

# Knowledge and Protective Behaviors About Skin Cancer Among Nursing Students in the West Black Sea Region of Turkey

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**Abstract** Skin cancer is an important health problem worldwide among cancer types and results in death at a minimum level in the case of early diagnosis. Therefore, the application of prevention programs is vital. Nurses by definition take responsibility for programs in prevention, early diagnosis, and screening for cancer. This study was conducted to determine the extent of skin cancer knowledge and protective behaviors among nursing students in the West Black Sea Region of Turkey. This cross-sectional, descriptive study was conducted between February and May 2015. The study sample consisted of 965 nursing students. Data were collected by means of a questionnaire form. Nursing students had a moderate level of knowledge, with average scores of  $24.35 \pm 3.66$ . The knowledge levels of first-year students were lowest compared with other years. It was determined that, among nursing students, the percentage of “negative behaviors” in response to skin cancer protective behaviors was higher than for “positive behaviors.” The results of this study highlight the knowledge level and skin cancer protective behaviors of nursing students. Training, seminars, and workshops that teach about risk factors, early detection, protective behaviors, and skin self-examination skills could increase the knowledge level of nursing students.

**Keywords** Skin cancer · Turkey · Nursing student · Knowledge · Behaviors

## Introduction

Skin cancer is an important health problem worldwide among cancer types and results in death at a minimum level in the case of early diagnosis [1, 2]. It is now known that one in every three cancer cases diagnosed is a type of skin cancer [3]. The incidence rate of skin cancer in Turkey is 18.9 per 100,000 people [4]. Assessment by sex found that skin cancer is the third-most frequent type of cancer diagnosed in males (20.0/100,000) and the second-most frequent type in females [5–7].

According to the World Health Organization (WHO) and previous studies, individual risk factors for skin cancer include fair skin; blue, green, or hazel eyes; light-colored hair; a tendency to burn rather than suntan; a history of severe sunburns; many moles or freckles; and a family history of skin cancer [1, 5, 8, 9]. In addition to these individual factors, ultraviolet (UV) rays, human papillomavirus infection, infrared radiation, inorganic arsenic, trauma, immunosuppression, and genetic disorders can also increase the risk of developing skin cancer [7, 10, 11]. Other studies have reported that such behaviors as sun tanning, using a tanning bed, having a permanent tattoo, using cosmetic products and detergents containing petroleum, smoking, consuming alcohol, and nutrition habits are additional important risk factors for skin cancer [12–14].

Although skin cancer is a prevalent disease, it is a preventable and easily treatable malignancy in the case of early diagnosis [1, 15]. Therefore, the application of prevention programs is vital. An analysis of studies showed that applied prevention programs most frequently target children and

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adolescents and focus on protection against the sun's rays [1, 3, 5, 10, 12, 16]. Protection against the sun's rays ranks highest among primary prevention programs [4, 5, 16]. Among secondary approaches, skin self-assessment, regular screening, and medical examinations have been deemed important for early diagnosis [15, 17]. It is important to note that even if the skin is protected from the sun's rays, the skin regularly experiences trauma, for example, when cosmetic products or permanent tattoos are applied, the latter of which has become popular in recent years among young people. Thus, early diagnosis and screening can help prevent skin cancer, and these factors should be included in research subjects and prevention programs [17–22].

Nurses by definition take responsibility for programs in prevention, early diagnosis, and screening for cancer. Because nursing students will play an important role in these programs in the future, whether they have accurate knowledge about cancer and display positive behaviors is important. Unlike other studies in this area, this study aimed to assess the level of knowledge about skin cancer and its application by nursing students in more detail and to further compare their knowledge level by risk factor.

## Material and Methods

This study used a descriptive, cross-sectional design. The study was conducted with nursing students from the three health schools in the 2014–2015 academic years in the West Black Sea Region of Turkey. No sampling method was used to select subjects for the study. All nursing students who agreed to participate were included. The study sample enrolled 965 volunteer nursing students. At these universities, nursing education involves eight semesters (approximately 4 years) toward a bachelor's degree.

The study was carried out between February 9 and May 1, 2015. The students were invited to participate after an explanation by the researcher, a presentation of the study objectives and determination of their eligibility to participate. The students were informed that the study was in no way associated with the teaching or assigning of marks for any of their classes. Pilot testing was done on 15 nursing students from each school to further validate the questionnaire, to eliminate bias and to assess the feasibility of administering the questionnaire. Minor revisions were made after the pilot testing. The questionnaires were filled out in the classroom, and the researcher stayed with the students while they were completing them. Completion of the instruments took an average of 15 min.

For data collection, a questionnaire was used to elicit responses in accordance with the literature [1, 5, 13, 14, 16, 18–20]. The questionnaire was composed of three parts. The

first part included 15 items about the socio-demographics and skin characteristics of the subject. The second part included 32 items testing knowledge about skin cancer prevention. The third part included 23 items asking about preventive behaviors against skin cancer. The questions were multiple choice and closed-ended.

## Data Analysis

Data were analyzed using SPSS (Statistical Package for Social Sciences) software for Windows version 16.0. Data were evaluated with number, percentage, mean, standard deviation, calculation using Student's *t* test, one-way ANOVA, Pearson correlation analysis, and the Kruskal–Wallis (KW) test. A *p* value <0.05 was considered statistically significant.

## Ethical Considerations

Approval for the study was obtained from the ethics committee of the BEU university (IRB; 54/09-03). Written permission was obtained from the institutions at which the research was conducted. Information was given to the students about the research, and verbal consent was obtained. Interviews were anonymous, and data remained confidential throughout the study.

## Results

The characteristics of the nursing students are shown in Table 1. The students' ( $N = 965$ ) mean age was  $20.85 \pm 1.87$  and 79.6% of them were women. The largest group of students (39.9%) was in the first year of nursing school and did not have cigarette smoking and alcohol drinking regarding risk factors for skin cancer (77.5%). A majority (94.9%) of the students did not have any chronic illness, and 1.1% ( $n = 11$ ) of them had a family member with skin cancer. The students were mostly dark-eyed (69.0%), dark-haired (60.4%), and fair-skinned (55.8%). The majority of students (99.4%) used cosmetics, but 64.4% of them did not look at the ingredients (Table 1).

The nursing students were mostly fair-skinned. The majority of students did not have a birthmark (75.2%) but most had moles (92.7%). They responded that their skin (35.4%) was rarely affected by redness or swelling due to sunlight exposure (Table 2).

The majority of students (98.7%;  $n = 952$ ) had knowledge about skin cancer, and approximately 45.2% ( $n = 430$ ) had academic information about the subject. Other reported sources of information were the Internet (37.8%;  $n = 360$ ), television and radio (33.5%;  $n = 319$ ), health professionals (19.2%;  $n = 183$ ), and magazines (18.3%;  $n = 174$ ). Nursing

**Table 1** Demographic characteristics of nursing students (*n* = 965)

Characteristics	Mean ± standard deviation	Age range
	<i>n</i>	%
Age, years	20.85 ± 1.87	17–35
Sex		
Female	768	79.6
Male	197	20.4
Year of nursing school		
First	385	39.9
Second	245	25.4
Third	178	18.4
Fourth	157	16.3
Harmful habits		
None	748	77.5
Cigarette smoking	128	13.3
Alcohol use	89	9.2
Existence of any chronic disease		
Yes	49	5.1
No	916	94.9
Color of eyes		
Fair (blue, green, or hazel)	299	31.0
Dark (brown or black)	666	69.0
Color of hair		
Fair (red or blond)	382	39.6
Dark (black or brown)	583	60.4
Family member with skin cancer		
Yes	11	1.1
No	954	98.9
Method for removing unwanted hair		
Waxing	506 <sup>a</sup>	52.4 <sup>b</sup>
Shaving (razor blade)	215 <sup>a</sup>	22.3 <sup>b</sup>
Depilatory cream	62 <sup>a</sup>	6.4 <sup>b</sup>
String	110 <sup>a</sup>	11.4 <sup>b</sup>
Epilating appliance	327 <sup>a</sup>	33.9 <sup>b</sup>
Laser	51 <sup>a</sup>	5.3 <sup>b</sup>
Cosmetic use		
Yes	766	99.4
No	119	20.6
Pay attention to cosmetic ingredients ( <i>n</i> = 766)		
Yes	273	35.6 <sup>b</sup>
No	493	64.4 <sup>b</sup>

<sup>a</sup> More than one answer

<sup>b</sup> Percentages based on number of responses

students in the study had a moderate level of knowledge, scoring an average of 24.35 ± 3.66 (range 0–32) on the questionnaire.

In Table 3, it can be seen that majority of nursing students gave correct answers to the statements on skin cancer. The answers that were most frequently missed included, “Ultraviolet rays can cause skin cancer,” “To identify early skin cancer, a person’s skin should be examined by a physician every two years, between the ages of 20 and 40 years; after age 40, this should be done every year,” “Sunscreen should be used one hour before going outside,” and “In women, melanoma most often appears first on the leg” (Table 3).

Knowledge level was significantly higher for females (*p* < .001) and fourth-year students (*p* = .041); students used cosmetics (*p* = .0021) and depilatory wax (*p* < .001) and epilating appliance (*p* < .001) for unwanted-hair removal. Knowledge level was significantly lower for students who used shaving (*p* < .001) for unwanted-hair removal. There was no statistically meaningful difference between the other variables and the score averages for the knowledge of skin cancer risk factors (Table 4).

It was determined that nursing students who have mole (*p* = 0.014) or swelling of the skin in sunlight (*p* = 0.027) scored higher on the knowledge test. There was no statistically meaningful difference between the variables of skin color and existence of a birthmark and average scores for knowledge of skin cancer risk factors (Table 5).

Some skin cancer protective behaviors are listed in Table 6. Among nursing students, the percentages of negative

**Table 2** Skin characteristics of nursing students (*N* = 965)

Characteristic	Number	Percentage
Color of skin		
Light-skinned	338	35.0
Fair-skinned	538	55.8
Dark-skinned	89	9.2
Existence of birthmark		
Yes	239	24.8
No	726	75.2
Existence of moles		
Yes	895	92.7
No	70	7.3
Effect of sunlight on the skin		
Painful redness	187	19.4
Swelling	38	3.9
Rarely redness or swelling	342	35.4
Rarely burns	167	17.4
Not affected	231	23.9

**Table 3** Descriptive analysis of knowledge about skin cancer of nursing students

Parameter	Correct answer, <i>n</i> (%)
The most common type of skin cancer is basal-cell carcinoma.	768 (80.7)
Melanoma is a form of skin cancer.	818 (85.9)
In women, melanoma most often appears first on the leg.	403 (42.3)
In men, melanoma most often appears first on the back.	514 (54.0)
Chemotherapy is the most common treatment for melanoma.	424 (44.5)
Most skin cancers can be prevented.	786 (82.6)
Skin cancer can be easily diagnosed.	605 (63.6)
Regular skin self-assessment is important for early diagnosis.	868 (91.2)
To identify early skin cancer, a person's skin should be examined by a physician every 2 years, between the ages of 20 and 40 years; after age 40, this should be done every year.	140 (14.7)
Although early diagnosis of skin cancer, the cure rate is even low.	741 (77.8)
People with dark skin color may be at risk for skin cancer.	712 (74.8)
The number of spots on the body does not correlate with skin cancer risk.	737 (77.4)
Moles that change shape or color may be a sign of skin cancer.	848 (89.1)
People with dark hair color may be at risk for skin cancer.	685 (72.0)
Fair hair color is not a risk factor for skin cancer.	674 (70.8)
Cosmetic products and detergents containing petroleum increase the risk of skin cancer.	867 (91.1)
Tattoos are not a risk factor for skin cancer.	797 (83.7)
The presence of freckles on the skin does not create a risk of skin cancer.	619 (65.0)
People with a family history of skin cancer may at higher risk of skin cancer.	795 (83.5)
People exposed to sunlight for long periods of time outdoors are at risk.	868 (91.2)
One should drink plenty of noncarbonated liquids to avoid developing skin cancer.	680 (71.4)
Ultraviolet rays can cause skin cancer.	97 (10.2)
Smoking can cause skin cancer.	814 (85.5)
Skin cancer is not associated with viruses.	632 (66.4)
Nonhealing wounds on the skin may be a symptom of skin cancer.	792 (83.2)
People who have had sunburns one to two times per year are not at risk for skin cancer.	623 (65.4)
Sunscreen should be used to protect skin from the sun's rays.	871 (91.5)
Sunscreen should be used 1 h before going outside.	128 (13.4)
Sunscreen should be reapplied every 3 h.	725 (76.2)
Sunscreen protects skin against both UVA and UVB light.	862 (90.5)
Skin should not be bronzed, in order to prevent skin cancer.	575 (60.4)
One should not enter into a tanning solarium, in order to prevent skin cancer.	702 (73.7)

behaviors were higher than for positive behaviors. It was found that students displayed mostly negative behaviors by neglecting to prevent skin cancer by avoiding tanning, wearing a hat and applying the appropriate sunscreen, performing skin self-assessments, having a doctor check spots or moles, or wearing gloves while cleaning (Table 6).

## Discussion

This study assessed nursing students' knowledge level about skin cancer and their preventive and protective behaviors against it. An analysis of previous studies determined that these studies have been carried out more frequently with high

school students [3, 23] and medical student doctors [24, 25] and that there has been only one study conducted with nursing students [26]. This study found that all these previous studies assessed knowledge and its applications about protecting oneself from the sun's rays in order to prevent skin cancer, concluding that the study subjects had inadequate knowledge about skin cancer and its prevention. Unlike the studies previously conducted, however, the present study assessed both student nurses' knowledge about protecting oneself from the sun's rays and applications for the prevention of skin cancer, as well as knowledge and its applications to known risk factors, such as using inappropriate cosmetic products and detergents that can cause skin trauma, or getting a permanent tattoo. This study also determined that student nurses are

**Table 4** Level of skin cancer knowledge of nursing students according to demographic characteristics

Characteristics	Mean ± standard deviation		Statistical test	p value
Age, years	24.85 ± 1.87		<i>r</i> = 0.053	<i>p</i> = 0.105
Sex				
Female	24.79 ± 3.48		<i>t</i> = 7.572	<i>p</i> = 0.000*
Male	22.61 ± 3.85			
Year of nursing school				
First	24.02 ± 3.78			
Second	24.20 ± 3.47		<i>KW</i> = 10.687	<i>p</i> = 0.014*
Third	24.63 ± 3.88			
Fourth	25.07 ± 3.25			
Family member with skin cancer	Yes	No	<i>Z</i> = −0.430	<i>p</i> = 0.667
	25.09 ± 2.25	24.34 ± 3.67		
Method for removing unwanted hair				
Wax	24.89 ± 3.45	23.76 ± 3.79	<i>t</i> = 4.753	<i>p</i> = 0.000*
Shaving (razor blade)	23.06 ± 3.88	24.72 ± 3.51	<i>t</i> = −5.885	<i>p</i> = 0.000*
Depilatory cream	23.45 ± 3.85	24.42 ± 3.64	<i>t</i> = −2.017	<i>p</i> = 0.044
String	24.57 ± 3.40	24.32 ± 3.69	<i>t</i> = 0.656	<i>p</i> = 0.512
Epilating appliance	24.92 ± 3.43	24.06 ± 3.74	<i>t</i> = 3.433	<i>p</i> = 0.001*
Laser	25.20 ± 3.22	24.31 ± 3.68	<i>t</i> = 1.673	<i>p</i> = 0.095
Harmful habits				
Cigarette	23.84 ± 3.54	24.42 ± 3.69	<i>F</i> = 1.424	<i>p</i> = 0.241
Alcohol	24.12 ± 3.51	24.39 ± 3.68	<i>F</i> = 0.479	<i>p</i> = 0.620
Cosmetic use	24.49 ± 3.60	23.81 ± 3.82	<i>t</i> = 2.318	<i>p</i> = 0.021*
Pay attention to cosmetic ingredients	24.50 ± 3.63	24.48 ± 3.59	<i>t</i> = 0.065	<i>p</i> = 0.949
Color of eyes				
Fair (blue, green, or hazel)	24.55 ± 3.52		<i>t</i> = 1.111	<i>p</i> = 0.267
Dark (brown or black)	24.26 ± 3.71			
Color of hair				
Fair (red or blond)	24.58 ± 3.33		<i>t</i> = 1.597	<i>p</i> = 0.111
Dark (black or brown)	24.20 ± 3.86			

\**p* < 0.05

poorly informed about melanoma, but their knowledge about what actions to take to prevent skin cancer is adequate. Considering that nearly half of the student nurses obtained their information about skin cancer from school, the subject of skin cancer and its early diagnosis should be take a larger place in nursing curricula Tables 5 and 6.

This study determined that the student nurses’ sex had an important effect on their mean knowledge scores and that female students had significantly higher knowledge scores. This result coincided with the fact that the female student population within the sample group was quite high. These results are consistent with findings of other studies. Patel et al. [24] conducted a study and found that the knowledge scores of female students studying in the medical faculty were higher than those of males. Rodriguez et al. [27] and Isik Andsoy et al. [1] also found that females had significantly higher knowledge levels on this subject than males. On the other hand, the study of Sumen and Oncel [5] and Yurtseven

et al. [28] reported that the students’ sex did not have a significant effect on their knowledge levels.

The present study determined that the knowledge scores of students significantly increased along with increasing years of nursing school. This result verified the finding that students obtained their information about skin cancer from school. Moreover, because the number of lessons in the curriculum from which students get information about the subject increases at higher grade levels, the mean knowledge scores of students also concomitantly increase, so this result came as no surprise. Sumen and Oncel [5] conducted a quasi-experimental study using a pretest–posttest design and showed that education had an effect on mean knowledge scores. This study reported that the posttest knowledge scores of a group receiving information about skin cancer significantly increased compared with their former scores.

The mean knowledge scores of nursing students who used cosmetic products for personal care were found to be

**Table 5** Level of skin cancer knowledge of nursing students according to skin characteristics

Characteristic	Mean ± standard deviation	Statistical test	<i>p</i> value
Color of skin			
Light-skinned	24.51 ± 3.54	<i>F</i> = 0.617	<i>p</i> = 0.540
Fair-skinned	24.30 ± 3.67		
Dark-skinned	24.06 ± 3.98		
Existence of birthmark			
Yes	24.40 ± 3.78	<i>t</i> = 0.240	<i>p</i> = 0.810
No	24.34 ± 3.61		
Existence of mole			
Yes	24.40 ± 3.65	<i>t</i> = 1.452	<i>p</i> = 0.014*
No	23.73 ± 3.66		
Effect of sunlight on the skin			
Painful redness	24.67 ± 3.28	<i>F</i> = 2.762	<i>p</i> = 0.027*
Swelling	24.92 ± 3.61		
Rarely redness or swelling	24.63 ± 3.63		
Rarely burns	24.11 ± 3.93		
Not affected	23.76 ± 3.74		

\**p* < 0.05**Table 6** Protective behaviors among nursing students to prevent skin cancer (*n* = 952)

Behavior	Protective behavior	
	<i>n</i>	%
I avoid the sun most of the time when I am out between 10:00 and 16:00.	677	71.1
I wear a wide-brim hat/cap, etc., most of the time when I am out between 10:00 and 16:00.	307	32.5
I wear light-colored, tightly woven loose clothes most of the time when I am out between 10:00 and 16:00.	582	61.1
I wear sunglasses most of the time when I am out between 10:00 and 16:00.	503	52.8
I do not swim in the sea most of the time when I am out between 10:00 and 16:00.	487	51.2
I do not sunbathe on the beach most of the time when I am out between 10:00 and 16:00.	578	60.7
I regularly put on sunscreen to protect myself from the sun's rays before going out.	422	44.3
I put on sunscreen with a protection factor of 15 or higher to protect myself from the sun's rays.	506	53.2
I regularly reapply sunscreen every 3 h to protect myself from the sun's rays.	319	33.5
I reapply sunscreen to protect myself from the sun's rays after swimming in the sea.	492	51.7
When I go to the seaside, I stay until I am getting a tan.	697	73.2
I regularly go to a tanning salon to get a tan.	873	91.7
I do not apply lotion or oil to get a tan.	568	59.7
I do not apply cheap/artificial suntan cream on my skin.	755	79.3
I stay indoors to protect myself from sunburn.	607	63.8
I stay in the shade to protect myself from sunburn.	772	81.1
I apply skin-lightening cream to protect myself from sunburn.	760	79.8
I drink 8–10 glasses of water a day.	653	68.6
I regularly have the doctor check any spots or moles on my body.	184	19.3
I regularly do a skin self-assessment.	450	47.3
I never permanently tattoo my skin.	724	76.1
I prefer cosmetic products that do not contain petroleum.	706	74.2
I certainly wear gloves while doing cleaning.	337	35.4

significantly high. Studies assessing students' skin cancer knowledge and applications of students about skin cancer and prevention of it did not find results about students' knowledge and applications related to the cosmetic products. Besides, the literature emphasized that the ingredients, chemical structure, and duration of exposure to cosmetics can cause skin toxicity [29]. Problems such as cosmetic intolerance syndrome, contact dermatitis, photocontact dermatitis, contact urticaria, acne/folliculitis, skin-color changes, and systemic effects related to cosmetic products can occur, and cosmetic products (especially those containing petroleum) can be carcinogenic [18, 19].

A comparison of skin characteristics with the mean knowledge scores of student nurses in the sample revealed that students who have nevi or suffer from swelling and painful redness when they are exposed to the sun had significantly higher mean knowledge scores. This study found the mean knowledge scores of such students at risk for skin cancer to be high, and this result is encouraging. The WHO [9] and previous studies likewise reported that the existence of moles and a history of sunburn [1, 5, 8] are individual risk factors, and suggested that such people need to be aware of skin cancer preventive behaviors.

This study determined that student nurses mostly display behaviors that are negative for skin cancer prevention. For example, students regularly preferred to go to solariums especially to get tanned, and displayed negative behaviors on wearing hat and applying sun cream when they are out, performing skin self-assessments or wearing gloves while using detergents. The WHO and the American Cancer Society reported that reducing time spent outside in the midday hours (10:00–16:00), wearing clothes with high protection against the sun, wearing a hat and sunglasses and applying sunscreen with a protection factor of 15 or higher are necessary to prevent skin cancer [9, 17]. Previous studies also reported that study subjects did not frequently use sunscreen and wear sun-protective hats [1, 26, 30] and did not adequately perform skin self-assessments [25].

There are several limitations to this study. First, the participants were nursing students in one geographical region of Turkey. Hence, the results may not be generalizable to all nursing students in Turkey. A second limitation was the use of self-reported questionnaires. A third limitation was the cross-sectional design of this study, which prevented the observation of protective behaviors among nursing students.

## Conclusion

The prevalence of skin cancer continues to increase. Hence, physical assessment should be performed by all healthcare

professions. The results of this study highlight the knowledge level and skin cancer protective behaviors of nursing students. In the current study, the nursing students surveyed had moderate skin cancer knowledge but were not adequately protecting themselves from primary risk factors for skin cancer. Training, seminars, and workshops that teach about risk factors, early detection, protective behaviors, and skin self-examination skills are needed for nursing students. Future research is needed to assess barriers to adopting skin cancer protective behaviors.

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**Compliance with Ethical Standards**

**Conflict of Interest** The authors declare that they have no conflict of interest.

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