

Research Article

Quality of Life in Cervicofacial Nonmelanoma Skin Cancer: Assessment with the Skin Cancer Index

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This study aimed to evaluate the quality of life (QoL) of patients with cervicofacial nonmelanoma skin cancer (NMSC) using the Brazilian Portuguese-adapted and validated version of the skin cancer index (SCI). After collecting demographic and clinical data from 182 patients with cervicofacial NMSC, the Brazilian versions of the SCI and the Dermatological Life Quality Index (DLQI) were applied preoperatively (T0) and 4 months postoperatively (T1). Assessments were carried out using the Shapiro–Wilk test, Student’s *t*-test, Mann–Whitney test, Kruskal–Wallis test, and Spearman’s correlation. The QoL was evaluated using the Student’s *t*-test in paired samples at T0 and T1. Significant results were observed, with an increase in scores on the SCI scale in all its dimensions and a decrease in scores on the DLQI scale, demonstrating better postoperative QoL. The variables that presented significant results on the total scale, which indicated better QoL, were men, without children, income above four minimum wages, from the private sector, did not report pruritus, and scalp lesions. The QoL measurement indicated a change from the baseline and improvement after 4 months postoperatively in all subscales, indicating that surgical treatment increased the QoL of these patients from an emotional, social, and physical appearance point of view. The multivariate analysis produced several statistically significant findings in relation to emotional, social, appearance, and total scores.

1. Introduction

Nonmelanoma skin cancer (NMSC) is the most prevalent malignancy among Caucasians worldwide. In Brazil, its incidence is increasing, corresponding to approximately 30% of all malignant tumors registered in the country [1]. Its incidence is often underestimated due to underreporting. Moreover, in recent years, there has been a reduction in the diagnosis of new cases due to the COVID-19 pandemic [2],

with a potential increase in morbidity [3]. It is estimated that 95% of these cases are of the basal cell carcinoma (BCC) and squamous cell carcinoma types. Together, they are called “keratinocyte carcinomas” [4], and 70% of NMSCs occur in the cervicofacial region, given the greater exposure of these areas to ultraviolet radiation, especially ultraviolet B rays (UVB) [5–7].

The most common treatment is traditional surgical excision. However, excision through Mohs surgery,

cryotherapy, radiotherapy, curettage and electrocoagulation, photodynamic therapy, or topical immunomodulators can be recommended as alternative therapies for patients who are not good candidates for classic excision surgery of the lesion or who do not wish to undergo a surgical procedure [5, 8, 9].

NMSC is a disease whose severity does not correspond with the degree to which it affects the patient's life, owing to the degree of anxiety generated by the possible diagnosis of other tumors in the coming years. In addition to the stress caused by the need to undergo most surgical treatments, there is uncertainty regarding the emergence of possible functional sequelae and physical appearance that may interfere with relationships with other people and the patient's state of mind. Studies have shown that the diagnosis and treatment of cervicofacial NMSC cause a variety of physical, emotional, and social sequelae with high levels of anguish, anxiety, depression, and social isolation that affect the general health of the patient and, as a result, compromise the quality of life (QoL) [7, 10].

The concept of QoL emerged with the creation of a group of specialists from the World Health Organization, which defined it as the "perception that the individual has of their position in life, in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns." In addition, it focuses on the patient's response, that is, the perception of the respondent or patient in question [11]. Therefore, QoL can have broad and variable meanings in different populations and cultures. In medicine, the term health-related quality of life (HRQoL) is used to represent the patient's perception of the effects of a disease and its treatment on the physical, psychological, and social aspects of life.

The most common and recommended way of measuring QoL is through health assessment questionnaires answered by the patients, also called patient-reported outcomes. These instruments can assess many aspects or dimensions, such as physical, social, and emotional functions, using questions or items. Such instruments are becoming increasingly important as a means of comparing health condition in medicine from a health policy perspective, as they are used for resource allocation [12].

In 2005, Rhee et al. created the first instrument in English for assessing the quality of life of patients with cervicofacial NMSC, termed as the skin cancer index (SCI) [12–15]. In a recent systematic review, the SCI was identified as the only easily applied instrument developed and validated to measure the QoL of patients with cervicofacial NMSC [10, 16, 17].

In 2010, Carvalho carried out the cross-cultural adaptation of the SCI into Portuguese patients from southeastern Brazil [18]. In 2020, a new adaptation and validation for Portuguese was carried out in patients from the Brazilian Northeast [19], as Brazil is a country of continental dimensions with an estimated population of 213.3 million people and significant cultural diversity between its regions. This new adaptation of the SCI to Brazilian Portuguese [19] was used in this study, the center of which was two cities in the northeastern Brazil.

In this context, the aim of this study was to evaluate the QoL of patients with cervicofacial NMSC in a population in northeastern Brazil, thus helping to understand the impact of this disease on these individuals and identify the variables related to better baseline QoL in these patients.

2. Methods

This cross-sectional study used the Brazilian version of the SCI to evaluate the QoL of patients with cervicofacial NMSC treated in public hospitals (ambulatory care of the Hospital of the Federal University of Sergipe, São Cristóvão e Lagarto, and Centro de Oncologia Hospital de Emergência de Sergipe) and in a private clinic in Aracaju, Brazil.

The sample size was estimated to be 182 patients through a sampling plan in which the sample size reflected the hypothesis test applied to assess the study objectives. Therefore, to evaluate the hypothesis that there is no difference in the QoL before and after surgery, the *t*-test for dependent samples was applied. Human Research Ethics Committee of the Federal University of Sergipe (Universidade Federal de Sergipe (UFS)), Brazil, approved the project under CAAE (Certificado de Apresentação de Apreciação Ética) number 02241518.5.0000.5546/opinion: 3.011.994 and all research studies were performed in accordance with relevant guidelines and regulations.

The study's inclusion criteria were patients over 18 years of age, with a diagnosis of cervicofacial NMSC, and a therapeutic plan for surgical resection of the lesion, whose cognitive conditions and verbal expressions allowed their participation in the application of the assessment instruments, and who agreed to participate in the study voluntarily. Patients with neuropsychiatric disorders that prevented them from understanding and completing the questionnaire were excluded.

The Brazilian version of the SCI consists of 15 items divided into three subscales, namely, emotion (7 items), social (5 items), and appearance (3 items), to evaluate the QoL of patients with cervicofacial NMSC. Each item is scored from 1 to 5 (1 = extremely, 2 = very much, 3 = moderately, 4 = slightly, and 5 = not at all), with the total score ranging from 0 to 100.

According to the study design, the collection procedure involved the selection of patients from plastic surgery, dermatology, and head and neck surgery outpatient clinics at the study sites. After recruitment, patients consented to participate in the study by completing an informed consent form (TCLE). Patients were interviewed before surgical treatment, and demographic and clinical data were collected.

The demographic data included address, place of birth, age, ethnicity, religion, marital status, education, profession, and family income. The clinical variables included type, time, number, size, and location of the lesions, as well as symptoms associated with the lesions; prior surgeries for other lesions; H-zone involvement; functional involvement; first intervention or reoperation; margin expansion or lesion recurrence; and diagnostic hypothesis and therapeutic plan (primary wound closure, grafts, or flaps).

After collecting the demographic and clinical data, the Brazilian versions of the SCI and the Dermatological Life Quality Index (DLQI), which is a generic questionnaire on QoL for dermatological diseases, were applied in the pre-operative period (T0). DLQI was created in 1993 by Finlay and Khan and was adapted into Brazilian Portuguese, including a pediatric version. It consists of 10 items, divided into six aspects: symptoms and feelings, daily activities, leisure, work/school, personal relationships, and treatment. Its score ranges from 0 to 30, with 0–1 having no impact; 2–5 having a light impact; 6–10 having a moderate impact; 1–20 having a very impactful impact; and 21–30 having an extreme impact on the patient's quality of life. [20].

The patients underwent surgery, and the diagnosis of NMSC was confirmed in an anatomopathological study. After 4 months, the Brazilian versions of the SCI and DLQI were applied again (T1).

2.1. Statistical Analysis. For analysis of demographic and clinical data, categorical variables are described using absolute frequencies and relative percentages. Continuous variables are described using the mean, median, standard deviation, and interquartile range. The percentages of their distributions are presented in the tables.

The hypothesis of adherence of continuous variables to a normal distribution was tested using the Shapiro–Wilk test. The hypothesis of equality of two dependent means, which evaluates the changes in the QoL of individuals between the pre- and postoperative periods, was tested using the Student's *t*-test and two independent medians using the Mann–Whitney test. The hypothesis of equality of three or more independent medians was tested using the Kruskal–Wallis test.

Spearman's correlation was used to assess the correlations between continuous and ordinal variables. Cohen's *d*, a measure of effect size, was used to assess the size of the observed differences: small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$) [21].

We also applied multivariate linear regression with SCI scales as dependent variable and 0.2 statistically significant clinic and demographic variables as independent variables [22].

The significance level was set at 5%, and the software used for the analysis in this study was R Core Team (version 4.2.0) [23].

3. Results

In the sample of 182 patients who responded at T0, nine individuals, after numerous unsuccessful attempts, had their follow-up interrupted due to loss of contact at T1 when the questionnaire was administered. It is noteworthy that this episode did not compromise the statistical feasibility. The approximate time for completing the questionnaire was between 5 and 10 min, and no patient refused to answer the questionnaire. There was no report of misunderstanding the items nor any lack of response to any question. Nonliterate patients were assisted by their companions in reading questions.

As for the demographic characteristics of the patients, the mean age was 67.6 years and the majority were women (51.6%), white (92.3%), with a partner (62.1%), with children (92.8%) (average number of children: 3.9 (SD: 2.6)), with more than 9 years of education (51.1%), working (60.6%), with an income less than 4 minimum wages (MW) (70.7%), and assisted in public hospitals (63.7%).

The distribution of the clinical characteristics of the patients ($n = 182$) showed that the mean duration of the lesion was 397.7 days, of which 95.1% grew, 30.2% presented with bleeding, 47.8% presented with pruritus, 15.4% presented with color change, 12.1% presented with local pain, and 18.7% had other symptoms. Reported comorbidities included high blood pressure (47.3%), diabetes (23.1%), and other cancers (2.7%). Approximately, 4.4% had already been operated upon for the injury in question and 25.8% had already been operated upon for other head and neck injuries; 84.1% had only one lesion, the most common sites being the nose (35.2%), hemiface (23.6%), forehead (14.3%), and eyelid (12.6%). Moreover, approximately 68.7% of the patients had involvement of the H-zone, with predominance in the nose (35.2%) and left (9.9%) and right hemiface (7.7%). Approximately, 30.2% had involvement in the functional area, with the nasal wing (13.2%) and eyelids (11%) being the most common sites.

On average, the tumors measured a combined 2.2 cm² (SD: 2.9 cm²), with 84.1% of the patients having only one tumor. Approximately, 96.2% of the patients were in the first intervention, 1.6% had enlarged margins, and 3.3% had recurrent tumors. As for surgical treatment, 68.1% of the patients underwent surgery for skin flaps, and the predominant type of cancer was BCC (81.4%); the predominant histological subtypes were ulcerated solid (30.1%), solid (27.8%), and superficial (11.4%).

The distribution of the QoL scale results is presented in Table 1. Significant results were observed with an increase in the scores on the SCI scale in its dimensions and in total and a decrease in the DLQI scale. In the “emotional” dimension, it was noted that there was an average increase of 11.49 points ($d = 0.539$), which was considered average. On the other hand, in the “social” dimension, an average increase of 6.64 points ($d = 0.489$) was considered small, and in the “appearance” dimension, an average increase of 9.07 points ($d = 0.410$) was considered small. In the total SCI, it was observed that there was an average increase of 9.38 points ($d = 0.616$), which was considered average. In the total DLQI, there was an average decrease of 0.74 points ($d = -0.259$), which was considered small.

Table 2 presents the intersections between the SCI scale scores and the categorical demographic variables. Among the significant results, some results indicated a higher score in the “emotional” dimension: male sex ($p = 0.002$), not having children ($p = 0.023$), income greater than 4 MWs ($p = 0.001$), and private sector ($p = 0.001$). In the “social” dimension, these results included male sex ($p = 0.034$), income greater than 4 MWs ($p < 0.001$), and private sector ($p < 0.001$). In the “appearance” dimension, the result included only income greater than 4 MWs ($p = 0.019$). In “total,” male sex ($p = 0.002$), not having children

TABLE 1: Distribution of the results of the quality of life scale (SCI and DLQI) between periods T0 and T1 (Sergipe, Brazil, 2021-2022).

			Differences paired		<i>t</i> -test statistics			
	Average	SD	Average	SD	<i>t</i>	gl	<i>p</i> value	d
SCI								
Emotional								
T0	70.9	22.93	11.49	21.30	7.05	170	<0.001	0.539
T1	82.08	20.13						
Social								
T0	87.95	15.65	6.64	13.58	6.39	170	<0.001	0.489
T1	94.59	10.84						
Appearance								
T0	83.14	21.73	9.07	22.10	5.36	170	<0.001	0.410
T1	92.20	14.74						
Total								
T0	78.89	16.98	9.38	15.24	8.05	170	<0.001	0.616
T1	88.28	13.96						
DLQI								
T0	3.36	3.47	−0.74	2.87	−3.38	170	0.001	−0.259
T1	2.62	3.64						

SCI, skin cancer index; DLQI, Dermatological Life Quality Index; SD, standard deviation; *t*, *t*-test statistics; gl, degree of freedom; d, Cohen's d effect size; T0, preoperative, T1, 4 months postoperatively.

TABLE 2: Distribution of crosses between the SCI scale scores and categorical demographic variables (Sergipe, Brazil, 2021-2022).

	SCI			
	Emotional median [IIQ]	Social median [IIQ]	Appearance median [IIQ]	Total median [IIQ]
Sex				
Female	67.9 [46.4–85.7]	90 [80–100]	91.7 [75–100]	78.3 [63.3–88.3]
Male	82.1 [64.3–92.9]	95 [87.5–100]	95.9 [75–100]	86.7 [75–95]
<i>p</i> ^M value	0.002**	0.034**	0.082	0.002**
Breed				
White	73.2 [53.6–92.9]	95 [85–100]	91.7 [75–100]	83.3 [68.3–91.7]
Brown	82.1 [71.4–85.7]	95 [90–100]	91.7 [66.7–91.7]	88.3 [66.7–91.7]
Black	75 [71.4–96.4]	95 [90–100]	100 [75–100]	88.3 [68.3–96.7]
<i>p</i> ^K value	0.532	0.717	0.755	0.690
Marital status				
With partner	75 [57.1–92.9]	95 [85–100]	91.7 [75–100]	83.3 [68.3–91.7]
No partner	67.9 [53.6–92.9]	95 [85–100]	91.7 [75–100]	81.7 [65–93.3]
<i>p</i> ^K value	0.456	0.475	0.673	0.500
Children				
Yes	71.4 [51.8–89.3]	95 [80–100]	91.7 [75–100]	82.5 [66.7–91.7]
No	92.9 [67.9–100]	95 [90–100]	100 [83.3–100]	88.3 [83.3–100]
<i>p</i> ^M value	0.023**	0.284	0.180	0.019**
Education				
<9 years	75 [53.6–89.3]	90 [80–100]	91.7 [75–100]	83.3 [66.7–91.7]
≥9 years	71.4 [53.6–92.9]	95 [90–100]	91.7 [75–100]	83.3 [70–93.3]
<i>p</i> ^K value	0.969	0.125	0.945	0.591
Work				
Yes	75 [53.6–89.3]	90 [80–100]	91.7 [75–100]	83.3 [66.7–91.7]
No	71.4 [57.1–92.9]	95 [90–100]	91.7 [79.2–100]	83.3 [72.5–92.5]
<i>p</i> ^M value	0.599	0.461	0.679	0.468
Family income				
Up to 4 MW	71.4 [46.4–85.7]	90 [80–100]	83.3 [75–100]	79.2 [65–89.2]
≥4 MW	85.7 [67.9–96.4]	100 [95–100]	100 [83.3–100]	87.5 [80–96.7]
<i>p</i> ^K value	0.001**	<0.001**	0.019**	<0.001**
Field of study				
Private	83.9 [67.9–96.4]	97.5 [90–100]	100 [75–100]	86.7 [76.7–96.7]
Public	71.4 [46.4–85.7]	90 [77.5–97.5]	87.5 [75–100]	78.3 [65–88.3]
<i>p</i> ^K value	0.001**	<0.001**	0.102	<0.001**

SCI, skin cancer index; IIQ, interquartile range; M, Mann–Whitney test; K, Kruskal–Wallis test. ** *p* < 0.05.

($p = 0.019$), income greater than 4 MWs ($p < 0.001$), and private sector ($p < 0.001$) were verified.

Table 3 shows the intersections between SCI and the anamnesis scale scores. Among the significant results, values with higher scores were observed for those who did not report pruritus in the anamnesis in the “social” ($p = 0.004$) and “appearance” ($p = 0.006$) dimensions, as well as in the “total” dimension ($p = 0.021$).

Table 4 presents the crossings between the SCI scale scores and lesion location. Among the significant results, values with higher scores were observed for those whose lesion was located on the scalp in the “emotional” dimension ($p = 0.010$) and the “total” dimension ($p = 0.012$) and for those whose lesion was on the ear in the “social” dimension ($p = 0.034$).

There were no significant associations between the SCI scale scores and clinical characteristics (involvement of the H-zone, involvement of the functional area, number of lesions, first intervention, enlargement of the margins, recurrence, type of surgery performed, and the type and histological subtype of the lesion).

Table 5 presents the crossings between the SCI scale scores and continuous or ordinal demographic and clinical variables. Significant results were observed for small and negative correlations between the number of children and the SCI-social dimension ($p = 0.020$, small) and the DLQI and all SCI dimensions: emotional ($p = 0.006$), social ($p < 0.001$), appearance ($p < 0.001$), and its total ($p < 0.001$). Furthermore, significant results were observed for small and positive correlations between age and the “emotional” ($p = 0.042$) and “appearance” ($p = 0.027$) dimensions as well as the “total” ($p = 0.011$) dimension.

Table 6 shows the multivariate analysis. We applied a multivariate linear regression with SCI scales as dependent variables and statistically independent variables selected from Tables 2–5. Analysis of the emotional dimension produced several statistically significant findings in relation to emotional factors. Men demonstrated an average increase of 8.47 points in emotional scores compared to women ($p = 0.011$). Individuals without children showed a notable decrease of 12.69 points in emotional scores compared to those with children ($p = 0.038$). Education level also played a significant role, with individuals with at least 9 years of education showing an average reduction of 10.53 points in emotional scores compared to those with less education ($p = 0.005$). In addition, a 1.44-point decrease in the Dermatology Life Quality Index (DLQI) was associated with an average increase in emotional scores ($p = 0.002$).

Regarding the social dimension, a decrease of 1.87 units was observed in the Dermatology Life Quality Index (DLQI), corresponding to an increase in social scores, indicating a better quality of life. Likewise, individuals with a family income above 4 minimum wages (MWs) showed an increase of 10.97 units in social scores, highlighting the positive impact of a higher family income on social aspects. The presence of pruritus (itching) was associated with a decrease of 4.13 units in social scores, suggesting a potential negative influence of itching on social aspects. Furthermore, the

presence of hemiface injuries was associated with a 5.38 unit decrease in social scores, highlighting the potential impact of facial injuries on social well-being.

When analyzing factors related to appearance, notable associations emerged. Individuals with a family income above 4 MWs exhibited a substantial increase of 16.74 units in appearance scores ($p = 0.006$), indicating a positive impact of family income on the perception of appearance. The presence of pruritus (itching) was associated with a notable decrease of 9.10 units in appearance scores ($p = 0.003$), highlighting the potential negative influence of pruritus on perceived appearance. In addition, a 1.23 unit decrease in the Dermatology Life Quality Index (DLQI) was associated with an increase in appearance scores ($p = 0.007$), suggesting that a better quality of life is associated with more positive perceptions of appearance. The presence of lesions on the hemiface was associated with a decrease of 7.18 units in appearance scores ($p = 0.047$), highlighting the potential impact of facial lesions on the perceived appearance.

Significant associations were observed in the analysis of total scores. Men exhibited a notable increase of 5.60 units in total scores compared to women ($p = 0.015$). The presence of children was associated with a notable decrease of 8.59 units in total scores ($p = 0.042$), suggesting an impact of parental responsibilities on general well-being. Furthermore, education showed significant effects, with individuals with at least 9 years of education demonstrating a decrease of 7.19 units in total scores ($p = 0.006$), while those with family income above 4 MWs exhibited an increase of 11.16 units in total scores ($p = 0.011$). The Dermatology Quality of Life Index (DLQI) showed a significant negative relationship, with a decrease of 1.54 units in the DLQI score associated with an increase in the total score ($p < 0.001$), indicating that a better dermatology quality of life correlates with a higher overall quality of life.

4. Discussion

By examining all subscales, both individually and in the total SCI score, significant changes were identified in the improvement of patients' quality of life between T0 and T1 and in the total SCI scale, as well as in all its dimensions, especially in those that showed an average increase in scores. This result indicates that the surgical treatment increased the QoL of these patients from emotional, social, and physical appearance points of view and suggests that all subscales are capable of capturing the response to surgical intervention.

The abovementioned findings agree with the statistically significant results ($p = 0.001$) of other equally relevant studies [15, 24–27]. Our results demonstrate the impact of NMSC on patients' QoL and the value of SCI, which measurably expresses what professionals involved in the care of these patients perceive in clinical practice.

One study showed an improvement in QoL after surgery both in the total scale and in the subscales after 3 months [27]. Although this was similar to our study, no significant difference was evidenced within 1–2 weeks postoperatively.

In contrast to our results, in a study that evaluated the QoL of patients with NMSC in the pre- and postoperative

TABLE 3: Distribution of crossovers between the SCI and anamnesis scale scores (Sergipe, Brazil, 2021-2022).

	SCI			
	Emotional median [IIQ]	Social median [IIQ]	Appearance median [IIQ]	Total median [IIQ]
Anamnesis				
Growth				
Yes	75 [53.6–92.9]	95 [85–100]	91.7 [75–100]	83.3 [68.3–93.3]
No	71.4 [64.3–82.1]	90 [85–95]	100 [75–100]	80 [71.7–88.3]
p^M value	0.940	0.428	0.706	0.843
Bleeding				
Yes	75 [53.6–89.3]	95 [85–100]	91.7 [79.2–100]	83.3 [72.5–92.5]
No	75 [53.6–92.9]	95 [82.5–100]	91.7 [75–100]	83.3 [67.5–92.5]
p^M value	0.850	0.837	0.649	0.816
Pruritus				
Yes	71.4 [50–89.3]	90 [77.5–100]	83.3 [66.7–100]	81.7 [62.5–90]
No	78.6 [55.4–92.9]	95 [87.5–100]	100 [83.3–100]	85 [72.5–95]
p^M value	0.179	0.004**	0.006**	0.021**
Color modification				
Yes	80.3 [53.6–91.1]	95 [80–100]	87.5 [75–100]	83.3 [60.9–95.8]
No	73.2 [53.6–92.9]	95 [85–100]	91.7 [75–100]	83.3 [67.5–91.7]
p^M value	0.626	0.840	0.460	0.842
Local pain				
Yes	78.6 [67.9–89.3]	92.5 [85–100]	95.8 [75–100]	85 [76.7–90]
No	71.4 [53.6–92.9]	95 [82.5–100]	91.7 [75–100]	82.5 [67.5–93.3]
p^M value	0.797	0.833	0.655	0.630
Other symptoms				
Yes	82.1 [50–92.9]	95 [90–100]	100 [75–100]	88.3 [70–95]
No	71.4 [53.6–89.3]	95 [85–100]	91.7 [75–100]	83.3 [68.3–90]
p^M value	0.649	0.761	0.361	0.497

SCI, skin cancer index; IIQ, interquartile range; M, Mann–Whitney test; K, Kruskal–Wallis test. ** $p < 0.05$.

TABLE 4: Distribution of crosses between the SCI scale scores and location of lesions (Sergipe, Brazil, 2021-2022).

	SCI			
	Emotional median [IIQ]	Social median [IIQ]	Appearance median [IIQ]	Total median [IIQ]
Lesions number				
1	71.4 [53.6–89.3]	95 [85–100]	91.7 [75–100]	83.3 [68.3–91.7]
2	80.4 [67.9–92.9]	90 [77.5–100]	91.7 [75–100]	85 [73.3–95]
p^M value	0.115	0.817	0.594	0.261
Location of lesions				
Scalp				
Yes	92.9 [82.1–100]	100 [90–100]	100 [91.7–100]	93.3 [85–99.2]
No	71.4 [53.6–89.3]	95 [85–100]	91.7 [75–100]	83.3 [67.5–91.7]
p^M value	0.010**	0.190	0.130	0.012**
Frontal region				
Yes	76.8 [60.7–92.9]	95 [90–100]	91.7 [83.3–100]	84.2 [76.7–95]
No	71.4 [53.6–92.9]	90 [85–100]	91.7 [75–100]	83.3 [68.3–91.7]
p^M value	0.833	0.298	0.377	0.520
Eyelid				
Yes	75 [60.7–83.9]	95 [82.5–100]	83.3 [70.9–100]	83.3 [69.2–89.2]
No	75 [53.6–92.9]	95 [85–100]	91.7 [75–100]	83.3 [68.3–93.3]
p^M value	0.978	0.557	0.262	0.874
Ear				
Yes	78.6 [60.7–92.9]	100 [95–100]	100 [83.3–100]	88.3 [78.3–93.3]
No	71.4 [53.6–91.1]	90 [80–100]	91.7 [75–100]	83.3 [67.5–92.5]
p^M value	0.538	0.034**	0.143	0.216
Nose: back				
Yes	71.4 [48.2–89.3]	90 [80–100]	91.7 [75–100]	80 [67.5–90.9]
No	75 [60.7–92.9]	95 [85–100]	91.7 [75–100]	84.2 [68.3–93.3]
p^M value	0.582	0.193	0.969	0.381

TABLE 4: Continued.

	SCI			
	Emotional median [IIQ]	Social median [IIQ]	Appearance median [IIQ]	Total median [IIQ]
Hemiface				
Yes	71.4 [50–91.1]	90 [72.5–100]	83.3 [66.7–100]	81.7 [62.5–90.8]
No	75 [53.6–92.9]	95 [85–100]	91.7 [75–100]	83.3 [70–93.3]
p^M value	0.411	0.182	0.123	0.215
Lip				
Yes	83.9 [62.5–89.3]	92.5 [85–100]	100 [79.2–100]	88.3 [77.5–93.3]
No	71.4 [53.6–92.9]	95 [85–100]	91.7 [75–100]	83.3 [68.3–93.3]
p^M value	0.590	0.963	0.450	0.416
Anterior cervical mentum				
Yes	67.9 [50–89.3]	90 [90–95]	75 [75–100]	78.3 [66.7–88.3]
No	75 [53.6–92.9]	95 [85–100]	91.7 [75–100]	83.3 [68.3–93.3]
p^M value	0.640	0.682	0.613	0.572

SCI, skin cancer index; IIQ, interquartile range; M, Mann–Whitney test; K, Kruskal–Wallis test. ** $p < 0.05$.

TABLE 5: Distribution of crosses between the SCI scale scores and continuous or ordinal demographic and clinical variables (Sergipe, Brazil, 2021–2022).

	Age P (p value)	How many children? P (p value)	Time that the lesion appeared P (p value)	Size of tumors P (p value)	DLQI P (p value)
SCI-emotional	0.15 (0.042)*	−0.05 (0.478)	−0.11 (0.131)	−0.10 (0.161)	−0.20 (0.006)*
SCI-social	0.11 (0.124)	−0.18 (0.020)*	−0.06 (0.425)	−0.08 (0.313)	−0.29 (<0.001)*
SCI-appearance	0.16 (0.027)*	0.03 (0.695)	−0.03 (0.734)	−0.06 (0.417)	−0.26 (<0.001)*
SCI-total	0.19 (0.011)*	−0.07 (0.382)	−0.09 (0.243)	−0.09 (0.214)	−0.26 (<0.001)*

SCI, skin cancer index; DLQI, Dermatological Life Quality Index; P, Spearman correlation. * $p < 0.05$.

period (2 weeks) of classic excisional surgery, the social subscale was lower than the baseline, that is, worsening of QoL, in addition to the other dimensions that did not show significant statistical changes. This difference can be explained by the reduced sample size ($n = 37$) and time of postoperative evaluation, as a longer period could improve anxiety levels, scar appearance, and, consequently, the individual's social relationships [28].

Regarding the DLQI in this study, there was also a significant positive impact on the QoL of the same patients in the same period. However, this was smaller than the SCI, possibly because it is a generic scale that would demonstrate this impact with less specificity than the SCI. Likewise, other studies [29] captured a small change in the QoL based on the DLQI and suggested the need to develop more specific questionnaires, such as the SCI. On the other hand, the authors of the SCI did not observe significant changes in QoL when using the DLQI [15].

The intersection between the SCI scores and the categorical demographic variables showed significant results that point to a higher score; that is, men have a better QoL at T0 (in the emotional, social, and total dimensions), without children (emotional and total dimensions), with income greater than 4 SM (all dimensions and in total), and assisted in the private sector (emotional, social, and total dimensions). This suggests that a higher socioeconomic profile (income greater than 4 SM and the private field) may be related to better resilience from a psychosocial point of view to the diagnosis of NMSC [30, 31].

In this sense, private health systems, with better attention and speed in treatment and the search for more information about the disease from different sources (Internet and other professionals), can interfere with these results. In contrast, the authors of the scale observed that a lower family income was predictive of a better QoL after injury treatment, even with lower baseline scores on the social and total subscales [15].

Consistent with previous research that used SCI [15, 24, 25, 27, 31], this study revealed higher baseline scores in men on all SCI subscales, indicating a better QoL than women in coping with this specific disease.

However, other studies have not reported any sex-related differences [32]. Recent research has found that although women had lower scores at baseline, they showed a greater degree of improvement than men with regard to aesthetic concerns in their QoL, perhaps due to greater access to resources to minimize the impact of surgical sequelae on their lives and appearances, such as makeup and aesthetic treatments [30].

The location of the lesion that presented the highest score, which reflects a better QoL, was the scalp in the “emotional” and “total” dimensions and the ear in the “social” dimension. A study [30] concluded that visible scars were the only variables negatively affecting the QoL. However, other studies did not report significance related to the location of the lesion [30, 33].

The crossovers between the SCI scale scores and demographic and clinical continuous or ordinal variables

TABLE 6: Multivariate linear regression for SCI scale scores and demographic and clinical variables (Sergipe, Brazil, 2021-2022).

	Emotional		Social		Appearance		Total	
	B	(CI 95%) p value	B	(CI 95%) p value	B	(CI 95%) p value	B	(CI 95%) p value
Intercept	83.30	(59.88; 106.72) <0.001	95.99	(80.79; 111.19) <0.001	81.29	(58.75; 103.84) <0.001	87.12	(70.92; 103.32) <0.001
Age	0.13	(-0.10; 0.37) 0.270	0.04	(-0.12; 0.19) 0.631	0.15	(-0.08; 0.38) 0.203	0.10	(-0.06; 0.27) 0.212
Sex								
Male-Female	8.47	(1.95; 14.98) 0.011	2.24	(-1.98; 6.47) 0.296	4.54	(-1.73; 10.80) 0.155	5.60	(1.10; 10.11) 0.015
Children								
Yes-No	-12.69	(-24.68; -0.71) 0.038	-3.11	(-10.88; 4.67) 0.432	-8.14	(-19.68; 3.40) 0.166	-8.59	(-16.88; -0.30) 0.042
Education								
≥9 years-<9 years	-10.53	(-17.84; -3.23) 0.005	-3.45	(-8.19; 1.29) 0.153	-5.61	(-12.64; 1.42) 0.117	-7.19	(-12.24; -2.14) 0.006
Family income								
≥4 MW-<4 MW	8.90	(-3.47; 21.26) 0.157	10.97	(2.95; 18.99) 0.008	16.74	(4.84; 28.64) 0.006	11.16	(2.61; 19.71) 0.011
Field of study								
Public-private	-5.61	(-17.05; 5.83) 0.335	-2.10	(-9.53; 5.32) 0.577	7.30	(-3.71; 18.32) 0.192	-1.86	(-9.77; 6.06) 0.644
Pruritus								
Yes-No	-2.38	(-8.66; 3.90) 0.455	-4.13	(-8.20; -0.05) 0.047	-9.10	(-15.15; -3.05) 0.003	-4.31	(-8.65; 0.04) 0.052
Scalp								
Yes-No	11.83	(-1.47; 25.13) 0.081	0.17	(-8.46; 8.80) 0.969	5.86	(-6.94; 18.66) 0.367	6.75	(-2.45; 15.95) 0.149
Ear								
Yes-No	-0.03	(-12.01; 11.95) 0.996	3.38	(-4.39; 11.15) 0.392	3.68	(-7.85; 15.21) 0.529	1.84	(-6.44; 10.13) 0.661
Hemiface								
Yes-No	-3.45	(-10.81; 3.90) 0.356	-5.38	(-10.15; -0.60) 0.028	-7.18	(-14.26; -0.10) 0.047	-4.84	(-9.93; 0.25) 0.062
Time that the lesion appeared								
DLQI	-0.00	(-0.01; 0.00) 0.159	0.00	(-0.00; 0.00) 0.936	-0.00	(-0.01; 0.01) 0.762	-0.00	(-0.01; 0.00) 0.313
Lesions number								
2-1	-1.44	(-2.36; -0.52) 0.002	-1.87	(-2.47; -1.28) <0.001	-1.23	(-2.12; -0.34) 0.007	-1.54	(-2.18; -0.91) <0.001
2-1	3.63	(-4.99; 12.25) 0.407	0.19	(-5.40; 5.79) 0.946	4.63	(-3.66; 12.93) 0.272	2.68	(-3.28; 8.65) 0.375

B, regression coefficient; CI 95%, 95% confidence interval. Multivariate linear regression. Bold values are statistically significant data.

showed significant results for small, negative correlations between the number of children and social dimensions as well as DLQI and all SCI dimensions and their total. In addition, significant results were observed for small and positive correlations between age, the emotional and appearance dimensions, and the total. Some studies have reported a low SCI score related to age <65 years [25].

As NMSC has high morbidity and low mortality rates, the QoL has become a relevant final point in the evaluation of therapeutic results. The impact of cancer diagnosis and the need for surgery on the patient alone generate feelings of fear and uncertainty, which are perceptible in clinical practice. In addition, the clinical and aesthetic alterations caused by the presence of the tumor explain the altered QoL scores in the preoperative period in our study.

Among the limitations of the study, we observed a selection bias underlying the selection of the convenience sample that may limit the representativeness of the study's results. Furthermore, it is noted that a third of the study's participants belonged to private clinics. This fact could facilitate understanding and response to the questionnaire, as these patients could also have better access to psychological support with an impact on their quality of life, to the detriment of patients in public hospitals where the research was carried out, who have a greater fragility in psychological support.

Another possibility of bias was the presence of comorbidities such as high blood pressure and diabetes, which, as they are chronic diseases, already affected the quality of life of patients. Furthermore, the study was conducted in two cities (Aracaju and Lagarto), although many individuals were from nearby regions with specific sociocultural characteristics. There could be greater heterogeneity in the sample, which does not invalidate the possibility that new studies should be carried out with larger and more diversified samples that may contribute to the assessment of the impact on the QoL of these individuals.

Furthermore, it is worth mentioning that the study was conducted during the COVID-19 pandemic. This was more specifically between the waves of the disease when outpatient health services were being opened, even if partially, at a time when the world population was exposed to the burden of significant stress resulting from the uncertainties inherent in the pandemic state. These could have negatively interfered with the QoL measurement of these individuals.

The assessment of quality of life is an important research topic in health services and it is at the time of diagnosis, when patients are most vulnerable, that psychosocial interventions should begin. New studies could collaborate in this sense by investigating whether early psychosocial interventions could bring benefits to these patients.

Furthermore, new studies, outside the pandemic context, with a more heterogeneous sample could also investigate the impact of the disease on quality of life, including the relationship with patients' work and its financial consequences.

The incidence of NMSC continues to increase due to multifactorial causes, especially exposure to ultraviolet rays (especially UVB), depletion of the ozone layer, increased outdoor activities, changes in clothing style, and increased

longevity. From this perspective, quality of life measurement can be considered a useful screening tool to investigate the psychological well-being of patients suffering from NMSC and this information can help healthcare professionals target risk groups in terms of perioperative counseling, in addition to guiding them in secondary prevention and initiation of favorable lifestyle changes.

In this context, the assessment of QoL is an important research topic in public and private health services. It helps direct health resources to improve the QoL of these individuals, whether through explanatory leaflets, group therapies, family guidelines, individual psychotherapies, or technological channels inherent in the current generation, such as apps, podcasts, and social networks, especially in younger patients who connect with this type of digital language and who are potential candidates for acquiring NMSC.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available because they are personal information of patients characterized as medical records but are available from the corresponding author upon reasonable request.

Ethical Approval

The project was approved by the Human Research Ethics Committee of the Federal University of Sergipe (Universidade Federal de Sergipe (UFS)), Brazil, under CAAE nº 02241518.5.0000.5546/Opinion: 3.011.994.

Consent

After recruitment, patients consented to participate in the study by completing an informed consent form (TCLE).

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

EvâniaCurveloHora and Carlos Anselmo Lima contributed to the conception, design of the study, and data collection and analysis. Material preparation was also performed by EvâniaCurveloHora. Marcelo Prado de Carvalho contributed to the methodology and review. Débora Silva Pereira, Julia Santos de Almeida Barreto, Gabriel GuimarãesMellara, Mirelly Grace Ramos Cisneiros, NatáliaAraújoBarreto, and Cassandra Luiza de Sá Silva carried out data collection. All authors read and approved the final manuscript.

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