Clinical assessment of the severity of chronic hand eczema: correlations between six assessment methods

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ABSTRACT

Objective. The severity of hand eczema (HE) can be assessed via numerous methods, however, a standard method remains lacking. Furthermore, correlations between the various methods are not known. The purpose of the study was to evaluate the correlations between six different methods used for assessing the severity of chronic HE. *Method.* The study included 100 patients with chronic HE. The severity of HE was assessed using the Hand Eczema Severity Index (HECSI), Physician Global Assessment (PGA), Dermatology Life Quality Index (DLQI), Photographic Guide (PG), Osnabrueck Hand Eczema Severity Index (OHSI), and Investigators' Global Assessment (IGA). Furthermore, correlations between the 6 methods were determined. *Result.* There was a strong correlation between HECSI, and OHSI, mTLSS, PG, and IGA, and between IGA, and PG and OHSI ($P < 0.001$). There was a moderate correlation between DLQI and PGA ($P < 0.001$), whereas correlations between DLQI and the other scales were weak. The females had lower quality of life, although gender was not associated with disease severity according to the other scales. *Conclusion.* Overall, the six methods used for assessing the severity of HE were significantly positively correlated. Females had lower quality of life, but the severity of HE assessed via the other five scales did not vary according to gender. The weakest correlation was between DLQI and all other scales.

Introduction

Hand eczema (HE) is among the most common dermatological disorders. The severity of HE varies from mild disease to severe disease that causes significant disability [1]. Assessment of the severity of HE via objective and reproducible methods is essential for evaluating preventative and therapeutic strategies. Numerous methods of assessing the severity of HE-including subjective and quantitative scoring systems-have been developed, but a standard method remains lacking [2]. Furthermore, correlations between

the various methods of assessing the severity of HE have yet to be clarified.

The aim of the present study was to evaluate the correlations between 6 HE severity measurement scales in a group of patients with chronic HE: the Hand Eczema Severity Index (HECSI), Physician Global Assessment (PGA)-Modified Total Lesion Symptom Score (mTLSS), Dermatology Life Quality Index (DLQI), Photographic Guide (PG),Osnabrueck Hand Eczema Severity Index (OHSI), and Investigators' Global Assessment (IGA).

Materials and Methods
The study included 100 patients with chronic HE. Chronic HE was diagnosed according to Apfelbacher et al.[3], as follows:
• Disease duration ≥ 3 months or ≥ 3 flare-ups during the previous 12 months.
• Pretreatment with topical steroids.
• No long-lasting healing in response to adequate topical treatment, including corticosteroids.
• No other active skin diseases or acute skin infections.
Exclusion criteria were as follows:
• Age < 18 years.
• Any systemic disease likely to affect hand findings.
• Treatment with phototherapy, X-ray radiation, or systemic corticosteroids, retinoids, or immunosuppressant drugs during the previous 4 weeks.
• Clear or almost clear HE.
Demographic data, disease duration, and nail involvement were evaluated. The severity of HE in each patient was assessed via HECSI, PGA-mTLSS, PG, OHSI, and IGA. Furthermore, quality of life data were obtained using DLQI. Correlations between these six scoring systems were evaluated.

HECSI is a validated scoring system designed for clinical assessment of HE that is based on both the extent and intensity of clinical signs [4]. The hand is divided into five areas (fingertips, fingers (except the tips), palms, hand dorsa, and wrists. For each area the intensity of six clinical signs (erythema, induration/population, vesicles, fissuring, scaling, and edema) are graded as follows: 0: no skin changes; 1: mild disease; 2: moderate disease; 3: severe disease. In terms of the extent of clinical signs, the total affected area of both hands is given

a score of 0-4 (0: 0%; 1: 1%-25%; 2: 26%-50%; 3: 51%-75%; 4: 76%-100%). The score for the extent at each area is multiplied by the total sum of the intensity of each clinical sign, and the total sum of the scores of each area is the HECSI total score, which varies from 0 to 360 [4].

OHSI is a system for scoring skin changes based on morphological criteria and extension [5]. In total, 6 clinical signs are evaluated: erythema, scaling, papules, vesicles, infiltration, and fissures. Extension is assessed based on the area of the hands affected by ≥ 1 clinical signs A 1/8 scoring system is used for the affected areas in each hand (fully affected palm: 1/8; dorsum: 1/8; each palmar/dorsal aspect of the fingers: 1/8).The affected areas on both hands are combined (if both hands are completely affected the score is 8/8, or 1). Each clinical sign, except fissures, are graded as follows: 0: absent; 1: extension ≥ 1/8. 2: extension between 1/8 and 2/8; 3: extension > 2/8. Fissures are graded as follows: 0: absent; 1: a small flat fissure (≥ 5 mm not hemorrhagic); 2: several small flat or larger (> 5 mm) flat fissures; 3: any deeper (hemorrhagic) fissure. Total sum of the grades for each clinical sign constitutes the OHSI total score, which ranges from 0 to 18 [5].

IGA consists of a 5-level scale: 0. Clear: no signs of HE; 1.Almost clear: just perceptible scaling, and/or erythema; 2. Mild disease: mild scaling and/or mild erythema, and/or mild cracking; 3. Moderate disease: moderate scaling and/or erythema, and/or moderate cracking/fissuring; 4. Severe disease: severe scaling and/or severe erythema, and/or severe cracking/fissuring [6]. Dorsal and palmar surfaces of the hand are evaluated together. In the present study the IGA score was assessed according to the more severely affected hand.

PGA is a 5-level scale: clear, almost clear, mild disease, moderate disease, and severe disease [7]. Each level is described according to the severity of six clinical signs (erythema, scaling, hyperkeratosis/lichenification, vesiculation, edema, and fissures, and such subjective symptoms as pruritus/pain) and a percentage of the handsurface involved. The severity of each sign or symptom is evaluated according to the modified Total Lesion Symptom Score (mTLSS), ranging from 0 (absent) to 3 (severe) [7].

DLQI is a 10-item questionnaire designed for use in dermatological patients aged >18 years [8, 9]. DLQI takes into account 6 aspects of daily life during the previous week: symptoms and feelings; daily activities; leisure; work and school; personal relationships; treatment. Each item is scored from 0 to 3 and the sum of the items is the DLQI total score, which ranges from 0 (no impairment of quality of life) to 30 (maximum impairment) [8]. Hongbo et al. classified DLQI scores, as follows: 0-1: no effect on patient's life; 2-5: small effect on patient's life; 6-10: moderate effect on patient's life; 11-20: large effect on patient's life; 21-30: very large effect on patient's life [10].

Recently, Conreeds et al. constructed a validated clinical photographic guide (PG) for assessing the severity of HE [11]. This guide evaluates the severity of HE according to the clinical findings in 5 categories: clear, almost clear, moderately severe, severe, and very severe.

Patients with history of chronic HE, but without evident current clinical findings of HE (fitting clear or almost clear based on PGA-mTLSS, PG, and IGA) were excluded from the study. All patients were informed and provided written informed consent, and the study protocol was approved by the Regional Ethics Committee.

Statistical methods

Statistical analysis was performed using SPSS v.18.0 for Windows (SPSS, Inc., Chicago, IL, USA). Continuous variables are presented as mean ± standard deviation (SD) or median (range); categorical variables are presented as percentage. For normally distributed variables between-group differences were determined via the independent samples t-test, whereas the Mann-Whitney U test was used for variables that were not normally distributed. The chi-square test was used to identify associations between categorical variables. The correlation between different groups was evaluated using Spearman's correlation coefficient. Statistical significance was considered as $P = 0.05$. Spearman's correlation coefficients were grouped as follows: < 0.3: weak correlation; 0.3-0.7: moderate correlation; > 0.7: strong correlation.

Results

Among the 100 patients, 62 (62%) were female and 38 (38%) were male. Mean age of the patients was 37.1 ± 15.2 years (range: 18-78 years; median: 32 years) and median disease duration was 24 months. Mean age of the female and male patients was 33.9 ± 12.9 and 42.1 ± 17.5, respectively, and median disease duration was similar in the male and female patients ($P = 0.554$). Nail involvement was observed in 9 (9%) patients.

According to PGA, 11 (11%), 40 (40%), and 49 (49%) patients had mild, moderate, and severe HE, respectively. Mean PGA-mTLSS score in females and males was similar (6.4 ± 2 and 7.3 ± 3.2, respectively, $P = 0.12$). According to PG, 30 (30%) patients had mild HE, whereas 47 (47%) and 23 (23%) had moderate and severe HE, respectively. According to IGA, 37 (37%), 44 (44%), and 19 (19%) patients had mild, moderate, and severe HE, respectively. Disease severity assessed via PGA-mTLSS, IGA, and PG did not differ according to gender ($P = 0.867$, $P = 0.891$, and $P = 0.25$, respectively).

Median HECSI score was 27.5 (28 in females vs. 24 in males, $P = 0.418$) and HECSI score was not associated with age ($P = 0.083$), disease duration ($P = 0.611$), gender ($P = 0.868$), or nail involvement ($P = 0.165$). Median OHSI score in the females and males was 6 ($P = 0.793$). OHSI score was not correlated with age ($P = 0.177$), disease duration ($P = 0.436$), gender ($P = 0.941$), or nail involvement ($P = 0.727$). Median DLQI score was 7. DLQI score was not correlated with age ($P = 0.586$), disease duration ($P = 0.110$), or nail involvement ($P = 0.919$). A weak correlation was noted between DLQI score and gender (rs = 0.212, $P = 0.034$). Mean DLQI score in females was 8.1 ± 6.0, versus 5.8 ± 4.5 in males ($P = 0.034$).

The strongest correlation was between HECSI and OHSI (rs = 0.842, $P < 0.001$), followed by IGA and PG (rs = 0.819, $P < 0.001$), and HECSI and PGA-mTLSS (rs = 0.812, $P < 0.001$). Furthermore, there was a strong correlation between OHSI and IGA (rs = 0.749, $P < 0.001$), between HECSI and PG (rs = 0.736, $P < 0.001$), and between HECSI and IGA (rs = 0.724, $P < 0.001$). There was a moderately strong correlation between DLQI and PGA (rs = 0.372, $P < 0.001$), between PGA-mTLSS and PG (rs = 0.554, $P < 0.001$), between OHSI and PG (rs = 0.653, $P < 0.001$), between OHSI and PGA-mTLSS (rs = 0.690, $P < 0.001$), and between

IGA and PGA-mTLSS (rs = 0.632, P < 0.001). Furthermore, there was a weak correlation between DLQI and HECSI (rs = 0.284, P = 0.004), between DLQI and PG (rs = 0.197, P = 0.05), between DLQI and IGA (rs = 0.294, P = 0.003), and between DLQI and OHSI (rs = 0.252, P = 0.011). Correlations between the six assessment methods are shown in the Table 1.

Table 1. Correlations between the six assessment methods

Methods	rs	P-value
HECSI-OHSI	0.842	< 0.001
IGA-PG	0.819	< 0.001
HECSI-PGA	0.812	< 0.001
OHSI-IGA	0.749	< 0.001
HECSI-PG	0.736	< 0.001
HECSI-IGA	0.724	< 0.001
DLQI-PGA	0.372	< 0.001
PGA-PG	0.554	< 0.001
OHSI-PG	0.653	< 0.001
OHSI-PGA	0.690	< 0.001
IGA-PGA	0.632	< 0.001
DLQI-HECSI	0.284	0.004
DLQI-PG	0.197	0.05
DLQI-IGA	0.294	0.003
DLQI-OHSI	0.252	0.011

DLQI: dermatology life quality index, HECSI: hand eczema severity index, IGA: investigators' global assessment, OHSI: osnabrueck hand eczema severity index, PG: photographic guide, PGA: physician global assessment, rs: spearman's rank correlation coefficient

Discussion

In the present study there were more female than male patients (62% vs. 38%), which is consistent with other recent studies (Apfelbacher et al. [3] studied 1163 HE patients [54.6% female vs. 45.4% male], Mollerup et al. [12] studied 294 patients [64.6% female vs. 35.4% male], and Agner et al. [13] studied 416 patients [60.6% female vs. 39.1% male]), but is inconsistent with others that included more male than female patents [14-16]. The incidence of HE may be higher in females due to a greater tendency to seek medical treatment for HE [12].

In the present study mean age of the patients was 37.1 ± 15.2 years (median: 32 years). In a multicenter study that included 416 HE patients median age was 39 years [13]; however, Apfelbacher et al. [3] reported

that mean patient age was 47.0 ± 13.7 years. Differences in patient age between studies may be due to differences in the timing of exposure to various irritants and allergens associated with socioeconomic factors and environmental factors. The female patients were younger than the males in the present study (mean age: 33.9 vs. 42.1), which is in agreement with Charan et al. [9], who reported that majority of the females were aged 40-49 years, versus 50-59 years for the males. Onset of HE may be earlier in females because of earlier exposure to irritants or allergens, which needs to be clarified with further studies.

In the present study there were significant positive correlations between the 6 HE severity assessment methods. The weakest correlation was between DLQI and the other 5 severity scores, which is consistent with Agner et al. [13], who compared HECSI, PGA-mTLSS, PG, and DLQI, and reported that although the 4 methods were correlated, the correlation between DLQI and the 3 other scores was weakest. The differences in these correlation findings might be due to differences in the assessment scales' characteristics. For instance, DLQI is not a HE-specific scale; it takes into account physical, social, and functional impairment because of a skin disease, whereas the other scales are HE specific.

The median DLQI score was 7 in the present study, which indicates that chronic HE had a significant negative effect on patient quality of life, as reported earlier [9, 13]. Furthermore, although quality of life scores were lower in the present study's female patients, disease severity (according to PGA-mTLSS, OHSI, IGA, HECSI, and PG) was similar in the males and females, as previously reported [12, 18, 19]. In contrast, a multicenter study that included 416 HE patients reported that males were more severely affected than females (median HECSI score: 20.5 in males vs. 14.5 in females, P < 0.025), but that there wasn't a significant difference in quality of life according to gender [13]. In both genders HE had a significant negative effect on quality of life (mean DLQI score: 7 for males vs. 8 for females; P = 0.406). The researchers concluded that lower disease severity, but similar quality of life in the female patients indicated that quality of life was more easily affected in females, which also supports the present DQLI findings.

In the present study the severity of HE was not associated with patient age, which is consistent with Charan et.al. [9], but is in contrast to Agner et al. [13], who reported that the severity of HE increased with age. Agner et al. [13] also reported that the negative effect of HE on quality of life did not increase significantly with age, indicating that HE patients might become more tolerant of the disease as they age. In addition there wasn't a significant correlation between age and DLQI score in the present study, which is similar to earlier findings [12, 13, 17, 20].

Published findings on the correlation between HECSI and DLQI are inconsistent. Agner et al. [17] reported that there was a significant positive correlation between HECSI and DLQI (rs = 0.30, P < 0.001), whereas Charan et al. [9] reported that there wasn't a significant correlation between HECSI and DLQI (P = 0.078). In the present study there was a significantly positive, but weak correlation between HECSI and DLQI, as reported by Agner et al [17]. The correlation between OHSI and DLQI has not been studied extensively. In a recent study Boehm et al. [20] reported a strong correlation between DLQI total score and OHSI (r = 0.419, P <0.001), whereas in the present study there was a positive, but weak correlation between DLQI and OHSI.

In conclusion, the present study examined the correlations between 6 HE severity assessment methods in a group of chronic HE patients. There were significant positive correlations between the 6 methods. Age and disease duration were not associated with the severity of chronic HE, according to all 6 methods. Quality of life was more negatively affected by HE in the female patients (based on DLQI scores), although there weren't any differences according to genderbased on the other 5 assessment scales. Among all the correlations, the weakest correlation was between DLQI and the other 5 scales, indicating that a HE-specific version of DLQI is needed. methods in a group of chronic HE patients. There were significant positive correlations between the six methods. Age and disease duration were not associated with the severity of chronic HE, according to all six methods. Quality of life was more negatively affected by HE in the female patients (based on DLQI scores), although there weren't any differences according to genderbased on the other five assessment scales. Among all the correlations, the weakest correlation was between DLQI and the other five scales, indicating that a HE-specific version of DLQI is needed.

References

[1] Cortesi PA, Scalone L, Belisari A, Bonamonte D, Cannavò SP, Cristaudo A, et al. Cost and quality of life in patients with severe chronic hand eczema refractory to standard therapy with topical potent corticosteroids. Contact Dermatitis. 2014;70:158-68.

[2] Weistenhöfer W, Baumeister T, Drexler H, Kütting B. An overview of skin scores used for quantifying hand eczema: a critical update according to the criteria of evidence-based medicine. Br J Dermatol. 2010;162:239-50.

[3] Apfelbacher C, Molin S, Weisshaar E, Bauer A, Elsner P, Mahler V, et al. Characteristics and provision of care in patients with chronic hand eczema: updated data from the CARPE registry. Acta Derm Venereol. 2014;94:163-7.

[4] Held E, Skoet R, Johansen JD, Agner T. The hand eczema severity index (HECSI): a scoring system for clinical assessment of hand eczema. A study of inter- and intraobserver reliability. Br J Dermatol. 2005;152:302-7.

[5] Skudlik C, Dulon M, Pohrt U, Appl KC, John SM, Nienhaus A. Osnabrueck hand eczema severity index--a study of the interobserver reliability of a scoring system assessing skin diseases of the hands. Contact Dermatitis. 2006;55:42-7.

[6] Thaci D, Steinmeyer K, Ebelin ME, Scott G, Kaufmann R. Occlusive treatment of chronic hand dermatitis with pimecrolimus cream 1% results in low systemic exposure, is well tolerated, safe, and effective. An open study. Dermatology. 2003;207:37-42.

[7] Ruzicka T, Lynde CW, Jemec GB, Diepgen T, Berth-Jones J, Coenraads PJ, et al. Efficacy and safety of oral alitretinoin (9-cis retinoic acid) in patients with severe chronic hand eczema refractory to topical corticosteroids: results of a randomized, double-blind, placebo-controlled, multicentre trial. Br J Dermatol. 2008;158:808-17.

[8] Finlay AY, Khan GK. Dermatology Life Quality Index (DLQI): A simple practical measure for routine clinical use. Clin Exp Dermatol. 1994;19:210-6.

[9] Charan UP, Peter CV, Pulimood SA. Impact of hand eczema severity on quality of life. Indian Dermatol Online J. 2013;4:102-5.

[10] Hongbo Y, Thomas CL, Harrison MA, Salek MS, Finlay AY. Translating the science of quality of life into practice: What do dermatology life quality index scores mean? J Invest Dermatol. 2005; 125:659-64.

[11] Coenraads PJ1, Van Der Walle H, Thestrup-Pedersen K, Ruzicka T, Dreno B, De La Loge C,et al. Construction and validation of a photographic guide for assessing severity of chronic hand dermatitis. Br J Dermatol. 2005;152:296-301.

[12] Mollerup A, Veien NK, Johansen JD. An analysis of gender differences in patients with hand eczema - everyday exposures, severity, and consequences. Contact Dermatitis. 2014;71:21-30.

[13] Agner T, Andersen KE, Brandao FM, Bruynzeel DP, Bruze M, Frosch P, et al; EECDRG. Hand eczema severity and quality of life: a cross-sectional, multicentre study of hand eczema patients. Contact Dermatitis. 2008;59:43-7.

[14] Handa S, Kaur I, Gupta T, Jindal R. Hand eczema: Correlation of morphologic patterns, atopy, contact sensitization and disease severity. Indian J Dermatol Venereol Leprol. 2012;78:153-8.

[15] Meding B, Swanbeck G. Epidemiology of different types of hand eczema in an industrial city. Acta Derm Venereol. 1989;69:227-33.

[16] Suman M, Reddy BS. Pattern of contact sensitivity in Indian patients with hand eczema. J Dermatol. 2003;30:649-54.

[17] Agner T, Jungersted JM, Coenraads PJ, Diepgen T. Comparison of four methods for assessment of severity of hand eczema. Contact Dermatitis. 2013;69:107-11.

[18] Wallenhammar LM, Nyfjall M, Lindberg M, Meding B. Health-related quality of life and hand eczema - a comparison of two instruments, including factor analysis. J Invest Dermatol. 2004; 122: 1381-1389.

[19] Bingefors K, Lindberg M, Isacson D. Quality of life, use of topical medications and socio-economic data in hand eczema: a Swedish nationwide survey. Acta Derm Venereol. 2011;91:452-8.

[20] Boehm D, Schmid-Ott G, Finkeldey F, John SM, Dwinger C, Werfel T, et al. Anxiety, depression and impaired health-related quality of life in patients with occupational hand eczema. Contact Dermatitis. 2012;67:184-92.