

# Hand eczema and health-related quality of life; a comparison of EQ-5D and the Dermatology Life Quality Index (DLQI) in relation to the hand eczema extent score (HEES)

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## Summary

**Background.** Health-related quality of life (HRQoL) is associated with the extent and severity of hand eczema. We still lack a consensus about which HRQoL instrument to use as the standard, and how to measure the extent and severity of hand eczema.

**Objectives.** To compare the Dermatology Life Quality Index (DLQI) with EQ-5D (a standardized instrument for use as a measure of health outcome), and to evaluate how the Hand Eczema Extent Score (HEES) relates to these instruments.

**Methods.** Ninety-three patients (61 females) were included. The HEES was recorded by a dermatologist, and the DLQI and EQ-5D by the patients. The results were analysed with factor analysis and non-parametric statistics.

**Results.** The DLQI and EQ-5D showed decreased HRQoL. Using factor analysis, we could not establish an association between the DLQI and EQ-5D. There were, however, correlations between the DLQI and the HEES (0.31), the EQ<sub>index</sub> and the HEES (−0.32), the DLQI and the EQ<sub>VAS</sub> (−0.62), and the DLQI and the EQ<sub>index</sub> (−0.67) (the EQ<sub>VAS</sub> and the EQ<sub>index</sub> are calculated from EQ-5D).

**Conclusions.** We could not link factors in the DLQI to EQ-5D, which has previously been done for SF-36 (Short Form 36). On the basis of this, we cannot recommend EQ-5D over SF-36 for hand eczema studies. The DLQI correlates with the EQ<sub>VAS</sub> and the EQ<sub>index</sub>, and can probably be used as an approximation for EQ-5D. Our findings with the HEES are interesting, as it can be used by patients.

**Key words:** DLQI; EQ-5D; hand eczema; HEES; quality of life.

Hand eczema is a common disease, with a 1-year prevalence of ~10% (1–3). Hand eczema can have far-reaching consequences for the individual, with

increased consumption of healthcare, sick leave, changes of job, and also early retirement (4–7). The prognosis is thought to be poor (4, 8–12).

During the past 15 years, it has also become evident from clinical studies that hand eczema can have profound effects on health-related quality of life (HRQoL) (13–18). Two recently performed cross-sectional epidemiological studies have clearly shown that the negative effect of hand eczema on HRQoL can be detected even at a population level (19, 20). The Dermatology Life Quality Index (DLQI) is a well-established instrument for the evaluation of HRQoL (21), and has also been used for hand eczema (13, 16, 17), where it has been shown to correlate with the severity of hand eczema (13) and the

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number of contact allergies detected (17). However, it is dermatology-specific, and consequently there are no population-based norm data, and it cannot be used for studies including comparisons with other diseases.

For hand eczema studies, it has been suggested that the DLQI could be combined with a generic HRQoL instrument (16). Wallenhammar et al. (14) compared the DLQI and the generic instrument Short Form 36 (SF-36) (22–24) in a clinical setting with hand eczema patients. It was shown that SF-36 alone could be used as a measure of HRQoL in hand eczema patients. Bingefors et al. (20) used SF-36 in a population-based survey in which the negative effects of hand eczema on HRQoL were shown at a population level. EQ-5D is a newer standardized instrument for use as a measure of health outcome (25), with just five questions and a visual analogue scale (VAS). It was used by Moberg et al. (19) in a population-based study, where it was found that persons reporting hand eczema also reported a lower HRQoL as measured with EQ-5D. To our knowledge, EQ-5D has not been applied in a clinical setting with hand eczema or compared with the DLQI for hand eczema.

In order to evaluate hand eczema disease and correlate it with the effects on the individual, there is also a need for methods to determine the clinical severity of hand eczema. However, a generally accepted methodology is still lacking (26). The Hand Eczema Extent Score (HEES) (27, 28) has been presented as a method that is easy to use, and it can be used both by patients themselves and in the clinic.

The first aim of the present study was to compare EQ-5D with the DLQI in a population of hand eczema patients at two dermatology clinics in Sweden. The second aim was to establish whether the HEES correlated with the reported HRQoL.

## Materials and Methods

Patients with hand eczema were recruited from the department of dermatology at the University hospital, Örebro, and the department of dermatology at Sörmland, Eskilstuna, Sweden. Inclusion criteria were age > 17 years, clinically established hand eczema (no sub-grouping), and no present systemic treatment for the hand eczema. The patients comprised both those who made first-time visits on referral from a general practitioner and those previously known at the clinics. In total, 93 persons were included.

At a scheduled visit at the clinic, the participants answered the DLQI and EQ-5D questionnaires, and then met a dermatologist (M.L. or M.B.), who filled in a questionnaire with some baseline data concerning hand eczema duration, sick leave during the past year,

history of childhood eczema, previous patch testing, and concomitant diseases and medication. To evaluate a history of childhood eczema, the validated question 'Have you had childhood eczema' was used (29). The dermatologists also recorded the extent of hand eczema, using the form for the HEES (27, 28). With the HEES, the presence of eczema signs on different locations of the hands is scored. Eczema on the entire backs of the hands scores 4 points, eczema on the entire palms of the hands scores 4 points, eczema on part of the backs of the hands scores 2 points, eczema on part of the palms of the hands scores 2 points, eczema on different parts of the fingers scores 1 point, and eczema on different parts of the finger webs scores 1 point. The maximum total score is 37 points for each hand, and thus 74 points for both. HEES scoring relates to the current status of hand eczema (at the time of the scoring). The DLQI consists of 10 items (questions), each with four response categories from 0 (not at all) to 3 (very much). The questions cover symptoms and feelings, daily activities, leisure, work and school, personal relationships, and treatment. The maximum score is 30, and scores below 6 indicate small or no effects on the patient's life. The total DLQI score (sum of the 10 questions) was calculated (30). EQ-5D is a generic instrument developed by the Euroqol group (31, 32). It consists of five descriptive questions (EQ-5D descriptive system) and a VAS. The five questions (domains) cover different aspects of HRQoL; mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each item has three response categories: no problems, some problems, and extreme problems. Each answer can be dichotomized into EQ-5D levels of no problems (i.e. level 1) and problems (i.e. levels 2 and 3) (19), and the outcome of these questions is reported descriptively. On the basis of the results of the VAS scale included in EQ-5D, the EQ<sub>VAS</sub> is presented as mean and standard deviation. The five questions included in EQ-5D can be used to determine EQ-5D health states, which, in turn, can be converted into a single summary EQ<sub>index</sub> based on weights derived from a population. We calculated the EQ<sub>index</sub> by using the English population data (31, 32).

For comparison between groups, the Mann–Whitney *U*-test was used. Correlations were calculated with Spearman's rank correlation test. Calculations were performed with the software STATISTICA 10<sup>®</sup> (Stat Soft Inc., Tulsa, OK, USA). Explorative and confirmative factor analyses and structural equation models were applied with the statistical software R<sup>™</sup>, to evaluate whether a previous model for the DLQI and SF-36 (14) with a latent physical factor and a latent mental factor in the DLQI could be confirmed for the DLQI and EQ-5D. The

factor analysis was performed by Statisticon, Statistic & Research in Uppsala, Sweden.

The DLQI was used with permission from Professor Andrew Finlay, Cardiff. EQ-5D™ is a trademark of the EuroQol Group (Rotterdam, The Netherlands), and the EQ-5D questionnaire was used with its permission. The study was approved by the Research Ethical Committee, Uppsala, Sweden.

## Results

Sixty-one females (median age 48 years; range 18–80 years) and 32 males (median age 53 years; range 22–70 years) participated. This age difference was statistically significant ( $p < 0.05$ ). There were no significant differences ( $p < 0.05$ ) between the patients at the two dermatology clinics concerning age and sex distributions, DLQI, EQ-5D and HEES scores, hand eczema duration, sick leave, or previous patch testing. Data from both clinics were thus pooled, and are presented grouped by sex.

Baseline data and the results of the DLQI, EQ<sub>index</sub> and the HEES are given in Table 1. There were sex differences in the reported childhood eczema (females > males) and in previous patch testing (females > males). The results of the five EQ-5D questions are given in Table 2. The EQ<sub>index</sub> mean (Table 1) was 0.74 (females = 0.70; males = 0.82), which is below that reported for the Swedish general population (31). No significant sex differences were found for the DLQI, EQ<sub>VAS</sub>, EQ<sub>index</sub>, or HEES. The only statistically significant sex difference was found for DLQI question 3, 'Over the last week, how much has your skin interfered with you going shopping or looking after your home or garden?', with higher DLQI scores for females.

The results obtained with Spearman's correlation test to test correlations between the DLQI, EQ<sub>VAS</sub>, EQ<sub>index</sub> and HEES are shown in Table 3. The strongest correlations were seen between the DLQI and the EQ<sub>index</sub>, and between the DLQI and the EQ<sub>VAS</sub>. There was a weak correlation between sick leave resulting from hand eczema and the DLQI ( $r = 0.36$ ). We found no statistically significant differences in total DLQI score or the EQ<sub>VAS</sub> between persons with negative or positive patch test results. It was not possible to establish a correlation between a latent mental and physical factor in the DLQI and questions in EQ-5D with factor analysis; neither was it possible to establish possible latent factors within the DLQI.

## Discussion

We found that the HEES, the DLQI and EQ-5D can be used to measure different aspects of hand eczema.

The DLQI and EQ-5D overlapped with regard to the response pattern for the individual questions, and a correlation was found between the EQ<sub>VAS</sub>, the EQ<sub>index</sub> and the DLQI total. However, it can be assumed that they capture slightly different aspects of HRQoL. We looked into this by using factor analysis, and we tried to link previously defined, latent sub-groups in the DLQI (14) with questions in EQ-5D. Using the same model as in the previous study comparing the DLQI and SF-36 (14), we could not establish a correlation between sub-groups of questions in EQ-5D and possible latent factors in the DLQI. An explanation could be that the selection of patients differed – an occupational dermatology clinic versus two general dermatology clinics in this study. For example, in the present study, the female/male ratio was 1.92 (61/32), as compared with 1.0 in the previous study. Another possible explanation is the difference in the number of included questions between SF-36 and EQ-5D (36 versus 5). The relatively small number of patients included in the studies might also have influenced the divergent results. A most interesting finding was the correlation between the DLQI, EQ-5D, and the HEES. Although this was a small sample, this indicates that the extent of eczema changes is an important factor in self-reported HRQoL.

The DLQI is dermatology-specific, and is considered to be sensitive to even small changes in skin disease, whereas EQ-5D is generic, and thus also captures the effects of factors other than skin disease, such as comorbidities, especially depression. For example, it is not, as far as we are aware, known how the presence of other skin diseases affects the outcomes of different instruments measuring HRQoL. In a recent register-based analysis of patients with psoriasis (33), the outcomes of the DLQI and EQ-5D were compared. A correlation was found for the DLQI and EQ<sub>VAS</sub> and effects on HRQoL, with an overlap in the response pattern with both techniques. It has been shown that the DLQI correlates with VAS scales in skin diseases (34). Generic instruments have the advantage that they can be used to compare HRQoL between disease groups. On the other hand, it is probable that they also capture other aspects of HRQoL at the same time. Dorman et al. compared SF-36 and EQ-5D in patients after stroke (35). They concluded that the two generic instruments captured different aspects of HRQoL, as EQ-5D was more focused on physical ability.

We have previously shown that the DLQI can be linked to SF-36 (14) in hand eczema patients by using factor analysis, and that sex difference could be detected with SF-36. In 2 population based surveys both SF-36 (20) and EQ-5D (19) were affected by self-reported hand eczema and it was also possible to detect some sex differences

**Table 1.** Patient characteristics and results of the Dermatology Life Quality Index (DLQI), EQ<sub>VAS</sub>, EQ<sub>index</sub>, and Hand Eczema Extent Score (HEES)

|                                                                      | Females (n = 61) | Males (n = 32) | Total (n = 93) |
|----------------------------------------------------------------------|------------------|----------------|----------------|
| Age, mean (SD)*                                                      | 48.2 (13.7)      | 53.6 (12.5)    | 50 (13.5)      |
| Self-reported childhood eczema, % (no.)*                             | 36.0 (22/61)     | 15.6 (5/32)    | 29.0 (27/93)   |
| Sick leave during the past 12 months because of hand eczema, % (no.) | 4.9 (3/61)       | 15.6 (5/32)    | 8.6 (8/93)     |
| Hand eczema duration (years), mean (SD)                              | 12.4 (12.2)      | 8.1 (7.3)      | 10.9 (10.9)    |
| Previous patch tests, % (no.)*                                       | 90.1 (55/61)     | 65.6 (21/32)   | 81.7 (76/93)   |
| Concomitant medication for other diagnosis, % (no.)                  | 27.9 (17/61)     | 31.2 (10/32)   | 29.0 (27/93)   |
| DLQI total, mean (SD)                                                | 7.5 (6.3)        | 6.2 (5.2)      | 7.1 (6.0)      |
| EQ <sub>VAS</sub> , mean (SD)                                        | 69.4 (23.8)      | 75.2 (15.6)    | 71.4 (21.3)    |
|                                                                      | n = 56           | n = 31         | n = 87         |
| EQ <sub>index</sub> , mean (SD)                                      | 0.70 (0.32)      | 0.82 (0.22)    | 0.74 (0.29)    |
|                                                                      | n = 58           | n = 31         | n = 89         |
| HEES, mean (SD)                                                      | 18.3 (15.5)      | 14.2 (14.2)    | 16.8 (15.0)    |

EQ<sub>index</sub>, an index based on the five questions in EQ-5D matched with weights extracted from different populations; EQ<sub>VAS</sub>, outcome of the visual analog scale (VAS) included in EQ-5D; SD, standard deviation.

Patients from Eskilstuna and Örebro were pooled together.

\* $p < 0.05$  for comparison between females and males.

**Table 2.** The responses to EQ-5D presented for each question

|                  | Category |       |     |       |     |       |     |       |     |       |
|------------------|----------|-------|-----|-------|-----|-------|-----|-------|-----|-------|
|                  | EQ1      | %     | EQ2 | %     | EQ3 | %     | EQ4 | %     | EQ5 | %     |
| Females (n = 58) |          |       |     |       |     |       |     |       |     |       |
| 1                | 49       | 84.48 | 52  | 89.66 | 39  | 67.24 | 8   | 13.79 | 31  | 53.45 |
| 2 + 3            | 9        | 15.52 | 6   | 10.34 | 19  | 32.76 | 50  | 86.11 | 27  | 46.55 |
| Males (n = 31)   |          |       |     |       |     |       |     |       |     |       |
| 1                | 30       | 96.77 | 30  | 96.77 | 25  | 80.65 | 8   | 25.81 | 20  | 64.52 |
| 2 + 3            | 1        | 3.23  | 1   | 3.33  | 6   | 19.35 | 23  | 74.19 | 11  | 35.48 |
| Total (n = 89)   |          |       |     |       |     |       |     |       |     |       |
| 1                | 79       | 88.76 | 82  | 92.13 | 64  | 71.91 | 16  | 17.98 | 51  | 57.30 |
| 2 + 3            | 10       | 11.24 | 7   | 7.87  | 25  | 28.09 | 73  | 82.02 | 38  | 42.7  |

Alternatives 2 and 3 were added together to dichotomize the result. Data were missing for 4 persons.

Categories: 1 = no problems; 2 = some problems; 3 = extreme problems.

The five questions (dimensions) included in EQ-5D (the so-called descriptive part of EQ-5D): EQ1 = mobility; EQ2 = self-care; EQ3 = usual activities; EQ4 = pain/discomfort; EQ5 = anxiety/depression.

**Table 3.** Correlations between the Hand Eczema Extent Score (HEES), the Dermatology Life Quality Index (DLQI), the EQ<sub>index</sub>, and the EQ<sub>VAS</sub>

|                     | DLQI | EQ <sub>VAS</sub> | EQ <sub>index</sub> | HEES  |
|---------------------|------|-------------------|---------------------|-------|
| DLQI                | 1    | −0.62             | −0.67               | 0.31  |
| EQ <sub>VAS</sub>   | –    | 1                 | 0.67                | −0.27 |
| EQ <sub>index</sub> | –    | –                 | 1                   | −0.32 |
| HEES                | –    | –                 | –                   | 1     |

$p < 0.05$  in italics.

that were not found in the present clinical study. Other diseases, especially skin diseases, as confounders in the analysis of HRQoL have been studied only to a minor extent. Lundberg et al. (36) showed that patients with psoriatic arthritis scored lower in SF-36 than those

without. In a more extensive analysis of the data in Bingefors 2011 (20), we have seen that persons with hand eczema obtain better scores if other self-reported skin diseases are used as confounders in the analysis.

Self-reported HRQoL is useful and often easy to record, especially if a disease-specific instrument is used. However, it is advisable to combine it with a measure of the disease severity (13). Today, there are several methods available to record disease severity; however, none is universal (26). Most methods combine an evaluation of the skin area involved and a grading of the inflammation. It has been suggested that a simple method for registration of hand eczema extent should be used in hand eczema studies (37). With the HEES, only the extent of skin signs is recorded, and it can be used both in the clinic and by respondents in a study. Spearman rank correlation

showed a correlation between the DLQI and the HEES, with  $r = 0.31$ , and weaker correlation for the EQ<sub>VAS</sub> and the EQ<sub>index</sub> (Table 3). It is tempting to speculate that the HEES could be used to evaluate both extent and severity of hand eczema if used in combination with an HRQoL instrument. The DLQI, EQ-5D and the HEES can be considered as snapshots of the patient's life (the current situation). There might be factors that vary over time, such as the influence of hand eczema flare frequency, that are not directly measured with these instruments.

In conclusion, we found that both the DLQI and EQ-5D detected decreases in self-reported HRQoL in hand eczema patients. In hand eczema patients, we could

not link factors (questions) in the DLQI to EQ-5D with factor analysis, which has previously been done for the DLQI and SF-36. This is a problem that merits further, more extensive studies. Our findings with the HEES are interesting, and need to be confirmed in studies including more patients with hand eczema and changes over time. It is possible that the HEES could be used as a proxy for hand eczema severity. We cannot, from the findings presented here, recommend EQ-5D over SF-36 if a generic instrument is needed to study hand eczema. However, the DLQI correlates well with the EQ<sub>VAS</sub> and the EQ<sub>index</sub>, and can probably be used as an approximation for EQ-5D.

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