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Development of the Facial Skin Care Index: A Health-Related Outcomes Index for Skin Cancer Patients

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Abstract

BACKGROUND—Existing health-related quality-of-life (HRQOL) tools do not appear to capture patients' specific skin cancer concerns.

OBJECTIVE—To describe the conceptual foundation, item generation, reduction process, and reliability testing for the Facial Skin Cancer Index (FSCI), a HRQOL outcomes tool for skin cancer researchers and clinicians.

METHODS—Participants in Phases I to III consisted of adult patients ($N = 134$) diagnosed with biopsy-proven nonmelanoma cervicofacial skin cancer. Data were collected via self-report surveys and clinical records.

RESULTS—Seventy-one distinct items were generated in Phase I and rated for their importance by an independent sample during Phase II; 36 items representing six theoretical HRQOL domains were retained. Test–retest I results indicated that four subscales showed adequate reliability coefficients ($\alpha = 0.60$ to 0.91). Twenty-six items remained for test–retest II. Results indicated excellent internal consistency for emotional, social, appearance, and modified financial/work subscales (range 0.79 to 0.95); test–retest correlation coefficients were consistent across time (range 0.81 to 0.97 ; lifestyle omitted).

CONCLUSION—Pretesting afforded the opportunity to select items that optimally met our a priori conceptual and psychometric criteria for high data quality. Phase IV testing (validity and sensitivity before surgery and 4 months after Mohs micrographic surgery) for the 20-item FSCI is under way.

Skin cancer is the most common form of cancer in the United States, accounting for an estimated 1.3 million new cases of cancer each year.¹ Nonmelanoma skin cancer (NMSC) is far more prevalent, but less deadly, than melanoma skin cancer. Although rarely life-threatening, NMSC can be disfiguring and can contribute to functional problems, especially if

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treatment is delayed.² NMSC includes two major types: basal (BCC) and squamous (SCC) cell carcinoma. BCC accounts for more than 90% of all NMSCs with approximately 80% occurring in the head and neck.³⁻⁶ Results of previous studies have indicated that, if detected early, even high-risk NMSCs can be successfully treated and serve as a wake-up call for behavioral change and enhanced health-related quality of life (HRQOL).^{2,7-9} Because current HRQOL instruments do not appear to adequately capture the concerns of skin cancer patients, however, results are weak. Psychosocial aspects of skin cancer have important implications for optimal management of patients,¹⁰ but without adequate measures, it is difficult to determine how diagnosis and treatment of skin cancer influence HRQOL. Despite high incidence rates and potential morbidity, specific tools that capture the unique HRQOL concerns of patients diagnosed with skin cancer are sparse. The purpose of this study is to describe the development of such a measure.

Current Status of Patient-Based HRQOL Tools for Skin Cancer

Dermatologic HRQOL research focuses mainly on patients with chronic skin conditions. A review of the literature shows that the Dermatology Life Quality Index¹¹ and Skindex¹² are among the few skin disease-specific tools used to study patients with varying skin conditions including NMSC. Although the results of Finlay and Khan¹¹ suggest that atopic eczema, pruritus, and psoriasis have a greater impact on HRQOL than BCC, the items were geared more toward these skin conditions rather than skin cancer (e.g., pain and itchiness are rarely associated with facial skin cancer, nor is choice in clothing affected). In contrast, general HRQOL measures such as the Medical Outcomes Survey—Short Form^{13,14} or the Functional Assessment of Cancer Therapy—General¹⁵ that are often used to compare outcomes among patients with different cancers and noncancerous diseases may not be relevant for NMSC patients who rarely have impairments that would limit stair climbing or general physical activity¹² or to outcomes for high-risk skin cancer patients undergoing Mohs micrographic surgery (MMS).^{6,7} Additionally, general tools have the disadvantage of being lengthy and impractical for routine use in busy dermatology or plastic surgery clinics.¹¹ Taken together, these findings suggest that (1) existing skin disease measures do not appear to capture concerns specific to skin cancer, (2) patient-centered HRQOL domains for skin cancer may differ from standard general HRQOL instruments, and (3) lengthy HRQOL tools may be impractical to administer in clinical practice.

Conceptual Framework for the Facial Skin Cancer Index (FSCI)

We modified definitions and domains for general HRQOL tools^{13,15} that have previously been used to explore the effects of treatment on HRQOL among NMSC patients.^{8,9} In keeping with the literature, the authors initially defined HRQOL as (1) an overall state of well-being composed of the ability to fulfill desired social, role, and physical activities; (2) the psychological effectiveness to perform these activities; (3) added skin cancer symptom status; and (4) satisfaction with treatment for skin cancer. A priori, the authors specified that the FSCI would be constructed to be reflective of the patient's perspective via direct elicitation of patient experiences (thus opening the door for emerging patient-centered domains); be acceptable to patients in terms of content, administration time, and reading ease; tap multiple domains important to skin cancer patients; and demonstrate evidence of reliability, validity, and sensitivity to treatment. There is a need for a well-grounded, simple, compact measure, applicable to patients with skin cancer for use as an assessment tool in routine clinical practice and follow-up care. This article describes the conceptual foundation, item generation, item reduction process, reliability, and domain development of the FSCI, a HRQOL outcomes tool for skin cancer researchers and clinicians.

Methods

Sample and Sampling Methods

As advocated by experts in the field,^{15,16} four phases of investigation were dedicated to development and validation of the FSCI: item generation, item reduction, establishing content domains, and psychometric evaluation. A total 141 NMSC patients were invited to participate in Phases I through III of the current study: of these, 134 agreed and completed self-report surveys (95% response rate). The study cohort was drawn from the otolaryngology/dermatology clinics of a large Midwestern teaching hospital during 2004. Participants consisted of English-speaking adult patients diagnosed with a biopsy-proven nonmelanoma cervicofacial skin cancer who were willing to provide written informed consent forms. Exclusion criteria consisted of physical or mental inability to complete a brief survey. A trained clinical research assistant administered research protocols. Participants received free hospital parking and \$10.00 in appreciation for each completed interview. All phases of the research study were approved by Froedtert Hospital Institutional Review Board, and the study protocol conformed to the guidelines of the 1975 Declaration of Helsinki.

Phase I: Item Generation

We used semistructured interviews administered by clinical staff to obtain qualitative data on HRQOL outcomes among NMSC patients stratified by sex. All participants had undergone treatment, typically MMS with reconstructive surgery, during the year before completing the survey. Phase I sample size ($n = 20$) was determined by the unique information that was still being obtained when the last few participants were interviewed. Small sample sizes have been shown to be efficient and effective in generating items for HRQOL instruments.^{15,17} Participants were asked to write their chief NMSC concerns related to each of six HRQOL domains: emotional, physical, family, social, work, and future concerns. Additionally, open-ended items invited participants to write any *other* concerns they might have experienced during skin cancer and subsequent treatment. To control for bias, an expert panel consisting of nurses, plastic surgeons, dermatologists, oculoplastic surgeons, otolaryngologists, statisticians, and psychologists independently analyzed the content and marked common phrases. Unique items (as determined by at least 50% of the panel) were assigned to a second questionnaire.

Phase II: Item Reduction

All nonduplicate items generated in Phase I were rated in terms of their importance (1 = not very to 5 = very) to HRQOL from the perspective of an independent sample of patients ($n = 52$) who also had undergone MMS treatment for NMSC. Participants rated the items and completed a brief demographic section while waiting for their dermatologic appointment. A clinical research nurse was on hand to answer questions and match surveys to medical record data. Items were reduced based on a priori criteria: means of 2 and SDs of 2 in terms of importance for well-being following treatment for NMSC and correlation coefficients of 0.30. Items meeting these criteria were refined, reformatted, and assessed for literacy levels (Flesch-Kincaid to the eighth grade level).

Phase III: Test–Retest I and II

Thirty-three patients (some with the aid of a partner) rated the set of reduced items during the initial test for test–retest I. Items were scored in terms of how much their skin cancer had affected their HRQOL (1 = not at all to 5 = very much) with higher scores indicating better HRQOL) during the past month. To ensure greater interpretability, raw scores are presented in their original metric (summed and averaged) and will be linearly transformed (0–100) when item placement on final subscales are verified. The scoring algorithm will accommodate

limited item nonresponse (<50%) by prorating subscales. At Time 1, surveys were completed while patients waited for their initial dermatologic consultation (post-biopsy); at Time 2, surveys were mailed and completed at home. On average, Survey 2 followed Survey 1 by approximately 2 weeks (mean 15.1 days; SD 2.01). Both Time 1 and 2 surveys took more than 5 minutes to complete (mean 5.48, SD 2.95; mean 5.52, SD 5.10, respectively). Participants who did not provide complete surveys at both time points were omitted from the analysis ($n = 2$). Items were selected based on a priori criteria: mean 3.5, SD 1.00, and item-to-total subscale correlation 0.70. A research nurse administered a second version of the test–retest after participant's initial dermatologic consultation. At Time 1, patients ($n = 33$) were told that the nurse would be calling them 2 weeks hence to complete a second survey. Proxies were not allowed. No physician office visits were scheduled between test administrations (testing interval mean 15.1 days, SD 2.13 days; completion time mean 3.54 minutes, SD 1.02 minutes). A total of 31 patients completed both test and retest interviews for Version II (i.e., attrition rate of 6.1%; $n = 2$). Item selection criteria remained the same across test–retest administrations.

Phase IV: Validation and Sensitivity Testing

We are currently field testing the revised FSCI (before and 4 months after MMS) and conducting psychometric tests for validity and sensitivity.

Data Analysis

The current study used multiple measures across four independent samples of biopsy-diagnosed NMSC patients to develop items suitable for a tool capable of assessing HRQOL among the target population. Depending on phase, various statistical procedures were performed. Means, SDs, and frequencies were calculated for all samples; Cronbach's α coefficient, a measure of internal consistency, was estimated for measures of subscale internal consistency during Phases II and III. Generally, scores of >0.60 are considered acceptable.¹⁸

Bivariate correlations were examined to assess overlap between items. In keeping with the literature, a strong association was defined as a correlation greater than 0.70, moderate to substantial as a correlation of 0.30 to 0.70, and modest as a correlation less than 0.30. In variance terms, these are equivalent to shared variances of greater than 50, 10 to 50, and less than 10%.¹⁹ Although the samples were small, strictly exploratory principal components factor analyses (PCFA) using varimax rotation were conducted to understand domain structure. Confirmatory PCFA will be conducted during Phase IV. Data were entered and statistics calculated using computer software (SPSS, Statistical Program for the Social Sciences, 2004, version 13.1, SPSS Inc., Chicago, IL, USA) software modules.

Results

As shown in Table 1, participants ranged in age from 30 to 86 years across all phases (median age 67.4 years). Approximately half (55%) were women. Across all phases, the majority of the participants were married, retired or working only part-time, middle class (upwards of \$50,000 per annum), and fairly well educated (most had graduated high school and some had attended, but not graduated, college), perhaps reflecting the standards of an earlier era. Less than 20% reported poor-to-fair current health status and almost all (91%) had been diagnosed with BCC. Tumors located in the nose area far outnumbered all other head and neck tumors.

Phases I and II: Item Generation and Reduction

A total of 71 distinct items were generated in Phase I and rated for their importance during Phase II. In keeping with the highest psychometric standards for HRQOL scale development (see McHorney and colleagues²⁰ for a review), items were evaluated for data quality, variability, internal consistency, range, and skewness. Almost 50% (36) of the items met our

criteria for further study. Approximately 20% of the remaining items were related to treatment issues and set aside for future exploration; the remaining items were discarded because they were not rated as even minimally important to NMSC patients HRQOL. As shown in Table 2, Phase II participants rated more emotional issues as important than physical issues. Bivariate correlations (not shown) indicated that social and family items clustered together. Items conceptualized as future concerns in Phase I were not moderately associated according to criteria. Two new sets of items displayed correlations of >0.30 and were named appearance and lifestyle based on item contents. Thirty-two of the original items were retained. Because the majority of the participants in Phase II did not work outside the home, means and SDs were somewhat lower than expected from the results of Phase I; thus, these items were modified to reflect work functions that occur either at work or at home. All other items were rated at least somewhat important with only moderate disagreement. With the exception of physical functioning that suggested marginal reliability ($\alpha = 0.63$), all subscales showed good internal consistency, with Cronbach's α ranging from 0.78 (lifestyle) to 0.87 (social/family). After item modifications, additions, refinement, and literacy checks, 36 items were assigned to test-retest I surveys.

Phase IIIa: Reliability over Time, Test-Retest I

Scores indicated that participants were more concerned about emotional and appearance issues than those related to other domains (Table 2). α Coefficients for these two subscales suggested excellent internal consistency (range 0.82–0.91). In general, however, scores for the majority of the items showed positive change over time and test-retest correlations were lower than expected, especially for physical functioning ($r = 0.38$) and financial/work concerns ($r = 0.33$). Item and subscale scores for the remaining domains showed evidence of ceiling effects and little variability. With the exception of physical functioning (T1 $\alpha = 0.58$, T2 $\alpha = 0.32$), α coefficients suggested at least minimal internal consistency (range financial/work 0.60, lifestyle 0.85). Although this finding suggested that the items were sensitive to change over time, it also marred assessment of reliability over time. A second test-retest survey consisting of 26 of the most promising items (lower means, larger SDs, less redundancy with other items) was administered to a different sample of patients. Physical functioning items did not meet inclusion criteria and were dropped for the second test-retest administration.

Phase IIIb: Reliability over Time, Test-Retest II

Again, item means were lower and SDs were greater for emotional well-being and appearance concerns (Table 2). Evidence of ceiling effects and low variability was shown for the majority of the remaining items. With the exception of lifestyle, α coefficients indicated excellent internal consistency for all subscales (range 0.80 to 0.95). Lifestyle items were not internally consistent at Time 2 ($\alpha = 0.58$). Subscale bivariate correlation coefficients (Table 3) showed excellent reliability between Time 1 and Time 2 with the exception of lifestyle. Subscales were moderately correlated with each other. Exploratory PCFA indicated that at Time 1, the 26 items separated into four factors explaining 87.0% of the variance in HRQOL. At Time 2, five factors explained 83.8% of the variance. In general, factor scores, after varimax rotation, indicated that all items loaded on the subscales as expected: emotional well-being, social well-being, appearance issues, financial/work-related well-being, and lifestyle. After eliminating lifestyle items, results showed that the 20 remaining items explained 84.9% of the variance in HRQOL at Time 1 and 81.1% at Time 2. These 20 items and their suggested subscales are shown in the Appendix. Item analysis showed substantial correlations between frustration and anxiety, concerns about friends and significant others, and worries about metastasis and development of more serious type of cancer. These items were combined, omitted, or moved to a new position on the final 20-item instrument to be administered during the next phase.

Phase IV: Scale Validation

A total of 250 patients will be randomly selected to participate in Phase IV. The final 20-item survey will be administered at two time points: before and at 4-months MMS follow-up. A confirmatory factor analysis will be conducted to determine the reliability of the abbreviated FSCI, and the resulting instrument will be validated against existing measures to determine the construct, concurrent, discriminant, and predictive validity of the newly developed FSCI.

Discussion

The overall objective of this study was to develop a HRQOL instrument specific to skin cancer. To our knowledge, there are no previous HRQOL instruments aimed specifically at skin cancer patients. This study represents the initial phases of the development of the FSCI, a HRQOL instrument that is specific to skin cancer patients. In our model, HRQOL is considered to be a multiple dimensional construct composed of four major areas of well-being: emotional, social/family, financial, and appearance-related issues. In general, scores for HRQOL among patients who had received treatment or dermatologic consultation to determine treatment were high, indicating that the items were important to the HRQOL of skin cancer patients. Our results suggest that although the developing FSCI needs further validation, particularly with patients at early stages of diagnosis, pretest results look promising.

Item generation results led to the identification of 71 distinct treatment and HRQOL-related concerns expressed by high-risk patients who had already completed MMS for NMSC. These items were then tested for their relative HRQOL importance by an independent, yet treatment-similar, patient sample. Items were ranked by their importance depending on domain. In the main, items generated in the first sample were confirmed as important issues in the lives of people who had been diagnosed and completed treatment for NMSC. Results suggested that although mortality is low for most skin cancer, the associated morbidity and collateral effects, including high personal and economic costs of disfigurement, treatment, and potential chronicity of health care delivery and financing, are important concerns. Many of these items focused on appearance (scarring) and lifestyle-related issues (shifting daily schedules), domains not included on general HRQOL tools. Luoma and Hakamies-Blomqvist¹⁷ also found these issues of importance for disease-specific modules aimed at breast cancer survivors. Treatment issues were another central theme that emerged from our original pool of items. These items were set aside and will be revisited as a predictor measure that may help to identify and allay patients' fears about the surgical process.

Our test-retest data also suggested several reasons why standard HRQOL tools may not capture the unique concerns of skin cancer patients. First, few reported physical functioning limitations either immediately before or up to a year after surgery. Our findings provide corroboration with other research that found the NMSC causes little physical handicap.²¹ Second, emotional and appearance issues were of primary concern. Trask and coworkers²² found that approximately 29% of skin cancer patients presenting for treatment reported moderate to high levels of distress that also was related to significantly poorer HRQOL. Although fears about metastasis and recurrence are common among all cancer survivors, concerns about appearance are rarely asked. Katz and colleagues²³ showed that disfigurement concerns are associated with psychosocial adjustment, particularly among patients diagnosed with head and neck cancer. Appearance-related concerns also may be more difficult for clinicians to deal with because of the emphasis on treatment. Worries about possible facial disfigurement and potential scarring are important patient-level concerns that may present barriers to early treatment. Third, a cluster of lifestyle behaviors was identified. Sun-protective health beliefs have been found to be important predictors of who will benefit most from skin cancer interventions among younger cohorts^{24,25} and should be even more informative if an intervention were mounted in older adults who (1) are at higher risk for skin cancer, (2) already

have experienced at least one skin cancer diagnosis, (3) are less likely to view a tan as healthy, and (4) may be more likely to have fixed incomes to (5) take care of a disease that is more often chronic than acute.^{23,26}

Limitations and Strengths

Ceiling effects, low variability, and low test–retest correlations for selected items and subscales were evidenced. A large pool of items was generated, and the authors did not expect all to be of equal importance. Those that were retained, however, were based on multiple samples of respondents, various time periods along the treatment trajectory, and a priori item selection criteria. Because dermatologic consultation occurred between test–retest I administrations, counseling effects may have marred the results; in contrast, these changes also suggest sensitivity. Because the second administration of test–retest I was in a written format that participants completed at home, the authors were unsure about whether or not the participant or a proxy had actually completed the survey. These issues were resolved during test–retest II and counted as lessons learned. Proxies were not allowed during the second test–retest administration, and to assure that the participant who had agreed to complete the survey actually did so, the clinical research assistant administered the retest via telephone. Dermatologic consultations did not occur between administrations of test–retest II. Results of the second test–retest suggested that for some items, ceiling effects may still be an issue, a concern with even “gold-standard” HRQOL measures.^{12,13,27} Moreover, items relating to lifestyle, a domain identified as important among NMSC patients,^{7,8,11} showed seasonal effects. These items will be used as predictors in future administrations and reflect a more general time frame that is less likely to be influenced by transitory weather variations.

Skin cancer has a better prognosis than most other types of cancer.⁵ Still, any diagnosis of cancer can be frightening, and it is natural to have concerns about medical tests, treatments, doctors' bills, and appearance, especially if the skin cancer is highly visible. Our scale appears to address subtle emotional issues that affect more than a million people in the United States alone each year. It is essential, however, to demonstrate that HRQOL assessment methods can detect change in HRQOL. Measures of HRQOL should not be used in clinical trials unless responsiveness had been demonstrated. Validity and sensitivity testing for the FSCI is currently under way. A confirmatory factor analysis will be conducted to determine the reliability of the abbreviated FSCI and the resulting instrument will be validated against existing measures to determine the construct, concurrent, discriminant, and predictive validity of the FSCI tool. In the future, it is hoped that the use of the FSCI in the routine clinical assessment of patients with skin cancer will help to make the patient–physician interaction more patient-centered by highlighting the psychosocial influences on the individual patient's well-being, as well as providing a useful practical measure for regular use.

Appendix

Items and Domains for 20-Item Version of the FSCI

Emotional

- Worry about existing cancer spreading (metastasis)
- Anxiety about skin cancer in general
- Worry that immediate family members may be more prone to developing skin cancer
- Worry about causal factors
- Frustration with skin cancer care
- Worry that existing tumor will become more serious type of cancer

- Worry about new skin cancers developing in the future

Social/Family

- Discomfort when meeting new people
- Concern that existing skin cancer worries friends and family
- Isolation, staying at home, not going out in public
- Bothered by people's questions, advice

Financial/Work

- Shifts in daily schedule for medical treatment or personal skin care
- Limited work activities either at home or at work
- Financial problems related to skin cancer treatment
- Effectiveness of skin cancer treatment
- Health insurance coverage
- Appearance
- Size of scar
- Effects of scar on self-image
- Embarrassed by skin cancer
- Visibility of scar to others

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TABLE 1
Descriptive Statistics for Sociodemographic and Study Variables*

Variable	Phase I	Phase II	Test-Retest I	Test-Retest II
Total No. of patients	20	52	31	31
Age (years)				
Median	69.5	69.5	69.0	61.0
Range	42–86	40–91	43–86	30–83
Sex				
Women	55.0 (11)	61.5 (32)	48.4 (15)	51.6 (16)
Men	45.0 (9)	38.5 (20)	51.6 (16)	48.4 (15)
Education				
High school (or less)	35.0 (7)	42.3 (22)	41.9 (13)	22.6 (7)
College attendance	40.0 (8)	28.8 (15)	22.6 (7)	22.6 (7)
College graduate	20.0 (4)	17.3 (9)	19.4 (6)	29.0 (9)
Graduate degree	5.0 (1)	9.6 (5)	16.1 (5)	25.8 (8)
Missing	None	1.9 (1)	None	None
Marital status				
Never	5.0 (1)	13.5 (7)	3.2 (1)	9.7 (3)
Married	70.0 (14)	55.8 (29)	77.4 (24)	80.6 (25)
Divorced	5.0 (1)	15.4 (8)	12.9 (4)	None
Widowed	20.0 (4)	15.4 (8)	6.5 (2)	9.7 (3)
Health status				
Poor	5.0 (1)			None
Fair	15.0 (3)			16.1 (5)
Good	35.0 (7)			19.4 (6)
Very good	25.0 (5)			45.2 (14)
Excellent	20.0 (4)			19.4 (6)
History				
Basal	75.0 (15)	86.5 (45)	100.0 (31)	96.7 (30)
Squamous	25.0 (5)	11.5 (6)	None	3.2 (1)
Tumor location				
Nose	40.0 (8)	40.4 (21)	38.7 (12)	48.4 (15)
Lip	25.0 (5)	0.0 (0)	9.7 (3)	6.5 (2)
Eye	15.0 (3)	13.5 (7)	9.7 (3)	12.9 (4)
Ear	0.05 (3)	5.8 (3)	3.2 (1)	9.7 (3)
Cheek	None	15.4 (8)	16.1 (5)	12.9 (4)
Forehead	None	13.5 (7)	9.7 (3)	3.2 (1)
Other (chin, brow, neck)	15.0 (3)	11.5 (6)	12.9 (4)	19.4 (6)
Time (minutes) [†]				
Completion Time 1			5.48 (2.95)	4.03 (1.17)
Completion Time 2			5.52 (5.10)	3.45 (0.85)
Time interval between tests			15.1 (2.01)	15.1 (2.13)

* Data are reported as % (*n*).

[†] Data are reported as mean (SD).

TABLE 2
 Item Frequency Distribution, Phase II, Test–Retest I (T-RD), and Test–Retest II (T-RD)*

Item	Phase II		T-R I		T-R II	
	T1	T2	T1	T2	T1	T2
Emotional						
Metastasis	4.31 (1.20)	3.39 (1.45)	3.87 (0.99)	3.74 (1.37)	3.77 (1.43)	3.77 (1.43)
Cancer progression	4.23 (1.20)	3.10 (1.35)	3.39 (1.36)	3.87 (1.34)	3.93 (1.34)	3.93 (1.34)
Family skin cancers	3.52 (1.51)	3.58 (1.34)	3.77 (1.18)	3.77 (1.36)	3.84 (1.32)	3.84 (1.32)
Causal factors	4.17 (1.28)	3.45 (1.43)	3.81 (1.33)	3.87 (1.41)	4.00 (1.21)	4.00 (1.21)
Frustrated	3.17 (1.44)	3.19 (1.56)	3.65 (1.23)	4.00 (1.32)	4.13 (1.15)	4.13 (1.15)
Anxiety	3.47 (1.33)	3.71 (1.16)	4.06 (1.21)	3.74 (1.29)	3.93 (1.24)	3.93 (1.24)
Future concerns	4.67 (0.71)	2.81 (1.51)	2.90 (1.19)	3.48 (1.23)	3.48 (1.43)	3.48 (1.43)
Treatment working		3.90 (1.22)	4.00 (1.26)	4.32 (1.08)	4.32 (1.08)	4.32 (1.08)
Subscale total	3.94 (0.86)	3.39 (1.08)	3.68 (0.97)	3.86 (1.10)	3.93 (1.11)	3.93 (1.11)
Subscale α (95% CI)	0.81	0.91 (0.85, 0.95)	0.91 (0.86, 0.95)	0.94 (0.91, 0.97)	0.95 (0.92, 0.98)	0.95 (0.92, 0.98)
Test–retest r, p value			0.67, 0.001		0.93, 0.001	
Appearance						
Clothing limitations	2.08 (1.33)	4.97 (0.18)	4.93 (0.25)	Deleted	Deleted	Deleted
Scar size, depth	3.69 (1.26)	3.06 (1.61)	3.61 (1.45)	3.65 (1.38)	3.71 (1.24)	3.71 (1.24)
Personal attractiveness	2.98 (1.36)	3.55 (1.41)	4.03 (1.22)	4.06 (1.31)	4.19 (1.14)	4.19 (1.14)
Embarrassment	2.50 (1.36)	4.19 (1.11)	4.53 (0.68)	4.29 (1.24)	4.48 (1.12)	4.48 (1.12)
Other's questions	2.25 (1.17)	4.45 (1.03)	4.84 (0.38)	Moved	Moved	Moved
Scar visibility	3.46 (1.41)	3.23 (1.45)	3.58 (1.50)	3.97 (1.33)	3.94 (1.21)	3.94 (1.21)
Subscale total	2.82 (0.99)	3.91 (0.94)	4.25 (0.75)	3.99 (1.18)	4.08 (1.10)	4.08 (1.10)
Subscale α (CI)	0.84	0.86 (0.77, 0.93)	0.82 (0.69, 0.90)	0.92 (0.86, 0.96)	0.88 (0.79, 0.94)	0.88 (0.79, 0.94)
Test–retest r, p value			0.79, 0.001		0.81, 0.001	
Financial/work						
Time off work	1.77 (1.34)	4.33 (1.30)	4.46 (1.24)	4.48 (1.09)	4.45 (0.96)	4.45 (0.96)
Limits advancement	3.33 (1.46)	4.83 (0.75)	4.92 (0.28)	4.77 (0.67), modified	4.71 (0.69) modified	4.71 (0.69) modified
Financial problems	3.04 (1.56)	4.83 (0.25)	4.81 (.57)	4.39 (1.05)	4.51 (0.85)	4.51 (0.85)
Work functions	1.91 (1.27)	4.87 (.57)	5.00 (0.00)	Deleted	Deleted	Deleted
Health insurance	4.02 (1.43)	4.07 (1.41)	3.90 (1.59)	3.94 (1.24)	4.16 (1.16)	4.16 (1.16)
Subscale total	2.49 (1.03)	4.63 (0.60)	4.47 (0.89)	4.40 (0.81)	4.46 (0.81)	4.46 (0.81)
Subscale α	0.81	0.60 (0.31, 0.79)	0.50 (0.08, 0.76)	0.79 (0.64, 0.89)	0.89 (0.81, 0.94)	0.89 (0.81, 0.94)
Test–retest r, p value			0.33, 0.084		0.84, 0.001	
Lifestyle/recreation						
Outdoor activities	3.52 (1.38)	4.06 (1.00)	4.13 (1.20)	4.35 (1.33)	4.45 (1.06)	4.45 (1.06)
Types outdoor activities	3.56 (1.41)	4.38 (1.02)	4.52 (0.81)	4.58 (0.89)	4.61 (1.05)	4.61 (1.05)
Interference with hobbies	2.79 (1.40)	4.48 (0.96)	4.39 (0.99)	4.81 (0.54)	4.55 (0.93)	4.55 (0.93)
Constant sunscreen use	4.08 (1.35)	4.26 (1.00)	4.06 (1.26)	4.58 (0.81)	4.55 (0.89)	4.55 (0.89)
Sun-protective clothing	3.96 (1.33)	4.00 (1.44)	4.03 (1.43)	4.58 (0.81)	4.58 (0.88)	4.58 (0.88)
Subscale total	3.58 (1.03)	4.24 (0.78)	4.23 (0.92)	4.58 (0.77)	4.55 (0.59)	4.55 (0.59)
Subscale α	0.78	0.75 (0.59, 0.97)	0.85 (0.75, 0.92)	0.90 (0.83, 0.95)	0.58 (0.29, 0.77)	0.58 (0.29, 0.77)
Test–retest r, p value			0.73, 0.001		0.41, 0.023	
Social/family						
What friends think	2.23 (1.38)	4.55 (0.77)	4.52 (0.77)	4.58 (0.96)	4.55 (0.99)	4.55 (0.99)
Limiting socialization	2.71 (1.59)	4.94 (0.25)	4.81 (0.48)	4.71 (0.82)	4.74 (0.82)	4.74 (0.82)
What family thinks	3.29 (1.43)	4.68 (0.75)	4.52 (0.96)	Deleted	Deleted	Deleted
Spousal attitude	2.73 (1.48)	4.57 (0.90)	4.45 (0.96)	4.52 (1.00)	4.61 (0.99)	4.61 (0.99)
Family responsibility	3.08 (1.51)	Deleted	Deleted	Deleted	Deleted	Deleted
Going out in public	2.70 (1.66)	4.55 (0.85)	4.45 (0.88)	4.45 (0.93)	4.52 (1.01)	4.52 (1.01)
Self-care		4.74 (0.58)	4.81 (0.48)	Deleted	Deleted	Deleted
Asking friends for care		4.35 (1.25)	4.35 (1.08)	Deleted	Deleted	Deleted
Other's questions				4.48 (0.93)	4.58 (0.81)	4.58 (0.81)
Subscale total	2.80 (1.15)	4.63(0.44)	4.56 (0.51)	4.55 (0.80)	4.56 (0.83)	4.56 (0.83)

Item	Phase II	T-R I		T-R II	
		T1	T2	T1	T2
Subscale α	0.87	0.60(0.32, 0.78)	0.74 (0.56, 0.86) 0.78, 0.001	0.92 (0.56, 0.86) Deleted all	0.94 (0.89, 0.97) 0.97, 0.001 Deleted all
Test-retest r, p value					
Physical/functioning	2.69 (1.50)	4.84 (0.37)	4.77 (0.56)		
Skin sensitivity	3.48 (1.32)	4.68 (0.79)	4.94 (0.25)		
Skin sore	3.75 (1.49)				
Body functions		4.84 (0.45)	4.94 (0.25)		
Bathing		4.87 (0.34)	4.81 (0.40)		
Grooming	3.49 (1.07)	4.81 (0.35)	4.86(0.22)		
Subscale total	0.63	0.58 (0.27, 0.78)	0.32 (0.18, 0.64)		
Subscale α			0.38, 0.0037		
Test-retest r, p value					

Note. Phase II, $n = 52$, 71 items; T-R I, $n = 31$, 36 items; T-R II, $n = 31$, 26 items.

* Data are reported as mean (SD).

TABLE 3
 Facial Skin Cancer Index Subscale Correlation Coefficients: Test-Retest II, Times 1 and 2

Variable	Time 1					Time 2				
	Emot 1	Appear 2	Finance 3	Life 4	Social 5	Emot 6	Appear 7	Finance 8	Life 9	Social 10
1. Emotional (1)	—									
2. Appearance (1)	0.73**	—								
3. Financial/work (1)	0.62**	0.64**	—							
4. Lifestyle (1)	0.46**	0.46**	0.69**	—						
5. Social (1)	0.58**	0.56**	0.65**	0.67**	—					
6. Emotional (2)	0.93**	0.71**	0.51**	0.43*	0.66**	—				
7. Appearance (2)	0.76**	0.81**	0.49**	0.45**	0.69**	0.83**	—			
8. Financial/work (2)	0.72**	0.58**	0.84**	0.62**	0.79**	0.66**	0.68**	—		
9. Lifestyle (2)	0.49**	0.40**	0.31**	0.41**	0.44**	0.57**	0.44**	0.41**	—	
10. Social (2)	0.57**	0.51**	0.69**	0.66**	0.97**	0.64**	0.72**	0.82**	0.41**	—

Note. $n = 31$ with complete data at both times.

* $p < 0.05$

** $p < 0.01$, two-tailed probabilities.