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Skin Cancer Awareness and Sun Protection Behavior Before and Following Treatment Among Skin Cancer-Treated Patients

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Abstract There is little known about illness perception in patients with skin tumors. We conducted this study to investigate Iranian patients' understanding of skin tumors, and to evaluate their sun-protective behavior changes after treatment of skin cancer. Patients with a skin biopsy of basal cell carcinoma were asked to complete questionnaires. A total of 110 patients were enrolled in the study. Patients were mostly referred to our tumor clinic from rural areas. At the skin cancer perception investigation, 63% of patients did not consider their disease as a long-lasting situation. Besides, 45.4% of patients consider their illness as a serious condition which significantly affecting their lives. Our patients had a strong belief in treatment control (81%) and 81% of them also described worries about their skin cancer. The leading causes of skin cancer as assumed by patients were: history of skin cancer (37.4%), poor medical care in the past (36.4%), extreme sun exposure (31.5%), and lack of sun protection (27.5%). In regard to sun-protective behavior after treatment of skin cancer, 55.4% of patients showed no changes or even negative change in their sun-protective behavior, But 44.5% of the patients changed their sun-protective behavior in a positive way which was statically significant ($P \leq 0.001$). Our study demonstrates how our patients with skin cancer perceive their disease and we need to educate our patients, considering diseases' aspects, causes and symptoms. This is of great value as dermatologists should be aware of patients' perceptions of their disease in order to improve patients' knowledge through educating more about different aspects of disease.

Keywords Skin cancer · Awareness · Sun protection

Introduction

Non-melanoma skin cancer (NMSC), specifically basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), represents the most frequently observed malignancy among Caucasian [1].

The incidence of skin cancers is well known to be correlated to ultraviolet light (UV) exposure and there is also a direct relationship between the incidence of NMSC and latitude [2–4].

Previous studies have shown that sun protection can reduce risk of NMSC [5, 6]. Personal sun-protective behaviors like wearing protective clothing, wearing hat, applying sunscreen, and avoiding sunlight during midday, have been evaluated by previous studies in general population [7, 8]. Of note, a few studies have assessed sun-protective behaviors in patients with NMSC; this issue is of special interest in these groups considering the fact that patients with a history of NMSC have a higher risk of developing a second primary skin cancer than the general population [9].

Illness perception demonstrates patients' personal beliefs about their diseases and the resulting psychosocial impact. The notion of illness perception comes from Leventhal's self-regulatory model and analyzes the relationship between illness, illness perceptions, coping processes, and health outcomes. According to Leventhal's model, patients respond to signs and symptoms of their disease by developing their own

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emotional and cognitive simulacrums of the disease, which result in a basis for their peculiar coping responses [10, 11].

As skin cancer remains an increasing public health problem in which early detection can probably improve prognosis and cancer screening appears to be a suitable method of secondary prevention. However, skin cancer prevention strategies have begun exploring disease perceptions by identifying patients' level of skin cancer awareness [12].

To our knowledge, there are no previous studies focusing on illness perception in skin cancer in Iran. Nonetheless, patients are highly heterogeneous; and to date, a few number of studies examined the role of demographic characteristic in skin cancer perceptions. We conducted this study to investigate patients' understanding of the BCC and to evaluate their sun-protective behavior changes before and after the treatment of skin cancer.

Methods

This descriptive study was conducted in Razi dermatology hospital, Tehran University of Medical Sciences. Patients with a skin biopsy of BCC who presented at the skin tumor clinics for treatment of their skin cancer from April 2014 to March 2015 were enrolled. Each patient was asked to participate in a survey that included questions related to their initial perception of the lesion that was finally diagnosed as BCC. Written informed consent was obtained from each patient.

To assess the perception of patients about their illness, a questionnaire including 15 questions was developed. The main focus of the questionnaire was based on disease chronicity, patients' understanding of disease, the seriousness of their skin cancers, the treatments and the patients' believes about disease risk factors comprising poor medical care in the past, extreme sun exposure, aging, alcohol, smoking, radiation therapy, environmental pollution, history of skin cancer, fair skin complexion, and inheritance. These components were assessed by 15 questions rated on a five-point scale ranging from strongly disagree, disagree, no idea, agree, to strongly agree. To evaluate disease perception, we categorized patients to three groups including those who agreed and disagreed (that showed they had proper and wrong understanding of their diseases, respectively) and patients who had no idea (without knowledge) about the question. Content validity index (CVI) and content validity ratio (CVR) were calculated for the analysis of content validity. A pilot study was done on 20 patients for validity and reliability testing. The CVR of questions ranged from 0.6 to 0.8 and the CVI was 0.7. The illness perception questionnaire obtained a Cronbach's alpha of 0.75. The pilot study on questionnaire validity and reliability demonstrated that it could be used to evaluate illness perception. A further section of the questionnaire addressed the patients' demographic characteristics, skin phototype, interval between lesion appearance on the skin and first time seeking a physician for medical treatment, having previous radiotherapy, and personal history of skin cancer. Also multiple-choice questions regarding the patients' initial believe about the nature of the lesions at the time of appearance were asked. All questions were inquired from patients by one dermatologist through interviews and then filled on independent forms.

Information About Sun Protection Measures

A checklist composed of six informative phrases about sun-protective behavior was given to the patients and asked them to reply to questions considering their sun-protective behavior before the diagnosis of skin cancer and also at least 3 months after the skin cancer treatment during remission period in order to measure the sun-protective behavioral changes. Each phrase were scored by five-point scale (never, rarely, sometimes, most of the times, and always). The total score range of the checklist was from 0 to 24. We considered the score of 0–8 as poor sun-protective behavior, 8–16 as acceptable sun-protective behavior, and more than 16 was considered as good sun protection. Then, we categorized patients into two groups. A group who did not change or negatively changed their sun protection behavior and another group who positively changed their behavior and then, we compared these groups according to age, sex, educational level, type of skin cancer, and history of skin tumor. Content validity index (CVI) and content validity ratio (CVR) were also calculated for the analysis of content validity for the sun-protective behavior questionnaire. A pilot study was done on 20 patients for validity and reliability testing. The CVR of questions ranged from 0.7 to 0.8 and the CVI was 0.75. The calculated Cronbach's alpha was 0.87. The pilot study on questionnaire validity and reliability showed acceptable measures for evaluating sun-protective behavior.

Statistical Analysis

Continuous variables were described using mean ± standard deviation and categorical variables were reported as frequency and percent. The chi-square and Fisher's exact tests were used to compare qualitative variables between groups. To compare sun protection behaviors before and after the treatment among participants, we used Mc Nemar Test. Two-sided P values < 0.05 were considered statistically significant (statistical package for social sciences (SPSS) version 18).

Results

All of the 110 patients with BCC, who were asked to participate in the survey, consented to participate in the study. The

mean age of patients was 63.5 ± 15.2 (range 25–95). 58.2% were male, 26.9% had a prior history of radiotherapy, and 19.6% had a prior personal history of skin cancer. The mean time interval between lesion appearance and seeking medical treatment was 2.8 years (ranged from 2 months to 18 years) (Table 1).

Table 1 Basic information of patients with skin tumor and initial perception of the lesion

Characteristics	Value, number (%)
Age, mean ± SD (min–max)	63.5 ± 15.1 (25–95)
Sex	
Male	64 (58.2%)
Female	46 (41.8%)
Marital status	
Married	98 (89%)
Single	3 (2.8%)
Divorced/widow	9 (8.3%)
Education level (%)	
Illiterate	40 (36.4%)
School	62 (56.4%)
University graduate	8 (7.2%)
Occupational status	
Farmer	16 (14.8%)
Rancher	4 (3.7%)
Governmental job	12 (10.2%)
Self-employed	34 (30.6%)
Housewife	44 (40.7%)
Work place condition	
Indoor	58 (52.9%)
Outdoor	52 (47.1%)
Skin phototype	
1 to 2	45 (40.9%)
3 to 4	58 (52.7%)
5 to 6	7 (6.4%)
Personal history of skin cancer	21 (19.6%)
Prior history of radiotherapy	29 (26.9%)
History of smoking	36 (33.3%)
Initial perception of the lesion	
Acne	34 (31%)
Nevus	30 (27.3%)
A sore	18 (16.4%)
Skin tumor	12 (10.9%)
Injury	7 (6.3%)
Wart	3 (2.7%)
Skin spot	2 (1.8%)
Chronic infection	1 (0.9%)
Bite	1 (0.9%)
Cyst	1 (0.9%)
Dry skin	1 (0.9%)

The most common initial perceptions of the lesions were acne (31%), nevus (27.3%), a sore (16.4%), skin tumor (10.9%), injury (6.3%), and wart (2.7%) (Table 1).

At the skin cancer perception investigation, in terms of disease chronicity, only 37% of participants had proper perception of their condition but 63% did not have correct information or even wrong belief. Besides, 45.4% of patients consider their illness as a serious condition which significantly affecting their lives. Our patients had a strong belief in treatment control (81%). Considering illness understanding 61.7% of patients did not have correct information about their disease. 80.9% of them also described worries about their skin cancer (Table 2).

The leading causes of skin cancer as assumed by patients were: history of skin cancer (37.4%), poor medical care in the past (36.4%), extreme sun exposure (31.5%), and lack of sun protection (27.5%). Moreover, the history of radiotherapy was significantly higher (54.5%) in patients who considered radiotherapy as a risk factor for their disease in comparison with patients with wrong idea (12.2%) or no idea (20.7%) ($P = 0.001$).

In order to analyze gender-related differences in cancer perception a gender-specific evaluation was also performed. The results showed that women (30.4%) more than men (14.5%) perceive fair skin complexion as a cause of their cancer ($P = 0.01$) but there was no difference between two sex regarding other questions.

Data About Sun Protection Measure

Before the skin cancer treatment, near half of the patients (38.2%) had acceptable sun-protective behavior, 52.7% of the patients had poor sun-protective behavior, and only 9.1% had good sun-protection. Acceptable and good sun-protective behavior was not significantly associated with sex, age, type of skin cancer, history of skin cancer, skin phototype, occupational status, and work place condition (data not shown). The only significant variables were educational level ($P = 0.05$) and marital status ($P = 0.009$).

In regard to sun-protective behavior at least 3 months after treatment of skin cancer, 55.4% of patients showed no changes or even negative change in their sun-protective behavior consisted of 32.7% of poor group which remain in the same group. But 44.5% of the patients changed their sun-protective behavior in a positive way which was statically significant ($P \leq 0.001$).

In order to analysis the factors associated with positive change in sun-protective behavior our data showed that age, diagnosis, and educational level were not significantly associated with positive changes of the sun-protective behavior, but sex was significantly associated with the sun-protective measure changes (25 out of 64 men (39.1%) and 7 out of 46 women (15.2%)) ($P = 0.007$).

Table 2 Distribution of patients according disease perception

	Proper idea	No idea	Wrong idea
Questions regarding views of disease			
Disease chronicity	40 (37%)	57 (51.9%)	13 (11.1%)
Seriousness	49 (45.4%)	53 (48.1%)	8 (6.5%)
Treatment effectiveness	89 (80.9%)	17 (15.5%)	4 (3.6%)
Disease understanding	42 (38.3%)	16 (14%)	52 (47.7%)
Emotional response	89 (80.9%)	11 (10%)	10 (9.1%)
Questions regarding disease cause			
Poor medical care in the past	40 (36.4%)	61 (55.5%)	9 (8.2%)
Extreme sun exposure	34 (31.5%)	53 (48.1%)	23 (20.4%)
Aging	26 (24.1%)	62 (56.5%)	22 (19.4%)
Smoking	19 (16.8%)	63 (57.9%)	28 (25.2%)
Radiation therapy	17 (15.6%)	64 (57.8%)	29 (26.4%)
Lack of sun protection	30 (27.5%)	54 (48.6%)	26 (23.9%)
Environmental pollution	26 (23.6%)	50 (45.5%)	34 (30.9%)
History of skin cancer	41 (37.4%)	48 (43.9%)	21 (18.7)
Fair skin complexion	24 (21.3%)	49 (45.4%)	37 (33.3%)
Inheritance	20 (18.2%)	36 (32.7%)	54 (49.1%)

Besides, the positive history of previous skin cancer was not significantly associated with better sun-protective scores ($P = 0.5$).

Discussion

There are few studies on illness perception in skin cancer like BCC [13, 14]. Studies focused on skin cancer perception have not been performed in Iran till now. Our results indicate that 63% of patients did not have correct information or even wrong belief about the chronicity of their disease. This is in contrast with findings of Eder et al. [15] on cutaneous T lymphoma patients and Hopman & Rijken [13] who performed a study among a random sample of cancer patients. Patients had different view on the chronicity of cancer, but many believed their cancer to be long-lasting. NMSCs, in most cases, have a short course between diagnoses to treatment, but disability due to tumor resection along with the need to follow up the recurrence often makes disease a life time problem. In our study, nearly 37% of patients believed in chronicity of their disease.

Another notable result was that 45.4% of patients consider their illness as a serious condition which significantly affecting their lives. Although BCC considered a skin tumor with favorable disease control, the seriousness of disease should be considered and discussed with the patients. Unfortunately, our patients did not have proper insight to their disease as a serious condition, though 80.9% of them described worries about their cancers.

Our patients had a strong belief in treatment control (80.9%) and this was partially in agree with the study of Eder et al. [15] and Hopman & Rijken [13] which showed a strong belief in the efficacy of their cancer treatment. Our results showed that 61.7% of patients did not have a good understanding of their disease that may be explained by the fact that our clinic as a referral clinic in our country notably treats patients from rural areas with low socioeconomic situation and it is hard to explain the disease and give them a clear understanding of the situation. It emphasizes the need for improvement of patient oriented information; also providing proper witting upon the diagnosis of a malignant situation is most of the time a challenging duty.

In our study, there was not any difference between men and women regarding disease perception and the only significant difference was that women more than men perceived fair skin complexion as a cause of their cancer. This was in contrast of the study of Eder et al. on CTCL patients which showed trends toward a difference between two sexes in beliefs about the chronicity of illness and in emotional representation. Furthermore, it is of great value to focus on differences in illness perception based on specific gender [15].

In our study, the most common initial perceptions of the lesions were acne (31%) and nevus (27.3%), and only 10.9% of patients considered their lesions as skin tumor; which shows we need to focus on educating people about symptoms of skin tumors. In a study by Yancovitz et al. [16], they assumed that the most common initial impressions of the lesion were skin cancer (20%), acne (19%), sore (10%), unknown (9%), dry

skin (7%), age spot (6%), and injury (6%) and patients with a history of skin cancer were more likely to think the lesion was a skin cancer on initial impression. They showed that those ≥ 50 years old and women were more likely to consider the lesion as a skin cancer or acne, whereas men most commonly thought the lesion to be acne, a sore, or skin cancer. Moreover, patients who considered the lesion was skin cancer were more likely to seek treatment within 3 months of noticing the spot. In another study by Alam et al. [17], they showed that patients who were younger or had a family history of skin cancer were more likely to delay seeking medical evaluation which was associated with larger tumor diameter. These results highlighted why patients delay seeking medical evaluation for their lesions and encourage trying for improvement in educational strategies in regard to early self-identification of a suspicious skin lesion. Furthermore, it may decrease the time to diagnosis and reduce the personal and societal burden of treatment of these tumors.

In our study, the leading causes of skin cancer as assumed by patients were: history of skin cancer (37.4%), poor medical care in the past (36.4%), extreme sun exposure (31.5%), and lack of sun protection (27.5%). Before the skin cancer treatment, 52.7% of our patients had poor sun-protective behavior, and only 9.1% had good sun protection. After treatment of skin cancer, 44.5% of the patients changed their sun-protective behavior in a positive way and men more than women significantly changed their sun protection. Interestingly, the positive history of previous skin cancer was not significantly associated with better sun-protective scores. These results further indicate low rates of sun-protective behaviors even among the population with history of skin cancer. In a study by Halpern et al. [18], they reported that countries with a high incidence of NSMC had greater awareness of the condition. The majority of their case group believed that there was a correlation between skin cancer and sun exposure and overall, 86% of respondents claimed that they always took precautions against ultraviolet exposure when in the sun, but only 26% applied sunscreen most or all of the time when they were exposed to the sun for more than 1 h. In most of the countries, outside workers reported lower sunscreen use than other respondents.

To wrap up, illness perceptions are an important issue, not only for evaluating patients' ideas about their diseases, but also for intervention for improvement of patient outcomes. Our study demonstrates how patients with skin cancer perceive their disease. This is of great value as dermatologists should be aware of patients' perceptions considering their disease in order to improve patients' knowledge through educating more about different aspects of disease. These data suggest that patients should be better educated about the diverse clinical presentations of skin cancer lesions and improving sun-protective behaviors among the patients and even general population.

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