CLINICAL REPORT

The Norwegian Version of the Dermatology Life Quality Index: a Study of Validity and Reliability in Psoriatics

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The aim of this study was to test the Norwegian version of the Dermatology Life Quality Index (DLQI-N) for validity and reliability in psoriatic patients. The DLQI-N was administered to 230 patients with psoriasis who underwent climate therapy on Gran Canaria, with a dermatologist assessing their psoriasis severity using the Psoriasis Area and Severity Index. Factor analyses resulted in a unidimensional pattern, which supports the use of a total DLQI-N score. The internal consistency coefficient of this unidimensional measure was 0.90 (Cronbach's alpha) and the paired inter-item correlations ranged from 0.20 to 0.76 ($p < 0.01$). Questions related to work, sport and sex were the issues most often ticked off as not relevant, and the item related to working/studying was often misunderstood. DLQI-N scores were significantly associated with disease severity, age and sex. We assess DLQI-N as a valid, reliable and clinically useful outcome measure for quality of life in Norwegian patients with psoriasis. *Key words: psoriasis; quality of life.*

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Quality of life (QoL) has become an important outcome variable in healthcare research during the past few decades. Traditionally, medical regimes focus on physical symptom relief as an outcome measure, while studies using QoL instruments tend to reveal other issues that are equally or more important to patients. QoL assessments also establish information about the range of patient-related problems, information that in turn is valuable to both patients and healthcare professionals. Patients may have persistent problems after the termination of treatment and partial or complete healing of symptoms. These problems can be overlooked, and QoL reports in such patients often give unexpected results. QoL can also be a predictor of treatment success and may therefore be of prognostic importance (1).

Increasingly it is being recognized that the patient him/herself is the appropriate source of information on QoL. The effects of illness on QoL differ between patient groups. Studies show that different diseases have specific profiles with regard to their effect on a patient's life (2). Attention must therefore be given to disease-specific measures of QoL that attempt to tap domains that are relevant to people with specific conditions. Psoriasis can have a profound effect on QoL, inducing different kinds of more or less chronically stressful experiences. Consequently, the aim of psoriasis treatment is to minimize the extent and severity of the condition to the point where it no longer substantially disrupts the patient's QoL. Measuring the area of physical disturbance does not therefore provide sufficient information for management of the disease (3).

There is a clear need for valid and reliable QoL measures that can be used in skin diseases such as psoriasis. According to Finlay (4), several dermatology-specific questionnaires have been described: Dermatology Life Quality Index (DLQI) (5), Skindex (6), Dermatology QoL Scales (DQOLS) (7) and Dermatology Specific QoL (DSQL) (8). There are at least two psoriasis-specific questionnaires: The Psoriasis Disability Index (PDI) (9) and the Psoriasis Life Stress Inventory (PLSI) (10). These instruments have been translated into several languages (4). So far, the PDI is the only disease-specific measure that has been validated in Norwegian psoriasis patients (11).

The considerable impact that psoriasis has on all aspects of life is reflected well by general dermatology measures such as the DLQI (5). This questionnaire has been translated into different languages and used in several studies examining QoL in various dermatology patients groups, but never validated in Norwegian patients. Success in using a QoL measure previously developed in another language requires a systematic approach to its translation and validation. Consequently, the aim of the present study was to report on the validity and reliability tests concerning the Norwegian version of the DLQI (DLQI-N) for use with Norwegian psoriatics. The following research questions were asked:

1. Is the feasibility of the DLQI-N acceptable?
2. Does the DLQI-N tap several, conceptually distinct, domains of QoL in dermatological disease or should this instrument – as hypothesized by its inceptors – be applied as a unidimensional measure?

3. Is the scalability (reliability) of DLQI-N satisfactory, as determined by inter-item correlations and Cronbach's alpha?
4. Are DLQI-N scores related to disease severity as expected and are sex and age gradients for DLQI-N parallel to those found for disease severity?

MATERIAL AND METHODS

Subjects

Four-hundred-and-twenty-two adult (> 18 years) patients with psoriasis selected for supervised climate therapy at the Norwegian Health Center on Gran Canaria were invited to participate in a longitudinal study focusing on the effect of climate therapy on QoL and disease severity (12). The patients were recruited by all doctors and from all districts in Norway in the period September 1995 to May 1996, and 230 patients fulfilled the study. Fifty-nine percent were men and the mean age was 48 years (SD 13.4). Patients selected for climate therapy must be capable of taking care of themselves, and those with high psoriasis severity, psoriasis arthritis and with a long distance to travel to treatment centres in Norway were given priority. Patients with known psychosocial problems, physical disability or complicated medical disorder difficult to handle at the Health Center were excluded. The treatment consists of heliotherapy, bathing in the sea, physical and mental stimulation and psoriasis-related education.

Methods

A dermatologist assessed the pretreatment psoriasis severity using the Psoriasis Area and Severity Index (PASI) and the patients were asked to complete the DLQI-N.

The DLQI, a dermatology-specific QoL measure developed by Finlay & Kahn (5), contains 10 questions concerning patient perception of the effect of dermatology problems on aspects such as symptoms and feelings (items 1 and 2), daily activities (items 3 and 4), leisure (items 5 and 6), work or school, personal relationships (items 7–9) and treatment (item 10). Responses are precoded as follows: 0 = not at all, 1 = a little, 2 = a lot, 3 = very much. The questionnaire has been used in several studies, both evaluative and descriptive, to assess QoL in different patient groups (e.g. 13, 14). The total score is calculated by summing the score of each question, with higher scores representing greater impairment of QoL.

The translation procedure was done using the translation–back translation method (15). Two independent English-speaking dermatologists translated the DLQI from English to Norwegian. After assessment of the Norwegian versions, an adjusted version was translated back to English by a person fluent in Norwegian and with English as his mother tongue and without knowledge of DLQI. A dermatologist and inpatients and outpatients with psoriasis from Rikshospitalet University Hospital discussed the questionnaire and adjusted the wording of the questions with respect to comprehensibility. The final version was judged and approved by the author of the instrument (A. Y. Finlay).

PASI is a standardized dermatology assessment tool in which intensity items evaluated by the dermatologist are used (erythema, infiltration, desquammation) ranging from 0 to 4 (0 = absence, 1 = slight, 2 = moderate, 3 = severe, 4 = very severe). The PASI score is calculated for the head, trunk, upper and lower extremity. The sum of the scores of the individual body parts gives a total severity score ranging from 0 to 72 (16). The mean PASI score for this cohort was 11.6 (SD 8.8).

Statistics

The SPSS PC version 9.0 was used to analyse the data. Descriptive analyses were performed to assess the frequency, mean, median, standard deviation and range of the scores (research question 1). A principal component analysis was performed to assess the empirical support of the DLQI in a Norwegian sample of patients (research question 2). Cronbach's alpha and inter-item correlations were used to estimate the internal consistency of the scale (research question 3). In addition, multiple linear regression analysis was used to explore the discriminative power of the DLQI-N (research question 4).

RESULTS

The total mean DLQI score was 1.48 (SD 0.68). The highest DLQI scores (poor QoL) were seen in items such as physical symptoms (item 1), treatment difficulties (item 10) and clothing (item 4) (Table I).

Is the feasibility of the DLQI-N acceptable?

Most "not relevant" responses were found in the work, sports activity and sex difficulty items (Table I). Items 7a and b were computed into one item in the present study because of a high missing rate and misunderstanding in how to tick off the alternatives. Many patients ticked off the responses in 7b despite the instruction not to do so if they answered yes to 7a. However, the other questions seemed to be easy to complete.

Does the DLQI-N tap one overall dimension of disease-specific QoL among psoriasis patients or does the instrument reflect several domain-specific issues of QoL in dermatological disease?

The construct validity of the DLQI-N as a unidimensional instrument was assessed by principal components analyses (i.e. "factor analysis"). If these analyses indicated several dimensions (e.g. one for "work", one for "recreation", etc.), we would consider using the DLQI-N as several separate indexes rather than as a single summary scale. A principal component analysis using the default criterion of an eigenvalue above 1.0 for extraction resulted in a one-factor solution. The scree plot (i.e. the pattern of eigenvalues for the successive dimensions extracted) showed a sharp drop in eigenvalues from the first to the second component, with subsequent components extracting progressively less of the variance. This indicated that a one-dimensional solution is to be preferred (Fig. 1).

The loadings of the DLQI items are given in Table II. All items show high loadings (> 0.40) from the first component. The factor solution explained 53% of the total variance in the 10-item DLQI.

Is the internal consistency of DLQI-N satisfactory?

Using the unidimensional concept, the internal consistency coefficient (Cronbach's alpha) was 0.90. Calculating

Table I. *Descriptive information of the Norwegian version of Dermatology Life Quality Index (DLQI-N)*

DLQI-N items	Frequency of responses (%)					Descriptives (mean, SD)
	Not at all (0)	A little (1)	A lot (2)	Very much (3)	Not rel.*	
1) Itchy, sore, painful or stinging skin	4.3	19.4	44.0	31.0	1.3	2.03 (0.83)
2) Embarrassment	15.9	29.3	37.9	15.9	0.9	1.54 (0.95)
3) Shopping/home	18.5	33.6	25.4	12.1	10.3	1.35 (0.96)
4) Clothes	10.8	20.3	39.7	25.4	3.9	1.83 (0.95)
5) Social activities	17.2	32.3	26.3	15.1	9.1	1.43 (0.98)
6) Sport	23.3	19.0	16.4	15.5	25.9	1.32 (1.12)
7) Working or studying						
a)	64.2	12.5			23.3	
b)	26.7	25.4	11.1		36.6	
(7a + b) new estimates	53.9	25.4	11.2	9.5		0.76 (0.98)
8) Interpersonal problems	23.7	32.8	23.7	11.6	8.2	1.25 (0.98)
9) Sexual difficulties	31.9	20.7	17.7	10.3	19.4	1.08 (1.06)
10) Treatment difficulties	6.9	13.4	39.2	38.3	2.2	2.11 (0.89)
Sum DLQI (mean)						1.48 (0.68)

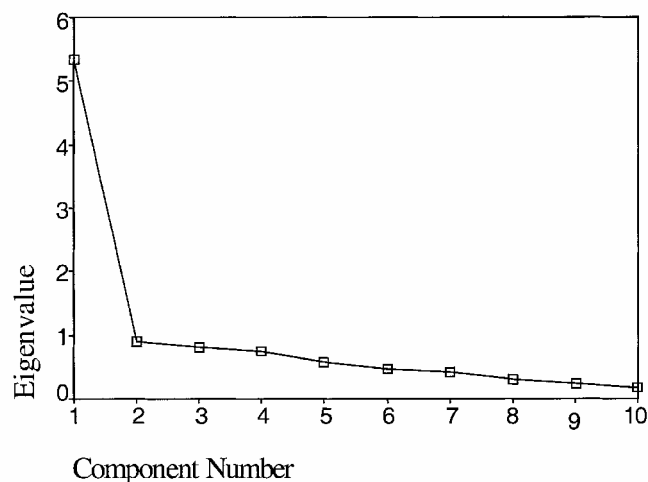*Not rel. = not relevant responses.

Fig. 1. Scree plot of the factor analyses of the Norwegian version of the Dermatological Life Quality Index (DLQI-N).

Table II. *Factor loadings of the Norwegian version of the Dermatology Life Quality Index (DLQI-N) items*

DLQI-N items	Component 1
1) Itchy, sore, painful or stinging skin	0.655
2) Embarrassment	0.759
3) Shopping/home	0.730
4) Clothes	0.786
5) Social activities	0.832
6) Sport	0.753
7) Working or studying	0.408
8) Interpersonal problems	0.804
9) Sexual difficulties	0.758
10) Treatment difficulties	0.735

the correlations between all items tested the internal consistency of the scale. The paired correlation between the items ranged from 0.20 to 0.76 ($p < 0.01$). The highest correlation was found between the social or leisure activities and sport (items 5 and 6). The lowest correlation was found between physical symptoms and working/studying (items 1 and 7).

Are DLQI-N scores related to disease severity, sex and age?

Results from multiple linear regression analyses between disease severity, age and gender and the DLQI show several significant relationships (Table III). Higher levels of disease severity (PASI) are significantly related to poor QoL (total and individual DLQI item score), except for specific QoL aspects such as working (item 7), problems with partner, etc. (item 8) and sexual difficulties (item 9). Furthermore, analyses show that sex is related to QoL. In general, women report significantly less favourable QoL than men, except in items such as sport (item 6), work (item 7), problems with partner, etc. (item 8) and sex difficulties (item 9). With regard to the impact of age, results show that older patients report a worse total QoL, with the exception of sport (item 6), work (item 7), social relations (item 8) and sexual difficulties (item 9).

As seen from Fig. 2, women report more impact on QoL than men do on all levels of disease severity except the highest level of severity. Furthermore, Fig. 2 shows a non-linear relationship between QoL and disease severity for women in contrast to men, where this relationship was linear. For women, the biggest difference in QoL is between those with low and medium low disease severity.

DISCUSSION

In the present case, a British questionnaire was translated and tested for reliability and validity in Norwegian psoriasis patients undergoing climate therapy. DLQI-N was initially judged to be a reasonable measure of QoL

Table III. *Relationships between the Norwegian version of the Dermatology Life Quality Index (DLQI-N), disease severity and demographics by means of standardized regression coefficients (β) predictors*

| DLQI items		Disease severity St.β (p) (higher PASI score = more severity)	Age St.β (p)	Sex St.β (p) (1 = men, 2 = women)
1)	Itchy, sore, painful or stinging skin	0.29 (0.000)	0.18 (0.005)	0.20 (0.001)
2)	Embarrassment	0.18 (0.006)	0.13 (0.041)	0.22 (0.001)
3)	Shopping/home	0.24 (0.000)	0.28 (0.000)	0.14 (0.033)
4)	Clothes	0.25 (0.000)	0.22 (0.001)	0.24 (0.000)
5)	Social activities	0.19 (0.005)	0.18 (0.009)	0.15 (0.026)
6)	Sport	0.36 (0.000)	0.09 (0.239)	0.09 (0.195)
7)	Working or studying	0.12 (0.074)	− 0.12 (0.067)	− 0.10 (0.140)
8)	Interpersonal problems	0.13 (0.067)	0.12 (0.077)	0.03 (0.651)
9)	Sexual difficulties	0.10 (0.182)	0.13 (0.070)	0.03 (0.730)
10)	Treatment difficulties	0.35 (0.000)	0.16 (0.009)	0.14 (0.026)
Total DLQI-N score (higher scores = poorer quality of life)		0.31 (0.000)	0.20 (0.002)	0.16 (0.012)
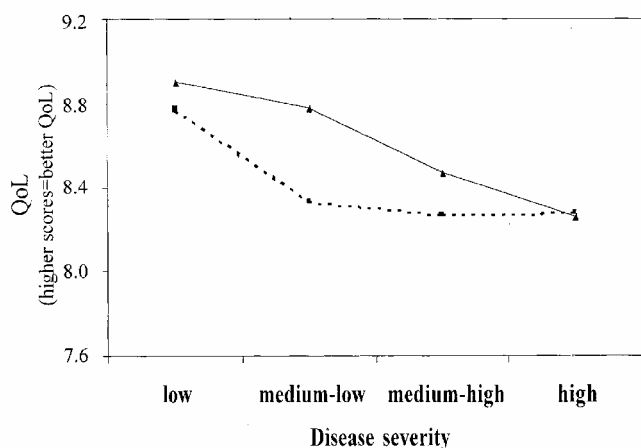
Fig. 2. The relationship between quality of life (QoL) and levels of disease severity by sex. ▪···▪: women; ▲—▲: men.

in psoriasis patients. The content of the DLQI reflects important issues related to living with psoriasis. Despite the general dermatological perspective, each question seems to capture important aspects in the lives of psoriasis patients. These issues are described in the literature and are well known in the clinical setting. One advantage of the DLQI over disease-specific questionnaires such as the PDI is the inclusion of a question about the patient's own experience of physical symptoms. Studies have shown that the experience of the physical body is a central issue in the lives of these patients (17, 18). The measure also meets other criteria regarding enhancement of validity and reliability, such as brevity, clarity, ease of administration and coding.

Descriptive analyses show that several patients ticked off "not relevant" responses in questions such as work, sport and sexual difficulties. Does this mean that these domains are not relevant for QoL in these patients? One could ask if "not relevant" is a suitable response in a highly specified scale such as the DLQI. From a content validity perspective, one would assume that each question should be of relevance in a disease-specific measure.

Patients may choose the "not relevant" response instead of "not at all impact". Furthermore, questions 7a and 7b include other responses than the rest of the questionnaire, and the answer given in 7a determines whether or not the patients should tick off any response in 7b. In the present study, many patients misunderstood this instruction, and a large number did not answer question 7a. It is likely that combining 7a and 7b into one item with response alternatives identical to those for the other items would be an advantage with regard to avoiding misunderstandings and thereby missing values.

From the point of view of construct validity, our factor analytic results yield empirical support for the unidimensional conception advocated by the inceptors of the instrument.

Treating the DLQI-N as a unidimensional measure of QoL in psoriasis patients yields a scale with highly acceptable psychometric properties: inter-item correlations on average are 0.47, which results in a Cronbach's alpha of 0.90 in an instrument with 10 items. Similar results have been found in validating the Danish version of the DLQI, where the paired correlations ranged from 0.30 (items 2 and 6) to 0.69 (items 8 and 9), all statistically significant at a 0.0001 level. The internal consistency coefficient (Cronbach's alpha) was 0.88 (19).

The study showed different patterns of relationships with criteria such as disease severity and demographic variables, which seems intuitively reasonable. The correlation between PASI score and DLQI-N indicates a satisfactory criterion validity. Similar patterns have been found in previous studies. Zachariae et al. (19) found that greater disease severity, being hospitalized, being female, having longer disease duration and being younger were associated with greater impairment of QoL. McKenna & Stern (20) found QoL decreased with increasing age and that women were more likely than men to report impairment in QoL domains. Roenigk & Roenigk (21) showed that women felt their life was more affected than was experienced by men. DLQI-N

has also been sensitive to effects of treatment in the present group of patients, which gives further support to the validity of the instrument. These results are presented in a separate article (12).

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