Published in final edited form as:

J Am Acad Dermatol. 2011 December ; 65(6): 1107–1116. doi:10.1016/j.jaad.2010.10.016.

Quality of life in dermatomyositis

Renato Goreshi, M.D.^{1,2}, Monika Chock, M.D.³, Kristen Foering, B.S.^{1,2}, Rui Feng, Ph. D.⁴, Joyce Okawa, M.S.^{1,2}, Matt Rose, M.S.^{1,2}, David Fiorentino, M.D.³, and Victoria Werth, M.D.^{1,2}

¹Philadelphia VA Medical Center, Philadelphia, PA

²University of Pennsylvania School of Medicine, Philadelphia, PA

³Stanford University, School of Medicine, Stanford, CA

⁴Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania, Philadelphia, PA

Abstract

Background—Quality of life (QoL) for patients with inflammatory skin disease can be significant, but has been evaluated in just one study in dermatomyositis (DM).

Objective—To examine the relationship between the Cutaneous Disease and Activity Severity Index (CDASI), a DM-specific cutaneous severity instrument, and various QoL study instruments and to determine the impact of DM on QoL.

Methods—Skin-specific QoL instruments, the Skindex and the Dermatology Life Quality Index (DLQI), and global medical QoL instruments, the SF-36 and the HAQ-DI, were used. Pruritus was evaluated by a visual analogue scale (VAS) and a 0–10 scale in DM and CLE populations, respectively.

Results—There was a significant correlation between the CDASI and all skin-specific QoL scores (lowest $p=0.0377$). Using the SF-36, DM was found to have significantly worse QoL scores than the general population with the exception of bodily pain (all subscore p values <0.01). Furthermore, DM had a significantly lower vitality score, representing energy level, compared to CLE, HTN, diabetes, and recent MI scores (lowest $p=0.003$). There was a significantly lower mental health score, representing overall mood, to all compared diseases except CLE and clinical depression (p values <0.01 when significant). We found that DM produces more pruritus than CLE ($p < 0.0001$).

Limitations—A larger patient population needs to be studied to further assess QoL in DM patients.

Conclusion—We conclude that DM has a large impact on QoL, even when compared to other diseases, and that DM skin disease activity correlates with a poorer QoL.

Corresponding Author: Dr. Victoria P. Werth, Department of Dermatology, Perelman Center for Advanced Medicine, Suite 1-330A, 3400 Civic Center Boulevard, Philadelphia, PA 19104, Tel. 215-823-4208, Fax 866-755-0625, werth@mail.med.upenn.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Conflicts of Interest: Honoraria from Amgen, Centocor, Chemocentryx, and MedImmune (Fiorentino), grants from Centocor, Abbott labs, Amgen (Fiorentino), and a filed patent (U.S. Patent Application Serial Number 12/694,980 for: "Profiling for Determination of Response to Treatment for Inflammatory Disease", filed on 1/27/2010)(Fiorentino) is also being disclosed.

Prior Presentation: An poster and abstract of this study, with a smaller number of study subjects, was accepted to the Society of Investigative Dermatology Annual Meeting in May 2010 and published in the *Journal of Investigative Dermatology* Volume 130 Supplement 1 April 2010 pg S54, respectively.

Keywords

dermatomyositis; quality of life; connective tissue disease; autoimmune disease; pruritus; itch; cutaneous lupus; clinical research

Background

Dermatomyositis (DM) belongs to a group of diseases called idiopathic inflammatory myopathies¹. Patients with amyopathic and hypomyopathic dermatomyositis demonstrate absent or clinically insignificant muscle findings². Recently, a tool called the Cutaneous Dermatomyositis Area and Severity Index (CDASI) was validated as a useful means to measure cutaneous findings in dermatomyositis quantitatively^{3, 4}.

Cutaneous autoimmune diseases have a negative impact on quality of life (QoL)⁵⁻⁶⁻⁸. Up to now, there has been only one published report on the impact of DM on a patient's QoL⁹. Now that new skin evaluation instruments and comparable data between DM and other diseases are available, studies on QoL in DM can be introduced into the literature.

Recently we performed a prospective study on a cohort of DM patients with skin involvement using the CDASI to elucidate the impact of the disease on their QoL and to demonstrate the need for more effective therapies that may include the use of off-label medications when standard less expensive options are ineffective. A substantial percentage of DM patients have psychiatric disease, especially depression and anxiety, compared to the normal population, the prevalence ranging from approximately 20–40% of DM patients, compared to 11–30% of normal persons, respectively¹⁰⁻¹⁷. Only one study has examined patients with cutaneous DM using a 5-point Physician's Global Assessment and skin-specific QoL measures⁹. No studies on DM have been performed using global health QoL measures. DM is a systemic disease, and thus it is important to study its effects on QoL using global medical QoL measures in addition to dermatologic QoL measures.

Comparing the QoL in DM relative to other dermatologic and non-dermatologic diseases is important in order to evaluate more completely its impact on QoL. Our previous work with a large cohort of cutaneous lupus patients showed that lupus patients have a significantly lower QoL than patients with common skin diseases such as non-melanoma skin cancer, acne, and alopecia⁵. Cutaneous lupus erythematosus had a greater effect on QoL relative to non-dermatologic diseases such as hypertension, type II diabetes mellitus, congestive heart failure, and recent myocardial infarction. There was no significant difference between lupus and DM using the Skindex-29 in a DM group⁵. Further research into comparisons of QoL between patients with DM and patients with cutaneous lupus is needed.

Our study examined the importance of clinical signs or symptoms in DM relative to cutaneous lupus to aid in assessing therapeutic efficacy. Pruritus, for example, is a common symptom experienced by many DM patients¹⁸. While it has been suggested that pruritus can be used as a distinguishing marker between DM and cutaneous lupus, it is also a prevalent symptom in both juvenile and adult DM. There have not been any studies showing a difference between the pruritus experienced by patients with DM and patients with cutaneous lupus patients¹⁹⁻²¹.

Methods

Patient Population

All patients with clinical or pathologic evidence of DM seen at the Hospital of the University of Pennsylvania and Stanford University dermatology clinics were invited to participate in the study regardless of whether or not they were currently undergoing treatment. 55 patients from the University of Pennsylvania and 65 patients from Stanford University were enrolled in the study. Of the 42 patients from the University of Pennsylvania who were able to participate in a study visit, 42 patients had their skin assessed by the CDASI, 42 completed the DLQI, 41 completed the Skindex 29+3, 40 completed the Pain VAS, 40 completed the Itch VAS, 40 completed the Patient Global Assessment, 42 completed the SF-36, and 39 patients completed the HAQ. Of the 42 patients from the University of Pennsylvania, 8 patients were male, 34 patients were female, 14 had classic DM with active muscle involvement, and 28 had no active muscle involvement. Of the 55 patients from Stanford University who were able to participate in a study visit, 55 had their skin assessed by the CDASI, 50 patients completed the HAQ, 50 patients completed the DLQI, 50 patients completed the Pain VAS, 49 patients completed the Itch VAS, and 7 patients completed the SF-36 fully (10 patients completed all but the Role-Emotional aspect of the SF-36). The differences in the number of completed questionnaires are due to non-completion of the study questionnaires by error by the study subjects. The large discrepancy in Stanford's population completing the SF-36 is due to their later introduction of the SF-36 into the study documents for their subjects. There was no selection bias to which patients ultimately completed or did not complete the questionnaires. Of the 55 patients from Stanford University, 15 were male and 40 were female. The subtype of DM was not recorded in the Stanford population at the time of the research visit.

194 patients seen at the Hospital of the University of Pennsylvania dermatology clinic with clinical and/or pathological evidence of lupus were invited to participate in the study. Of these, 123 patients had CLE without systemic involvement and 71 patients had SLE with cutaneous disease. 178 of the 194 patients with lupus completed the Skindex 29. 161 and 162 patients completed the pruritus and pain assessment scales, respectively. Of the 123 CLE patients, 112 patients completed the SF-36 and 65 of the 71 SLE patients completed the SF-36. The study was approved by the institutional review board (IRB). All patients were age 18 or above and were enrolled after signing IRB-approved informed consent and Health Insurance Portability and Accountability Act (HIPAA) forms.

Study Instruments

A number of study instruments were completed at the same visit. To assess QoL among DM patients, two skin-specific QoL measures, the Skindex-29+3 and the Dermatology Life Quality Index (DLQI), and two global health QoL measures, the Short Form 36 (SF-36) and the Health Assessment Questionnaire-Disability Index (HAQ-DI), were completed by patients. Additionally, patients answered questions regarding their demographics and disease history. To assess disease severity, the physician completed the CDASI and physician global assessment measures.

Skindex-29+3

The Skindex-29 is a validated skin-specific measure of QoL^{22–243}, 25. Each question has 5 choices, scored as 100, 75, 50, 25, or 0. Scoring is categorized to different subscales. These include functioning, symptoms, emotions, and photosensitivity. Three questions were added to represent DM-specific effects: namely two questions for photosensitivity and one question for alopecia. The maximum score in each category is 100, indicating maximum disability.

Dermatology Life Quality Index (DLQI)

The DLQI was the first validated dermatologic QoL study instrument to be described^{8,26}. It measures the effect of dermatologic disease on QOL and consists of 10 questions, each of which can be answered by marking one of four choices. These are scored from 0–3, with a maximum total score of 30, indicating maximum disability. The DLQI has been previously shown to be reliable and valid^{8, 26}.

SF-36

The SF-36 is a global medical QOL study instrument that previously has been shown to be reliable and valid^{27, 28}. The instrument consists of 36 items answered by marking from 2–6 options. Scoring ranges from 0–100, with zero indicating maximum disability. Scores are categorized to the following: physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH) (See Table 1). The first four scores can be summed to create the physical composite score (PCS), while the last four can be summed to create the mental composite score (MCS). The SF-36 was used to compare QoL with DM to lupus, congestive heart failure (CHF), recent myocardial infarction (MI), depression, and hypertension (HTN) using the SF-36 Health Survey and values obtained from our previous work, except for SLE and CLE values, which were obtained during this study²⁹.

Health Assessment Questionnaire – Disability Index (HAQ-DI)

The HAQ-DI is a global medical study instrument found to be reliable and valid^{30–32}. The combined responses to questions indicating the difficulty in performing 20 different instrumental activities assess the level of disability of the patient. Each is scored from 0–3, with 3 representing maximum disability. The HAQ-DI consists of 24 questions which assess eight instrumental activities: (1) Dressing and Grooming, (2) Arising, (3) Eating, (4) Walking, (5) Hygiene, (6) Reach, (7) Grip, and (8) Activities.

Skin Severity

The CDASI, a validated disease severity score, was used to determine the severity of cutaneous disease. Total scores range from 0–132, which are divided into (1) Activity and (2) Damage, with scores ranging from 0–100 and 0–32, respectively.

Pruritus and Pain

Pruritus and pain were measured using a visual analogue scale (VAS). For pruritus, the VAS has been used extensively and has been found to be useful in a clinical research setting^{25, 33, 34}. The VAS has been known to be a ‘gold standard’ for assessing pain^{35–38}. The VAS is a 100 mm horizontal line with one end representing maximum itch or pain and the other expressing no itch or pain. Lupus patients used a 0–10 scale to represent the amount of pruritus and pain with 10 indicating maximum itch or pain and 0 indicating no itch or pain.

Physician's and Patient's Global Assessments

The physician and patients were asked to rate the severity of various aspects and overall disease of DM using a VAS from 0–10, where 10 indicates maximum severity.

Statistical Analysis

Descriptive statistics were obtained for each of the QoL measures for the DM population. Using the Skindex-29, mean DM scores (one score for each of the three subscales) were compared to mean scores of other dermatologic diseases obtained through literature review, our lab results for CLE, or from data obtained from Chren MM^{39–42}. Using the SF-36,

mean DM norm-based scores (one score for each of the eight subscores) were compared to those of seven other diseases and the general population norm-based scores. SLE and CLE data was obtained from our lab while other compared diseases were obtained from a previous paper evaluating QoL in CLE5. Since standard deviations were not available for compared groups other than SLE or CLE, it was assumed that the standard deviation of DM was non-significantly different from other groups (SLE and CLE standard deviations were used since they were available). Skindex 29 and SF-36 means were compared by using a two-tailed t-test at an adjusted significance level of 0.01. Mean HAQ-DI and SF-36 subscores were compared between classic dermatomyositis (CDM) and amyopathic or hypomyopathic dermatomyositis (AHDM) using the Mann-Whitney U test at an adjusted significance level of 0.01. The adjusted significance level was used to minimize experiment-wise error rate. Mean itch, pain, and photosensitivity scores for CLE and DM were compared using the Mann-Whitney U test at a significance level of 0.05. To determine the correlation between disease severity and QoL, CDASI activity scores were correlated with the Skindex-29 and the DLQI, using Pearson's correlation. Since there is no straightforward mean to test the difference between two Spearman's rho, Pearson's correlation was used to determine the correlation between SF-36 subscores and HAQ-DI scores to the Patient Global Assessment-Overall Disease and the Skindex-Emotion. To determine the significance of statistical differences among correlated correlations, we used the Z test⁴³. Non-parametric tests were used due to the non-normality of certain variables.

Results

Overview of QoL in DM

DM was found to have a mean (SD) DLQI score of 7.6 (6.5) and a HAQ-DI score of 0.795 (0.788). Each of the Skindex-29 and SF-36 subscores, pruritus, and pain score will be described below and in corresponding tables. The mean (SD) CDASI activity score in our study population was 19.5 (10.5). All of the outcome measures had a mixed distribution except for the HAQ, which had a positively-skewed distribution.

Skin-specific QoL of DM versus other dermatologic diseases

The Skindex-29 subscores were used to compare DM with 12 other dermatologic diseases and one negative control group (See Table 1). DM had among the highest mean subscores, with the emotional subscore being the most severely affected [mean (SD) = 50.4 (26.1)]. The emotional subscore in DM was significantly higher than in epidermolysis bullosa, pemphigus, CTCL, rosacea, non-melanoma skin cancer/actinic keratoses (NMSC/AK), vitiligo, and the negative control group. DM had the highest emotional subscore among all compared groups with the exception of vulvodynia, which had an approximately equivalent emotional subscore. DM also showed a higher mean symptom subscore than all compared groups except for vulvodynia, epidermolysis bullosa (mixture of various subtypes), and eczema, and had a significantly higher score compared to acne vulgaris, CTCL, NMSC/AK, vitiligo, and normal skin. DM patients were less severely affected in the functional realm with a mean (SD) score of 28.2 (26.6), significantly lower than vulvodynia but significantly higher than NMSC/AK, vitiligo, and normal skin.

Global health QoL of DM versus other diseases

The SF-36 subscores were used to compare DM with seven other diseases and the general population (See Table 2). When compared to the general population, DM was found to have significantly poorer scores in all domains, except for bodily pain. In the physical realm, DM was found to have significantly poorer scores than CLE, type II diabetes, clinical depression, and hypertension, and a significantly better score than SLE either in some or all of the physical domains. DM had the poorest score in physical functioning with a mean (SD) of

39.6 (14.85). In the social/emotional realm, DM had significantly worse score(s) to CHF, recent MI, type II diabetes, and hypertension, though a significantly better score to clinical depression. DM had the poorest score in role-emotional with a mean (SD) of 42.6 (13.71).

Global health QoL between different subtypes of DM

HAQ-DI and SF-36 scores were used to compare classic DM with hypomyopathic/amyopathic DM. Although mean scores in the physical subscores of the SF-36 and the HAQ-DI suggest poorer QoL in the classic DM population, statistical significance was not reached (Table 3).

Pruritus and Pain in DM and CLE

DM was found to have a significantly higher median pruritus score than CLE (DM: 3.80 CLE: 2) ($p<0.0001$) whereas there was no significant difference between median pain scores (DM: 0.7 CLE: 1). Figure 1 gives graphical representations of both findings.

Photosensitivity in DM and CLE

Median scores from the two photosensitivity questions added to the Skindex-29 showed no significant difference between DM and CLE (DM: 62.5 CLE: 62.5) (Figure 2).

Correlations of skin-specific QoL instrument scores

Each of the Skindex-29 subscores significantly correlated with the DLQI scores (Skindex-29 Symptom $r=0.6323$, Skindex-29 Emotion $r=0.6744$, Skindex-29 Function $r=0.8598$; all p values <0.0001), implying that the DLQI and the Skindex-29 measure related constructs. The Skindex-29 scores were also found to correlate with one another (lowest $r=0.5345$, highest $p=0.0003$) (Table 4). Additionally, the correlation between DLQI and Skindex-29 Function scores were significantly higher than the correlation between DLQI and Skindex-29 Emotion scores ($p=0.004$).

Correlation between skin severity and skin-specific QoL instrument scores

All of the Skindex-29 subscores and the DLQI scores significantly correlated with CDASI scores ($r=0.2729$, $p=0.0377$), suggesting that increased cutaneous severity is correlated with a poorer QoL (Table 5).

Correlation between pruritus/skin severity and skin-specific QoL instrument scores

Pruritus scores correlated significantly with Skindex-Symptom, Skindex-Function and DLQI scores ($r=0.6015$ $p=0.001$; $r=0.45520$ $p=0.0036$; $r=0.3477$ $p=0.0009$, respectively), but significance was not attained between pruritus and Skindex-Emotion subscores. The above results implicate that pruritus is associated with a poorer QoL, though it may not significantly affect a patient emotionally (Table 5).

Comparison of SF-36 and HAQ-DI as global health QoL assessment tools in DM

The correlations between each of the physical component SF-36 subscores and the HAQ-DI scores to the overall patient global assessment (PtGA) were determined. Additionally, the correlations between each of the emotional component subscores and the HAQ-DI scores to the Skindex-Emotion score were determined. Overall, the emotional components of the SF-36 correlated better with Skindex-Emotion than the HAQ-DI. The SF subscore of the SF-36 correlated significantly more to the Skindex-Emotion than the HAQ-DI correlated to the Skindex-Emotion. There was no significant difference between the correlations of the physical components of the SF-36 to the PtGA compared and the correlation between the

HAQ-DI and PtGA (See Table 6). The HAQ-DI and all SF-36 subscores, except for RE and MH, were found to have a significant correlation to the overall PGA (Table 6).

Discussion

The above results indicate that DM has a significant impact on QoL even when compared to various other dermatologic and non-dermatologic diseases. Using the Skindex-29, DM was found have a significantly worse impact on the emotional realm of QoL compared to several other diseases. Based on the results of a global health QoL instrument, the SF-36, DM patients were found to have a significantly worse mental health, representing overall mood, than patients representing all of the compared diseases except CLE, SLE, and clinical depression, which all had significantly worse mental health scores than DM. This is an important conclusion for multiple reasons. Firstly, although it well-established that psychiatric co-morbidities are often present in dermatology, it has also been shown that dermatologists frequently do not identify self-reported psychiatric disease patients^{10–14,16,17,44,45}. Furthermore, a study of 1580 psoriasis patients in 39 Italian dermatology centers showed that dermatologists do not tend to modify their clinical approach to include psychosocial interventions for patients when psychological distress is present^{46,47}. This is especially alarming as patients who have suicidal ideations have significantly higher Skindex-29 subscores (subscore means ranging from 44.3 to 49.5) than those who do not have suicidal ideations (subscore means ranging from 18.6 to 32.1)⁴⁸. Consequently, it is important to realize that DM patients may be an under-served population in terms of being evaluated by clinicians for psychological well-being. Secondly, there is increasing evidence in the field of psychoneuroimmunology supporting the role of psychological and social factors influencing the state of disease, particularly in psoriasis, through production of pro-inflammatory cytokines^{46, 49, 50}. Further investigations are needed to assess how psychological and social factors may influence the disease state in the DM population.

Our results also show that there is a significant correlation between cutaneous disease severity and QoL. This is in accordance to a previous study using a 5-point Likert PGA scale⁹. This has also been shown in a variety of other disease states, including acne, pemphigus, psoriasis, cutaneous lupus, and vitiligo^{10, 40–42, 51,5}.

It has been suggested that pruritus may be useful in distinguishing between DM and lupus patients^{9, 19, 21}. We have shown that prevalence of pruritus is significantly higher in DM than in the CLE population and that it correlates significantly with QoL (the latter finding being consistent with a previous study)⁹. Though we have shown that the DM population experiences a significantly higher level of pruritus than the CLE population, further investigation is needed to determine its usefulness in distinguishing between the two diseases.

Though we were not able to achieve statistical significance, which likely was related to our small sample size, the data suggest that classic DM is associated with a worse QoL with respect to physical functioning. Investigations that assess QoL among the DM subtypes could shed light on this result.

By comparing the two skin-specific QoL instruments, we were able to show that the DLQI significantly correlates with each of the Skindex-29 subscores as well as pruritus. Given that the DLQI is a simpler, shorter skin-specific QoL instrument, this finding suggests that the DLQI may be more feasible for clinical use in DM patients where a more comprehensive outcome instrument such as the Skindex-29 is not needed (i.e. where QoL is not a primary outcome variable). It is important to note, however, that the DLQI contains only one question examining purely the emotional impact of skin disease. Given the result that the

DLQI correlates with the Skindex-29 Function significantly better than to the Skindex-29 Emotion, and since we have shown that DM creates a significant emotional impact on patients, study instruments examining emotion more thoroughly may be more informative.

In a paper evaluating QoL instruments in psoriasis, the DLQI was noted to focus mainly on limitation, supporting our conclusion that the DLQI is an inadequate tool in the DM population since we have shown there is a significant emotional impact as well⁵². Comparing the two global health instruments, the SF-36 emotional subscores correlated better to the Skindex-Emotion than the HAQ-DI, suggesting that the SF-36 is a more useful instrument to assess the emotional components of QoL than the HAQ-DI. Since statistical significance was only achieved comparing the SF-36 Social Functioning score and the HAQ-DI, further research with a larger study population is needed to better demonstrate that the SF-36 is a better global medical QoL outcome instrument than the HAQ-DI to compare QoL in DM and other non-dermatologic diseases. Furthermore, in our study population, 38% scored the minimal score on the HAQ-DI, compared to 0% on the SF-36. This may suggest that the HAQ-DI may not be sensitive enough to detect minor disease in the DM population. Interestingly, in another study, 25.3% of the study population in rheumatoid arthritis had the HAQ-DI minimum score which may suggest that the HAQ-DI may create a positively-skewed distribution in multiple diseases⁵³. This conclusion, however, needs to be further assessed as the HAQ-DI has been used extensively, especially in arthritis populations.

Although we were able to make several conclusions from this study, a few limitations should be addressed. The study was cross-sectional and did not discriminate between those who had initiated treatment and those who had not. To fully explore the relationship between disease activity and QoL, future studies on the changes in QoL as disease activity changes are warranted. Secondly, the study is limited by the small study population. A larger patient population needs to be studied to further assess QoL in DM patients, specifically to better compare DM subtypes and to better compare DM to the other diseases. Thirdly, two study populations were used, namely one population at the University of Pennsylvania and the other at Stanford University. Thirdly, as both study centers are in referral centers, it is possible that our study population may not represent the DM population as a whole.

- There is only one published study examining the impact of dermatomyositis (DM) on patients' quality of life (QoL).
- Patients with DM have worse QoL on all subscales of the SF-36 compared to the general population and score worse on vitality and mental health compared to several chronic diseases. Patients with DM experience more pruritus than patients with cutaneous lupus.
- The presence of pruritus may help to distinguish between DM and cutaneous lupus.

Acknowledgments

This material is based upon work supported by the National Institutes of Health, including NIH K24-AR 02207 (Werth), NIH K24 AR052667 (Chren), and training grant NIH 5-R25-HL084665-04 (Goreshi). This work was also partially supported by a Merit Review Grant from the Department of Veterans Affairs Veterans Health Administration, Office of Research and Development, Biomedical Laboratory Research and Development.

References

1. Dugan EM, Huber AM, Miller FW, Rider LG. International Myositis Assessment and Clinical Studies Group. Review of the classification and assessment of the cutaneous manifestations of idiopathic inflammatory myopathies. *Dermatol Online J*. 2009 Feb 15;15(2):2. [PubMed: 19336019]
2. Gerami P, Schope JM, McDonald L, Walling HW, Sontheimer RD. A systematic review of adult-onset clinically amyopathic dermatomyositis (dermatomyositis sine myositis): A missing link within the spectrum of the idiopathic inflammatory myopathies. *J Am Acad Dermatol*. 2006; 54(4):597–613. [PubMed: 16546580]
3. Gaines EWV. Development of outcome measures for autoimmune dermatoses. *Arch Dermatol Res*. 2008 January; 300(1):3–9. [PubMed: 17985101]
4. Klein RQ, Bangert CA, Costner M, Connolly MK, Tanikawa A, Okawa J, Rose M, Fakharzadeh SS, Fiorentino D, Lee LA, Sontheimer RD, Taylor L, Troxel AB, Werth VP. Comparison of reliability and validity of outcome instruments for cutaneous dermatomyositis. *Br J Dermatol*. 2008 Sep; 159(4):887–894. [PubMed: 18616782]
5. Klein R, Moghadam-Kia S, Taylor L, Coley C, Okawa J, LoMonico J, Chren MM, Werth VP. Quality of life in cutaneous lupus erythematosus. *J Am Acad Dermatol*. 2010 in press.
6. Jayaprakasam A, Darvay A, Osborne G, McGibbon D. Comparison of assessments of severity and quality of life in cutaneous disease. *Clinical & Experimental Dermatology*. 2002; 27(4):306–308. [PubMed: 12139677]
7. Zachariae R, Zachariae H, Blomqvist K, Davidsson S, Molin L, Mørk C, Sigurgeirsson B. Quality of life in 6497 nordic patients with psoriasis. *Br J Dermatol*. 2002; 146(6):1006–1016. [PubMed: 12072069]
8. Finlay AY. Quality of life assessments in dermatology. *Semin Cutan Med Surg*. 1998; 17(4):291–296. [PubMed: 9859917]
9. Hundley JL, Carroll CL, Lang W, Snively B, Yosipovitch G, Feldman SR, Jorizzo JL. Cutaneous symptoms of dermatomyositis significantly impact patients' quality of life. *J Am Acad Dermatol*. 2006 Feb; 54(2):217–220. [PubMed: 16443050]
10. Picardi A, Abeni D, Melchi CF, Puddu P, Pasquini P. Psychiatric morbidity in dermatological outpatients: An issue to be recognized. *Br J Dermatol*. 2000; 143(5):983–991. [PubMed: 11069507]
11. Hughes JE, Barraclough BM, Hamblin LG, White JE. Psychiatric symptoms in dermatology patients. *Br J Psychiatry*. 1983 Jul; 143:51–54. [PubMed: 6882992]
12. Wessely SCLG. The classification of psychiatric morbidity in attenders at the dermatology clinic. *Br J Psychiatry*. 1989 Nov; 155:686–691. [PubMed: 2611599]
13. Woodruff PWR, Higgins EM, du Vivier AWP, Wessely S. Psychiatric illness in patients referred to a dermatology-psychiatry clinic. *Gen Hosp Psychiatry*. 1997; 19(1):29–35. [PubMed: 9034809]
14. Aktan S, Ozmen E, Sanli B. Psychiatric disorders in patients attending an outpatient dermatology-psychiatry clinic. *Dermatology*. 1997; 197:230–234. [PubMed: 9812026]
15. Attah Johnson FY, Mostaghimi H. Co-morbidity between dermatologic diseases and psychiatric disorders in papua new guinea. *Int J Dermatol*. 1995 Apr; 34(4):244–248. [PubMed: 7790138]
16. Picardi A, Pasquini P, Abeni D, Fassone G, Mazzotti E, Fava GA. Psychosomatic assessment of skin diseases in clinic practice. *Psychother Psychosom*. 2005; 74(5):315–322. [PubMed: 16088270]
17. Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the united states. results from the national comorbidity survey. *Arch Gen Psychiatry*. 1994 Jan; 51(1):8–19. [PubMed: 8279933]
18. Kovacs SOKS. Dermatomyositis. *J Am Acad Dermatol*. 1998; 39:899–920. [PubMed: 9843002]
19. Sontheimer RD. Dermatomyositis: An overview of recent progress with emphasis on dermatologic aspects. *Dermatol Clin*. 2002 Jul; 20(3):387–408. [PubMed: 12170874]
20. Peloro TM, Miller OF 3rd, Hahn TF, Newman ED. Juvenile dermatomyositis: A retrospective review of a 30-year experience. *J Am Acad Dermatol*. 2001 Jul; 45(1):28–34. [PubMed: 11423831]

21. Shirani Z, Kucenic MJ, Carroll CL, Fleischer AB Jr, Feldman SR, Yosipovitch G, Jorizzo JL. Pruritis in adult dermatomyositis. *Clin Exp Dermatol*. 2004 May; 29(3):273–276. [PubMed: 15115510]
22. Chren MM, Lasek RJ, Quinn LM, Mostow EN, Zyzanski SJ. Skindex, a quality-of-life measure for patients with skin disease: Reliability, validity, and responsiveness. *J Invest Dermatol*. 1996; 107:707–713. [PubMed: 8875954]
23. Chren MM, Lasek RJ, Quinn LM, Covinsky KE. Convergent and discriminant validity of a generic and a disease-specific instrument to measure quality-of-life in patients with skin disease. *J Invest Dermatol*. 1997; 108:103–107. [PubMed: 8980297]
24. Chren MMLR. Skindex 1.1: Reliability, validity, and responsiveness of a refined instrument to measure the effects of skin disease on quality-of-life. *J Invest Dermatol*. 1997; 108:366.
25. Veraldi S, De Micheli P, Schianchi R, Lunardon L. Treatment of pruritis in mild-to-moderate atopic dermatitis with a topical non-steroidal agent. *J Drugs Dermatol*. 2009 Jun; 8(6):537–539. [PubMed: 19537379]
26. Finlay AYKG. Dermatology life quality index (DLQI): A simple practical measure for routine clinical use. *Clin Exp Dermatol*. 1994; 19:210–216. [PubMed: 8033378]
27. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. conception framework and item selection. *Med Care*. 1992 Jun; 30(6):473–483. [PubMed: 1593914]
28. McHorney CA, Ware JE Jr, Raczek AE. The MOS 36-item short-form health survey (SF-36): II. psychometric and clinical tests of validity measuring physical and mental health constructs. *Med Care*. 1993 Mar; 31(3):247–263. [PubMed: 8450681]
29. Ware, JE., Jr; Kosinski, M.; Gandek, B. SF-36 health survey: Manual and interpretation guide. Lincoln, RI: Quality Metric Incorporated;
30. Chatzitheodorou D, Kabitsis C, Papadopoulos NG, Galanopoulou V. Assessing disability in patients with rheumatic diseases: Translation, reliability, and validity testing of a greek version of the stanford health assessment questionnaire (HAQ). *Rheumatol Int*. 2008 Sep; 28(11):1091–1097. [PubMed: 18438668]
31. Fries JF, Spitz P, Kramer G, Holman HR. Measurement of patient outcome in arthritis. *Arthritis Rheum*. 1980; 23:137–145. [PubMed: 7362664]
32. Bellamy N, Boers M, Feldson D, Fries J, Furst D, Henry D, Liang M, Lovell D, March L, Strand S, Linden S. Health status instruments/utilities. *J Rheumatol*. 1995; 22:1203–1207. [PubMed: 7674258]
33. Wahlgren CF, Ekblom A, Hägermark O. Some aspects of experimental induction and measurement of itch. *Acta Derm Venereol*. 1989; 69(3):185–189. [PubMed: 2566219]
34. Langner MDMH. Pruritis measurement and treatment. *Clin Exp Dermatol*. 2009 Apr; 34(3):285–288. [PubMed: 19309370]
35. Jensen MP, Karoly P, Braver S. The measurement of clinical pain intensity: A comparison of six methods. *Pain*. 1986; 27:117–126. [PubMed: 3785962]
36. Yarnitsky D, Sprecher E, Zaslansky R, Hemli JA. Multiple session experimental pain measurement. *Pain*. 1996 67:327–333. [PubMed: 8951926]
37. Myles PS, Urquhart N. The linearity of the visual analogue scale in patients with severe acute pain. *Anaesthesia and Intensive Care*. 33:54–58. [PubMed: 15957691]
38. Bergh IH, Stener-Victorin E, Wallin G, Mårtensson L. Comparison of the PainMatcher and the visual analogue scale for assessment of labour pain following administered pain relief treatment. *Midwifery*. 2009 Jun 4. [Epub ahead of print].
39. Tabolli S, Sampogna F, Di Pietro C, Paradisi A, Uras C, Zotti P, Castiglia D, Zambruno G, Abeni D. Quality of life in patients with epidermolysis bullosa. *Br J Dermatol*. 2009 Oct; 161(4):869–877. [PubMed: 19624546]
40. Paradisi A, Sampogna F, Di Pietro C, Cianchini G, Didona B, Ferri R, Abeni D, Tabolli S. Quality-of-life assessment in patients with pemphigus using a minimum set of evaluation tools. *J Am Acad Dermatol*. 2009 Feb; 60(2):261–269. [PubMed: 19004524]
41. Sampogna F, Frontani M, Baliva G, Lombardo GA, Alvetreti G, Di Pietro C, Tabolli S, Russo G, Abeni D. Quality of life and psychological distress in patients with cutaneous lymphoma. *Br J Dermatol*. 2009 Apr; 160(4):815–822. [PubMed: 19120325]

42. Linthorst Homan MW, Spuls PI, de Korte J, Bos JD, Sprangers MA, van der Veen JPW. The burden of vitiligo: Patient characteristics associated with quality of life. *J Am Acad Dermatol*. 2009; 61(3):411–420. [PubMed: 19577331]
43. Meng X-L, Rosenthal R, Rubin DB. Comparing correlated correlation coefficients. *Psychological Bulletin*. 1992; 111(1):172–175.
44. Sambhi RLP. Psychiatric treatments in dermatology: An update. *Clinical and Experimental Dermatology*. 2009 Oct 23; 35(2):120–125. [PubMed: 19874324]
45. Picardi A, Amerio P, Baliva G, Barbieri C, Teofoli P, Bolli S, Salvatori V, Mazzotti E, Pasquini P, Abeni D. Recognition of depressive and anxiety disorders in dermatological outpatients. *Society for Publication of Acta Dermato-Venereologica*. 2004 Report nr 84:M3: Report.
46. Locala JA. Current concepts in psychodermatology. *Curr Psychiatry Rep*. 2009 Jun; 11(3):211–218. [PubMed: 19470283]
47. Finzi A, Colombo D, Andeassi L, et al. Psychological distress and coping strategies in patients with psoriasis: The PSYCHAE study. *J Eur Acad Dermatol Venereol*. 2007 Oct; 21(9):1161–1169. [PubMed: 17894699]
48. Picardi A, Mazzotti E, Pasquini P. Prevalence and correlates of suicidal ideation among patients with skin disease. *J Am Acad Dermatol*. 2006; 54(3):420–426. [PubMed: 16488292]
49. Tausk F, Elenkov I, Moynihan J. Psychoneuroimmunology. *Dermatol Ther*. 2008 Jan–Feb; 21(1): 22–31. [PubMed: 18318882]
50. Urpe M, Buggiani G, Lotti T. Stress and psychoneuroimmunologic factors in dermatology. *Dermatol Clin*. 2005; 23(4):609–617. [PubMed: 16112436]
51. Jones-Caballero M, Pedrosa E, Peñas PF. Self-reported adherence to treatment and quality of life in mild to moderate acne. *Dermatology*. 2008; 217(4):309–314. [PubMed: 18714158]
52. De Korte J, Mombers FM, Sprangers MA, Bos JD. The suitability of quality-of-life questionnaires for psoriasis research: A systematic literature review. *Arch Dermatol*. 2002 Sep; 138(9):1221–1227. [PubMed: 12224984]
53. Linde L, Sørensen J, Ostergaard M, Hørslev-Petersen K, Hetland ML. Health-related quality of life: Validity, reliability, and responsiveness of SF-36, 15D, EQ-5D [corrected] RAQoL, and HAQ in patients with rheumatoid arthritis. *J Rheumatol*. 2008 Aug; 35(8):1528–1537. [PubMed: 18484697]

Figure 1.
Pain and Pruritus between DM and CLE

Figure 2.
Photosensitivity between DM and CLE

Table 1

Skindex-29 scores of DM and other dermatologic diseases.

	Sample size	Symptoms Mean (SD)	p-value	Emotions Mean (SD)	p-value	Functioning Mean (SD)	p-value
Vulvodynia	280	50 (17)	0.09	50 (20)	0.91	44 (22)*	<0.0001
DM (Penn)	41	44.9 (24.3)	-	50.4 (26.1)	-	28.2(26.6)	-
CLE	178	41.3(23.8)	0.385	49.1(27.8)	0.785	28.4(25.6)	0.964
Epidermolysis Bullosa	75	49 (25)	0.39	35(26)*	0.003	31(24)	0.56
Eczema	102	48 (23)	0.47	41 (27)	0.06	26 (26)	0.65
Penphigus	126	37 (22)	0.05	37 (22)*	0.001	33 (23)	0.26
Psoriasis	44	42 (21)	0.55	39 (27)	0.05	23 (27)	0.37
Acne vulgaris	63	30 (19)*	0.0007	41 (25)	0.07	16 (16)*	0.004
CTCL	95	32(23)*	0.004	29(18)*	<0.0001	22(22)	0.16
Rosacea	29	33 (20)	0.03	33 (20)*	0.004	16 (18)	0.03
Alopecia	7	31 (24)	0.17	27 (33)	0.04	14 (23)	0.19
Vitiligo	245	13.9 (14.6)*	<0.0001	35.9 (23.6)*	0.0004	16.7(19.5)*	0.001
NMSC/AK	136	29 (20)*	<0.0001	20 (19)*	<0.0001	9 (14)*	<0.0001
Without skin disease	107	14 (12)*	<0.0001	9 (13)*	<0.0001	4 (8)*	<0.0001

* significant finding (p<0.01); Diseases listed in descending order of aggregate mean of all Skindex-29 subscores.

Table 2

SF-36 norm-based scores of DM and other diseases.

	Sample Size	PF mean (p)	RP mean (p)	BP Mean (p)	GH mean (p)	VT mean (p)	SF mean (p)	RE mean (p)	MH mean (p)
SLE	65	39.8 (0.959)	39.0 (0.512)	43.0 (0.010)	35.8 (0.0004)*	40.1 (0.110)	37.9 (0.032)	40.1 (0.035)	41.2 (0.058)
CHF	216	35.1 (0.050)	37.7 (0.126)	46.8 (0.165)	39.2 (0.154)	44.0 (0.784)	44.7 (0.432)	43.9 (0.549)	49.7 (0.003)*
CLE	112**	49.6 (<0.001)*	48.7 (<0.001)*	53.6 (0.046)	46.0 (0.015)	49.0 (0.003)*	47.4 (0.025)	47.7 (0.033)	47.7 (0.193)
Clinical depression	502	45.2 (0.001)*	40.5 (0.987)	45.1 (0.019)	42.0 (0.848)	42.0 (0.392)	38.5 (0.014)	36.0 (0.005)*	33.5 (<0.001)*
DM****	52****	39.6	40.5	49.5	41.7	43.5	43.1	42.6	45.3
Recent MI	107	44.4 (0.057)	42.5 (0.366)	51.1 (0.465)	44.9 (0.088)	50.3 (0.001)*	50.5 (0.001)*	47.0 (0.065)	50.3 (0.013)
Hypertension	2089	46.0 (0.002)*	45.5 (0.006)*	50.9 (0.520)	46.8 (0.001)*	50.6 (<0.001)*	51.4 (<0.001)*	48.0 (0.006)*	51.5 (<0.001)*
Type II diabetes	541	43.6 (0.066)	44.0 (0.062)	49.3 (0.901)	43.4 (0.267)	49.4 (<0.001)*	49.3 (<0.001)*	47.6 (0.013)	50.9 (0.001)*
General population	2474	50.5 (<0.001)*	50.9 (<0.001)*	52.1 (0.144)	50.9 (<0.001)*	51.8 (<0.001)*	49.9 (<0.001)*	49.4 (<0.001)*	49.7 (0.007)*

* p<0.01. PF: Physical activities associated with daily living; RP: Physical health influencing work; BP: How pain severity interferes with daily activities; GH: Patient's perception of health status; VT: Energy level of patient; SF: Emotional/Physical problems interference with social activities; RE: Emotional state influence on work and other daily activities; MH: Mood, especially sadness and anxiety

** 110 patients with BP score

*** 49 patients with RE score

**** DM: Dermatomyositis

Table 3

Mean (sd) of HAQ-DI and SF-36 scores in classic and amyopathic/hypomyopathic DM (AHDM= Amyopathic/Hypomyopathic DM)

	HAQ-DI	PF	RP	BP	GH	VT	SF	RE	MH
Classic	0.8621 (0.8077)	36.6 (13.5)	40.1 (12.2)	47.4 (16.6)	38.2 (11.1)	40.3 (12.3)	44.0 (11.2)	41.8 (13.3)	45.4 (11.1)
AHDM	0.4450 (0.560)	43.5 (13.6)	41.3 (13.2)	50.4 (11.8)	42.8 (11.2)	45.6 (11.9)	43.2 (14.0)	41.4 (13.8)	43.7 (13.2)
P	0.0818	0.123	0.670	0.393	0.229	0.285	0.978	0.899	0.779

Table 4

Correlations (p-values) among Skindex-29 subscores and DLQI in DM

Key: Rho/Sig level *=p<0.01	Skindex Symptoms	Skindex Emotion	Skindex Function	DLQI
Skindex Symptoms	1			
Skindex Emotion	0.5345/<0.0003*	1		
Skindex Function	0.6020/<0.0001*	0.7620/<0.0001*	1	
DLQI	0.6323/<0.0001*	0.6744/<0.0001*	0.8598/<0.0001*	1

Table 5

Correlations between pruritus and CDASI and skin-specific QoL instruments Rho/Sig level

	Skindex-Symptoms	Skindex Emotion	Skindex Function	DLQI
Pruritus	0.6015/0.0001 *	0.1937/0.2375	0.45520/0.0036 *	0.3477/0.0009 *
CDASI-Activity	0.3257/0.0377 *	0.4623/0.0023 *	0.4413/0.0039 *	0.2729/0.0071 *

*
p<0.05

Table 6

Correlations between global health QoL instruments and overall disease PtGA and Skindex-Emotion (Note: SF-36 scores were multiplied by -1 to create positive correlations).

r/n	Overall Disease PtGA (VAS)	Skindex-Emotion	p value of difference between HAQ-DI correlation
HAQ-DI	0.3453/46	0.3451/38	-
PF	0.3698/46	-	0.74
RP	0.4212/46	-	0.47
BP	0.296/46	-	0.67
GH	0.3367/46	-	0.94
VT	-	0.2426/38	0.43
SF	-	0.6336/38	0.02*
RE	-	0.5181/38	0.14
MH	-	0.5418/38	0.21

*
p<0.05