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Health-Related Quality of Life in Morphea

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Abstract

Background—Little is known about the health-related quality of life (HRQOL) of patients with morphea, and previous studies have yielded conflicting results.

Objectives—To determine the impact of morphea on HRQOL and clinical and demographic correlates of HRQOL in adults.

Methods—Cross sectional survey (n=73) of Morphea in Adults and Children (MAC) cohort.

Results—Morphea impairs HRQOL in adults. Patients were most impaired by emotional well-being and concerns that the disease will progress to their internal organs. Patients with morphea had worse skin-specific HRQOL than those with non-melanoma skin cancer, vitiligo, and alopecia (lowest $P < .0001$). Study subjects had significantly worse global HRQOL scores than the general U.S. population for all subscales (all $P \leq .004$) with the exception of bodily pain. Comorbidity ($r = .35-.51$, $P \leq .0029-.0001$) and symptoms of pruritus ($r = .38-.64$, $P \leq .001-.0001$) and pain ($r = .46-.74$, $P < .0001$) were associated with impairment in multiple domains of skin-specific and global HRQOL. Physician-based measures of disease severity correlated with patient-reported HRQOL.

Conclusion—Patients with morphea have negative impact on HRQOL particularly if symptoms (pruritus and pain) or concerns regarding internal manifestations are present. Providers should be aware of this when evaluating and treating patients.

Key Indexing Terms

Scleroderma; Localized; Severity of Illness Index; Quality of Life; Adult; Health Surveys; Cross-Sectional Studies; morphea; Skindex-29; SF-36; itch

INTRODUCTION

Morphea, also known as localized scleroderma, is an idiopathic inflammatory disorder that produces sclerosis of the skin and subcutaneous tissues. Recent studies have examined physician based outcome measures in morphea including clinical and radiology based

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Conflict of Interest:

The authors report no conflicts of interest.

outcomes. Few have examined the impact of morphea on health-related quality of life (HRQOL), particularly in adults.

It is well-known that cutaneous disease impacts HRQOL.¹⁻³ Further, the importance of patient based outcomes has been underscored in numerous publications.⁴ Yet HRQOL in morphea is poorly described, and existing studies largely focus on children.⁵⁻⁷ These pediatric studies indicate that morphea has modest effect on life quality, while studies in adults generally report greater negative impact on life quality and emotional distress.^{6,8} Conclusions from these studies are limited by incomplete information regarding patient demographics and clinical features or by use of unidimensional measures.^{6,8-11} No studies to date have examined the impact of morphea on overall HRQOL in adults, thus comparison of impact of morphea with that of other medical conditions is limited. Further, correlation between newly validated clinical scoring systems with patient perceived disease impact is poorly described.

The objective of this study was to determine the impact of morphea on HRQOL in adults as measured by multidimensional HRQOL scales (Skindex-29+3 and SF-36) and ascertain how well these measures correlated with physician based outcomes. We also determined demographic and clinical features correlated with HRQOL.

MATERIALS AND METHODS

Participants

The institutional review board-approved Morphea in Adults and Children (MAC) cohort contained 322 adults (18 years old at enrollment) and children (17 years old at enrollment) as of March 2012. Criteria for inclusion in this study included: eligibility for enrollment in MAC cohort (the details of eligibility have been reported previously),^{8,12} age

18 years at time of enrollment, presence of sufficient information for analysis including baseline Skindex-29+3 and SF-36 HRQOL surveys, and English language/literacy skills. Of the 322 of patients in the cohort, 249 were excluded due to the following: age <18 years (n=79), English language/literacy skills (n=4), and insufficient data on variables of interest (n=166, the Skindex-29+3 and SF-36 were not administered at the outset of the cohort).

The MAC cohort was designed to prospectively capture prevalent and incident cases of morphea. Patients are recruited from within the UT Southwestern Medical Center system and through regional referrals from private practitioners.

After patients signed consent, all data were abstracted using a comprehensive clinical report form designed prior to the study, including demographic, clinical, medical and family history, and HRQOL questionnaires. All patient reported histories were also confirmed by review of medical records. At the time of enrollment, all patients were evaluated by one examiner with expertise in morphea (H.J.), who assigned subtype and clinical scores (modified Rodnan skin score and LoSCAT).^{13,14} Subtype classifications used herein are those proposed by Zulian and Laxer).¹⁵

Variables of Interest

Skindex-29+3—Skin-specific HRQOL was evaluated with the Skindex-29.¹⁶ The Skindex-29 assesses three subscales: emotions, symptoms, and functioning in the month preceding administration. A fourth subscale was added to characterize morphea-specific concerns: (1) activity limitation as a result of disease, (2) concern for involvement of internal organs and (3) feelings of isolation. Morphea specific subscale items were initiated by the investigators based on concerns commonly expressed by patients. Each subscale score ranges from 0 to 100; higher scores indicate poorer HRQOL.

DLQI—Skin-specific HRQOL was also measured with the Dermatology Life Quality Index (DLQI).¹⁷ This questionnaire evaluates the impact of skin disease on HRQOL over the week prior to administration. Total score ranges from 0 to 30 and higher scores indicate poorer HRQOL.

SF-36—HRQOL as it pertains to general health was measured via the SF-36.¹⁸ This 36-item questionnaire evaluates eight health domains: physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH). The eight scales of the SF-36 are incorporated in two summary measures, the Physical Component Summary (PCS), and the Mental Component Summary (MCS). SF-36 scores range from 0 to 100; lower scores indicate poorer HRQOL.

SCQ—The burden of patients' comorbidities was measured with the Self-Administered Comorbidity Questionnaire (SCQ).^{19,20} Scores range from 0 to 45, with higher scores indicating maximal comorbidity.²⁰ The SCQ assesses the presence (and limitations imposed by) prevalent conditions including heart disease, hypertension, and back pain.

Pruritus and Pain

Physical symptoms of pruritus and pain were assessed on a visual analog scale (VAS) of 1-10, with 10 representing greatest severity. Visual analog scales for patient reported symptoms were utilized because they have extensive validation and history of use in skin disorders, including prior studies with morphea in the form of the Impact of Chronic Skin Disease on Daily Life (ISDL).^{9,10,21-23}

Physician Based Measures

Patients were scored by the same investigator (H.J.) using the modified Rodnan Skin Score (mRSS)¹³ and the newly validated Localized Scleroderma Cutaneous Assessment Tool (LoSCAT).¹⁴ Because the LoSCAT was not validated at the inception of the cohort, patients enrolled before 2008 were only scored with the mRSS. After 2008, MAC patients were assessed with both the mRSS (for continuity with initial assessments) and the LoSCAT. The LoSCAT contains measures of activity (Localized Scleroderma Skin Severity Index [LoSSI] and Physician Global Assessment-Activity [PGA-A]) and damage (Localized Scleroderma Skin Damage Index [LoSDI] and Physician Global Assessment-Damage [PGA-D]). Higher scores on all physician-based measures indicate greater disease severity.^{14,24}

Cosmetically sensitive areas were identified as lesions on the face and neck. Functional limitation was defined as having at least one of the following: (1) limited joint mobility (limited range of motion secondary to skin and subcutaneous tissue involvement, but not due to arthritis or other mechanical issues), (2) limb-length discrepancy or (3) contracture.

Socioeconomic Variables

Through use of the subjects' residential postal zip codes and 2007-2011 U.S. census data (<http://factfinder2.census.gov>), annual household income was obtained for each zip code tabulation area as an aggregation of census tracts using previously published methods.^{25,26} As census data is not normally distributed, median values were used and classified as \$24,999/year, \$25,000-\$49,999/year, \$50,000-\$99,999/year, and \$100,000/year. As an additional marker of socioeconomic status we categorized participants' insurance as public, private, or uninsured.^{27,28}

Statistical Analysis

Overall HRQOL in morphea was evaluated by summary statistics of the Skindex-29+3, DLQI, and SF-36 and assessing correlations among subscales. HRQOL in morphea was compared with historical HRQOL in other dermatologic diseases by comparing means of the three Skindex-29 subscales.^{22,29} HRQOL in morphea was compared with that of other medical conditions, and with the general U.S. population using norm-based scores of the SF-36.³⁰ Data for comparison was obtained from previous studies evaluating HRQOL.³¹⁻³³ Means were compared using a two-tailed, two-sample *t* test.

We also evaluated the relationship between HRQOL (defined as a dependent variable) and independent variables (including demographic and clinical) of interest. Associations with HRQOL were assessed using analysis of variance (ANOVA); two-tailed, two-sample *t* tests; and Pearson correlations (to minimize experiment-wise error rate, comparisons between morphea and other diseases were evaluated with statistical significance designated as $P < .01$). Calculations were completed using SAS 9.3 (SAS Institute, Cary, NC).

RESULTS

Patient Characteristics

Seventy-three patients out of 322 met inclusion criteria, the majority were female (85%), white (71%), and with the generalized morphea subtype (59%). Details of the demographic and clinical features of subjects are available in Table 1. The majority of our subjects had private insurance and moderate to high income. Although there were differences in the mean HRQOL scores based on demographics (ethnicity and income), they did not reach statistical significance. Patients were treated with topical/intralesional therapies (including calcipotriene, imiquimod, topical tacrolimus, intralesional and topical corticosteroids), systemic immunosuppressives (including methotrexate, systemic and intramuscular corticosteroids) and/or phototherapy, or were not undergoing active treatment. Patients on multiple therapies were counted more than once (Figure 1).

Skin-Specific HRQOL

Skindex 29+3—Among the Skindex-29+3 subscales, highest mean scores occurred in the emotions and morphea-specific domains, with mean +SD scores of 41+26 and 37+29, respectively (Figure 2B). Within the emotions domain, patients were most concerned that their skin may get worse (63+34) or that their condition may be serious (55+33) (Fig. 1B). In the morphea-specific domain, patients were most concerned that the condition would affect their internal organs (49+35) (Figure 1C). In the symptoms domain, patients were most affected by itch (47+ 31); patients noted their social life was affected within the functioning domain (32+32).

Skindex-29 scores in morphea were compared to patients with other dermatologic conditions and those without skin disease (Table 2). Ethnicity²⁹ and gender^{22,29} distributions of our cohort are similar to historic reference populations. Patients with morphea had greatest impairment in the emotions domain, with Skindex-29 mean+SD scores (41+ 26) similar to those with acne vulgaris (41+ 25), eczema (40.8+ 27) and psoriasis (39+ 27). HRQOL in morphea was significantly poorer across all subscales of the Skindex-29 than those without dermatologic disease ($P < .0001$).

DLQI—Thirty four patients (47%) experienced moderate or greater impact on HRQOL as defined by a DLQI > 5.¹⁷ The details of studies examining DLQI in this cohort were previously published.⁸

Overall HRQOL

SF-36 scores in morphea were compared with the general U.S. population, healthy individuals, and those with 9 other medical conditions (Table 3). With respect PCS, patients with morphea were similar to those with pain (sciatica) and depression and significantly worse than the U.S. healthy population.³² Patients with morphea had greatest impairment in the mental health domain. With regard to MCS, scores of patients with morphea were similar to those with systemic lupus erythematosus, and significantly poorer than the general and healthy U.S. population.^{31,32}

Multivariate Analysis (Table 4)

Patient-based measures of HRQOL (Skindex-29+3, DLQI, SF-36), were highly correlated with one another ($P < .0001$). Correlation among the emotions, symptoms, functioning, and morphea-specific Skindex 29+3 subscales was of relevant magnitude of effect, as high scores in one subscale were associated with high scores in others ($r=44770-6995$, $P < .0001$).

Clinical Variables Correlated with HRQOL (Table 4)

Patient-reported comorbidity as identified by the SCQ correlated with impaired HRQOL across 2 Skindex- 29+3 subscales (with the exception of emotions), the DLQI, and both summary measures of the SF-36. Lesion pain was associated with impairment in the SF-36 PCS, DLQI and all Skindex-29+3 subscales with the exception of emotions. Presence of itch was associated with worse Skindex 29+3 symptoms and morphea-specific Skindex-29+3 scores. Morphea specific concerns, including activity limitation, were closely linked with

the Skindex functioning subscales and SF-36 PCS ($r = .6995$ and $.5706$, respectively, $P < .0001$).

Increased severity of active disease (LoSSI component) correlated with worse HRQOL. The LoSSI was associated with worse symptoms and morphea-specific Skindex-29+3 subscores and worse SF-36 PCS scores. There was little correlation with HRQOL and the damage domain of the LoSCAT (LoSDI) with exception of the SF-36 PCS. Physician-assessed functional limitation was associated with worse morphea-specific Skindex-29+3 scores and SF-36 PCS scores.

Patients with generalized disease had significantly poorer HRQOL than those with the plaque subtype in the Skindex 29+3 morphea-specific domain (Fig 2D). There were no significant differences in HRQOL between patients receiving treatment and those that were not.

DISCUSSION

In this prospective cross sectional study of adults enrolled in the MAC cohort we determined the impact of morphea on HRQOL and associated demographic and clinical features. Our results demonstrated that morphea had negative impact on HRQOL similar to disorders such as eczema and rheumatoid arthritis, especially in the domain of emotions and mental health. The presence of comorbid conditions, increased morphea activity, and symptoms were correlated with impaired HRQOL across all measures.

We confirmed prior observations that symptoms associated with morphea, particularly pain and itch were strongly associated with poor HRQOL.⁸⁻¹⁰ In fact, pain and itch were stronger correlates of HRQOL than the location of lesions in cosmetically or functionally sensitive sites. This likely reflects the notion that physical symptoms are known pervasive, chronic stressors linked with anxiety, depression, and impairment of activities of daily living.³⁴⁻³⁶ Similar to prior observations in our cohort, itch was significantly correlated with lesion activity (as measured by the LoSSI component of the LoSCAT), suggesting that pruritus might be a marker of active disease. Similar to studies in other disorders, the presence of greater comorbidity was strongly associated with greater impairment, though common conditions (e.g., hypertension) were unrelated to morphea. This implies patients have difficulty discerning the impact of morphea in the context of multiple health concerns. This may also account for the lesser impact of morphea on HRQOL in children versus adults.³⁷

We also found that increased disease activity as measured by the LOSSI component of the LoSCAT is linked with poorer HRQOL in morphea. Our results are similar to those of Szramka-Pawlak et al, who found a correlation between the activity domain of the LOSSI and skin-specific HRQOL in their population as measured by the Skindex-29.¹¹ In contrast to previous observations in our cohort in which DLQI scores were correlated with the presence of damage as measured by the LoSDI, the results of the present study suggest that the LOSSI (activity) is more closely linked with HRQOL than the LoSDI (damage)⁸ although functional impairment (which is not a component of the LoSDI) did have negative impact on HRQOL and may be considered damage. This emphasizes the importance of

addressing active lesions in clinical practice and implies the LoSCAT activity measures elements of morphea significant to patients but the LoSDI may not.

The finding that socioeconomic status was not associated with impact on HRQOL was unexpected, as these factors are known to strongly affect HRQOL.³⁸ However, despite our efforts to recruit a diverse patient population, our sample was predominately Caucasian and relatively affluent, which may reflect the referral center setting of our study or even the relatively high socioeconomic status of the patient population in Dermatology as a whole.³⁹ This might have limited our ability to determine the effect of these variables.

We are not aware of any prior studies that examined the effect of morphea on global HRQOL in adults. This has prevented comparison between morphea and other medical conditions. We found that morphea impacts overall HRQOL, particularly its mental domains, to an extent comparable to a number of conditions with frequent internal manifestations such as back pain and rheumatoid arthritis. Similarly, comparison of Skindex-29 scores reveals morphea has impact resembling other chronic skin conditions such as vitiligo and alopecia. These findings confirm that morphea has serious implications in the view of affected patients.

A notable finding from our study is that participants had a high level of concern that morphea may affect their internal organs. This may reflect the ability of patients to independently research morphea, at which point they likely encounter sources referring to morphea interchangeably with localized scleroderma, systemic sclerosis, and scleroderma which produces confusion with regard to diagnosis and prognosis. This highlights the need for providers to educate patients appropriately, particularly with respect to differences between morphea and scleroderma.

The present study includes a number of limitations. Sample size limits conclusions in subgroups of patients. Generalized morphea was more prevalent in our cohort than the morphea population as a whole, likely because our study was conducted at a referral center. Thus HRQOL in the MAC cohort may be poorer than that of patients with morphea overall. Also, the cross sectional nature of the study precludes conclusions regarding the effect of time and treatment on HRQOL.

This study demonstrates that morphea exerts a negative influence on HRQOL, particularly in the domain of emotions and that patients have significant concern about the systemic implications of morphea. With this in mind, providers can be better equipped to recognize and address the components of morphea most worrisome to their patients.

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What's already known about this topic?

- Little is known about HRQOL in morphea.
- Existing studies indicate morphea has modest effect on life quality in children, while studies in adults generally report greater negative impact on life quality and emotional distress.

What does this study add?

- Disease severity and symptoms such as pain and itch are linked with HRQOL. Pruritus reflects disease activity. Individuals with morphea worry about the impact and progression of their condition.
- HRQOL issues in morphea should be addressed. Physicians have the opportunity to intervene with education about the disease and its prognosis.

Figure 1.

Details of HRQOL in morphea as assessed by the Skindex-29+3. Mean skindex subscale scores (A) and mean scores of individual questions within the (B) emotions, and (C) morphea-specific subscales are depicted.

Figure 2.

Factors related to HRQOL as measured by the Skindex-29+3. Mean Skindex-29+3 scores are given for (A) ethnicity, (B) Z-AHI, (C) insurance type (unavailable for 2 patients) and (D) disease severity. Z-AHI, Zip-code based annualized household income (unavailable for 7 patients).

Table 1

Patient characteristics

Age Mean Yrs, (SD)		41.3(18.2)
Gender n, %		
Female	62	85%
Male	11	15%
Ethnicity n, %		
White	52	71%
Hispanic/Latino	11	15%
African American	4	5%
Asian and Others	6	8%
Income n, %		
Less than \$25,000	4	6%
\$25,000-49,999	18	27%
\$50,000-100,000	40	61%
Over \$100,000	4	6%
Insurance Status n, %		
No Insurance	4	6%
Public	17	24%
Private	50	70%
Morphea Subtype n, %		
Plaque	9	12%
Linear	21	29%
Generalized	43	59%
LoSCAT mean (SD)		
LoSSI	12	(15)
PGA-A	28	(27)
LoSDI (mean)	19	(16)
PGA-D	30	(22)
MRSS	6	(5)
Current Therapy n, %		
Topical/Intralesional (IL) Therapy	19	26%
Systemic Agents/Phototherapy	16	22%
Combination Treatment	14	19%
No Current Therapy	24	33%

Nine patients were excluded from LoSSI analysis, 7 from PGA-A analysis, 6 from MRSS analysis, 9 from LoSDI analysis, and 8 from PGA-D analysis as these scores were not calculated on same visit as HRQOL instrument administration. Income and insurance data were unavailable for 7 and 2 patients, respectively.

LoSCAT, localized scleroderma cutaneous assessment tool; *LoSDI*, Localized Scleroderma Skin Damage Index; *LoSSI*, Localized Scleroderma Skin Severity Index; *MRSS*, modified Rodnan skin score; *PGA-A*, Physician Global Assessment-Activity; *PGA-D*, Physician Global Assessment-Damage; *IL*, intralesional.

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Skin-specific HRQOL in morphea compared with other dermatologic conditions as measured by the Skindex. Scores range from 0-100, higher scores indicate poorer HRQOL.

Table 2

	Sample Size	Symptoms, mean (SD)	<i>P</i> * value	Emotions, mean (SD)	<i>P</i> * value	Functioning, mean (SD)	<i>P</i> * value
Morphea	73	32.8 (22.8)	—	40.8 (26.2)	—	22.0 (22.9)	—
Without skin disease	107	14 (12)*	<.0001	9 (13)*	<.0001	4 (8)*	<.0001
Vitiligo	245	13.9 (14.6)*	<.0001	35.9 (23.6)	.1475	16.7 (19.5)	.0558
NMSC/AK	136	29 (20)	.2238	20 (19)*	<.0001	9 (14)*	<.0001
Acne vulgaris	63	30 (19)	.4299	41 (25)	.9688	16 (16)	.0883
Alopecia	7	31 (24)	.5702	27 (33)*	.0001	14 (23)	.0108
Rosacea	29	33 (20)	.9644	33 (20)	.0533	16 (18)	.0883
Cutaneous lupus erythematosus	178	41.3 (24)	.0115	49.1 (28)	.0430	28.4 (26)	.1014
Psoriasis	44	42 (21)	.0128	39 (27)	.6494	23 (27)	.7989
Dermatomyositis	41	44.9 (24)*	.0002	50.4 (26)*	.0069	28.2 (27)	.0545
Lichen sclerosus	262	46.8 (19)*	<.0001	38.2 (20)	.5206	33.6 (19)*	.0024
Eczema	102	48 (23)*	<.0001	41 (27)	.9636	26 (26)	.2700
Epidermolysisbullosa	75	49 (25)*	<.0001	35 (26)	.0954	31 (24)*	.0095
Vulvodynia	280	50 (17)*	<.0001	50 (20)*	.0004	44 (22)*	<.0001

* To minimize experiment size error rate, comparisons between morphea and other diseases were evaluated by a statistical Significant finding ($P < .01$).

Mean (SD) Skindex-29 scores for patients with morphea and other dermatologic diseases 22.29 *P* values are shown as a comparison between mean Skindex-29 subscores of morphea patients and those of other skin conditions. NMSC/AK, Non-melanoma skin cancer/actinic keratosis. Higher Skindex-29+3 scores indicate worse HRQOL.

Table 3

SF-36 scores of morphea patients compared with general U.S. populations, including healthy adults and those with selected diseases.

	PCS		MCS	
	N	Mean (SD)	Mean (SD)	P value
Morphea	73	47.70 (12.48)	45.37 (11.41)	—
General U.S. Population	1982	50.00 (10.00)	50.00 (10.00)*	<.0001
Healthy population	571	55.83 (5.34)*	52.48 (7.25)*	<.0001
Back pain, sciatica	766	45.60 (10.84)	47.95 (10.97)	.0490
Depression	256	45.13 (12.54)	36.78 (11.60)*	<.0001
Hypertension	503	44.08(11.56)*	50.63 (10.00)*	<.0001
Rheumatoid arthritis	133	41.66 (11.37)*	48.11 (11.22)	.0418
Diabetes	169	42.05 (11.49)*	48.24 (12.00)	.0454
Heart disease	184	39.36 (11.31)*	48.84 (11.44)	.0115
Systemic sclerosis	504	36.7 (11.2)*	49.0 (11.7)*	.0094
Systemic lupus erythematosus	1316	36.3 (11.5)*	44.3 (11.8)	.4476
Fibromyalgia	2733	31.9 (9.6)*	41.9 (12.5)	.0197

* To minimize associations made by chance alone, P values <0.01 were considered statistically significant.

Mean (SD) SF-36 scores for patients with morphea and other populations 31-33 P values are shown as a comparison between mean norm-based SF-36 scores of morphea patients and those of other populations. Higher SF-36 scores indicate better HRQOL. *Significant finding (P <.01)

Table 4
Significant correlations (Pearson's R) and P values between clinical variables and HRQOL measures in morphea.

	Skindex-Symptoms		Skindex-Emotions		Skindex-Functioning		Skindex-Morphea-Specific		DLQI		SF-36 PCS		SF-36 MCS	
	R	P	R	P	R	P	R	P	R	P	R	P	R	P
SCQ	.4430	.0001*	.2203	.0689	.4655	<.0001*	.3552	.0027*	.4504	.0001*	.5066	<.0001*	.3534	(.0029)*
Pain	.7441	<.0001*	.1966	.1055	.4555	<.0001*	.4813	<.0001*	.5289	<.0001*	.4755	<.0001*	.2402	(.0468)
Itch	.6439	<.0001*	.1263	.3012	.2188	.0709	.3818	.0012*	.2308	.0583	.2225	.0662	.2053	(.0907)
Functional Limitation	.1793	.1292	.0642	.5895	.1101	.3537	.3599	.0018*	.1750	.1414	.3754	.0011*	.0376	(.7519)
LoSSI	.5570	<.0001*	.0885	.4866	.2665	.0333	.3376	.0064*	.2750	.0292	.4163	.0006*	.1905	(.1316)
PGA-A	.5930	<.0001*	.2222	.0729	.3887	.0013*	.3738	.0020*	.3948	.0011*	.3708	.0022*	.2860	(.0199)
LoSDI	.1282	.3127	.0937	.4615	.0872	.4935	.1907	.1312	.1337	.2960	.3949	.0012*	.0773	(.5436)
PGA-D	.1171	.3529	.1000	.4280	.2099	.0933	.1632	.1941	.1782	.1588	.2812	.0233	.0602	(.6341)
MRSS	.3191	.0085*	.0288	.8189	.2228	.0700	.3050	.0121*	.1959	.1149	.4548	.0001*	.0782	(.5294)

* Statistical Significant finding ($r \geq .30$, $P < .01$) to minimize associations made by chance alone.

A. Clinical variables significantly correlated with impaired HRQOL in one or more Skindex-29+3 or SF-36 subscales as designated by Pearson correlation coefficients. $\geq .30$ and $P < .05$ are depicted. C. Pearson correlation coefficients between disease severity as measured by the LoSCAT and HRQOL measures are shown.

DLQI, Dermatology Life Quality Index; LoSDI, Localized Scleroderma Skin Damage Index; LoSSI, Localized Scleroderma Skin Severity Index; MCS, mental component summary; MRSS, modified Rodnan skin score; PCS, physical component summary; PGA-A, Physician Global Assessment-Activity; PGA-D, Physician Global Assessment-Damage; SCQ, Self-Administered Comorbidity Questionnaire.