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Original Research Article

Awareness, knowledge and behavior of medical personnel regarding skin cancer, sun-related hazards and sunscreen utilization at King Abdulaziz University Hospital, Jeddah

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ABSTRACT

Background: Worldwide, skin cancer is a major public health concern. It is a common malignancy in Saudi Arabia. The three most prevalent types of skin cancer are basal cell carcinoma, squamous cell carcinoma and melanoma. Exposure to ultraviolet (UV) radiation is the most common modifiable risk factor to lower the risk of the leading types of skin cancer. Practicing protective measures can aid in decreasing the risk of developing skin malignancies.
Methods: Data collection took place at King Abdul-Aziz University Hospital, Jeddah, Saudi Arabia. This cross-sectional study was conducted via a structured self-administered questionnaire among medical personnel.
Results: The majority (81.9%) of the sample participants were Saudi citizens. Moreover, medical students of 4th year, 5th year and 6th year represented half of the sample. Mean±SD values for the knowledge, behavior, and awareness scores were 6.85±3.31, 8.57±5.00, and 17.75±7.05 respectively. There was no statistically significant difference in mean awareness score for the various categories of demographic variables. One-way-ANOVA revealed statistically significant difference among the different job titles in terms of awareness score with a p value <0.001.
Conclusions: The results of this study have shown that the knowledge regarding skin cancer and behavior towards sun exposure is inadequate. Therefore, increasing the knowledge in the form of awareness campaigns is highly recommended.

Keywords: Skin cancer, Knowledge, Behavior, Sunscreen, Medical personnel

INTRODUCTION

Worldwide, skin cancer is a major public health burden as it's incidence has been increasing over the past decades.[1] It is a common malignancy in Saudi Arabia as it accounts for 3.2% of all newly diagnosed cancers in 2010.[2] In the United States, more than 3.5 million cases are recorded per year and over the past three decades, skin cancer affected more people than all other cancers combined.[3,4] The incidence of skin cancer varies significantly among different racial and ethnic groups. Specifically, Caucasians have very high rates of skin cancer and Asians have low rates.[5]

The three most prevalent types of skin cancer are basal cell carcinoma, squamous cell carcinoma and melanoma.[6] Across these types, basal cell carcinoma and squamous cell carcinoma account for most cases of skin cancer.[7] Exposure to ultraviolet (UV) radiation is the most common modifiable risk factor to reduce the risk of the major types of skin cancer.[8,9] Therefore, practicing

protective measures such as application of sunscreens, avoiding direct sun exposure during peak hours, and wearing sunglasses can aid in decreasing the risk of developing skin malignancies.[8-10]

A cross-sectional investigation in Saudi Arabia showed that only 55% of people were aware of the association between sun exposure and skin cancer. The pattern and prevalence of skin cancer among Saudi Arabians is currently undefined.[11] Healthcare workers play an integral role in educating patients about the sun exposure hazards and the preventive measures that can reduce the risk of developing skin cancer. Given the lack of knowledge of the link between sun exposure and skin cancer in Saudi Arabia, the purpose of the present study is to assess health care practitioner's knowledge about the hazards of UV radiation and to assess their own practice of sunscreen utilization.

METHODS

Population and setting

This cross-sectional study was conducted between July-2017 and December-2017 at King Abdulaziz University Hospital, Jeddah, Saudi Arabia. All advanced year medical students involved in clinical care, medical interns, residents and nurses working at King Abdulaziz University Hospital were invited to participate. All participants were informed about the demands of the study and those who agreed to participate were enrolled. Verbal consent was obtained. Participants who refused to participate or failed to complete the questionnaires were excluded.

Data collection

Both electronic and paper copies of the questionnaires were used for data collection. The electronic forms were used to obtain data from medical students and interns. The paper copies were distributed to nurses and residents.

Measures/instruments

The questionnaire was developed based on previous research in the area, combined with questions that were developed to address the unique circumstances of our sample. The final survey was a 45-question, multiple-choice and Likert scale, self-report instrument. Three major domains were assessed. First, there were eight questions that assessed socio-demographic characteristics like gender, age, marital status, nationality, job title, the specialty or department of the healthcare provider and history of sunburn. Second, there were ten questions about behaviors for protection from the sun. Third, there were eighteen questions about knowledge of skin cancers, sun-related hazards, and sunscreen application and other methods of protecting against the sun. The survey took approximately 10 minutes for participants to complete.

Knowledge level score

The general knowledge of sun-related hazards, including skin cancer and methods of protection against the sun, was examined across 18 questions. The knowledge level score (KLS) was obtained by awarding one point for each of the correct responses (0 points were given for "Wrong/I do not know" answers). KLS was calculated by adding all the scores together. KLS ranged from zero (minimum knowledge) to 18 (maximum knowledge).

Behavior score

To calculate the Behavior Score for protection against the sun, the answer "always" was assigned three points, "sometimes" was assigned two points, "rarely" was assigned one point and "never" was assigned zero points. To obtain the Behavior Score, points were summed. The minimum score was zero and the maximum score was 24. Behavior score was calculated for questions with Likert scale only, those that had different answers were not included in the score.

Awareness score

Overall awareness score was obtained by summing KLS and behavior score. Awareness score ranged from minimum 0 to maximum 42.

Statistical analysis

Descriptive statistics were used to describe demographic characteristics, KLS and Behavior Scores for all respondents. A Chi-squared test was conducted to examine the link between the KLS, the Behavior Score, and demographic characteristics. Differences in mean awareness scores for different socioeconomic groups were obtained by using an independent samples t-test and one-way ANOVA test. Simple linear regression and multivariate linear regression analysis were conducted to examine the associations between the Awareness Score and the covariates. Again, one-way ANOVA test was conducted to compare the Behavior Score with demographic variables. The analysis was performed with the confidence interval set at 95%. The software program used was the Statistical Package for Social Science (SPSS), version 20.

RESULTS

The study assessed the awareness, knowledge, and behavior of healthcare professionals' sun protection practices. All participants worked at King Abdulaziz University Hospital, Jeddah, Saudi Arabia. A total of 414 participants completed the questionnaire and were included in the final analysis. Of the 414 respondents, 58.5% were female and 41.5% were male. The mean age was 25.31 years (SD=6.39). Most participants were single (78%). The majority (81.9%) of the sample participants

were Saudi Arabia citizens. Medical students in their clinical training years comprised half of the study sample, but interns (14.3%), nurses (14.7%), and medical residents (15.0%) were also represented. The respondents worked in various specialties, as shown in Table 1. The socio-demographic information for the study sample is also presented in Table 1.

Table 1: Baseline characteristics of all respondents (n=414).

Characteristics	N	%
Gender		
Male	172	41.5
Female	242	58.5
Marital status		
Single	323	78
Married	91	22.0
Nationality		
Saudi	339	81.9
Non-Saudi	75	18.1
Job title		
4th year medical student	73	17.6
5th year medical student	95	22.9
6th year medical student	64	15.5
Medical Intern	59	14.3
Nurse	61	14.7
Medical resident	62	15.0
Specialty		
Medicine	18	4.3
Surgery	7	1.7
Pediatrics	32	7.7
OB/GYN	33	8
ER	4	1.0
Ophthalmology	5	1.2
ENT	3	0.7
Intensive care unit	7	1.7
Radiology	10	2.4
Family medicine	5	1.2
Medical students/interns	290	70.0
Have you ever suffered any severe sun burns before the age of 15?		
No	351	84.8
Yes	60	14.5
Have you ever suffered from sunburns recently?		
No	348	84.1
Yes	63	15.2

Knowledge level

The percentage of correct answers on the knowledge about skin cancer and risk-related behaviors are illustrated in Table 2**.** Those with correct answers ranged from 17% to 82%.

Behavior

In terms of behavior of respondents towards sun exposure and UV light avoidance, 40% of the sample indicated that they always seek shade or avoid sun during peak hours of the day. Furthermore, 40% of the sample rarely practice outdoors during the day, 31.4% sometimes do, and 20.0% never spend time outside during the day. The use of tanning beds is an uncommon behavior among healthcare professionals and more than half of the sample (63.8%) never used tanning beds. Less than half of the participants (44.4%) never use sunscreen of SPF 30 or above, 41.1% indicated they never use sunscreen while sunbathing on holidays, and only 12.3% use sunscreen during their daily activities. The majority of those that use sunscreen (82.1%), do not reapply it throughout the day. A small percentage of participants (4.6%) indicated that their skin gets checked by a physician for potential cancerous lesions, whereas the majority (79.5%) has never had a skin check for cancer. The majority of the sample (61%) reported that they do no perform self-examination of their skin for potential cancerous lesions. In exploring the reasons for not using sunscreen, 35.7% responded that they do not use it because of tiredness/laziness or lack of time, and 27.1% felt no need for sunscreen. Most of the respondents (84.8%) denied sunburns before the age of 15, and 15.2% have suffered it recently.

Knowledge and behavior

Please refer to Table 4 for means and standard deviations for the awareness score, knowledge level scores and the behavior level scores. Median scores and ranges are also provided in Table 4**.** There were no statistically significant differences in mean awareness score for the various demographic variables i.e., gender, age, marital status and nationality. One-way-ANOVA revealed statistically significant difference among the different job titles in terms of awareness score ($p<0.001$). See Table 5 for more information. Simple linear regression revealed that the awareness about skin cancer could not be predicted by any demographic variables (all $p>0.05$). The results of multiple regression analysis showed that marital status was a significant predictor of awareness score ($\beta=0.111$, $p=0.025$). The overall model fit was $R^2=0.012$. Hence, awareness score increased by 0.11 points for the married respondents in comparison with single respondents (CI=0.79). Please see Table 6 for more information.

The practice of reapplying sunscreen was similar across the different demographic groups. When asked about what is keeping them from using sunscreen, male and female respondents responded differently ($p<0.001$). There were also differences based on marital status ($p=0.042$), Saudi and non-Saudi status ($p=0.015$), job titles ($p= 0.030$) and the specialty ($p=0.010$). There were no demographic differences in responses to the question of whether they had experienced a sun burn before age 15 as in Table 7. There were gender differences in the report of having had recent sunburns ($p=0.015$). See Table 8 for more information.

Table 2: Knowledge related variables (n=414).

Variables	N	%
The use of sunscreen protect from skin cancers		
True	297	71.7
False	25	6.0
I don't know	92	22.2
Regular examination by a dermatologist help detect early stages of skin cancers		
True	342	82.6
False	21	5.1
I don't know	51	12.3
Self-examination for any suspicious lesions help detect early stages of skin cancers		
True	325	78.5
False	28	6.8
I don't know	61	14.7
Too much sun exposure can cause freckles		
True	264	63.8
False	39	9.4
I don't know	111	26.8
Too much sun exposure can cause early wrinkles of the skin		
True	265	64.0
False	32	7.7
I don't know	117	28.3
Too much sun exposure can cause immunosuppression		
True	96	23.2
False	125	30.2
I don't know	193	46.6
The sun is the strongest and the most harmful between 1000 am to 200 pm		
True	314	75.8
False	33	8.0
I don't know	67	16.2
The ideal sunscreen should have a sun protection factor (SPF) of at least 30		
True	204	49.3
False	26	6.3
I don't know	184	44.4
SPF higher than 30 provides minimal additional protection with the (additional cost disadvantage)		
True	116	28.0
False	64	15.5
I don't know	234	56.5
To cover your whole body with sunscreen, you need at least 30 ml or 2 table spoon of application		
True	75	18.1
False	47	11.4
I don't know	292	70.5
If properly applied, SPF 30 means you can stay in the sun 30 times longer without burning		
True	71	17.1
False	76	18.4
I don't know	267	64.5
The amount of cream/lotion applied equivalent to one fingertip; when spread; covers an area of one hand (both sides)		
True	130	31.4
False	53	12.8
I don't know	230	55.6

Continued.

Variables	N	%
If clothes are wet, they transmit more UV radiation and cause more harm		
True	79	19.1
False	69	16.7
I don't know	265	64.0
Sunscreens should be applied 15-30 mins before getting exposed to the sun, and should be re-applied every 2 hrs		
True	222	53.6
False	22	5.3
I don't know	170	41.1
Having red or blonde hair can increase your risk of skin cancer		
True	244	58.9
False	45	10.9
I don't know	125	30.2
Skin cancer can also occur in dark skinned individuals		
True	308	74.4
False	21	5.1
I don't know	85	20.5
One blistering sunburn in childhood more than doubles a person's risk of developing melanoma later in life		
True	133	32.1
False	44	10.6
I don't know	237	57.2
If you have family history of skin cancer, this will increase your risk of skin cancer		
True	314	75.8
False	15	3.6
I don't know	84	20.3

Table 3: Behavior related variables (n=414).

Variables	N	%
How often do you		
Avoid the sun during peak hours and/or seek shade		
Always	168	40.6
Sometimes	182	44.0
Rarely	46	11.1
Never	17	4.1
Practice/compete outdoors during day		
Always	35	8.5
Sometimes	130	31.4
Rarely	166	40.1
Never	83	20.0
Use tanning beds		
Always	16	3.9
Sometimes	58	14.0
Rarely	76	18.4
Never	264	63.8
Use sunscreen during daily activities		
Always	51	12.3
Sometimes	114	27.5
Rarely	66	15.9
Never	183	44.2
Use sunscreen while sunbathing on holidays		
Always	75	18.1
Sometimes	99	23.9
Rarely	70	16.9
Never	170	41.1

Continued.

Variables	N	%
Use sunscreen with SPF 30 or above		
Always	78	18.8
Sometimes	86	20.8
Rarely	65	15.7
Never	184	44.4
Reapply the sunscreen*		
Every 2 hours	21	5.1
Every 4 hours	19	4.6
Every 6 hours	33	8.0
Don't reapply	340	82.1
Get your skin checked by physician for potential cancerous lesions		
Always	19	4.6
Sometimes	30	7.2
Rarely	36	8.7
Never	329	79.5
Perform self-examination of your skin for potential cancerous lesions		
Always	43	10.4
Sometimes	55	13.3
Rarely	62	15.0
Never	254	61.4
If you don't use sunscreen, what's keeping you from using them?*		
Not applicable	121	29.2
Lazy/tired/no time	148	35.7
Want a tan	22	5.3
Embarrassed	5	1.2
I don't need it	112	27.1

*Questions not included in behavior score.

Table 4: Showed the distribution of behavior score, knowledge/attitude score and total awareness score (n=414).

Variable	Mean±SD	Median	Range
Behavior score	8.57±5.00	8	0-24
Knowledge score	6.85±3.31	7	0-18
Total awareness score	17.75±7.05	17	0-42

Table 5: Differences in mean awareness scores for different socio-demographic characteristics (n=414).

Variable	Category	Awareness score (Mean±SD)	P value
Gender	Male	16.24±7.45	0.065
	Female	18.82±6.66	
Age	<25 years	18.33±6.85	0.501
	≥25 years	17.52±7.14	
Marital status	Single	17.41±7.01	0.811
	Married	18.86±7.14	
Nationality	Saudi	17.55±7.55	0.795
	Non-Saudi	18.44±7.05	
Job title	4th year medical student	16.44±6.96	<0.001*
	5th year medical student	19.98±8.12	
	6th year medical student	16.00±6.40	
	Intern	15.80±5.72	
	Nurse	19.03±7.17	
	Resident	18.29±5.96	

*ANOVA test used to compare the mean difference between groups.

Table 6: Associations between awareness score and covariates (linear regression).

Covariate	B-Coefficient	95% confidence interval	P value
Simple linear regression analysis			
Age in years	0.049	0.087	0.571
Marital status	1.679	1.041	0.108
Nationality	-0.640	1.302	0.623
Job title	-0.400	0.284	0.160
Specialty	-0.165	0.129	0.202
Multivariate linear regression analysis			
Age in years	0.034	0.526	0.600
Marital status	0.111	0.786	0.025
Nationality	0.004	0.067	0.947
Job title	-0.033	0.606	0.545
Specialty	-0.038	0.725	0.469

Table 7: Comparison of few behavior related variables with demographic variables (n=414).

Variable	Categories	F	P value
Reapply sunscreen	Gender	0.166	0.919
	Age	0.367	0.777
	Marital status	0.335	0.800
	Nationality	1.030	0.379
	Job title	1.997	0.114
	Specialty	1.422	0.236
What is keeping you from using sunscreen	Gender	13.853	<0.001
	Age	0.971	0.423
	Marital status	2.506	0.042
	Nationality	3.130	0.015
	Job title	2.714	0.030
	Specialty	3.350	0.010
Suffered any sunburn before age 15 years	Gender	3.996	0.046
	Age	0.167	0.683
	Marital status	2.283	0.132
	Nationality	0.792	0.374
	Job title	0.363	0.547
	Specialty	0.158	0.691
Suffered from sunburn recently	Gender	6.018	0.015
	Age	1.800	0.181
	Marital status	0.127	0.722
	Nationality	3.014	0.083
	Job title	1.127	0.289
	Specialty	5.264	0.022

Table 8: Comparison of few behavior related variables with mean awareness score.

Variable	Category	Awareness score (Mean±SD)	P value
Reapply sunscreen	Never	13.93±5.89	<0.001
	Rarely	23.09±6.23	
	Sometimes	24.21±6.03	
	Always	26.10±7.89	
What is keeping you from using sunscreen	Not applicable	19.71±6.88	<0.001
	Laziness/tiredness/no time	15.29±6.91	
	Want a tan	16.15±7.26	
	Embarrassed	19.40±9.13	
	I don’t need it	11.39±5.32	

Continued.

Variable	Category	Awareness score (Mean±SD)	P value
Suffered any sunburn before age 15 years	Yes	17.82±8.95	0.004
	No	15.38±6.85	
Suffered from sunburn recently	Yes	17.56±8.90	0.004
	No	15.40±6.85	

DISCUSSION

Throughout the previous three decades it has been reported that skin malignancy incidence has increased more than all other types of cancer combined together.[4] As stated by the latest record by the Saudi Cancer Registry (SCR) in 2010, it has been showed that non-melanoma skin cancer is considered to be the 9th most prevalent cancer for both males and females in Saudi Arabia, which was approximately 3.2% of all recently reported cancer cases (52.7% males & 47.3% females with a female to male ratio of 100:111).[11] Not much is known about the awareness of medical personnel regarding exposure to the sun and its associated risks. As to our knowledge, currently there are no previous studies done on this population. Due to the limited knowledge in this field, this study aimed to assess skin cancer awareness, sunscreen and UV exposure among medical students and healthcare providers in Jeddah, Saudi Arabia. (n=414).

Females represented more than half of the respondents (58.5%) which was similar to two previous studies.[12,13] According to our findings, it has been shown that medical students and health care providers at this tertiary hospital have narrow knowledge in regard to skin cancer which was collateral to the conclusion of previous studies conducted among the general population in Saudi Arabia, Medical students in France, Nursing students and by the American Academy of Dermatology in 1995.[12,14-16] In contrast, skin cancer knowledge and perceived severity to sun exposure were shown to be high in a study in Italy among school students.[17] A research paper established among non-dermatologist physicians concluded that participants had adequate knowledge on skin cancer hazard factors and sun protection measures and knew that UV light can lead to skin cancers.[18]

Similar to the findings of Alamri et al, more than 70% of the respondents were aware of the most harmful time of the day regarding sun exposure. Also, only 32.1% were aware that severe sunburn occurring during childhood duplicates an individual's risk of acquiring melanoma subsequently in life, which was similar to the findings of the same study with the percentage of 31.4%, compared to other studies done in the UK, USA and France; awareness levels were 82%, 58% & 97.4% respectively.[12,14,16,19]

There was no statistically significant difference in mean awareness score for the various categories of demographic variables e.g. gender, age, marital status and nationality. In contrast, age was found to have statistically significant associations with awareness about skin cancer in other studies.[12,20-22] One interesting finding was the marital status (β=0.111, p=0.025) which was a significant predictor of awareness score, also coinciding with the findings of Alamri et al.[12]

The mean behavior score was 8.57±5.00 with a possible maximum score of 24 which reveals a low level of sun protection behavior in agreement to the results of other studies.[15,23] The current work found that half of the participants recognized that sun block should be applied 15-30 minutes before getting exposed to the sun, and should be re-applied every 2 hours. In a study done among college athletes, a population that spend a lot of time exposed to the sun, less than half of them (45%) knew that individuals should utilize sunscreen 15–30 minutes before going outdoors and only 35% recognized that sun block should be reapplied every hour.

Another important finding was that the principal barriers to using sunscreen, 35% reported that they're lazy, tired or don't have time and 27% claimed they don't need it. Suppa et al evaluated the principal barriers to sun protection among school students in Italy, and found that 46.77% reported tiresome ⁄ bothering and 36.5% had the desire to attain a tan as the main barriers.[17] Also, less than half of the participants (44.4%) never use sunscreen of SPF 30 or above, similar to the same study that was done among school students as 39.1% never use any sunscreen despite knowledge of dermatological cancer and the hazard of sun exposure.[17] Among physicians, 79.6% declared the application of sun block as a method of protection against the sun.[18]

In this study, only a minority of participants 20.5% disclosed visiting a physician to have their skin checked for possible malignant lesions, similar to the college athletes paper findings (20.7%).[23] Yilmaz et al noted that a considerable proportion of nursing students did not know the number of moles on their bodies and did not perform self-examination for the early determination of skin cancers.[15] What was surprising was that a large proportion of the participants (78%) know that self-examination for any suspicious lesions help detect early stages of skin cancers, despite that, only 39% performed self-examination of their skin. However, among health professionals and educators in Portugal 82% of them preformed skin self-examination.[24]

More than 90% of skin cancers are preventable and as prevention is better than cure, it is imperative to

incorporate the skills of self-examination in future teaching activities for medical personnel, in medical schools and as pre-employment courses.[25] Increasing health care providers' awareness about the importance and methods of self-examination, will definitely influence the general populations' awareness.

CONCLUSION

In conclusion, the results of this study have shown that knowledge regarding skin cancer and behavior towards sun exposure among healthcare providers is inadequate. Therefore, educational awareness campaigns are recommended.

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REFERENCES

1. World Health Organization. Skin cancers. Available at: http://www.who.int/uv/faq/skincancer/en/index1.html. Accessed on 12 March 2018.
2. Ghdx.healthdata.org. Saudi Cancer Registry GHDx. Available at: http://ghdx.healthdata.org/organizations/saudi-cancer-registry. Accessed on 12 March 2018.
3. Rogers HW, Weinstock MA, Harris AR, Hinckley MR, Feldman SR, Fleischer AB, et al. Incidence estimate of nonmelanoma skin cancer in the United States, 2006. Archives of dermatology. 2010;146(3):283-7.
4. Stern RS. Prevalence of a history of skin cancer in 2007: results of an incidence-based model. Archives of dermatology. 2010;146(3):279-82.
5. Corona R. Epidemiology of nonmelanoma skin cancer: a review. Annali-Istituto Superiore Di Sanita. 1996;32:37-42.
6. Magnus K. The Nordic profile of skin cancer incidence. A comparative epidemiological study of the three main types of skin cancer. International journal of cancer. 1991;47(1):12-9.
7. Olson AL, Gaffney CA, Starr P, Dietrich AJ. The impact of an appearance-based educational intervention on adolescent intention to use sunscreen. Health Edu Res. 2007;23(5):763-9.
8. Armstrong, Bruce K. How sun exposure causes skin cancer: an epidemiological perspective." Prevention of skin cancer. Springer, Dordrecht; 2004: 89-116.
9. Coups EJ, Manne SL, Heckman CJ. Multiple skin cancer risk behaviors in the US population. American J Prevent Med. 2008;34(2):87-93.
10. Nahar V, Ford M, Hallam J, Bass M, Vice M. Sociodemographic and Psychological Correlates of Sun Protection Behaviors among Outdoor Workers: A Review. J Skin Cancer. 2013;2013:1-10.
11. Al-Eid H. Cancer Incidence Report, Saudi Arabia 2010. Kingdom of Saudi Arabia: Ministry of Health, Saudi cancer registry; 2014;14:103.
12. Alamri F, Saeedi MY, Alharbi M, Ali AM, Ibrahim AK. Skin Cancer and Its Correlates: A Study of Knowledge and Preventive Behavior in Riyadh. Cancer Clin Oncol. 2015;5(1):11.
13. Baybay H, Atassi M, Elfakir S, Gallouj S, Meziane M, Mernissi FZ. Skin cancer knowledge and attitudes in the region of Fez, Morocco: a cross-sectional study. BMC dermatology. 2017;17(1):2.
14. Isvy A, Beauchet A, Saiag P, Mahe E. Medical students and sun prevention: knowledge and behaviours in France. J Eur Acad Dermatol Venereol. 2013;27(2):e247-51.
15. Yilmaz M, Yavuz B, Subasi M, Kartal A, Celebioglu A, Kacar H, et al. Skin cancer knowledge and sun protection behavior among nursing students. Japan Journal of Nursing Science. 2015;12(1):69-78.
16. Centers for Disease Control Prevention. Survey of knowledge of and awareness about melanoma. United States: MMWR Morb Mortal Wkly Rep. 1996;45(17):346-9.
17. Suppa M, Cazzaniga S, Fargnoli MC, Naldi L, Peris K. Knowledge, perceptions and behaviours about skin cancer and sun protection among secondary school students from Central Italy. Journal of the Eur Acad Dermatol Venereol. 2013;27(5):571-9
18. Thomas M, Rioual E, Adamski H, Roguedas AM, Misery L, Michel M, et al. Physicians involved in the care of patients with high risk of skin cancer should be trained regarding sun protection measures: evidence from a cross sectional study. J Eur Acad Dermatol Venereol. 2011;25(1):19-23.
19. Miles A, Waller J, Hiom S, Swanston D. SunSmart. Skin cancer knowledge and preventive behaviour in a British population representative sample. Health Educ Res. 2005;20(5):579-85.
20. Avagyan, G. Skin Cancer Knowledge, Attitudes, and Practices Among Residents of Yerevan, Armenia. (master), American University of Armenia College of Health Sciences, 2009. Available at: http://auachsr.com/PDF/MPH/2009/Avagyan,%20Gayane.pdf. Accessed on 3 August 2017.
21. Kristjánsson S, Ullén H, Helgason ÁR. The importance of assessing the readiness to change sun-protection behaviours: a population-based study. European Journal of Cancer. 2004;40(18):2773-80.
22. Cinar ND, Cinar S, Karakoc A, Ucar F. Knowledge, attitudes and behaviors concerning sun protection/skin cancer among adults in Turkey. Pak J Med Sci. 2009;25(1):108-12.
23. Hobbs C, Nahar VK, Ford MA, Bass MA, Brodell RT. Skin cancer knowledge, attitudes, and behaviors in collegiate athletes. J Skin Cancer. 2014;2014.
24. Duarte AF, Correia B, Picoto A, Costa Pereira A, Nagore E, Correia O. Behaviour towards sun exposure, skin self-examination and skin cancer

knowledge of educators, health professionals and the general population–cross-sectional study. J Eur Acad Dermatol Venereol. 2017;31(2):132-5.
25. Anand P, Kunnumakara AB, Sundaram C, Harikumar KB, Tharakan ST, Lai OS, et al. Cancer is a preventable disease that requires major lifestyle changes. Pharm Res. 2008;25(9):2097-116.

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