SHORT COMMUNICATION

Dermatology Life Quality Index as a Prognostic Tool for Predicting Need for Healthcare in Patients with Eczema: A Pilot Study

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Atopic dermatitis (AD) and hand eczema (HE) are chronic relapsing inflammatory skin diseases, which are related to impaired health-related quality of life (HRQoL) (1). Patient-reported outcomes (PROs) are increasingly used in treatment choices (2) and the Dermatology Life Quality Index (DLQI) is recommended for patients with AD by the Harmonising Outcome Measures for Eczema (HOME) group for evaluating the effect of treatments for patients with eczema (3). A change of 4 points was considered to be a minimal clinically important difference (MCID) (4). There is a large body of literature linking DLQI scores with the severity of HE (1, 5, 6). Tauber et al. has demonstrated that DLQI scores are responsive to change at a 3-month follow-up for patients with HE who receive treatment and patient education (7). A previous study by Loden et al. (8) has shown that the DLQI total score is responsive to change in recurrence of HE under treatment with moisturizers. Cvetkovski et al. (9) has also shown that the DLQI instrument has a predictive ability for patients with HE.

The primary aim of this study was to determine whether an increase in DLQI score can predict an eczema flare up and thus a need for treatment escalation/physician appointment. The secondary aim was to explore variations in DLQI over time.

METHODS AND RESULTS

Forty-eight outpatients with AD and/or HE were recruited at the departments of dermatology at Mälar hospital, Eskilstuna, and Örebro university hospital, Örebro, Sweden, with a follow-up rate of 95.8% (46 of 48). The diagnosis of AD and/or HE eczema was established with a combination of a relevant medical history and assessment by a physician.

All patients were examined by a dermatologist at baseline for optimization of AD and/or HE treatment. At baseline, demographic data including age, sex, and previous treatments were collected, HRQoL was assessed with DLQI (10) and the eczema severity was assessed with Investigator's Global Assessment (IGA) (11). Demographic data and DLQI were then collected regularly every 3 months for 18 months, when each patient visited the same doctor to assess IGA.

At the start of the study period, participants were instructed to contact the dermatology clinic for a re-evaluation of treatment if their AD and/or HE worsened. Information regarding treatment was gathered retrospectively at the end of the study from the patients' medical records.

The patient group was dichotomized into DLQI $\geq$6 (moderate-to-severe effect on QoL) and DLQI <6 (no or small effect on QoL).

The statistical analyses used are described in the text. The study was approved by the Regional Ethical Review Board in Uppsala (DNR 2010/235) and each patient signed an informed consent to participate.

Of the 46 patients, 24 (52.2%) had AD and 22 (47.8%) HE, 19 (41.3%) had a DLQI <6 and 27 (58.7%) a DLQI $\geq$6. Three patients from the group with DLQI $\geq$6 at baseline did not complete DLQI at all intervals. Table SI shows baseline characteristics.

At baseline, there was a significant, correlation (Spearman's correlation) between DLQI and IGA, $r_s = 0.729$, $p < 0.0001$. The strength of the association was considered large, Cramer's V=0.653, whereas the association was weak at 18 months, $r_s = -0.119$, $p < 0.444$.

Table I show the number of patients and DLQI total score and median and mean change over time. In the group with DLQI $\geq$6 at baseline, 44.4% had HE. The DLQI total score was statistically significantly different at the different time-points during the follow-up, $\chi^2(6)=33.106$, $p < 0.0001$ (Friedman test). Post-hoc analysis revealed a statistically significant median decrease in total DLQI (median difference 5.0) between baseline and 18 months follow-up. In the patient group with DLQI <6 at baseline, 57.9% had HE. This group did not show a change in DLQI over time.

In the patient group with DLQI $\geq$6 at baseline, Wilcoxon signed-rank test showed a significant median decrease in IGA total score (from 2 to 0), $z=-4.26$, $p < 0.0001$ at 18 months whereas the group with DLQI <6 showed no change, $z= -1.09$, $p = 0.277$.

The study period included DLQI follow-ups every 3 months, giving a total of 6 intervals between 2 DLQI assessments. In total, there were 34 occasions where DLQI increased by 4 points or more between 2 time-points. During the the follow-up periods, the proportion of patients who needed to visit a dermatologist for re-evaluation was: 2nd interval 15.2% (7 of 46); 3rd 9.1% (4 of 44);

Table I. Number of patients and Dermatology Life Quality Index (DLQI) total score change over time for dichotomized DLQI at baseline with no-to-small effect on patient's quality of life (QoL) in one group and moderate-to-severe effect on patient's QoL in the other group

	Baseline	3 months	6 months	9 months	12 months	15 months	18 months	$\chi^2(6)$	*p*-value
No to small effect on QoL, *n*	19	19	19	19	19	19	19	7.368	0.288
Mean (SD)	2.42 (1.74)	3.47 (2.88)	3.26 (3.45)	2.53 (3.27)	2.26 (1.94)	2.58 (3.20)	3.21 (5.26)		
Median	2.00	3.00	2.00	1.00	2.00	1.00	2.00		
Moderate to severe effect on QoL, *n*	27	27	25	24	25	24	25	33.106	0.005
Mean (SD)	13.44 (6.95)	12.67 (6.73)	9.96 (5.98)	9.00 (5.61)	10.60 (6.64)	9.17 (4.82)	7.08 (4.71)		
Median	12.00	12.00	9.00	7.00	10.00	9.00	7.00		

DLQI total score at baseline between 0–5 corresponds to no-to-small effect, and DLQI total between 6–30 corresponds to moderate- to-severe effect on patient's QoL. SD: standard deviation.

4th 2.3% (1 of 43); 5th 18.6% (8 of 43); 6th 2.3% (1 of 43); and 7th 14.0% (6 of 43).

Generalized estimating equation (GEE) (12) was used to assess the effect of increased DLQI by 1 MCID between 2 DQLI assessments on the likelihood that the patient visited the clinic for re-evaluation of treatment. The model was adjusted for age, sex, IGA at baseline, and dichotomized baseline DLQI values to adjust for predefined confounding factors.

The GEE analysis was significant (beta regression coefficient 3.25; 95% CI: 2.20–4.30; $p<0.001$). Patients with increased DLQI by 1 MCID at any interval had a greater odds (OR 25.69; 95% CI: 8.99–73.43; $p<0.001$) of visiting a dermatologist before the next interval. Of the predictor variables in the adjusted model, increasing age was associated with a reduction in the likelihood of receiving intensified treatment OR 0.94; 95% CI: 0.91–0.97; $p<0.001$ (**Table II**).

DISCUSSION

This study revealed that a change in DLQI of ≥4 points (1 MCID) was associated with a visit to a dermatologist for re-evaluation of treatment. It was also found that patients with DLQI ≥6 at baseline achieved an almost complete clearance of eczema according to the physicians' objective measure at final follow-up, but 58.3% of patients still reported an impaired DLQI ≥6.

Despite a strong correlation between patients reported DLQI and the physicians' assessment of eczema severity at study start, there was no such correlation at the end of the study, i.e. the patients reported problems related to eczema, while the physician reported eczema clearance. This is in accordance with previous studies that have shown a disagreement in assessment of disease severity between eczema patients and physician rated scores (13, 14).

The current study supports that there is a need to use an outcome measure (e.g. a HRQoL instrument) to consider the full burden of the disease in patients with eczema. This approach will shift the focus to the burden of the disease as reported by the patient, rather than focusing on its signs (15).

The current study found that the patient group with DLQI <6 at baseline showed no worsening of eczema severity by both patients' and physicians' measures. This retained DLQI over 18 months could be partly ascribed to the baseline dermatologist visit, but could also be the impact of the regular measuring of HRQoL, which by itself, reminded patients of their eczema status.

The small study sample, the fact that there were no standardized criteria for deciding the time until a new doctor visit when calling the clinic, and variations in the physicians' experience must be remembered when analysing the results.

However, the finding that an increase in DLQI is associated with a re-evaluation of treatment indicates that regular measurements of DLQI can be used as a prognostic tool. This finding requires further study.

Table II. Generalized estimating equations model for the association between increased DLQI by one MCID at an interval and need for intensified treatment for the next interval

	OR[a]	95% CI	Beta coeff.	95% CI	Signif.
Increased by one minimal clinically important difference					
Yes	25.69	8.99–73.43	3.25	2.20–4.30	**<0.001**
No	1				
Age	0.94	0.91–0.97	−0.06	−0.09 to −0.03	**<0.001**
Sex					
Women	0.68	0.21–2.14	−0.39	−1.54–0.76	0.506
Men	1				
Investigator's Global Assessment (IGA) at baseline					
Severe	4.57	0.35–59.76	1.52	−1.05 to −4.09	0.247
Moderate	1.50	0.12–18.57	0.41	−2.11–2.92	0.752
Almost clear	1.01	0.10–10.50	0.01	−2.33–2.35	0.994
Clear	1				
Dermatology Life Quality Index (DLQI) at baseline					
DLQI <6	1.564	0.287–8.523	0.447	−1.248–2.143	0.605
DLQI ≥6	1				

[a]Model adjusted for age, sex, IGA at baseline and dichotomized baseline DLQI no-to-small and moderate-to-severe effect on quality of life (QoL).
OR: odds ratio; CI: confidence interval, beta coeff: Beta coefficient; Signif.: significance.
DLQI <6 corresponds to no-to-small effect on patients' QoL. DLQI ≥6 corresponds to moderate-to-extreme effect on patients' QoL.
Significance $p<0.05$ and in bold text.

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