



Quality of Life in Patients with Non-melanoma Skin Cancer: Implications for Healthcare Education Services and Supports

Robabeh Abedini¹ · Maryam Nasimi¹ · Pedram Noormohammad Pour¹ · Atie Moghtadaie² · Hamid Reza Tohidinik³

Published online: 28 April 2018

© American Association for Cancer Education 2018

Abstract

Non-melanoma skin cancer (NMSC) is the most prevalent type of cancer among Caucasian populations worldwide. The purpose of this work was to measure quality of life (QOL) of the patients with diagnosis of basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) who were referred to our cancer clinic. During 1 year, 95 patients were selected and asked to complete Dermatology Life Quality Index (DLQI) questionnaires. Ninety-five patients with NMSC (74 men and 21 women) with mean age of 64.6 ± 12.5 participated in this cross-sectional study. From 95 patients, 75 had BCC, 15 had SCC, and 5 patients had both SCC and BCC. The total DLQI scores of the all participants were between 0 and 16; the mean was 4.1 ± 4.25 and median was 2. Variables which were associated with impaired QOL were marital status ($P=0.03$) and tumor location ($P=0.02$). By using general dermatology QOL questionnaire, it had been demonstrated that patients with NMSC faced with minimal QOL impairment; also, this handicap was more pronounced in younger patients and singles and patients with tumors located in exposed areas. Our findings demonstrated a need to educate our patients to improve patients' knowledge about different aspects of disease.

Keywords Skin cancer · Quality of life · DLQI

Introduction

Non-melanoma skin cancer (NMSC) is the most prevalent type of cancer among Caucasian populations worldwide [1]. Basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) account for 95% of all NMSC cases. NMSC frequently presents in exposed parts of the body, with 60–70% of cases occurring in the head and neck regions [2]. Metastases of NMSC especially BCC are rare; but morbidity is commonly due to local invasion and destruction of underlying tissue like bone and cartilage [3]. There are different treatment modalities for NMSC; each one has some benefits and also drawbacks. In regard to these points, excisional surgery is the most widely used treatment modality with

acceptable recurrence rate, however, it can cause severe morbidity as a result of scar formation and physical disfigurement [3].

Although the primary goal of therapy in NMSC is prevention of tumor recurrence, patients' quality of life (QOL) and costs of therapy should also be considered as important outcomes because NMSC only rarely affects survival [4]. Studies have shown that not only the treatment but also the diagnosis of different cancers has a variety of negative psychological effects on patients [5, 6]. It is estimated that 16–25% of newly diagnosed patients with cancer experience symptoms of depression [7]. Different factors contribute to QOL impairment in patients with NMSC, which some of them related to tumors themselves, like appearance in visible areas of the skin, symptoms with pain, discharge, and bleeding, and also patients' perception of skin cancer [8, 9]. Other factors are limitations related to the interventions especially surgeries and their outcomes. Moreover, after surgery, patients may be faced with disfigurement of treatment, functional impairment, and a constant anxiety of tumor recurrence [8].

The QOL of patients with NMSC has been determined using different types of questionnaires, such as the Dermatology Life Quality Index (DLQI) [10]. It is a validated instrument developed for skin diseases and is considered the criterion standard questionnaire to evaluate QOL in those with skin diseases.

✉ Maryam Nasimi
Nsm.maryam@gmail.com

¹ Autoimmune Bullous Disease Research Center, Department of Dermatology, Razi Hospital, Tehran University of Medical Sciences, Razi Hospital-Vahdate Eslami Street, Tehran 1199663911, Iran

² Tehran University of Medical Sciences, Tehran, Iran

³ School of Public Health, Gonabad University of Medical Sciences, Gonabad, Iran

In other words, although NMSC is extremely common and generally not life-threatening, the specific negative psychological effects of cancer diagnosis and the effects of treatment on QOL are not well known [11, 12]. The purpose of this work was to measure QOL of the patients with diagnosis of BCC and SCC who were referred to our cancer clinic.

Materials and Methods

This descriptive study was approved by the Ethics Committee of Tehran University of Medical Sciences. From March 2015 to March 2016, patients with NMSC over the age of 16 were sequentially selected from nearly 1500 patients (with male to female ratio of 3.5–4:1 and BCC to SCC of about 4:1) of the tumor clinic of Razi Hospital (Center of Skin Diseases of Tehran University of Medical Sciences) until required sample size ($N=95$) and were asked to complete questionnaires. Patients who were older than 80 and illiterate and also had language problems were excluded from the study ($N=20$).

The questionnaires consisted of two parts: the first part which was fulfilled by the same dermatologist, consisted of questions about gender, age, educational level, marriage status, disease' duration, time after skin cancer diagnosis, tumor location, type of skin cancer, occupation, history of radiotherapy, and treatment modality; the second part included questions measuring DLQI.

DLQI, which was introduced by Finlay and Khan [8], is a self-explanatory survey which consists of ten questions grouped into six heading items (symptoms and feelings, daily activities, leisure, work and school, personal relationships, and treatment) that measure different aspects of health-related QOL. Each question is scored from 0 (no or not at all) to 3 (very) and the DLQI score is calculated by summing the score of each question resulting in a possible score of 0 to 30. The higher the score, the more QOL is impaired (0–1 = no effect, 2–5 = small effect, 6–10 = moderate effect, 11–20 = very large effect, 21–30 = extremely large effect). The valid and reliable Persian version was used for measuring patient's QOL [13]. We assessed the relationships between demographic and disease-related characteristics with the DLQI scores.

For statistical analysis the SPSS version 16 was used. Continuous variables were described as mean and standard deviation (SD). Categorical variables were reported as frequencies and percent. For comparison of continuous variables in two and more than two groups, we used independent samples *t* test for normally distributed data and one-way ANOVA, respectively. Non-parametric Mann-Whitney *U* test was used for variables showing skewed distribution. The correlation between continuous variables was assessed using Pearson's correlation coefficients. A two-tailed $P < 0.05$ was considered statistically significant.

Results

Ninety-five patients with NMSC (74 men and 21 women) with mean age of 64.6 ± 12.5 participated in this cross-sectional study. From 95 patients, 75 had BCC, 15 had SCC, and 5 patients had both SCC and BCC (Table 1).

Fifty-seven patients (60.1%) were new cases without history of treatment; excisional surgery was the most preferable

Table 1 Basic information of patients with skin cancer

Characteristics	Value, number (%)
Age, mean \pm SD	64.6 \pm 12.5
Disease duration (months)	65.5 \pm 369.7
Sex	
Male	74 (77.9%)
Female	21 (22.1%)
Marital status	
Married	82 (86.3%)
Single	13 (13.7%)
Education level (%)	
Illiterate	45 (46.8%)
School	40 (42.6%)
University graduate	10 (10.6%)
Prior history of radiotherapy	
Yes	40 (42.1%)
No	52 (54.1%)
Unknown	3 (3.2%)
Type of skin cancer (%)	
Basal cell carcinoma	75 (78.9%)
Squamous cell carcinoma	15 (15.8%)
Both of them	5 (5.3%)
Number of tumors	
1	26 (27.3%)
2 to 3	22 (23.2%)
More than 3	47 (49.5%)
Tumor size	
< 2 cm	63 (66.3%)
\geq 2 cm	32 (33.7%)
Treatment modality	
Surgery	24 (25.3%)
Surgery + cryotherapy and or 5-fluorouracil	9 (9.6%)
Cryotherapy	4 (4.2%)
Radiotherapy	1 (1.1%)
New cases before treatment	57 (60.1%)
Tumor location	
Face	39 (41%)
Head + neck	36 (37.9%)
Face + head + neck	12 (12.6%)
Trunk + extremities	6 (6.3%)
Face + head + neck + trunk	2 (2.2%)

method of treatment in 86.8% of patients who were treated in our cancer clinic.

The total DLQI scores of the all participants were between 0 and 16; the mean was 4.1 ± 4.25 and median was 2 (Table 2). Although there was not any significant difference in mean DLQI scores of male (4.4 ± 4.6) and female groups (3.05 ± 2.2) ($P =$

0.06), some dimensions of DLQI including personal relationships, work and school, and treatment were more severely impaired in the male group ($P < 0.05$). Other variables which were associated with impaired QOL were marital status ($P = 0.03$) and tumor location ($P = 0.02$). The impact on QOL was higher in single patients, and in those who had skin tumors in exposed

Table 2 Associations between DLQI dimension scores and total scores, and basic characteristics in patients with skin cancer

	Symptom and feelings	Daily activities	Leisure	Personal relationships	Work and school	treatment	Total score
Sex							
Male	1.5 ± 1.3	0.8 ± 1.4	0.5 ± 0.8	0.4 ± 0.8	0.5 ± 1.0	0.47 ± 0.7	4.4 ± 4.6
Female	2.5 ± 1.2	0.4 ± 0.8	0.2 ± 0.4	0.15 ± 0.35	0.05 ± 0.2	0.1 ± 0.3	3.5 ± 2.2
<i>P</i>	0.1	0.1	0.06	<i>0.01</i>	<i>0.001</i>	<i>0.001</i>	0.06
Marital status							
Married	1.6 ± 1.3	0.6 ± 1.1	0.4 ± 0.7	0.3 ± 0.6	0.4 ± 0.8	0.3 ± 0.5	3.7 ± 4.01
Single	1.6 ± 1.3	1.8 ± 1.8	0.7 ± 0.8	0.7 ± 1.01	0.7 ± 1.1	0.7 ± 1.03	6.3 ± 5.1
<i>P</i>	0.9	<i>0.03</i>	0.1	0.1	0.2	0.2	<i>0.03</i>
Educational level							
Illiterate	1.8 ± 1.4	0.8 ± 1.2	0.4 ± 0.7	0.4 ± 0.7	0.4 ± 0.9	0.4 ± 0.6	4.4 ± 4.3
School	1.6 ± 1.3	0.8 ± 1.5	0.5 ± 0.8	0.3 ± 0.7	0.5 ± 1.01	0.4 ± 0.7	4.3 ± 4.5
University graduate	1.2 ± 1.03	0.1 ± 0.3	0.2 ± 0.6	0.1 ± 0.3	0.1 ± 0.3	0.2 ± 0.6	1.9 ± 1.3
<i>P</i>	0.3	0.2	0.5	0.3	0.3	0.6	0.2
Number of tumors							
Single	1.9 ± 1.6	0.7 ± 1.08	0.3 ± 0.6	0.3 ± 0.6	0.5 ± 0.9	0.3 ± 0.6	4.1 ± 4.1
2 to 3	1.1 ± 1.03	0.3 ± 0.7	0.3 ± 0.6	0.2 ± 0.5	0.3 ± 0.7	0.1 ± 0.3	2.3 ± 2.8
More than 3	1.7 ± 1.3	1.06 ± 1.5	0.5 ± 0.8	0.4 ± 0.8	0.4 ± 0.9	0.5 ± 0.7	4.8 ± 4.6
<i>P</i>	0.08	0.08	0.1	0.3	0.7	0.06	0.07
Tumor size							
< 2 cm	1.5 ± 1.3	0.7 ± 1.3	0.3 ± 0.7	0.3 ± 0.7	0.4 ± 0.8	0.4 ± 0.7	3.7 ± 4.05
≥ 2 cm	1.9 ± 1.4	0.8 ± 1.2	0.6 ± 0.8	0.5 ± 0.8	0.5 ± 1.01	0.3 ± 0.6	4.8 ± 4.5
<i>P</i>	0.2	0.6	0.13	0.2	0.4	0.8	0.2
Tumor location							
Exposed	1.8 ± 1.4	0.9 ± 1.3	0.47 ± 0.8	0.5 ± 0.8	0.6 ± 1.01	0.5 ± 0.7	4.9 ± 4.7
Non-exposed	1.5 ± 1.2	0.5 ± 1.2	0.4 ± 0.6	0.1 ± 0.4	0.2 ± 0.6	0.2 ± 0.5	3.07 ± 3.2
<i>P</i>	0.3	0.1	0.5	<i>0.004</i>	<i>0.01</i>	0.07	<i>0.02</i>
Treatment condition							
Treated patients	1.7 ± 1.6	0.8 ± 1.4	0.3 ± 0.6	0.4 ± 0.8	0.5 ± 0.9	0.4 ± 0.7	4.1 ± 4.6
New cases	1.6 ± 1.1	0.8 ± 1.1	0.5 ± 0.8	0.3 ± 0.7	0.4 ± 0.9	0.3 ± 0.6	4.03 ± 4.02
<i>P</i>	0.6	1	0.2	0.7	0.5	0.7	0.8
Type of skin cancer							
BCC	1.6 ± 1.2	0.7 ± 1.3	0.4 ± 0.7	0.3 ± 0.6	0.3 ± 0.8	0.3 ± 0.6	3.9 ± 0.4
SCC	2.1 ± 1.6	1.1 ± 1.1	0.6 ± 0.8	0.6 ± 0.9	0.8 ± 1.2	0.4 ± 0.7	5.7 ± 5.2
Both of them	1.2 ± 1.6	1 ± 1.4	0.6 ± 0.9	0.6 ± 0.9	0.8 ± 1.3	0.6 ± 0.5	4.8 ± 4.7
<i>P</i>	0.3	0.5	0.5	0.3	0.65	0.12	0.23
Age							
Age	-0.08	-0.13	-0.16	-0.15	-0.41	-0.07	-0.22
<i>P</i> ¹	0.4	0.19	0.12	0.13	<i>0.001</i>	0.48	<i>0.03</i>
Duration							
Duration	0.05	0.01	0.06	-0.05	-0.04	-0.08	0.002
<i>P</i> ¹	0.60	0.87	0.51	0.56	0.66	0.42	0.98

The statistically significant *P*-values are provided in italics

¹ Pearson correlation

areas of the head and neck (Table 2). Total DLQI scores did not differ between two groups regarding variables including tumor size, number, and type of skin cancer (P values > 0.05).

Furthermore, there was not any significant association between DLQI scores and treatment modality and also between patients who were new cases and those previously treated. Furthermore, we analyzed this association according to the type of skin cancer, in which the DLQI score of patients with SCC who went under surgery was 10.5 ± 5.1 in comparison to 3.2 ± 3.9 of BCC cases, in which the difference was statistically significant ($P < 0.05$).

For evaluation of association between age and disease duration with DLQI scores, we used Pearson correlation test which showed a reverse and significant association between age and DLQI ($P = 0.03$, $r = -0.22$). Also, there was not any relation between disease duration and DLQI scores ($P = 0.98$, $r = 0.002$).

Discussion

NMSCs are the most prevalent types of cancers among Caucasian populations worldwide in which SCC and BCC account about 95% of them. Consequences of skin tumors themselves and treatment modalities with resulting scars and deformities may lead to psychological and physical disorders [14].

QOL measures are essential parts of evaluation of the results of different types of cancer treatment; however, they are not routinely used for NMSC. Various QOL instruments are available for the assessment of disorders related to physical condition, social interaction, and emotional state. The DLQI and Skindex-29 assess the QOL of patients with skin diseases. Such determinations make it possible to consider intervention programs for the purpose of changing those variables with negative impact on the cancer patients [15].

The total DLQI scores of all participants of our study were between 0 and 16; the mean was 4.1 ± 4.2 which showed a small effect of skin cancers on patients' life based on the banding system of DLQI. In a study by Carvalho et al. in 100 cases, 50 patients with skin cancer and 50 controls, they found that patients with skin cancer had lower self-esteem compared with the control group and this was more pronounced among younger people [16].

Another study of 52 patients with NMSC, who completed the German version of the DLQI questionnaire, showed that 31% of the patients experienced moderate to strong impairment in their QOL which mostly involved emotions, symptoms, leisure activities, and daily living activities, whereas the disease had less impact on work and school activities [17].

Blackford et al. conducted a study using the DLQI questionnaire on NMSC patients. In their study, 44 patients with BCC were evaluated at baseline and 3 months after treatment. The scores, in agreement with our findings, demonstrated little

impairment associated with the disease at baseline or after treatment. Also, they could not find any significant change in the scores after treatment [18]. In another study by Rhee et al. on 121 patients, results indicated a tendency toward an improvement in overall QOL after treatment [19]. They did not find any clinical variable which was associated with more impairment in DLQI scores. However, in our study, younger and single patients and those who had lesions in exposed area experienced more impairment in their QOL. It seems that in younger patients, diagnosis and treatment of skin cancer may lead to more disability, both physically and emotionally.

Furthermore, we could not find any significant association between DLQI scores and treatment modalities and also between patients who were new cases and those previously treated. However, DLQI scores of patients with SCC who went under surgery were 10.5 ± 5.1 in comparison to 3.2 ± 3.9 of BCC cases, in which the difference was statistically significant. It can be assumed that in comparison to BCC, patients with SCC faced with more impairment in QOL as a result of more aggressive nature of their disease, physicians' giving worries about disease's spreading and metastasis, and more aggressive treatment modalities.

In the present study, male patients had higher scores in personal relationships, work and school, and treatment domains of DLQI, but there was no significant difference between male and female in total DLQI scores. Although about 78% of our patients were male, these results show that skin cancers may have more impacts on males than females, at least in some aspects of their life.

In a study by Hunes et al., they showed that the size (> 2 cm in diameter), presence of ulceration, and site of tumor significantly increased DLQI scores. They assumed that signs of tumor growth such as size, location, and ulceration were main factors that influenced the patient's perception of the risks [20].

These contradictory findings demonstrate that a more disease-specific questionnaire may be needed for patients with skin cancers especially NMSCs, as the pertinent QOL issues may not have been adequately addressed with general questionnaires. In this regard, Rhee's group was the first to develop the skin cancer index (SCI), a 15-item questionnaire with emotional (7 items), social (5 items), and appearance (3 items) subscales, which is unique in its focus on the different aspects of impact of skin cancer on patients' life [21]. Rhee et al. utilized the SCI along with the DLQI in 183 patients with NMSC and showed statistically significant improvement with treatment by SCI ($P = 0.001$), whereas the DLQI did not reveal significant changes ($P = 0.46$) [22]. However, SCI, as a disease-specific questionnaire, could not be considered a suitable method for broad-spectrum comparison of different skin diseases [8].

To sum up, by using general dermatology QOL questionnaire, it has been demonstrated that patients with NMSCs

faced with minimal QOL impairment, and this handicap was more pronounced in younger patients and singles and patients with tumors located in an exposed area. Our study demonstrates how our patients with skin cancer were affected by their diseases and we need to educate our patients considering diseases' morbidities. This is of great value as dermatologists should be aware of the amount of QOL impairment in patients with skin cancer in order to improve patients' knowledge through educating more about different aspects of disease.

From a practical viewpoint, these results can (1) encourage dermatologists to evaluate their patients considering risk factors which may influence the patients' well-being and (2) persuade designing a disease-specific questionnaire for better understanding the impact of skin cancers on patients.

Compliance with Ethical Standards

This descriptive study was approved by the Ethics Committee of Tehran University of Medical Sciences.

References

- Kim RH, Armstrong AW (2012) Nonmelanoma skin cancer. *Dermatol Clin* 30:125–139
- Jung GW, Metelitsa AI, Dover DC, Salopek TG (2010) Trends in incidence of nonmelanoma skin cancers in Alberta, Canada, 1988–2007. *Br J Dermatol* 163:146–154
- Telfer NR, Colver GB, Morton CA (2008) Guidelines for the management of basal cell carcinoma. *Br J Dermatol* 159:35–48
- Chren MM, Sahay AP, Bertenthal DS, Sen S, Seth Landefeld C (2007) Quality-of-life outcomes of treatments for cutaneous basal cell carcinoma and squamous cell carcinoma. *J Invest Dermatol* 127:1351–1357
- Ernst J, Götze H, Brähler E et al (2012) Quality of life of parents diagnosed with cancer: change over time and influencing factors. *Eur J Cancer Care (Engl)* 21:535–541
- Meyer AA, Hwang M, Farasatpour M et al (2013) Metastatic breast cancer in patients with schizophrenia. *Mol Clin Oncol* 1:359–364
- Sellick SM, Crooks DL (1999) Depression and cancer: an appraisal of the literature for prevalence, detection, and practice guideline development for psychological interventions. *Psychooncology* 8: 315–333
- Gaulin C, Sebaratnam DF, Fernández-Peñas P (2015) Quality of life in non-melanoma skin cancer. *Australas J Dermatol* 56:70–76
- Abedini R, Nasimi M, Nourmohammad Pour P, Etesami I, Al-Asiri S, Tohidinik HR (2017) Skin cancer awareness and sun protection behavior before and following treatment among skin cancer-treated patients. *J Cancer Educ* 15:1–6
- Finlay AY, Khan GK (1994) Dermatology Life Quality Index (DLQI): a simple practical measure for routine clinical use. *Clin Exp Dermatol* 19:210–216
- Czajkowska Z, Radiotis G, Roberts N, Körner A (2013) Cognitive adaptation to nonmelanoma skin cancer. *J Psychosoc Oncol* 31: 377–392
- Roberts N, Czajkowska Z, Radiotis G, Körner A (2013) Distress and coping strategies among patients with skin cancer. *J Clin Psychol Med Settings* 20:209–214
- Aghaei S, Sodaifi M, Jafari P, Mazharinia N, Finlay AY (2004) DLQI scores in vitiligo: reliability and validity of the Persian version. *BMC Dermatol* 4:8
- Rhee JS, Matthews BA, Neuburg M, Logan BR, Burzynski M, Nattinger AB (2006) Validation of a quality-of-life instrument for patients with nonmelanoma skin cancer. *Arch Facial Plast Surg* 8: 314–318
- Maciel PC, Veiga-Filho J, Carvalho MP et al (2014) Quality of life and self-esteem in patients submitted to surgical treatment of skin carcinomas: long-term results. *An Bras Dermatol* 89:594–598
- Carvalho MP, Oliveira Filho RS, Gomes HC et al (2007) Auto-estima em pacientes com carcinomas de pele. *Rev Col Bras Cir* 34(6):361–366
- Steinbauer J, Koller M, Kohl E, Karrer S, Landthaler M, Szeimies RM (2011) Quality of life in health care of non-melanoma skin cancer—results of a pilot study. *J Dtsch Dermatol Ges* 9:129–135
- Blackford S, Roberts D, Salek MS, Finlay A (1996) Basal cell carcinomas cause little handicap. *Qual Life Res* 5:191–194
- Rhee JS, Matthews BA, Neuburg M, Smith TL, Burzynski M, Nattinger AB (2004) Skin cancer and quality of life: assessment with the Dermatology Life Quality Index. *Dermatol Surg* 30:525–529
- Nunes DH, FrÖde TS (2013) Quality of life in basal cell carcinoma patients in Brazil: a pilot cross sectional study. *Dermatol Surg* 39: 620–626
- Rhee JS, Matthews BA, Neuburg M, Burzynski M, Nattinger AB (2005) Creation of a quality of life instrument for non-melanoma skin cancer patients. *Laryngoscope* 115:1178–1185
- Rhee JS, Matthews BA, Neuburg M, Logan BR, Burzynski M, Nattinger AB (2006) Validation of a quality of-life instrument for patients with non-melanoma skin cancer. *Arch Facial Plast Surg* 8: 314–318