

Original Article

The Effect of Sun Protection Education Given to Nursing Students on the Level of their Knowledge about Skin Cancer and Sun: A Randomized Controlled Study

Asli Akdeniz Kudubes, RN, PhD

Associate Professor, Department of Pediatric Nursing, Bilecik Seyh Edebali University Faculty of Health, Bilecik, Turkey

Correspondence: Asli A. Kudubes, RN, PhD, Associate Professor, Department of Pediatric Nursing, Bilecik Seyh Edebali University Faculty of Health, Bilecik, Turkey E-Mail: asliakdeniz@hotmail.com

Abstract

Nursing students can increase awareness among people by fulfilling their educational and counseling roles, explaining the effects of sunlight on the skin, and guiding patients when they detect suspicious skin lesions. Both nurses and nursing students can increase awareness among people by fulfilling their educational and counseling roles, explaining the effects of sunlight on the skin, and guiding patients when they detect suspicious skin lesions. The study consisted of a total of 100 nursing students, including 50 in the experimental and 50 in the control groups. The data of the study were collected using The Nursing Student Information Form and The Skin Cancer and Sun Knowledge Scale. A four-week Sun Protection and Sun Protection Education Program was given to the students in the experimental group through an online meeting platform. Descriptive statistics, correlation analysis, and regression analysis were used to evaluate the data. The means of the pretest and posttest total scores were 36.02 ± 3.62 and 47.06 ± 2.17 , respectively. A statistically significant difference was found between the mean scores ($F = 317.462$; $p < 0.001$). The education program was found to explain 76% ($R^2 = 0.764$) of the increase in the level of knowledge about skin cancer and sun protection. The power and the effect size of the study were evaluated according to the regression analysis; accordingly, the values were determined as 0.98 and (f^2) 0.844, respectively. It is important to raise individuals' awareness to reduce the incidence of skin cancer in society and to spread skin cancer and sun protection behaviors.

Keywords: Skin Neoplasms, Sun, Education, Nursing

Introduction

The global increase in the prevalence of both melanoma and nonmelanoma skin cancers in recent years has become an important problem (Grossman et al., 2018). Skin cancer is the most commonly diagnosed cancer in the United States. An estimated 106,110 new cases of invasive melanoma and 101,280 cases of in situ melanoma will be diagnosed in the US in 2021, while 7,180 people will die from this disease (American Cancer Society, 2021).

In 2017, skin cancers were the third most common cancer types in Turkey and the number of people diagnosed with skin cancer was reported as 687 (T.C. Ministry of Health, Turkey Cancer Statistics 2017). Increased exposure of people to the sun in the last

century has escalated the incidence of skin cancer. In parallel with this situation, it is stated that the decrease in the stratospheric ozone layer, traveling to sunny regions on vacations, and using solarium are also effective in augmenting the incidence (Brunssen et al., 2017).

The incidence of skin cancer increases in people who have fair skin, are in advanced age, are male, and have been exposed to the sun, X-rays, and ultraviolet light for a long time (Grossman et al., 2018). Prevention strategies are as important as the treatment of skin cancer, and there are various strategies for the prevention of skin cancer (Brunssen et al., 2017).

Adopting environmental, social, and behavioral changes, such as wearing high-

impact sunscreen, wearing protective dresses and a hat, and avoiding indoor tanning is reported as the primary strategy for preventing skin cancer (Hobbs et al., 2014). It is emphasized that primary prevention strategies alone are inadequate in combating skin cancer and that secondary prevention strategies are also important in the skin cancer process. Secondary prevention strategies are important in diagnosing skin cancer symptoms and treating them in early stages.

Nurses are responsible for preventing, screening, and treating skin cancer (Brunssen et al., 2017; Hobbs et al., 2014; Saes Da Silva et al., 2018). For this reason, they need to gain the necessary knowledge and skills for skin cancer during their education or professional life. Thus, they can become the right role model for society and motivate individuals to change their behaviors related to skin cancer (Loescher et al., 2018).

Providing education on skin cancer and prevention strategies in nursing undergraduate education will both enhance students' knowledge on this subject and enable them to gain sensitivity. In a limited number of studies in Turkey, nursing students have been shown to have inadequate knowledge about the prevention of skin cancer and protection from the harmful effects of the sun, and studies involving educational interventions have been recommended (Andsoy et al., 2013; Celik et al., 2018; Karimi et al., 2019; Sabouri et al., 2020; Yilmaz et al., 2015). Also, it has been stated that interventional studies on the topic in nursing students are limited (Erkin and Aygun, 2020).

To prevent the negative effects of the sun on the skin, it is of great importance to raise the awareness of the public about effective protection measures (Brunssen et al., 2017; Sabouri et al., 2020). Skin cancer is a big risk and economic burden for human health; nevertheless, skin cancer prevention strategies are neglected. Increasing individual awareness is important in terms of spreading skin cancer prevention strategies in society and reducing the incidence.

Both nurses and nursing students can increase awareness among people by fulfilling their educational and counseling roles, explaining

the effects of sunlight on the skin, and guiding patients when they detect suspicious skin lesions.

To fulfill these tasks, nursing students must have enough knowledge and equipment about the subject. This study aims to fill the gap in the literature by investigating the effect of sun protection education given to nursing students on the level of their knowledge about skin cancer and sun.

Methods

Aim and Design: The study was conducted as a randomized controlled trial (RCT) to determine the effect of sun protection education program given to nursing students on the level of their knowledge about skin cancer and sun. This RCT was carried out between April 2020 and January 2021 in a university located in Turkey. After initial data collection (pretest) of knowledge levels on skin cancer and sun, students were randomized into experimental and control groups using simple random numbers generated by the R statistical software, a free software package for data analysis (R Core Team, 2016).

Sample: The study sample was calculated as 34 individuals using G-power 3.1 software package based on 0.05 significance level, 80% power, and medium effect size (0.15). The study complies with the guidelines of the Consolidated Standards of Reporting Trials (CONSORT). The CONSORT 2010 checklist, information that is included when reporting a randomized trial, is presented in Figure 1. A total of 100 students, including 50 in the experimental group and 50 in the control group, were included in the study (Figure 1). The study included students who were studying nursing, were aged over 18, had not received education program on sun protection and skin cancer before, and volunteered to participate in the study.

Data Collection: Due to the Covid-19 pandemic, the questionnaires were filled out on an online platform. A research invitation letter was sent to the nursing students via their e-mail addresses that were found in the university database. An online link to the web page containing an informed consent form and other data collection forms (a Nursing Student Information Form and a Skin Cancer and Sun Knowledge Scale) was sent to the

students who responded positively to the research invitation. After the collection of pre-education data, the students were randomized into experimental and control groups. It took about 10 minutes to fill out the forms on the web page. No personal data were collected from the students. A four-week education program for sun protection and skin cancer was given to the students in the experimental group via an online meeting platform. The education program was designed by the researcher who conducted the study.

The Nursing Student Information Form:

This form consists of 12 items. The first two aim to collect socio-demographic data (age, gender) about the students, and the remaining items are questions about the color of students' hair, skin, and eyes, presence of freckles and moles, history of skin cancer, history of sunburn, duration of sun exposure, and receiving education on skin cancer/prevention (Haney et al., 2018; Kaymak Yesim, Tekbas Omer Faruk, 2007; Yilmaz et al., 2015).

The Skin Cancer and Sun Knowledge Scale (SCSK):

This scale was developed by Day et al. (2014). It consists of 25 items that assess the knowledge levels of adults about skin cancer and sun health. The scale had been developed after a systematic literature review that revealed current best practice research and scale items on skin cancer and sun health. It evaluates the knowledge of adults about five areas: sun protection (items 1, 16-22), tanning (items 2-12), skin cancer risk factors (items 13-14, 23), prevention of skin cancer (item 15, 24), and symptoms of skin cancer (item 25). The scale consists of 15 true-false and 10 multiple-choice questions. Correct answers are assigned 1 point and incorrect answers are given 0 points. The total score obtained by summing up the scores assigned to the items ranges between 0 and 25 points, and high scores indicate a high level of knowledge. The Turkish validity and reliability study of the scale was conducted by Ozturk Haney et al. (2018). Cronbach's alpha value of the scale was found as 0.72. For the Turkish form of the scale, the content validity index (CVI) was calculated as 93.71%, internal consistency reliability coefficient (KR-20) as 0.51, and test-retest reliability as 0.52 (Day et al., 2014; Haney et al., 2018).

The Education Program on Sun Protection and Skin Cancer:

The education program about sun protection, which was prepared by the researchers, was designed after a comprehensive literature review on the topic (Grossman et al., 2018; Hartnett and O'Keefe, 2016; Iglesias-Puzas et al., 2019; Lucas et al., 2016; Narayanan et al., 2010; Walsh et al., 2014). The content of the education was submitted to the opinions of six experts, including three from the Department of Public Health Nursing, one from the Department of Oncology Nursing, and two from the Oncology Institute Clinical Oncology Department. The program was finalized in line with the opinions of the experts. It consisted of modules to be implemented over four weeks. The content of the first-week module consisted of the effects of ultraviolet rays on health, skin cancer, and sun protection. The content of the module in the second week was about the self-skin examination. The third-week module was about sun protection behaviors (reducing the environmental effects of ultraviolet exposure, protection with clothes, protection with a wide-brimmed hat, protection of eyes, and protection with sunscreens). The module of the fourth week consisted of sun protection programs and the role of the nurse in sun protection, and a sample case discussion was held.

Implementation of the Education Program:

The education consisted of a four-week program. It was carried out as 30-minute education sessions every week on an online meeting platform (ZOOM Meetings). Interactive teaching methods, which enabled student participation, were utilized during the education. In-class group discussions were held with the nursing students during the implementation of the modules, and concept maps were created. Also, during the last module, the students made a nursing care plan for a case given to them. The sources on the subject were shared with the students.

Data Analysis: The study data were analyzed on IBM SPSS Statistics for Windows (Version 23.0. Armonk, NY: IBM Corp.) software package. Mean and percentage values were used in the evaluation of descriptive data. The Shapiro-Wilk test was used to evaluate the fit of the data to normal distribution. T-test and ANOVA tests were

used to examine the relationship between descriptive characteristics and mean scale scores. Multivariate analysis of variance in repeated measurements was used to compare the mean scores of the students from the Skin Cancer and Sun Knowledge Scale according to the group, time, and group*time interaction. The relationship between the education and the Skin Cancer and Sun Knowledge Scale was evaluated with Pearson correlation analysis. The predictive effect of education on the variance in the Skin Cancer and Sun Knowledge Scale was evaluated with linear regression analysis. Tolerance and variance inflation factor (VIF) values were used to find out whether there was multicollinearity between the education and the Skin Cancer and Sun Knowledge Scale and to decide whether a regression analysis could be done with the variables. The power and the effect size of the study were calculated based on regression analysis. Independent variables with a VIF value of less than 10, a tolerance value of greater than 0.2, and condition index values of less than 15 were included in the regression analysis. Results were evaluated at a 95% confidence interval and a significance level of $p < 0.05$.

Ethical Considerations: At the outset, the permission of the author of the scale used in the study was obtained via e-mail. Also, institutional permission was obtained to conduct the study. Approval of the Non-Invasive Clinical Research Ethics Committee of a university was obtained (Issue: 5479-GOA, 2020/13-03). The purpose and scope of the research were explained to the students in the study through the "Informed Consent Form". Data were collected from students who volunteered to participate in the study. They were also informed that they could quit the study at any time without giving any reason.

Results

According to the descriptive characteristics of the nursing students, the mean age was 20.52 ± 0.94 in the experimental group and 20.33 ± 0.65 in the control group.

Descriptive characteristics of the students are given in Table 1. As a result of the analysis, it was found that the groups were homogeneous in terms of variables in the nursing student information form ($p > 0.05$, Table 1).

The mean scores of the students in the intervention and control groups from the pretest administration of the SCSK were 36.02 ± 3.62 and 36.08 ± 3.66 , respectively. On the other hand, the mean scores of the groups from the posttest administration of the SCSK were 47.06 ± 2.17 and 35.84 ± 3.88 , respectively. Statistically significant differences were found between the mean scores ($F = 317.462$; $p < 0.001$).

When the relationship between the education program and SCSK was examined, a high level, positive, and highly significant relationship was found between the education program and the SCSK ($r = 0.874$; $p < 0.01$).

The predictive effect of the education program on the level of the variance in the knowledge levels of nursing students about skin cancer and sun protection is given in Table 3.

Accordingly, the education program was found to explain 76% ($R^2 = 0.764$) of the increase in the level of knowledge about skin cancer and sun protection.

Receiving education increased the knowledge level about skin cancer and sun protection by 0.874 times ($\beta = 0.874$), and it was statistically significant ($p < 0.001$, Table 3).

The power and the effect size of the study were evaluated according to the regression analysis; accordingly, the values were determined as 0.98 and (f^2) 0.844, respectively.

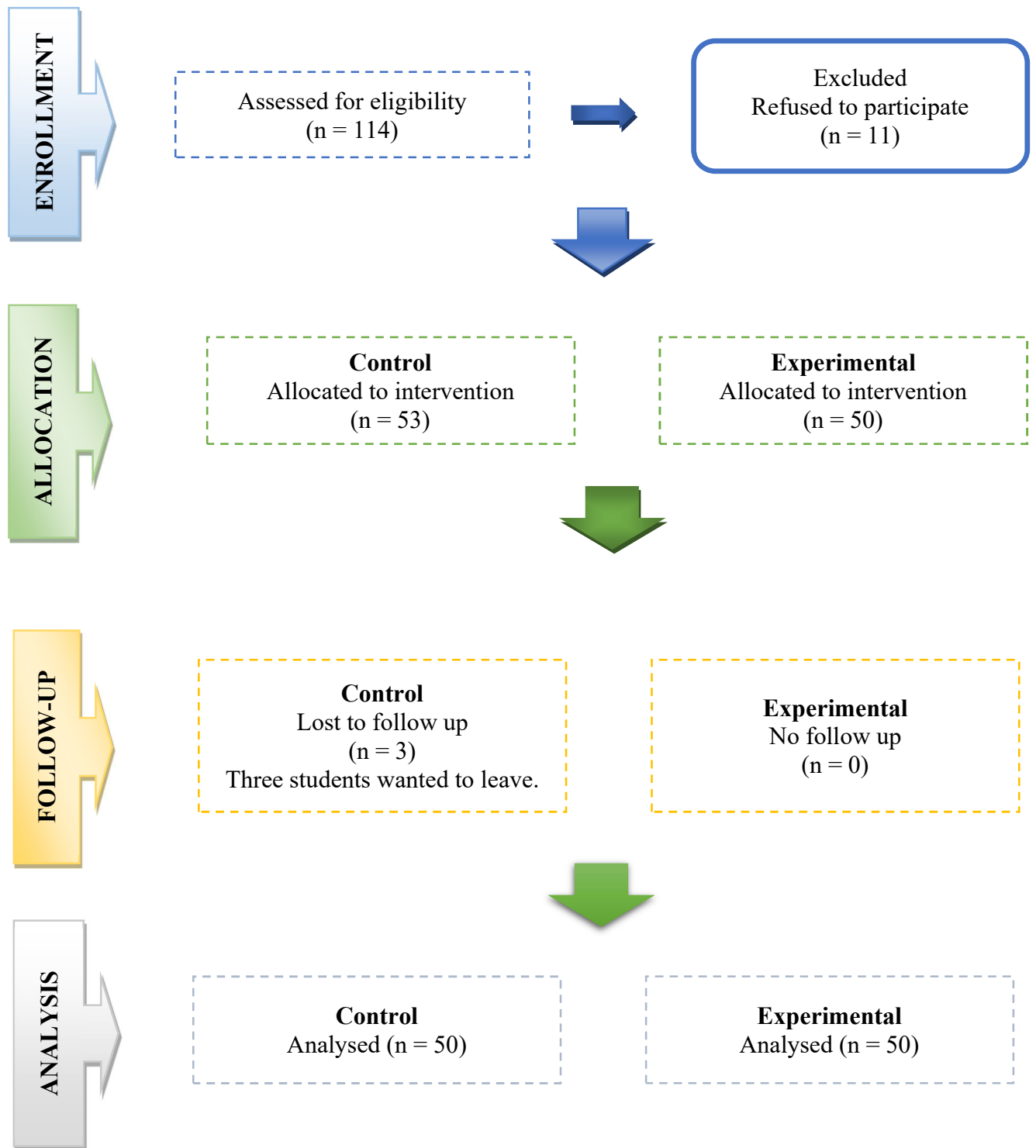


Figure I. Consort flow diagram

Table 1. Descriptive Characteristics of the Nursing Students Before Intervention

Descriptive Characteristics	Experimental group		Control group		X ²	df	P
	n	%	n	%			
Gender							
Female	30	60	35	70	1.099	1	0.295
Male	20	40	15	30			
Hair colour							
Blond	8	16	9	18	0.082	3	0.994
Light brown	13	26	13	26			
Brown	7	14	7	14			
Black	22	44	21	42			
Eye colour							
Blue	6	12	5	10	0.106	3	0.991
Green	6	12	6	12			
Hazel	6	12	6	12			
Brown	32	64	33	66			
Skin colour							
Freckled-light-skinned	12	24	13	26	0.066	3	0.996
Brown-Light Brown	5	10	5	10			
Brown	13	26	13	26			
Brunette	20	40	19	38			
Fitzpatrick Skin Type							
Type I	7	14	4	8	2.806	5	0.730
Type II	5	10	9	18			
Type III	4	8	3	6			
Type IV	13	26	16	32			
Type V	8	16	8	16			
Type VI	13	26	10	20			
Freckles							
Yes	7	14	9	18	0.298	1	0.585
No	43	86	41	82			
Moles							
Yes	14	28	17	34	0.421	1	0.517

No	36	72	33	66			
Skin cancer in the family							
Yes	4	8	2	4	0.709	1	0.400
No	46	92	48	96			
Sunburn in the last 12 months							
never	22	44	19	38			
1 times	15	30	20	40	1.434	3	0.698
2 times	8	16	8	16			
3 and more	5	10	3	6			
The duration of sun exposure on sunny days							
Less than 1 hour	17	34	19	38	0.188	2	0.910
1-2 hours	27	54	25	50			
More than 2 hours	6	12	6	12			
Does sun exposure cause skin cancer?							
Yes	36	72	39	78	0.480	1	0.488
No	14	28	11	22			
Self-examination of the skin							
Yes	5	10	6	12	0.102	1	0.749
No	45	90	44	88			

Table 2. Comparison of Mean Total Scores of Nursing Students in the Experimental and Control Group for Skin Cancer and Sun Knowledge Scale After Intervention

Group	Time	Pretest	Posttest	F	p
		X±SD	X±SD		
SCSK	Experimental group	36.02 ± 3.62	47.06 ± 2.17	317.462	< 0.001
	Control group	36.08 ± 3.66	35.84 ± 3.88		

SCSK: Skin Cancer-Sun Knowledge Scale; SD: Standard Deviation; F = analysis of covariance

Table 3. The predictive effect of the education program on the level of the variance in the knowledge levels about skin cancer and sun protection according to the self-evaluation of the nursing students

Constant	Knowledge Levels on Skin Cancer and Sun						
	Unstandardized Beta	Standart Error	Standardized Beta β	t	p	95 % Confidence Interval	
						Lower	Upper
Education *	11.220	0.630	0.874	17.8	0	9.970	12.470
				17	.		
					0		
					0		
					0		
R			0.874				
R²			0.764				
F			317.462				
P			0.000				
Durbin Watson			1.877				

*When coding the study program, the intervention group was coded as "1" and the control group as "0."

R: correlation; R²: correlation coefficient (explained variance ratio); F: model statistics; p: level of significance

Discussion

In this study, it was determined that the mean pretest and posttest scores of the control group from the SCSK were similar, but that the mean posttest score of the intervention group was higher than their mean pretest scores. A statistically significant difference was found between the mean pretest and posttest scores of the intervention group ($p < 0.001$; Table 1).

Although there are many studies in the literature investigating the level of nursing students' knowledge on skin cancer and sun protection and their related behaviors (Celik et al., 2018; Iglesias-Puzas et al., 2019; Yilmaz et al., 2015), studies examining the effect of skin cancer or sun protection education models on the knowledge level of nursing students are limited (Erkin and Aygun, 2020).

However, the low level of nursing students' knowledge about the subject raises the need for education on this topic. Plannig sun

protection education programs has been recommended in these studies (Iglesias-Puzas et al., 2019; Siegel and Eckardt, 2017; Yilmaz et al., 2015).

Siegel and Eckardt (2017) carried out an interventional study with second-year students on skin cancer knowledge, sun protection behaviors, and the role of the nurse in the prevention of skin cancer. In this study, a significant increase was determined in all variables of the students in the experimental group, in which a simulation-based education program was implemented, and the effectiveness of the education model was emphasized (Siegel and Eckardt, 2017). In the study of Romero-Collado et al. (2020), in which health protection and development education modules were implemented on third-year nursing students, it was emphasized that sun protection recommendations should be added to health protection and development education modules (Romero-Collado et al., 2020).

In the study of Erkin and Aygun (2020), a education program on self-skin examination and skin cancer risks was given to nursing students, and an increase was found in their level of knowledge (Erkin and Aygun, 2020). It was observed that the findings of the present study were consistent with the literature. In this study, the increase in the mean score of the intervention group was thought to be due to the case discussions held based on scenarios prepared on the subject in the education program given to the students, group discussions about students' questions, and the ease of accessing materials related to the subject.

In the literature, it has been emphasized that the use of interactive education models in health protection and development interventions is important in increasing the level of knowledge, helps students to understand the subject, and strengthens the retention of information (Bergeron et al., 2017).

It has also been stated that the case discussion method helps students to transfer theoretical knowledge into practice (Forsgren et al., 2014). Using a randomized controlled trial design and interactive education models in the implementation of the education program in this study constituted the strength of the study.

In this study, the education program explained 76.4% of the increase in the mean SCSK score (Table 3; $p < 0.001$). There are data in the literature about the percentage of the effect of skin cancer and sun protection education programs on the variance in knowledge levels of various groups (adolescents, school-age children, etc.) (Aygun and Ergun, 2017; Saridi et al., 2015), but there are no data about the variance in the knowledge levels of nursing students. When the literature revealing the effectiveness of the skin cancer and sun protection education programs in nursing students is examined, it can be seen that the skin cancer prevention education programs are effective in increasing the knowledge level (Erkin and Aygun, 2020).

Besides, it is stated in the literature that there are many factors affecting the level of knowledge about skin cancer and sun protection (Haney et al., 2018; Hartnett and

O'Keefe, 2016; Lucas et al., 2016; Siegel and Eckardt, 2017).

Therefore, the 76.4% increase provided by the education program in the knowledge level of nursing students suggests that it is a good result obtained in terms of skin cancer and sun protection, which is affected by many variables. This finding is also important in terms of revealing the effectiveness of the study. It is thought that the education program was effective because it was student-oriented, it covered all subjects related to skin cancer and sun protection, it employed interactive learning methods (case discussion, group discussion, etc.), and the content of the education focused on the learning needs of the nursing students.

In this study, the power and effect size were calculated according to regression analysis. While the power shows the statistical significance of the study, the effect size gives information about the practical/clinical significance (Cohen, 1992). Cohen (1988) classifies effect sizes of $0.02 \geq f^2 < 0.15$ as small, $0.15 \geq f^2 < 0.35$ as medium, and $0.35 \geq f^2$ as large (Cohen, 1988). Given these values, the study can be said to have a strong effect size.

There are no studies in the literature that indicate the power and effect size of education programs on skin cancer and sun protection. The effect size in this study was found greater than 0.80, and this showed the practical significance of the study was high. It is thought that the practical significance of the web-supported interactive education method carried out with nursing students was high. These results showed that the study was feasible and effective.

Limitations: The study was carried out in a single center. This prevents the generalization of the study findings. In addition, study results were based on participants' self-report.

Implications for Nursing Practice: Although skin cancer is a major public health problem, skin cancer prevention practices are neglected. It is important to raise individuals' awareness to reduce the incidence of skin cancer in society and to spread skin cancer and sun protection behaviors. Being a role model is of great importance in increasing individuals' awareness.

Therefore, for nurses and nursing students to be the right role models for society, they must first organize their own knowledge and behaviors. Besides, nurses and nursing students should play an active role in detecting skin cancer at an early stage and educating society. Therefore, they should increase their knowledge and behaviors and become an expert on this subject. For this reason, it is very important to evaluate the effectiveness of sun protection education models to be given to nursing students.

Conclusion: It was found that the sun protection and skin cancer education program was effective in increasing the knowledge level of nursing students on skin cancer and sun protection and that the study had enough quality to contribute to the country and world literature and nursing education.

Since nursing students should be actively involved in the protection and regulation of the health of individuals, it is of great importance to equip them with the necessary knowledge and behaviors about skin cancer and sun protection.

References

- American Cancer Society (2021) *Cancer Facts and Figures 2021*.
- Andsoy II, Gul A, Sahin AO, Karabacak H. (2013) What Turkish nurses know and do about skin cancer and sun protective behavior. *Asian Pacific Journal of Cancer Prevention* 14(12), 7663–7668. DOI: 10.7314/APJCP.2013.14.12.7663.
- Aygun O and Ergun A (2017) The impact of sun protection program on the sun protection behavior of adolescents. *Clinical and Experimental Health Sciences* 8(3), 166–174. DOI: 10.5152/clinexphealthsci.2017.588.
- Bergeron K, Abdi S, DeCorby K, Mensah G, Rempel B, Manson H. (2017) Theories, models and frameworks used in capacity building interventions relevant to public health: A systematic review. *BMC Public Health* 17(1). 1–12. DOI: 10.1186/s12889-017-4919-y.
- Brunssen A, Waldmann A, Eisemann N, Katalinic A. (2017) Impact of skin cancer screening and secondary prevention campaigns on skin cancer incidence and mortality: A systematic review. *Journal of the American Academy of Dermatology* 76(1), 129-139.e10. DOI: 10.1016/j.jaad.2016.07.045.
- Celik S, Ilce A and Andsoy II (2018) Knowledge and Protective Behaviors About Skin Cancer Among Nursing Students in the West Black Sea Region of Turkey. *Journal of Cancer Education* 33(4), 885–892. DOI: 10.1007/s13187-017-1188-5.
- Cohen J (1988) *The Concepts of Power Analysis BT - Statistical Power Analysis for the Behavioral Sciences (Revised Edition)*. 2nd ed. Hillsdale N.J.: Hillsdale, N.J.: L. Erlbaum Associates. DOI: 10.4324/9780203771587.
- Cohen J (1992) A power primer. *Psychological Bulletin* 112(1). American Psychological Association Inc.: 155–159. DOI: 10.1037/0033-2909.112.1.155.
- Day AK, Wilson C, Roberts RM, Hutchinson AD. (2014) The Skin Cancer and Sun Knowledge (SCSK) Scale. *Health Education & Behavior* 41(4), 440–448. DOI: 10.1177/1090198114529129.
- Erkin O and Aygun O (2020) Effects of an Education Intervention on Nursing Students' Knowledge and Attitudes Regarding Skin Self-Examination and Skin Cancer Risks. *Journal of Nursing Research* 28(1), e62. DOI: 10.1097/jnr.0000000000000326.
- Forsgren S, Christensen T and Hedemalm A (2014) Evaluation of the case method in nursing education. *Nurse Education in Practice* 14(2), 164–169. DOI: 10.1016/j.nepr.2013.08.003.
- Grossman DC, Curry SJ, Owens DK, Barry MJ, Caughey AB, Davidson KW, Doubeni CA, Epling JW Jr, Kemper AR, Krist AH, Kubik M, Landefeld S, Mangione CM, Silverstein M, Simon MA, Tseng CW. (2018). US preventive services task force recommendation statement. *JAMA*, 319(11),1134–1142. DOI: 10.1001/jama.2018.1623.
- Haney MO, Bahar Z, Beser A, Arkan G, Cengiz B. (2018) Psychometric Testing of the Turkish Version of the Skin Cancer and Sun Knowledge Scale in Nursing Students. *Journal of Cancer Education* 33(1), 21–28. DOI: 10.1007/s13187-016-1041-2.
- Hartnett PD and O'Keefe C (2016) Improving Skin Cancer Knowledge Among Nurse Practitioners. *Journal of the Dermatology Nurses' Association* 8(2),123–128. DOI: 10.1097/JDN.0000000000000206.
- Hobbs C, Nahar VK, Ford MA, Bass MA, Brodell RT, (2014). Skin cancer knowledge, attitudes, and behaviors in collegiate athletes. *Journal of skin cancer* 248198. DOI: 10.1155/2014/248198.
- Iglesias-Puzas Á, Méndez Iglesias M, Diéguez Montes MP, Flórez Á. (2019) Assessment of sun-related behaviour, knowledge and attitudes among nursing students.

- Photodermatology Photoimmunology and Photomedicine* 35(5), 304–312. DOI: 10.1111/phpp.12466.
- Karimi N, Saadat-Gharin S, Tol A, Sadeghi R, Yaseri M, Mohebbi B. (2019) A problem-based learning health literacy intervention program on improving health-promoting behaviors among girl students. *Journal of education and health promotion* 8(1), DOI: 10.4103/JEHP.JEHP_476_19.
- Kaymak Yesim, Tekbas Omer Faruk Si (2007) University Students' Knowledge, Attitudes and Behaviors About Sun Protection. *Turkderm* 41: 81–85.
- Loescher LJ, Harris JM Jr, Curiel-Lewandrowski C. A (2018) Systematic review of advanced practice nurses' skin cancer detection knowledge and attitudes, clinical skin examination, lesion detection, and training. *Journal of the American Association of Nurse Practitioners* 30(1),43–58. DOI: 10.1097/JXX.0000000000000004.
- Lucas AS, Chung E, Marchetti MA, Marghoob A. (2016) A guide for dermatology nurses to assist in the early detection of skin cancer. *Journal of Nursing Education and Practice* 6(10): 71. DOI: 10.5430/JNEP.V6N10P71.
- Narayanan DL, Saladi RN and Fox JL (2010) Ultraviolet radiation and skin cancer. *International Journal of Dermatology*. DOI: 10.1111/j.1365-4632.2010.04474.x.
- R Core Team (2016) R: a language and environment for statistical computing. Available at: <https://www.r-project.org/> (accessed 23 January 2021).
- Romero-Collado A, Baltasar-Bagué A, Puigvert-Viu N, Rascón-Hernán C, Homs-Romero E. (2020) Using simulation and electronic health records to train nursing students in prevention and health promotion interventions. *Nurse Education Today* 89, 104384. DOI: 10.1016/j.nedt.2020.104384.
- Sabouri M, Shakibazadeh E, Mohebbi B, Tol A, Yaseri M, Babae S. (2020) Effectiveness of an educational intervention using theory of planned behavior on health care empowerment among married reproductive-age women: A randomized controlled trial. *Journal of Education and Health Promotion* 9(1), 293. DOI: 10.4103/JEHP.JEHP_751_20.
- Saes Da Silva E, Tavares R, Paulitsch F, Zhang L. (2018) Use of sunscreen and risk of melanoma and non-melanoma skin cancer: a systematic review and meta-analysis Clinical report Use of sunscreen and risk of melanoma and non-melanoma skin cancer: a systematic review and meta-analysis. *Eur J Dermatol* 28(2), 186–201. DOI: 10.1684/ejd.2018.3251.
- Saridi MI, Toska AG, Rekleiti MD, Tsironi M, Geitona M, Souliotis K. (2015) Sun burn incidence and knowledge of Greek elementary and high school children about sun protection. *Asian Pacific Journal of Cancer Prevention* 16(4), 1529–1534. DOI: 10.7314/APJCP.2015.16.4.1529.
- Siegel V and Eckardt P (2017) A Prospective Observational Cross-Sectional Study Examining the Effect of Using Human Simulation and Moulages to Assist in Skin Cancer Education of Nursing Students. *Journal of the Dermatology Nurses' Association* 9(6), 296–300. DOI: 10.1097/JDN.0000000000000353.
- T.R. Ministry of Health, General Directorate of Public Health (2021), Turkey Cancer Statistics 2017.
- Walsh LA, Stock ML, Peterson LM, Gerrard M. (2014) Women's sun protection cognitions in response to UV photography: The role of age, cognition, and affect. *Journal of Behavioral Medicine* 37(3), 553–563. DOI: 10.1007/s10865-013-9512-y.
- Yilmaz M, Yavuz B, Subasi M, Kartal A, Celebioglu A, Kacar H, Adana F, Ozyurek P, Altiparmak S. (2015). Skin cancer knowledge and sun protection behavior among nursing students. *Japan journal of nursing science: JJNS* 12(1), 69–78. DOI: 10.1111/jjns.12049.