
The Atopic Dermatitis Quickscore (ADQ): validation of a new parent-administered atopic dermatitis scoring tool

Kirstin Carel, MD*; Donna L. Bratton, MD*; Naomi Miyazawa, PA*; Elizabeth Gyorkos, PA*; Kimberly Kelsay, MD†; Bruce Bender, PhD‡; Matthew Strand, PhD‡; Dan Atkins, MD*; Erwin W. Gelfand, MD*; and Mary D. Klinnert, PhD†

Background: Atopic dermatitis (AD) severity is assessed using relatively elaborate scoring systems administered by health care practitioners; modification for parent assessment or self-assessment is limited. For ongoing home-based evaluation of pediatric AD treatment and outcomes, a quick, easy-to-use, parent-administered scoring tool is essential.

Objective: To evaluate the validity and responsiveness to change of the Atopic Dermatitis Quickscore (ADQ) compared with the established, widely used Scoring Atopic Dermatitis Severity Index (SCORAD).

Methods: The ADQ was developed for parent report and was validated against the SCORAD. The SCORAD assesses percentage of body surface area involved, intensity of a “representative area,” pruritus, and insomnia. The ADQ assesses involvement and pruritus of 7 body parts. Sixty-eight children entering a pediatric day treatment program for moderate to severe AD were recruited. Skin severity was scored at admission by a physician assistant using the SCORAD and by a parent using the ADQ. Pearson correlations of the 2 scales were assessed.

Results: The ADQ total score correlates with the SCORAD total score ($r = 0.64$, $P < .001$). The ADQ pruritus score correlates with the SCORAD pruritus score ($r = 0.62$, $P < .001$). Correlation at the end of treatment was also seen for ADQ and SCORAD total and pruritus scores ($r = 0.39$, $P = .02$, and $r = 0.66$, $P < .001$, respectively). Responsiveness of both scales to change in skin condition was demonstrated, with significant decreases in total and pruritus scores ($P < .001$).

Conclusions: The parent-administered ADQ takes 5 minutes to complete. Scores from the ADQ and the SCORAD are well correlated and are responsive to changes in skin condition, supporting the validity of the ADQ.

Ann Allergy Asthma Immunol. 2008;101:500–507.

INTRODUCTION

Atopic dermatitis (AD) affects 5% to 20% of children, with prevalence depending on geographical location. It is estimated to affect 8.2% of children in the United States.¹ Objective scoring systems are critically important in following patient progress and in clinical research studies of AD as a means to quantify the extent and severity of skin involvement and to evaluate response to therapeutic interventions.

Several AD scoring systems are available. The Scoring Atopic Dermatitis Severity Index (SCORAD), the Eczema Area and Severity Index (EASI), and the Six Area Six Sign Atopic Dermatitis Severity Index (SASSAD) are the most widely used (Table 1).² All these systems require elaborate calculation of body surface area involvement, severity scor-

ing of an “average” or “typical” lesion, or both. Except for a self-administered version of the EASI (SA-EASI) and the Skin Detective, all are intended to be administered by a clinician.^{3,4} A disadvantage to the currently available systems is that few have been thoroughly evaluated for validity or sensitivity to change.⁵

An ideal monitoring tool for patient follow-up during therapy is one that could be performed, in the case of children, by the parent, with a simple, rapid, and objective scoring system. For this purpose, the Atopic Dermatitis Quickscore (ADQ) was developed. The parent is asked for an evaluation of skin severity and pruritus on separate body parts using lay terms. The highest numbers reported for each body part are simply summed, providing a total score. Accuracy and sensitivity to change for the ADQ were compared against the SCORAD, currently the most widely used tool by health care professionals. This is the first study of a simple, parent-administered skin scoring tool and of its performance compared with the most widely used scoring instrument.

METHODS

Study Population

Participants were recruited from the population of patients admitted to a day treatment program for AD at National Jewish Medical and Research Center. Eligible patients were 0

Affiliations: * Division of Pediatric Allergy and Immunology, National Jewish Medical and Research Center, Denver, Colorado; † Division of Pediatric Behavioral Health, National Jewish Medical and Research Center, Denver, Colorado; ‡ Division of Biostatistics, National Jewish Medical and Research Center, Denver, Colorado.

Disclosures: Authors have nothing to disclose.

Funding Sources: This study was supported by the Department of Pediatrics, National Jewish Medical and Research Center, and by the Dr Scholl Foundation.

Received for publication November 28, 2007; Accepted for publication August 13, 2008.

to 12 years old, with a mean (SD) age of 4.6 (3.4) years and a median age of 3.9 years (Table 2). The 68 participants had AD diagnosed clinically based on history and the appearance of erythematous, lichenified, excoriated skin in areas typical for AD. Severity was mild ($n = 2$), moderate ($n = 25$), or severe ($n = 41$). Age, race, and sex details are summarized in Table 2. National Jewish Medical and Research Center provided institutional review board approval, and informed consent was obtained from each participant.

Treatment Program

After patients were initially evaluated by the treatment team, an individualized treatment plan was developed. Typical treatment included a 20-minute bath, immediately followed by application of a topical corticosteroid to eczematous lesions, moisturizers to clear areas, and a wet wrap to the involved areas for 2 hours.⁶ Based on severity, patients may have undergone treatment 1, 2, or 3 times a day. Extensive education about the management of AD was provided. Food allergy evaluation and skin cultures were performed as indicated by each individual's presentation. Thirty-nine percent of the patients were found to have food allergies. Foods playing an allergic role were removed from the diet if clinically indicated based on results of skin prick tests and ImmunoCAP (Phadia, Uppsala, Sweden) and on food challenge if necessary. Antibiotics were prescribed if clinically indicated for skin infection.

Skin Scoring

Each patient's skin was scored by a clinician (N.M. or E.G.) using the SCORAD and by a parent using the ADQ on admission to the program. For the final 36 patients enrolled, on the day of discharge from the treatment program, the skin was reassessed by a clinician using the SCORAD and a parent using the ADQ. This addition to the original plan of study was introduced to evaluate whether the ADQ and the SCORAD would be equally responsive to changes in skin condition with time. Patients remained in the program for a mean (SD) of 7 (3) days.

Skin Evaluation Scales

ADQ. The first portion of the ADQ asks the parent for an evaluation of skin severity on separate body parts using lay terms (Figure 1). These assessments correspond to an ordinal scale (0 = clear, 1 = dry, 2 = scaly, 3 = redness, 4 = cracks or openings, and 5 = oozing). The highest number reported is recorded for each body part: head, neck, trunk, arms, hands, legs, and feet. The highest scores for each body part are summed, for a possible ADQ skin severity score ranging from 0 to 35. The second portion of the ADQ asks for an evaluation of pruritus severity (0 = not at all, 1 = a little bit, 2 = somewhat bothered, 3 = quite bothered, 4 = very bothered, and 5 = extremely bothered/losing sleep) for each of the same body areas. The highest scores for each body part are summed to attain the ADQ pruritus score, with a possible range of 0 to 35. The total of the skin severity and pruritus

scores is the ADQ total score, with a possible total of 70. To ensure accuracy, the ADQ was validated against the SCORAD, currently the most widely used tool in the research setting. Sensitivity to change was evaluated compared with the SCORAD as well. The ADQ has previously been referred to as the *Atopic Dermatitis Questionnaire*.

SCORAD. The SCORAD was administered by 1 of 2 clinicians for all patients on program admission and for a subset of patients at discharge. The calculated total, using the SCORAD formula, which also includes pruritus and sleep disturbance, is the SCORAD total score. The evaluation of overall pruritus asked of the parent, the SCORAD pruritus score, uses a scale from 0 to 10. Interrater reliability of the 2 clinicians' SCORAD ratings (total score) was strong, with interclass correlation of 0.99 (95% confidence interval [CI], 0.96–1.0; $n = 15$).

Data Analysis

Simple linear least squares regression and Pearson correlations were used to evaluate the relationship between SCORAD and ADQ scores. To take into account the different division of body parts in the 2 scales, ADQ scores for the neck, hands, and feet were compared with SCORAD scores for the back of the head, the front of the upper limbs, and the back of the lower limbs, respectively. Bland-Altman plots were constructed for standardized SCORAD and ADQ variables to evaluate agreement between the scoring systems. The 95% CIs (t-distribution) for mean pruritus and total scores were constructed for the SCORAD and the ADQ for admission, discharge, and admission minus discharge scores.

RESULTS

Mean admission scores for total AD severity and pruritus severity, for the SCORAD and the ADQ, are detailed in Table 3. Based on the SCORAD, most patients were in the moderate and severe categories. Individual data points are shown in Figure 2. At program admission, correlation of the ADQ total score with the SCORAD total score was moderately strong ($r = 0.64$, $P < .001$). Correlation of ADQ and SCORAD pruritus scores at admission was also significant ($r = 0.62$, $P < .001$). The least squares regression fits in Figure 2 demonstrate the linear relationships between ADQ and SCORAD variables. To illustrate the regression equation, all the patients in the population of interest who have an ADQ total score of 54 would have a mean predicted SCORAD total score of 53.66 (95% CI, 49.75–57.56). The predicted SCORAD total score for 1 patient in this population with an ADQ total score of 54 would also be 53.66 (95% CI, 26.07–81.24). Owing to the apparent increasing variability in scores about the regression line (Fig 2B), a subsequent regression analysis used a variance-stabilizing transformation. The resulting confidence bands were not dissimilar from those presented (data not shown). The Bland-Altman plot for SCORAD and ADQ total scores is shown in Figure 3; for lower average scores, there was less variability, and the standardized SCORAD

Table 1. Comparison of Clinician-Administered and Patient- or Parent-Administered AD Scales

	Severity	Body parts	Surface area assessment
Clinician-Administered AD Scales			
SCORAD ^{2,5,9}	Assessment of “erythema, excoriation, edema, lichenification, oozing, xerosis” separately at 1 “representative site” (average) on a 0–3 scale.	Based on 1 representative site.	Rule of nines used to assess total body involvement, accounting for natural differences in surface area above and below 2 y of age.
EASI ^{2,5,9,11}	Assessment of “erythema, induration/papulation, excoriation, lichenification” separately on a 0–3 scale for each body site.	Head and neck, upper extremities, trunk, lower extremities.	Extent of surface area involvement scored 0–6 for each body area. Proportional factor differs for above and below age 8 y.
SASSAD ^{2,5,10}	Assessment of “erythema, exudation, excoriation, dryness, cracking, lichenification” separately, from 0–3, at each body site.	Arms, hands, legs, feet, head and neck, trunk.	Uses 6 body parts in scoring.
Patient- or Parent-Administered AD Scales			
SA-EASI ^{3,9}	Assessment of “redness, thickness, scratches, dryness, itchiness” of an “average” AD area for the whole body using a VAS scale.	Head and neck, upper extremities, trunk, lower extremities.	Patient shades silhouette of involved areas. Investigator assigns score (0–6) for the 4 areas based on percentage involvement. Weighted for age by rule of nines.
Skin Detective ⁴	Assessment comparing skin to AD photographs for “dryness, red, knotty swellings or blisters, weeping or scabbed, traces of scratching, and deep creases,” rating from 0–3.	Not divisible with current data available. Not included in the reported study.	Patient shades in silhouette of areas affected.
ADQ	Assessment using an ordinal scale for each of 7 body parts, ranging from “clear, dry, scaly, redness, cracks/opening, to oozing.”	Head, neck, trunk, arms, hands, legs, feet.	Uses more body parts as a surrogate for surface area.

Abbreviations: AD, atopic dermatitis; ADQ, Atopic Dermatitis Quickscore; EASI, Eczema Area and Severity Index; SCORAD, Scoring Atopic Dermatitis Severity Index; SA-EASI, self-administered EASI; SASSAD, Six Area Six Sign Atopic Dermatitis severity index; VAS, visual analog scale.

score tended to be higher than the corresponding ADQ score. The Bland-Altman plot for pruritus scores did not demonstrate differences in variability across average scores (data not shown).

The ADQ skin severity subscores for individual body parts at admission also showed significant correlation with SCORAD body part subscores on admission (Table 3), although comparisons for some areas (neck, hands, and feet) were not directly represented as areas evaluated on the SCORAD (ADQ scores for the neck, hands, and feet were compared with SCORAD scores for the back of head, the front of the upper limbs, and the back of the lower limbs, respectively).

The correlation between the ADQ total score (mean [SD], 14.0 [8.6]) and the SCORAD total score (mean [SD], 14.6 [8.2]) at discharge was significant ($r = 0.39$, $P = .02$). Mean (SD) pruritus scores (ADQ: 5.8 [4.4], and SCORAD: 2.1 [1.6]) were significantly correlated at discharge as well ($r = 0.66$, $P < .001$). Evaluation of the responsiveness of both scoring tools to treatment (reflected in a change in ADQ and SCORAD total and pruritus scores) is shown in Figure 4. All the patients had subjective improvement in appearance and pruritus, and objective scores on the total and pruritus scales improved, with significant decreases between admission and

discharge total and pruritus scores ($P < .001$ for each scale and category). The overlapping 95% CIs for the ADQ and the SCORAD demonstrate that mean scores (after adjusting for scales) were similar across scales and categories for the 2 scoring systems. The changes remained highly significant even when the responses of subgroups (mild, moderate, and severe) were evaluated individually (data not shown).

DISCUSSION

The parent-administered ADQ performed well in this pilot study. The ADQ total score (accounting for skin condition and pruritus) and the ADQ pruritus score correlated moderately, but significantly, with the respective scales of the widely used SCORAD. In contrast to the high correlations expected when comparing physical or laboratory measures, moderate correlations are the norm when assessing the validity of a new symptom report measure in relation to an established instrument,⁷ such as with validation of the SA-EASI.³ The established measure, the SCORAD, is the gold standard in the field, whereas the newly validated ADQ will allow for parental or layperson rating. Given the different educational backgrounds of the 2 groups, a layperson-friendly scoring system has been needed to evaluate AD in

Table 1. Continued

Pruritus and sleep	Calculation	Strengths/weaknesses
VAS of whole body (0–10). VAS of sleep loss (0–10).	Complicated formula; software available to make calculation easier. Total score of 103 possible.	Software program for scoring available on the Internet. Most widely used and tested in trials. Choice of a representative site may vary among observers.
No direct pruritus assessment. A later version (modified EASI) included a VAS. Sleep not assessed.	Formula multiplying sum of the severity scores by the percentage of area covered and the proportional factor depending on age. Total score of 72 possible.	5–9 min to administer (not including scoring). Self-administered version also available.
No direct separate assessment of pruritus or sleep.	Simple addition of each severity score from each body part. Total score of 108 possible.	2–10 min to administer. Correlates well with other assessments of pruritus. Validated against global assessments and quality-of-life measures.
VAS scale for “scratches, itchiness” of an “average” AD area for the whole body. Sleep not assessed.	Complicated formula, using a multiplier for age and body surface area, uses VAS scores to get “acute” and “chronic” scores.	Validated with mEASI scored by a dermatologist. “Acute” is assessed by redness, thickness, itching, and “chronic” is assessed by dryness; this may misclassify some AD.
0–10 rating of itching was assessed but was not included in the reported study. 0–10 rating of sleeplessness.	Severity scores summed by simple addition.	Based on SCORAD. Child administered: aged 7–21 y. Surface area assessment by child did not correlate with clinician assessment (using SCORAD), so not included in the reported study.
Pruritus ordinal scale (none to extremely bothered) for the 7 body areas. Sleep was assessed as part of the pruritus scale.	Highest number for each body part summed for total (severity and pruritus together), possible score of 70.	5 min to score and tally. Parent administered. Validated with the SCORAD in this study. Responsive to treatment.

situations in which contextual concerns (time, distance, staffing, etc) prohibit use of the SCORAD. In addition, the ADQ was as responsive as the SCORAD in reflecting change in AD severity before vs after treatment.

Several health care professional-administered scales are available for evaluation of AD. Table 1 details the most commonly used scales and compares them with the ADQ. The SCORAD, administered by a health care provider, is the most widely tested AD scoring tool in clinical trials.⁵ It is a composite of 6 clinical intensity signs (erythema, excoriation, edema, lichenification, oozing, and xerosis) at a “representative” (or “average”) body site, with an estimate of the percentage of surface involvement using the rule of nines. A visual analog scale (VAS) for pruritus and sleep loss is also used. The composite score is calculated using a complicated formula. Although widely used and well validated, the scale was designed for administration by health care professionals. One criticism is that the SCORAD requires each rater to identify a representative area for the body as a whole. With training, a health care professional can learn to reliably evaluate the surface involvement and intensity of a “representative area” for the whole body, but this task may be difficult for a layperson. The ADQ asks for an evaluation of pruritus

and severity of 7 body parts, which allows an accounting for specific body parts, because a patient could have generalized xerosis but isolated severe involvement in some areas. Thus, compared with the SCORAD, the simplicity of the ADQ lends itself to use by laypersons.

The EASI and the SASSAD are the next most widely used scales.² The EASI uses a complicated formula to account for surface area differences across age groups.⁸ The proportion of particular body parts affected is evaluated. Erythema, induration/papulation, excoriation, and lichenification (difficult for layperson use) are each evaluated for 4 body sites. It has no direct evaluation of pruritus.⁹ The SASSAD has a simpler scoring scheme, directly summing the scores for severity for each of 6 body sites.¹⁰ It does not evaluate pruritus or sleep disturbance individually. To our knowledge, it has not been compared directly with the SCORAD, but it performed well against a quality-of-life measure.¹⁰ In comparison, the ADQ is equally as easy to score as the SASSAD but it also accounts for pruritus, which is a major problem for most patients with AD. Furthermore, the ADQ uses layperson-oriented terminology.

Scales intended to be used by the patient or parent are also available (Table 1). The SA-EASI, based on the EASI, was

Table 2. Characteristics of the 68 Study Participants

Characteristic	Value
Age, y	
Mean (SD)	4.6 (3.4)
Median	3.9
Sex, No. (%)	
Male	38 (56)
Female	30 (44)
Race/ethnicity, No. (%)	
White	26 (38)
Asian	7 (10)
African American	5 (7)
Hispanic	4 (6)
American Indian	2 (3)
Mixed race	3 (4)
Unreported	21 (31)
Severity on admission, No. (%)	
Mild (SCORAD score <15)	2 (3)
Moderate (SCORAD score 15–39)	25 (36)
Severe (SCORAD score ≥40)	41 (60)

Abbreviation: SCORAD, Scoring Atopic Dermatitis Severity Index.

validated against the EASI, with “high” Pearson correlations in the range of 0.6 to 0.62 ($P < .001$) for total acute and chronic scores.³ It is cumbersome to score.³ It uses a silhouette back and front figure for shading body areas with AD.

The investigator assigns a numerical score for the head, upper extremities, trunk, and lower extremities based on the percentage involvement on the silhouette. A multiplier accounts for age and body surface area, and the 4 area subscores are summed. For redness, thickness, dryness, scratches, and itchiness, VASs are used to estimate the severity of an “average” AD lesion for the body. Acute (using the redness, thickness, and itching VASs) and chronic (using the dryness VAS) scores are tabulated by means of a formula that accounts for the area and severity scores.³ However, distinguishing between acute and chronic lesions using these characteristics is difficult because some patients with mild AD have simply dry skin but may not fit a “chronic” category, which usually involves thickness as well. In comparison, the ADQ uses an ordinal scale to better account for the transitions of exacerbating or healing lesions and is easier to score than the SA-EASI.

The Skin Detective tool, reported in one publication,⁴ was based on the SCORAD and was intended for use by children (aged 7–21 years) to evaluate their own eczema. Children were trained to compare their skin to SCORAD illustrations of AD. The investigators reported that the tool was useful for recording the severity of the skin condition but not the degree of spread over the body. Pruritus was evaluated but was not reported in the publication. The Skin Detective was not

Figure 1 – ADQ – Atopic Dermatitis Quickscore *

Please circle the number under the column that describes the skin on each part of your child's body. **Please circle any and all that apply.**

	Clear	Dry	Scaly	Redness	Cracks/ openings	Oozing
Head (face, ears, scalp)	0	1	2	3	4	5
Neck	0	1	2	3	4	5
Trunk (body, not including limbs)	0	1	2	3	4	5
Arms	0	1	2	3	4	5
Hands	0	1	2	3	4	5
Legs	0	1	2	3	4	5
Feet	0	1	2	3	4	5

How itchy has your child's skin been in the following places? **Please circle only one.**

	None at all	A little bit	Somewhat bothered	Quite bothered	Very bothered	Extremely bothered/ losing sleep
Head (face, ears, scalp)	0	1	2	3	4	5
Neck	0	1	2	3	4	5
Trunk (body, not including limbs)	0	1	2	3	4	5
Arms	0	1	2	3	4	5
Hands	0	1	2	3	4	5
Legs	0	1	2	3	4	5
Feet	0	1	2	3	4	5

Figure 1. The Atopic Dermatitis Quickscore (ADQ), previously referred to as the *Atopic Dermatitis Questionnaire* in published abstracts, consists of 2 parts that evaluate skin severity and pruritus on separate body parts using lay terms. Copyright 2007 National Jewish Medical and Research Center.

Table 3. Correlation Between the ADQ and the SCORAD at Admission

	ADQ	SCORAD	Correlation (<i>r</i>)	<i>P</i> value
Admission scores, mean (SD)				
Total	45.4 (13.6)	46.7 (17.7)	0.64	<.001
Pruritus	24.2 (7.9)	7.5 (2.4)	0.62	<.001
Admission body part subscores, mean (SD)				
Head	3.1 (1.4)	36.7 (36.8)	0.42	<.001
Neck	2.5 (1.6)	22.8 (35.6) ^a	0.26	.03
Trunk	2.7 (1.4)	38.4 (35.7)	0.29	.02
Arms	3.6 (1.1)	45.3 (34.9)	0.44	<.001
Hands	3.35 (1.5)	45.3 (34.9) ^b	0.29	.02
Legs	3.4 (1.2)	52.4 (36.4)	0.46	<.001
Feet	3.3 (1.6)	52.4 (36.4) ^c	0.28	.02

Abbreviations: ADQ, Atopic Dermatitis Quickscore; SCORAD, Scoring Atopic Dermatitis Severity Index.

^a Compared with the back of the head score of the SCORAD.

^b Compared with the front of the upper limbs score of the SCORAD.

^c Compared with the back of the lower limbs score of the SCORAD.

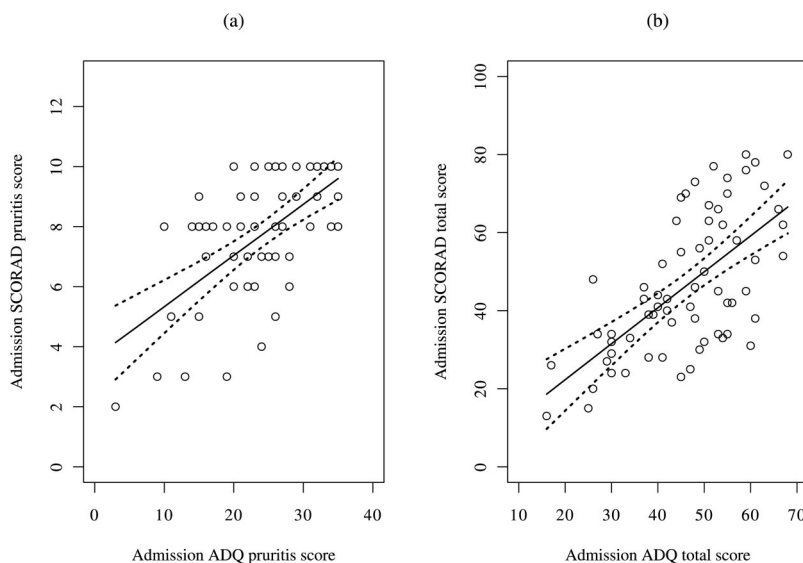


Figure 2. Scatterplots of admission Scoring Atopic Dermatitis Severity Index (SCORAD) pruritus scores vs admission Atopic Dermatitis Quickscore (ADQ) pruritus scores (A) and admission SCORAD total scores vs admission ADQ total scores (B), with least squares regression fits (solid line) and 95% confidence bands for the mean SCORAD score given the ADQ score (dotted lines). The Pearson correlations and fit least squares regression equations are $r = 0.62$ ($P < .001$), predicted SCORAD = $3.86 + 0.162$ ADQ for pruritus scores and $r = 0.64$ ($P < .001$), predicted SCORAD = $3.89 + 0.92$ ADQ for total scores.

evaluated in children younger than 7 years, the age group that accounts for a substantial portion of pediatric AD. The ADQ, designed with patient age in mind, allows the evaluation of younger patients by having the parent score for the child, an advantage given the age distribution of AD.

The ADQ has several advantages that make it a useful tool in clinical and research settings. Obvious advantages in the clinical setting with the ADQ are ease of use by parents and ease of scoring. The use of descriptive terms eliminates the difficulty a layperson may have in categorizing acute vs chronic lesions or in identifying an “average” lesion. The

simplicity and ease of use of the ADQ may facilitate self-evaluation across time by patients. The capacity to self-monitor and produce a meaningful score may also be empowering for patients and thus encourage adherence to skin care regimens. The ADQ could also be useful for patients who must travel long distances to see their physician because it provides a simple objective measure of severity and response to treatment that can be communicated to the physician from a distance. These attributes could provide significant advantages for scaling up or scaling down therapy and effecting better overall outcomes.

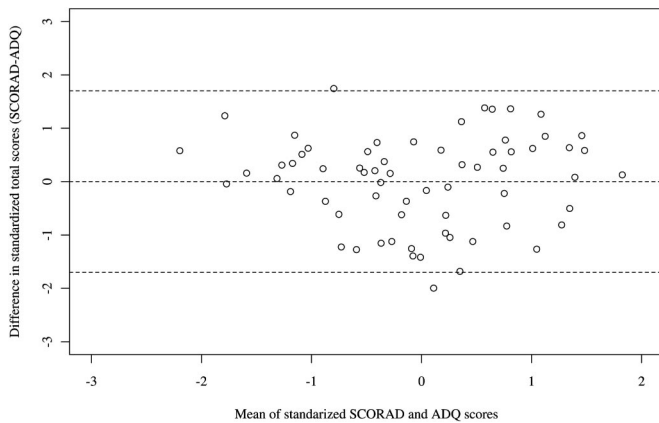


Figure 3. Scatterplot of standardized Scoring Atopic Dermatitis Severity Index (SCORAD) total scores minus standardized Atopic Dermatitis Quickscore (ADQ) total scores vs the mean of the standardized ADQ and SCORAD scores (Bland-Altman plot). The upper, middle, and lower dotted lines represent the mean + 2 SDs, the mean, and the mean - 2 SDs, respectively. The plot illustrates that for lower scores (on the horizontal axis) there was less variability and that the standardized SCORAD score tended to be higher.

Cumulatively, these attributes make the ADQ attractive not only for clinical use but potentially as a research tool as well. The ADQ is responsive in assessing changes in skin condition due to treatment. It performs as well as the SCORAD in this regard and could be used as a complementary self-report tool for research investigations of AD treatments. The ease of use and efficiency (<5 minutes to perform and score) would be advantageous. It provides simplicity and the opportunity to divide the body into several areas in a different manner than

does the SCORAD or the EASI, allowing direct evaluation of the hands, feet, and neck, all typical areas that can be severely affected by AD, particularly in younger children.

One potential criticism of the ADQ is that, similar to any self- or parent-administered scoring tool, it is subject to interobserver variability. Our highly trained observers with years of expertise in eczema care had excellent interobserver correlation using the SCORAD. However, when using the ADQ, it is reasonable to assume that parents' perceptions of severity differ. One child's skin may be scored in a moderate range by one parent but as severe by another adult. However, given the responsiveness of the ADQ to change across time, individuals should be able to detect improvement, even with disparate starting points. Dividing the body into individual parts and scoring each part based on descriptive lay terms for the skin, as the ADQ does, may help counterbalance this natural variability. Further research to evaluate between- and within-rater reliability for the ADQ will be pursued. Similarly, the Bland-Altman plots showed that for lower average scores there was less variability and that the SCORAD score tended to be higher. This may be due to the difference of a trained experienced observer accurately scoring a "representative area" vs a layperson underestimating severity in milder cases.

Further validation against the SCORAD would further establish the ADQ's utility as an at-home parent- or patient-administered tool for objective monitoring of long-term therapeutic interventions. Research to evaluate interobserver and intraobserver reliability is also needed. The tool may be useful for self-scoring among young patients but has not yet been evaluated. Nevertheless, this initial pilot study shows that the ADQ is valid and responsive compared with the

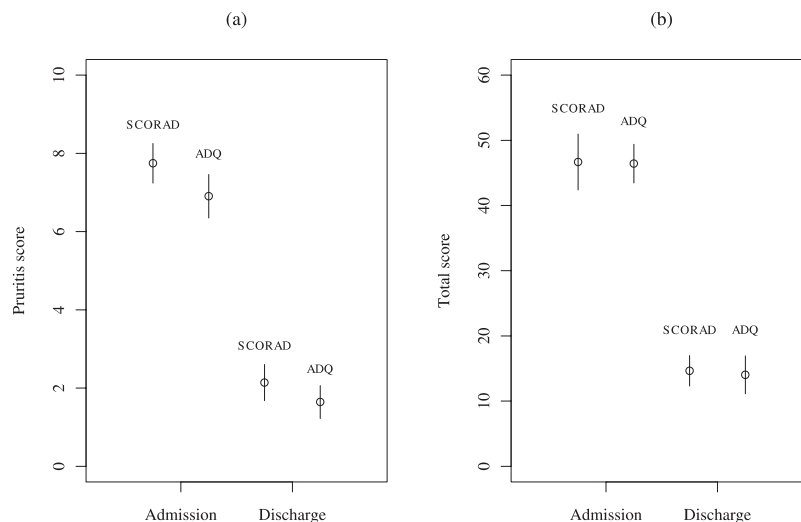


Figure 4. Mean pruritus scores (A) and total scores (B) categorized by time (admission vs discharge) and survey (Scoring Atopic Dermatitis Severity Index [SCORAD] vs Atopic Dermatitis Quickscore [ADQ]). For pruritus scores, ADQ scores were divided by 3.5 to make the range commensurate with the SCORAD range. The 95% confidence intervals for mean differences (admission minus discharge) were 5.1 to 6.4 for SCORAD pruritus scores, 4.1 to 5.6 for ADQ pruritus scores, 28.7 to 37.8 for SCORAD total scores, and 26.9 to 35.0 for ADQ total scores (not shown). Error bars represent 95% confidence intervals.

widely used SCORAD and has the potential to fill the need for a self-report measure of AD for clinical and research use.

ACKNOWLEDGMENTS

We thank Anni Kelley-Day and Sarah Solanyk for help in enrolling and tracking patients; Kayo Walsh and Eric Moody for statistical assistance; and Jane Robinson and Jennifer Moyer-Darr for help in enrolling patients.

REFERENCES

1. Williams H, Robertson C, Stewart A, et al. Worldwide variations in the prevalence and symptoms of atopic eczema in the International Study of Asthma and Allergies in Childhood. *J Allergy Clin Immunol*. 1999;103:125–138.
2. Charman C, Chambers C, Williams H. Measuring atopic dermatitis severity in randomized controlled clinical trials: what exactly are we measuring? *J Invest Dermatol*. 2003;120:932–941.
3. Housman TS, Patel MJ, Camacho F, Feldman SR, Fleischer AB, Balkrishnan R. Use of the Self-Administered Eczema Area and Severity Index by parent caregivers: results of a validation study. *Br J Dermatol*. 2002;147:1192–1198.
4. Lob-Corzilius T, Boer S, Scheewe S, et al. The “Skin Detective Questionnaire”: a survey tool for self-assessment of patients with atopic dermatitis: first results of its application. *Dermatol Psychosom*. 2004;5:141–146.
5. Charman C, Williams H. Outcome measures of disease severity in atopic eczema. *Arch Dermatol*. 2000;136:763–769.
6. Boguniewicz M, Schmid-Grendelmeier P, Leung D. Atopic dermatitis. *J Allergy Clin Immunol*. 2006;118:40–43.
7. Kasdin A. *Research Design in Clinical Psychology*. 4th ed. Boston, MA: Allyn & Bacon; 2003:365–366.
8. Barbier N, Paul C, Luger T, et al. Validation of the Eczema Area and Severity Index for atopic dermatitis in a cohort of 1550 patients from the pimecrolimus cream 1% randomized controlled clinical trials programme. *Br J Dermatol*. 2004;150:96–102.
9. Gelmetti C, Colonna C. The value of SCORAD and beyond: towards a standardized evaluation of severity? *Allergy*. 2004;59(suppl 78):61–65.
10. Charman CR, Venn AJ, Williams HC. Reliability testing of the Six Area, Six Sign Atopic Dermatitis severity score. *Br J Dermatol*. 2002;146:1057–1060.
11. Oranje AP, deWaard-van der Spek FB. Atopic dermatitis: review 2000 to January 2001. *Curr Opin Pediatr*. 2002;14:410–413.

Requests for reprints should be addressed to:
Kirstin Carel, MD
National Jewish Medical and Research Center
1400 Jackson St
Room J325
Denver, CO 80206
E-mail: carelk@njc.org