also highly heterogeneous with regard to disease severity, and included patients with hand eczema both related and unrelated to occupation.

Conclusion

Although, on the surface, disease severity was equal among the genders, hand eczema impacted on women much more profoundly, according to sick leave and quality of life. Quality of life could be linked directly to both disease severity and number of aggravating factors, and this comprehensive overview has, to the best of our knowledge, not been reported elsewhere. Gender differences need to be considered in the dermatological treatment of hand eczema patients, especially in counselling for ongoing preventive behaviour. The findings emphasize the need to address everyday exposures and habits as part of a tailored patient counselling programme.

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