

ORIGINAL ARTICLE

Skin cancer knowledge and sun protection behavior among nursing students

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Abstract

Aim: The objective of this study was to determine skin cancer knowledge and sun protection behavior among nursing students.

Methods: A total of 1178 nursing students in the Aegean Region of Turkey took part in this descriptive study. A score for knowledge on protection against skin cancer and a score for protective behavior against skin cancer were calculated.

Results: In this study, first year students sunbathed more in the middle of the day than fourth year students, and their knowledge of skin cancer was lower. No statistical difference was determined for protective behavior between the two groups. The knowledge levels and protective behavior of first year students were alarmingly low, but the average scores for knowledge and behavior of the fourth year university students were higher. The knowledge levels of the fourth year students were average but their protective behavior was insufficient. It was found that the knowledge levels and the levels of protective behavior of light-skinned students were higher.

Conclusion: This study revealed that the knowledge levels and protective behavior of first year nursing students against the harmful effects of the sun and for protection against skin cancer were alarmingly low. It also showed that the knowledge levels of the fourth year nursing students were average, but that their protective behavior was very insufficient. These findings suggest that it is of extreme importance to acquire knowledge and behavior for protection against skin cancers in the education of nursing students.

Key words: nursing student, skin cancer, sun protection.

INTRODUCTION

Skin cancer is a major health problem (Healthy People 2020 Guidelines; Mahon & Yackzan, 2010). Today,

people are exposed more to intensive ultraviolet (UV) rays than in the past with the popularity of tanning in recent years; people spend an excessive amount of time under the sun during seaside vacations and in participating in outdoor sports; new technology has meant an increase in industrial equipment emitting UV rays; and the hole in the protective ozone layer has increased in size. This increased exposure to UV radiation may be one of the biggest factors contributing to the rise in the incidence of skin cancer (Mahon & Yackzan, 2010).

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Studies have been made in many countries to determine the effect of the sun's rays on the skin in various segments of society, the levels of knowledge and awareness on the subject of skin cancers, and behavior for protection against the sun (Nikolaou *et al.*, 2009; Saridi *et al.*, 2009; Stanton, Janda, Baade, & Anderson, 2004). Furthermore, many types of media and educational campaigns have been carried out with the objective of preventing the development of skin cancers (Geller *et al.*, 2002; Saraiya *et al.*, 2003; Vries, Lezwijn, Hol & Honing 2005).

Primary and secondary prevention are essential components of the effort to decrease mortality and morbidity risk from these malignancies. The total of all skin cancers can be decreased by 80% with suitable protective measures taken from an early age (Saraiya *et al.*, 2003). The Healthy People 2020 Guidelines aims to "increase the proportion of persons who participate in behaviors that reduce their exposure to harmful ultraviolet (UV) irradiation and avoid sunburn". The Healthy People 2020 Guidelines pointed to an increase in the proportion of people using skin cancer primary prevention strategies, which include at least one of the following protective measures: avoiding the sun between 10.00 and 16.00 hours, wearing sun-protective clothing, using sunscreen with a sun protection factor (SPF) of 15 or higher, and decreasing or avoiding UV radiation exposure (Healthy People 2020 Guidelines). Just as early detection of skin cancer and screening are important, taking individual protective measures are also extremely important (Mahon & Yackzan, 2010). The personalization of these measures according to age, sex, and educational status is important (Stanton *et al.*, 2004). Intelligent strategies should be also developed for changing the belief and perception that having a tanned skin is desirable (Nikolaou *et al.*, 2008; Saridi *et al.*, 2009).

Training individuals on protection against the harmful effects of the sun's rays, changing stereotyped behavior, and transforming information into behavior are of extreme importance. Nurses can influence the public to practice primary and secondary prevention strategies (Mahon & Yackzan, 2010; Tidy, 2003). It is inevitable that nurses, who have an effective role in health protection, should also be included in education and campaigns against skin cancer. Therefore, acquiring the knowledge and skills to change behavior in relation to skin cancers is relevant to the education of nurses. In a Greek study including nurses, women were found to use sunglasses and sunscreen more than men and age was also found to affect the use of protective measures

with those aged between 30 and 50 years found to use an umbrella/shade and clothing to protect themselves from sun exposure more than those younger than 30 years (Brokalaki *et al.*, 2011). In other study (Ermertcan *et al.*, 2005), use of sunscreen and sunglasses in men over 30–40 years of age were significantly higher in doctors and nurses (52.7% and 50.5%, respectively) than medical and nursing students. It was found that incomplete information about protective measures, especially using sunscreen and wearing protective clothing and a hat. Ermertcan *et al.* (2005) suggest that an efficient policy of education on the effective use of sun protection methods beginning in childhood and adolescence should be developed to prevent skin cancer.

The Aegean Region of Turkey has a typical sunny Mediterranean climate. This region benefits greatly from the sun and is exposed to sunlight for 9 months a year. Consequently, it is important to determine the knowledge levels and protective behavior against the effects of the sun and protection against skin cancers of nursing students born or living in this region. The objective of this study was to determine the skin cancer knowledge and sun protection behavior among nursing students. In accordance with this objective, the study questions directed to the first and fourth year university students were as follows:

- 1 Is there a difference between the groups (first and fourth year nursing students) in their knowledge level scores for protection against the sun and skin cancer?
- 2 Is there a difference between the groups in their protective behavior scores for protection against the sun and skin cancer?

METHODS

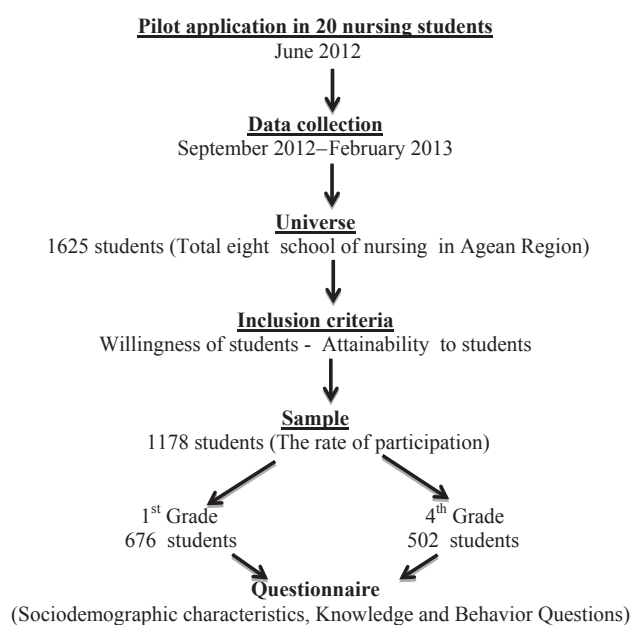
Sample and setting

This descriptive study was carried out between September 2012 and February 2013. In Turkey, nursing schools are faculties directly connected to a university. Nursing education involves a 4 year (eight semester) bachelor degree program in a university. Each semester, the students register in one main professional nursing course and in the second semester they attend a clinical practice course in addition to their theoretical courses.

The research was conducted among students of eight nursing colleges in cities in the Aegean Region of Turkey ($n = 1625$). No sampling method was used in the study, because the study included the whole adolescent and youth population of the selected university ($n = 1178$) (Table 1). The ratio of participation was 72.8% for the first year students and 72.1% for the fourth year

Table 1 Name, location of nursing school and number of students in Aegean Region

University	Location	Grade 1	Grade 4
Denizli	City	99	65
Manisa	Urban	101	80
Kütahya	Urban	108	87
Uşak	Urban	96	48
Afyon	Urban	51	26
Muğla	Urban	104	96
Aydın	City	49	44
İzmir	City	68	56
Total		676	502

**Figure 1** Design of study.

students. The criteria for inclusion were being a university student of the nursing and being willing to take part in the study (Fig. 1). The majority of students (37.4%) were born in a city in the Aegean Region, 14.8% in the Mediterranean Region and 14.4% in the Black Sea Region.

Data collection

The data were collected by the researchers between September and December in the academic year 2012–2013. They were contacted directly in their classroom. Detailed information was given to the students about the research and verbal consent was obtained. The ques-

tionnaires were distributed to students in their classroom. It took approximately 20 min to fill out a survey in a single session. After the students filled out the questionnaires in the classroom, the questionnaires were collected by researchers in a box.

Instruments

The survey instrument was a questionnaire developed to determine knowledge and behavior, and was based on the current published work (Brokalaki *et al.*, 2011; Devos, Baeyens, & Van Hecke, 2003; Ermertcan *et al.*, 2005; Hedges & Scriveni, 2010; Miles, Waller, Hiom, & Swanston, 2005; Nikolaou *et al.*, 2009; Saridi *et al.*, 2009; Stanton *et al.*, 2004). After determining the questions, the expert opinions of one dermatologist, three academician nurses and two dermatology nurses were obtained. In June 2012, subsequently, a pilot application was conducted with 20 young nursing students of the same age who were not participating in the study. The final questionnaire included four parts, with 17 questions relating to sociodemographic characteristics, 10 questions about behavior for protection against the sun, 14 questions relating to the risk factors of skin cancer, and 18 questions about knowledge of skin cancers and methods of protecting against the sun. In addition, questions were asked about familial skin cancer, experiences of sunburn, sources of knowledge, tanning behavior and use of SPF. The skin types of the students were grouped according to the Fitzpatrick classification: skin “burns” without or with minimal tanning (phototype I and II), “burns” and then tans (phototype III) or tans easily without burning (phototype IV) (Nikolaou *et al.*, 2009).

Knowledge level score for protection against skin cancer

The knowledge level for the etiopathogenesis of skin cancers and methods of protection against the sun was examined in 15 questions and the results were obtained by adding 1 point for each of the correct responses (0 points were given for “wrong/I do not know” answers and 1 point was given for correct answers). The knowledge level score was formed by adding all the scores together. The knowledge scores ranged 0 (minimum) to 15 (maximum).

Behavior score for protection against the sun and skin cancer

Points were given according to the frequency of implementation of each of the methods applied for protection

against the sun and were evaluated on a 4 point scale (“never” = 1, “sometimes” = 2, “frequently” = 3 and “always” = 4). The total points obtained were divided by the number of 13 items, to calculate the behavior score for protection against the sun and skin cancer. For the calculation of the total score, a minimum of eight responses to the 13 protective behavior patterns was needed (minimum 13, maximum 52 points).

Ethical implementations

Permission was obtained from the ethics committee of the university (ethic no: 26) where the research coordinatorship was located in order to carry out the study. Verbal permission was obtained from the nursing universities where the study was carried out and verbal approval was obtained from the students. Students’ names were not used.

Statistical analysis

The data were evaluated with IBM Predictive Analytics SoftWare (PASW) Statistical Product and Service Solutions (SPSS, Chicago, IL, USA) version 20.0. In the evaluation of the data obtained in the study, statistical significance tests – non-parametrical tests such as the χ^2 -test, standard deviation, Student’s *t*-test and one-way

ANOVA – were used, in addition to descriptive statistics given in numbers and percentages. Number and percentage distributions of the sociodemographic characteristics of the students and the frequencies of protective practices were compiled. In the determination of the average scores for protective behavior, the responses of the students for each item were rated in the form of “always”, “frequently”, “sometimes/rarely” and “never” and were evaluated between 1 and 4 points. When a student’s score approached 4, it was interpreted that protective measures were being taken, and when it approached 1, it was interpreted that protective measures were not being taken. In addition, a relationship was sought between the sociodemographic variables of the students and their scores for protective behavior, knowledge levels and risk factors. Cronbach’s alpha was 0.72 (moderate = 0.60–0.80) (Ozdamar, 2002).

FINDINGS

Demographics and skin characteristics

The sociodemographic characteristics of the students are given in Table 2. A majority of both the first year and fourth year students were female (first year, 78.6%; fourth year, 54.1%). The students were mostly fair

Table 2 Sociodemographic characteristics of nursing university students and their risk factors for skin cancer

Characteristics	Grade 1		Grade 4		χ^2	<i>P</i>
	<i>n</i>	% [†]	<i>n</i>	% [†]		
Mean age, years	19.2 ± 1.2		22.4 ± 1.4			
Sex					5.04	0.002
Female	531	78.6	366	54.1		
Male	145	21.4	136	45.9		
Color of skin					4.98	0.83
Light-skinned	474	15.2	87	17.3		
Fair-skinned	371	54.9	294	58.6		
Dark-skinned	202	29.9	121	24.1		
Photo type					9.72	0.008
I–II	424	62.7	307	61.2		
III–IV	252	37.3	195	38.9		
Color of hair					3.06	0.80
Blonde–auburn	220	32.5	188	37.5		
Dark brown/black	456	67.5	314	62.5		
Common nevi					7.81	0.09
I have never counted	351	52.0	225	44.8		
≤5	124	18.3	96	19.1		
6–10	60	8.9	63	12.5		
11–20	65	9.6	52	10.4		
>20	76	11.2	66	13.2		
Total	676	57.4	502	42.6		

[†]The percentage of rows.

Table 3 Distribution of nursing students' knowledge about sun protection and skin cancer prevention

Characteristics	Grade 1		Grade 4		χ^2	p
	n	%	n	%		
Knowledge status of skin cancer						
Do not know	402	59.5	170	33.9	75.59	0.000
Know	274	40.5	332	66.1		
Knowledge of protection from skin cancer						
Do not know	187	27.7	76	15.1	65.38	0.000
Yes, I know	102	15.1	169	33.7		
I know a bit	387	57.2	257	51.2		
Perception of skin cancer risk in future						
High	29	4.3	23	4.6	12.37	0.006
Moderate	113	16.7	110	21.9		
At average	257	38.0	211	42.0		
I do not know	277	41.0	158	31.5		
Source of information [†]						
From the lessons	92	13.6	233	46.4		
From the clinical practice course	46	6.8	94	18.7		
From the health profession	26	3.8	57	11.3		
From the media (e.g. Internet, TV)	175	25.9	269	53.6		
From family or friends	83	12.3	61	12.1		

[†]There is possibility of marking multiple choices in this question.

skinned (first year, 54.9%; fourth year, 58.6%) and had dark brown or black hair (first year, 67.5%; fourth year, 62.5%). The proportion of phototype I–II in the first year students was higher than in the fourth year students ($\chi^2 = 9.72$, $P = 0.008$). A large proportion of the students in both years (first year, 52%; fourth year, 44.8%) did not know the number of moles on their bodies (Table 2).

Knowledge level for protection against the sun and skin cancer

It was determined that 59.5% of the first year students did not know about skin cancers but that 66.1% of the fourth year students knew about skin cancers ($\chi^2 = 75.59$, $P = 0.000$) (Table 3). It was found that the first three sources of knowledge for the first year students were media tools at 25.9%, lessons at 13.6% and friends and family at 12.3%, while for the fourth year students the first three sources of knowledge were media tools at 53.6%, lessons at 46.4% and clinical practice course at 18.7% (Table 3). It was determined that in answer to the question about knowing how to protect against skin cancer, 57.2% of the first year students responded “I know a bit”, 51.2% of the fourth year students responded “I know a bit” and 33.7%

responded “Yes, I know”; and there was a significant difference between the two groups in knowing how to protect against skin cancer ($\chi^2 = 65.38$, $P = 0.000$) (Table 3).

For perceiving the risk of having skin cancer in the future, 41% of the first year students stated “I do not know”. The response of the fourth year students was average or less than average at 31.5%. A statistically significant difference was determined for perceiving risk between the two groups ($\chi^2 = 12.37$; $P = 0.006$) (Table 3).

It was observed that the average scores for knowledge ($t = 10.13$, $P = 0.000$) and behavior ($t = 4.48$, $P = 0.000$) for protection against the sun and skin cancer of the fourth year students (knowledge, 7.6 ± 2.9 ; behavior, 9.4 ± 2.8) were higher than those of the first year students (knowledge, 2.5 ± 0.4 ; behavior, 2.6 ± 0.4). A statistically significant difference was determined between the average scores of the two groups (Table 4).

Behavior for protection against the sun and skin cancer

It was determined that 64.4% of the first year students sunbathed more in the noon hours, compared to 35.6%

Table 4 Distribution of students' mean scores of knowledge, behavior and attitude about sun protection and skin cancer prevention

Scores	Grade 1, n/%		Grade 4, n/%		<i>t</i>	<i>P</i>
Knowledge (15 questions)	676	7.6 ± 2.9	502	9.4 ± 2.8	10.13	0.000
Behaviors (13 questions) [†]	676	2.5 ± 0.4	502	2.6 ± 0.4	4.48	0.000

[†]1 = never, 4 = always.

Table 5 Distribution of nursing university students' behavior about sun protection

Characteristics	Grade 1, n/%		Grade 4, n/%		χ^2	<i>P</i>
Sunbathing in noon hours						
No	535	55.8	424	44.2	5.38	0.02
Yes	141	64.4	78	35.6		
Tanning						
No	458	67.7	332	66.1	0.19	0.66
Yes	218	32.3	170	33.9		
Sunbathing time (<i>n</i> = 218)						
Day long	33	15.1	26	15.3	8.53	0.03
09.00–11.00 hours	55	25.2	55	32.4		
11.00–16.00 hours	61	28.0	27	15.9		
After 16.00 hours	69	31.7	62	36.5		
Use of sun-protective factors						
No	420	62.1	288	57.4	2.72	0.09
Yes (>15 SPF)	256	37.9	214	42.6		
Experience of slight sunburn (in their lifetime)						
Never	273	40.4	181	36.0	2.27	0.13
Minimum, once	403	59.6	321	64.0		
Experience of 3–4 degree sunburn (in their lifetime)						
Never	591	87.4	426	84.9	1.60	0.20
Minimum, once	85	12.6	76	15.1		

SPF, skin protection factor.

of the fourth year students ($\chi^2 = 5.38$, $P = 0.02$). It was observed that 32.3% of the first year students and 33.9% of the fourth year students sunbathed to get a tan, and that the first year students did this mostly between 11.00 and 16.00 hours and after 16.00 hours, while the fourth year students sunbathed to get a tan between 09.00 and 11.00 hours and after 16.00 hours ($\chi^2 = 8.53$, $P = 0.03$). A large proportion of the students in both years of study did not use sun protectors (first year, 62.1%; fourth year, 57.4%) and it was observed that the difference between the two groups was not significant ($P > 0.05$) (Table 5). A total of 59.6% of the first year students and 64% of the fourth year students had experienced slight sunburn at least once and 13.8% (first year 12.6%, fourth year 15.1%) had experienced third to fourth degree sunburn at least once ($P > 0.05$) (Table 5). The fourth year students used sunglasses at a higher ratio ($\chi^2 = 8.89$, $P = 0.03$). Other than this,

no statistically significant difference was determined between the two groups for protective behavior ($P > 0.05$) (Table 6).

The genetic characteristics and knowledge, behavior, and attitude scores of all students were examined. It was found that light-skinned students showed more protective behavior than those with dark skins (2.65 ± 0.49 and 2.15 ± 0.52 , respectively) ($F = 6.19$, $P = 0.000$), and that their scores on knowledge of protection against the sun were higher (8.77 ± 3.0 and 8.07 ± 3.0 , respectively) ($F = 3.55$, $P = 0.000$). Similarly, it was found that those of phototype I/II (light-skinned) (I, 2.65 ± 0.4 ; II, 2.55 ± 0.4) showed greater protective behavior than those of phototype III/IV (dark-skinned) (I, 2.58 ± 0.4 ; II, 2.41 ± 0.4) ($F = 6.01$, $P = 0.00$). It was observed that those with light hair showed more protective behavior (light hair, 2.63 ± 0.4 ; dark brown, 2.58 ± 0.4 ; black, 2.46 ± 0.4) ($F = 11.45$, $P = 0.000$), and that their

Table 6 Distribution of nursing university students' behavior about sun protection and skin cancer prevention

Protective behavior	Grade	Never, <i>n</i> (%) [†]	Occasionally, <i>n</i> (%) [†]	Often, <i>n</i> (%) [†]	Always, <i>n</i> (%) [†]	χ^2	<i>P</i>
Using a cap	1	422 (62.4)	213 (31.5)	24 (3.6)	17 (2.5)	6.87	0.07
	4	317 (63.1)	119 (27.7)	33 (6.6)	13 (2.6)		
Staying in the shade	1	27 (4.0)	99 (14.6)	281 (41.6)	269 (39.8)	4.50	0.21
	4	12 (2.4)	63 (12.5)	231 (46.0)	196 (39.0)		
Use of sunglasses	1	225 (33.3)	231 (34.2)	142 (21.0)	78 (11.5)	8.89	0.03
	4	146 (29.1)	154 (30.7)	119 (23.7)	83 (16.5)		
Tanning at the beach	1	352 (52.1)	179 (26.5)	63 (9.3)	82 (12.2)	2.50	0.47
	4	251 (51.0)	129 (25.7)	61 (12.2)	61 (12.1)		
Using an umbrella	1	484 (71.6)	107 (15.8)	50 (7.4)	35 (5.2)	1.79	0.61
	4	344 (68.5)	8 (17.5)	45 (9.0)	25 (5.0)		
Clothing, long-sleeves	1	140 (20.7)	329 (48.7)	100 (14.8)	106 (15.8)	2.31	0.67
	4	90 (17.9)	244 (48.6)	86 (17.1)	82 (16.3)		

[†]Percentage of rows.

knowledge scores were higher (light hair, 8.72 ± 3.1 ; dark brown, 8.45 ± 2.9 ; black, 8.01 ± 3.1) ($F = 6.42$, $P = 0.002$).

DISCUSSION

The main known cause of skin cancers is exposure to sunlight. Turkey is a Mediterranean country located between the temperate zone and subtropical zone and is a country with abundant sunlight. Despite this intensive exposure to the sun's rays, there are still no societal initiatives for protection against the effects on health of the sun and against skin cancers, such as exist in the other European countries (Geller *et al.*, 2002; Saraiya *et al.*, 2003; Vries, de Lezwijs, Hol, & Honing, 2005). Not much is known, however, about the behavior, attitude, and perceptions of adolescents and young people on the subject of exposure to the sun and its associated risks. This study has shown the need for eliminating the lack of knowledge on protection against skin cancers in the curricula as a course in one semester or to take place in the lessons of nursing students, who will be responsible for the care of individuals in the society in the future, and the need for giving more place in education to the skills of acquiring protective attitudes and behavior such as wearing sun-protective clothing and sunglasses, and using sunscreen with an SPF.

Phenotypic individual risk factors, such as hair, skin and eye color, are directly related to sensitivity to UV radiation. Persons with a light or fair complexion have a tendency to freckle or burn easily and are at higher risk (Brokalaki *et al.*, 2011; Mahon & Yackzan, 2010; Nikolaou *et al.*, 2009). A large proportion of the students in the study had dark brown or black hair. This is

an advantage against the effects of sunlight. Nevertheless, the first year students were mainly light-skinned (phototype I–II), which shows that this group had a greater risk.

Widespread exposure to the sun causes an increase in moles, and the number of melanocytic moles is correlated with risk (Mahon & Yackzan, 2010). It was observed that a large proportion of the students in both years did not know the number of moles on their bodies and did not perform self-examination for the early determination of skin cancers. In other studies, just as in this study, it was determined that nurses (Brokalaki *et al.*, 2011) and adolescents (Saridi *et al.*, 2009) had similar numbers of moles and did not self-examine their moles. If skin cancer is detected early, its treatment is facilitated. Therefore, personal skin examination is important for early diagnosis (Tidy, 2003). It is important to acquire the skill of self-examination in future training activities for adolescents and young people.

It has been reported in other studies that protection is of primary importance for decreasing the exposure to the major risk factors for skin cancers. One of the key preventive measures is to stay in the shade during the peak hours of the day (Mahon & Yackzan, 2010; Saraiya *et al.*, 2003). The present study draws attention to the fact that approximately one third of the students in both years sunbathed to get a tan. Besides, the first year students preferred to sunbathe between 10.00 and 16.00 hours and showed riskier behavior. In fact, in studies made with different samplings (Brokalaki *et al.*, 2011; Nikolaou *et al.*, 2009; Saridi *et al.*, 2009), it was observed that individuals also sunbathed at risky hours and that the incidence of sunbathing was similar or even higher.

Those who experience a serious degree of sunburn before the age of 18 years at risk of developing melanoma, which is the most serious cancer type (Saridi *et al.*, 2009). According to the conclusion of one study, the belief that it is necessary to burn to get a tan prevents the use of protection, and this also coincides with more frequent sunburns (Geller *et al.*, 2002). That the fourth year students experienced slight and severe sunburn at a higher rate than the first year students shows that this group was exposed to greater risk. The ratio of sunburn experiences of the students in both groups are close to the results in various other studies (Geller *et al.*, 2002; Vries *et al.*, 2005) and are higher than in some others (Brokalaki *et al.*, 2011; Turgay, Sari, Can, & Ekti Genc, 2005).

The Healthy People 2020 Guidelines has announced the aim of increasing the proportion of adults aged 18 years and older who follow protective measures to reduce the risk of skin cancer (Healthy People 2020 Guidelines). The three methods of protection implemented the most frequently are staying in the shade (Brokalaki *et al.*, 2011; Devos *et al.*, 2003; Ermertcan *et al.*, 2005; Uslu, Karaman, Savk, & Sendur, 2006; Vries *et al.*, 2005), the use of protective clothing (Devos *et al.*, 2003; Vries *et al.*, 2005) and the use of sunglasses (Brokalaki *et al.*, 2011; Ermertcan *et al.*, 2005; Uslu *et al.*, 2006). Just as in another study made in Turkey (Ermertcan *et al.*, 2005), this study showed that the risk of sun exposure is largely unrecognized in the Aegean Region of Turkey, and nursing students have very inadequate information and behavior concerning protective measures. The use of sun protection in the students in both years was very low. While this result was similar to the results of some studies (Devos *et al.*, 2003; Ermertcan *et al.*, 2005; Geller *et al.*, 2002; Saridi *et al.*, 2009; Spradlin, Bass, Hyman, & Rosanne, 2010), it was low compared to studies conducted in Greece (90%) (Nikolaou *et al.*, 2009) and Malta (51%) (Scerri, Aquilina, Amato, & Dalmas, 2002). Other than the fourth year students using sunglasses more, the protective measures in both groups were very insufficient, and no difference was observed between the two groups of students. In a study conducted on persons between the ages of 16 and 65 years, it was determined that the use of protection and general protective behavior were the lowest in persons between 16 and 24 years of age (Weinstock, Rossi, Redding & Maddock, 2000). Geller *et al.* (2002) reported an increase in behavior for protection against the sun in students between 15 and 18 years of age when the topic of skin cancer was added to school curricula. In Turkey, there is no formal lesson

on the curriculum of nursing schools on health protection and development, and is generally given little coverage in the content of lessons on protection from cancer. Teaching protective measures should be given to students in a lesson including health promotion issues such as cancer epidemiology, health promotion strategies, early diagnosis and medical–surgical nursing from the first grade to fourth grade. These educational sessions should be given by interactive methods to increase awareness. It must be determined whether behaviors change by long-term follow up. If behavior change has not occurred during this process in students at risk, counseling should be given to take individual protective measures. Some messages can be specifically targeted at students at risk. If these messages are given by peers, it can have a positive influence on an student's sun safety habits.

In studies made in various countries (Hedges & Scriveni, 2010; Miles *et al.*, 2005), it was reported that the knowledge of participants of the risks of exposure to sunlight and of protective measures was at a medium to high level. In the present study, half or more than half of the students in both years did not know the types of skin cancer and how to protect against them. In a study conducted in Greece (Nikolaou *et al.*, 2009), it was determined that a majority of the participants knew that exposure to the sun was a cause of skin cancer, but that this was not known by those younger than 34 years of age. It was reported that Greek adolescents between 15 and 18 years of age (Saridi *et al.*, 2009) had both insufficient knowledge and also displayed risky behavior during the summer months. In this study, despite the fact that the average knowledge scores of the fourth year students were higher than those of the first year students, if it is considered that the students at this year level have received professional education, then it can be stated that their levels of knowledge and ratios of showing protective behavior were very low. This conclusion shows that besides adding knowledge to nursing education curricula, the need for acquisition of positive behavioral changes must be addressed. In the future, comprehensive studies can be designed.

Studies made in various countries (Hedges & Scriveni, 2010; Saridi *et al.*, 2009) show that television and family are the most important sources of knowledge and, in fact, for the students in this study, media tools (Internet, newspapers, TV) were in first place. The fact that the media was used frequently as a source of knowledge in both groups shows that it is an effective tool in reaching all segments of society with awareness and educational campaigns. Nevertheless, it is thought-

provoking that the level of the use of classes and professional practice as a source of knowledge by fourth year students throughout their university education was very low.

A differentiation was observed between the first and fourth year students on the perception of the risk of skin cancer in the future. While the first year students did not know the risk (41%), the fourth year students saw it as a less than average risk (42%). It has been reported that those who consider themselves at risk for skin cancer and those who have skin which is sensitive to the sun take more protective measures against exposure to sunlight (Abroms, Jorgensen, Sothwell, Geller, & Emmons, 2003). Studies by Stanton *et al.* (2004) and Vries *et al.* (2005) show that those who consider themselves to be at risk use more protective measures. However, it was found in this study that protective behavior and knowledge levels about skin cancer in students who did not see themselves as being at risk of skin cancer in the future was low, and that there was no relationship between those who considered themselves to be at high risk and the use of protective measures. It was also observed that the use of protective measures was also slight in those who did not foresee or did not know the risk. According to a study by Fangchao, Collado-Mesa, Hu, Kirsner (2007), it can be stated that the perception of the risk of skin cancer in Turkish adolescents and young people is lower than the risk perception of people in other countries.

There were some limitations of this study. The moles were not counted by a health professional and the numbers were recorded according to the student's memory. Another limitation is that the students answered "I know" or "I do not know" with a statement about skin cancer, a fact lead to an overestimation of the proportion of students who have a true knowledge of skin cancer. The study population was non-randomized. Finally, the sample included only nursing students in the Aegean Region of Turkey. Studies should be carried out to show data for all Turkey's regions' nursing students.

CONCLUSION

The conclusion of this study revealed that the knowledge levels and protective behavior of first year university students against the harmful effects of the sun and for protection against skin cancer were alarmingly low. Additionally, it also showed that the knowledge levels of the fourth year university students were average, but that their protective behavior was very insufficient. Con-

sequently, it is of extreme importance to acquire knowledge and behavior about the harmful effects of the sun, and for the education of nursing students in protection against skin cancer, who will act as role models and who will take an active role in the protection and maintenance of the health of individuals. To make the Healthy People 2020 Guidelines into a reality, increased efforts to implement primary, secondary and tertiary skin cancer prevention are needed. Sun-safe behavior should be greatly encouraged. Implementation for developing competent nursing graduates should be strengthened. Finally, faculty development and integration of clinical practice guideline to the schools program of study may be warranted. Putting educational programs into practice will help to decrease the risk of skin cancers in children and young people in the future and contribute to the acquisition of protective behavior and attitudes.

CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

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