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Evaluation of preoperative quality of life in patients with nonmelanoma skin cancer

To the Editor: It is estimated that more than 4,000,000 adults were treated for nonmelanoma skin cancer (NMSC) between 2007 and 2011, with average annual treatment costs of approximately $4.8 billion in the US population.[1] The average number of adults treated annually for skin cancer in the US population increased from 3.4 million in 2002-2006 to 4.9 million in 2007-2011, with the average annual total cost for skin cancer increasing from $3.6 billion to $8.1 billion (an increase of 126.2%), demonstrating that the health and economic burden of skin cancer treatment is vastly increasing.[2] The aim of this study was to identify factors that predict lower quality of life (QOL) scores in patients undergoing Mohs micrographic surgery for NMSC.

The Skin Cancer Index (SCI), a 15-item validated QOL questionnaire, was administered to a prospective cohort of patients with NMSC at a 2-physician academic dermatologic surgery center. The SCI was used, as it is disease specific to NMSC and has been previously validated in a dermatologic surgery setting.[3] A 5-point response format was used to assess the extent to which each item described the feelings of the patient, with 1 meaning very much and 5 meaning not at all and a higher score indicating better QOL. Patients with diagnosed NMSC who were attending the Brigham and Women's Hospital Mohs and Dermatologic Surgery Center from March 2014 through March 2015 were eligible for participation in the study. A 2-sample *t* test with unequal variances and Welch's approximation was used to examine factors predictive of overall SCI score and scores on the social, emotional, and appearance subscales. Statistical analyses were performed by using Stata software (version 12.0, StataCorp, College Station, TX). The Partners Human Research Committee approved this study.

Table I summarizes the characteristics of the study cohort. A total of 389 patients were included in the study. Eleven patients declined to participate. In our overall analysis, independent predictors of lower overall SCI score were younger age ($P < .001$), female sex ($P < .001$), being employed ($P < .001$), and tumor location on the head and neck ($P < .01$) (Table II). Independent predictors of lower subscale scores were as follows: on the social subscale,

Table I. Baseline cohort characteristics

Variable	n	%
Total patients	389	
Mean age, y (SD)	66.5 (13.1)	
Age range, y	20-95	
Sex		
Male	197	50.6
Female	192	49.4
Race		
White	385	99.0
Other	4	1.0
Employment status		
Employed	195	50.1
Retired	175	45.0
Unemployed/unknown	19	4.9
Immunosuppression		
No	335	13.9
Yes	54	86.1
History of skin cancer		
No	156	40.1
Yes	233	59.9
Comorbidity*		
Hypertension	112	31.4
Diabetes	34	8.7
Hyperlipidemia	26	6.7
Type of skin cancer treated		
Basal cell carcinoma	247	63.5
Invasive squamous cell carcinoma	105	27.0
Squamous cell carcinoma in situ	15	3.9
Other	22	5.7
Location of skin cancer		
Head/neck (including ear/lip)	300	77.1
Trunk	21	5.4
Extremities	65	16.7
Genitalia	3	0.8
Mean tumor diameter, cm (SD)	1.42 (1.00)	
Mean postoperative area size, cm (SD)	2.68 (5.67)	
Median QOL score (IQR)†		
Overall Skin Cancer Index	81.9 (70.0-91.2)	
Emotional subscale	71.4 (53.6-85.7)	
Social subscale	95.0 (85.0-100.0)	
Appearance subscale	83.3 (58.3-100.0)	

IQR, Interquartile range; *QOL*, quality of life; *SD*, standard deviation.
*Less than 5% of patients had the following comorbidities: chronic obstructive pulmonary disease, stroke, breast cancer, prostate cancer, lymphoma, leukemia, colon cancer, lung cancer, depression, and ulcerative colitis.
†Each raw score was standardized by using the formula (raw score − 1) × (100/4).

Table II. Analysis of factors predictive of overall Skin Cancer Index and subscale scores

Skin cancer index score	Mean (SD)	*P* value
Overall Skin Cancer Index score		
Age quartile		
Lower	52.2 (12.6)	<.001
Upper	95.8 (2.7)	
Sex		
Male	81.4 (15.4)	<.001
Female	74.2 (18.5)	
Employment status		
Employed	73.8 (18.3)	<.001
Unemployed/retired	82.5 (15.1)	
Tumor location		
Head/neck (including lip/ear)	76.7 (17.8)	.01
Below neck	81.8 (15.1)	
Social subscale score		
Employment status		
Employed	86.5 (15.1)	<.001
Unemployed/retired	91.4 (11.3)	
History of skin cancer		
Yes	90.0 (13.1)	.032
No	86.9 (14.4)	
Emotional subscale score		
Age quartile		
Lower	43.2 (18.3)	<.001
Upper	90.4 (6.9)	
Sex		
Male	71.7 (20.6)	<.001
Female	64.0 (22.4)	
Appearance subscale score		
Age quartile		
Lower	39.3 (23.5)	<.001
Upper	98.7 (3.5)	
Sex		
Male	82.9 (23.1)	<.001
Female	70.8 (29.5)	
Employment status		
Employed	70.6 (28.9)	<.001
Unemployed/retired	83.8 (23.2)	
Tumor location		
Head/neck (including lip/ear)	73.6 (28.1)	<.001
Below neck	88.1 (19.5)	

SD, Standard deviation.

employment ($P < .001$) and previous history of skin cancer ($P = .032$); on the emotional subscale, younger age ($P < .001$) and female sex ($P < .001$); and on the appearance subscale, younger age ($P < .001$), female sex ($P < .001$), employment ($P < .001$), and tumor location on the head and neck ($P < .001$).

Other studies of QOL in patients with skin cancer are rare and have focused on other factors or study questions.[4,5] We consider the finding regarding employment to be particularly interesting because it persisted once age-adjusted. Older people who may otherwise not suffer greatly from their skin cancer suffer more if they are still working. It important for physicians to understand that patients work longer now than in prior generations, and this may affect the toll that their skin cancer is taking on them. A greater understanding of QOL in patients with NMSC will lead to a more patient-centered treatment approach to disease and better overall outcomes that are important to patients with NMSC.

Jean-Phillip Okhovat, MD, MPH,[a,b,c] Pritesh S. Karia, MPH,[c,d] Ariana N. Mora, BA,[c] Frederick C. Morgan, BSPH,[c] Robert J. Besaw, MPH,[c] and Chrysalyne D. Schmults, MD, MSCE[c]

From the Beth Israel Deaconess Medical Center[a] and Department of Dermatology, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts[c]; the Department of Biostatistics and Epidemiology, Harvard T.H. Chan School of Public Health, Boston, Massachusetts[b]; and the Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland[d]

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Correspondence to: Chrysalyne D. Schmults, MD, MSCE, Department of Dermatology, Brigham and Women's Hospital, 1153 Centre St, Suite 4J, Boston, MA 02130

E-mail: cschmults@bwh.harvard.edu

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