






Research Article

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ATTITUDES TOWARDS SUN PROTECTION AND SKIN CANCER AMONG FACULTY MEMBERS AND STUDENTS OF MEDICINE AND OF ARTS/SCIENCES AT A TURKISH UNIVERSITY

BİR TÜRK ÜNİVERSİTESİNDEKİ TIP VE FEN-EDEBİYAT FAKÜLTELERİ ÖĞRETİM ÜYELERİ VE ÖĞRENCİLERİNİN GÜNEŞTEN KORUNMA VE CİLT KANSERİNE KARŞI TUTUMLARI

 Coşkun Öztekin¹,  Aynure Öztekin²,  Engin Senel²

¹Hitit University, School of Medicine, Department of Family Medicine, Çorum

²Hitit University, School of Medicine, Department of Dermatology, Çorum

Yazışma Adresi / Correspondence:

Coşkun Öztekin (e-mail: coskunoztekin@gmail.com)

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Öz

Amaç: Güneşten korunma uygulamaları hakkında halkın bilgisi ve tutumu, cilt kanserinden ve güneşe maruz kalmanın diğer zararlı etkilerinden korunmada önemli faktörlerdir. Topluma tıbbi bilgi vermeleri ve halk sağlığı politikalarını şekillendirmeleri sebebiyle tıp öğrencilerinin ya da eğitimcilerin farkındalık seviyeleri de önemlidir. Bu çalışmanın amacı, bir Türk üniversitesindeki tıp ve fen-edebiyat fakülteleri öğretim üyeleri ve öğrencilerinin güneş ışığına maruz kalmanın ve güneşten korunmanın etkilerine yönelik bilgi ve tutumlarını ortaya koymaktır.

Materyal ve Metot: Bu tanımlayıcı enine kesitsel çalışma, Hitit Üniversitesi Fen Edebiyat Fakültesi, Tıp Fakültesi ve Sağlık Hizmetleri Meslek Yüksekokulu öğrencilerine ve öğretim üyelerine 37 maddelik bir anket uygulayarak gerçekleştirildi. Sorular, katılımcıların güneşe maruz kalma ve güneşten korunmanın etkileriyle ilgili bilgi düzeylerini, bu konularla ilgili bilgi kaynaklarını ve çevresel faktörlerle ilgili davranışlarını değerlendirmeye yönelik olarak formüle edildi. Yanıtlar uygun araç ve yöntemlerle istatistiksel analizlere tabi tutuldu.

Bulgular: Çalışmaya, yaş ortalaması $26,0 \pm 9,2$ yıl olan 217 katılımcı katıldı, bunların 145'i (%66,8) öğrenci ve 72'si (%33,2) öğretim üyesiydi. Katılımcıların 118'i (%55,1) kadın, 151'i (%69,6) tıp alanındaydı. Katılımcıların büyük çoğunluğu ($n=204$, %94) güneş kremi kullanıyordu ve en sık olarak SPF> 30 olan güneş kremi kullanılmaktaydı (%44). Güneşten koruyucu alırken marka (%45,2) ve yüksek SPF (%46,2) en çok göz önünde bulundurulmuş faktörlerdi. Katılımcıların cinsiyet, unvan ve çalışma alanına göre karşılaştırılması, güneş ışığına maruz kalma ve güneşten korunma ile ilgili bilgi ve uygulamalarda gruplar arası bazı farklılıklar olduğunu göstermiştir.

Sonuç: Tıbbi alandaki öğrenciler ve öğretim üyeleri, tıbbi olmayan alanlardan olanlara kıyasla güneşe maruz kalma ve güneşten korunma ile ilgili konularda genel olarak daha yüksek bilgi düzeyine sahip olsalar da, tıp öğrencileri ve öğretim üyeleri arasında bile güneşe maruz kalma ile ilişkili risklerin ciddiyeti hakkında hala önemli bir bilgi eksikliği bulunmaktadır. Halkın bilinçlendirilmesinde kullanılan yöntemler ve medya kanalları, hedef kitlelerin demografik özelliklerine göre uyarlanmalıdır. Bu çalışmanın hedef popülasyonundaki genel tabloyu ortaya koyabilmek için, daha kapsamlı ve organize veri toplama araçları ve daha çeşitli kurumlardan geniş bir örnekleme yapılacak çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: Cilt kanseri, güneşten korunma, güneş kremi kullanımı, halk sağlığı, davranış, bilgi.

Abstract

Objectives: Public knowledge about and attitude towards sun protection practices are important factors in attempts to avoid skin cancer and other harmful effects of sun exposure. Such are the awareness levels of the students of medicine or their educators as they deliver the information to the general public and shape public health policies. The aim of this study was to reveal the knowledge and attitudes of the faculty members and students of medicine and of arts/sciences at a Turkish university towards the effects of sun exposure and protection.

Materials and Methods: This descriptive cross-sectional study was conducted by administering a 37-item questionnaire to students and faculty members in the School of Arts/Sciences, School of Medicine, and Vocational School of Medical Sciences at Hitit University. The questions were formulated to evaluate the participants' level of knowledge regarding the effects of sun exposure and protection, the source of their knowledge about these subjects, and their behaviors related to environmental factors. Responses were subjected to statistical analyses with appropriate tools and methods.

Results: The study included a total of 217 participants with an average age of 26.0 ± 9.2 years: 145 (66.8%) students and 72 (33.2%) faculty members. Of these, 118 (55.1%) were female and 151 (69.6%) were in medical fields. A great majority of the participants ($n=204$, 94%) had used sunscreens, and sunscreens with SPF>30 were the most commonly used ones (%44). Brand (45.2%) and high SPF (46.2%) were the most frequently considered aspects when buying sunscreens. A comparison of subgroups of participants based on gender, position, and area of study indicated some differences in knowledge and practices related to sun exposure and sun protection.

Conclusion: Although students and faculty members of medical areas had generally higher level of knowledge about the issues surrounding sun exposure and protection in comparison with those from non-medical backgrounds, there is still a significant knowledge deficit about the severity of associated risks and some room for improvement even among the students and faculty members of medical schools. The methods and media channels that would be used to increase public awareness should be adapted according to the demographic characteristics of target audiences. Further studies with a more comprehensive and well-managed data collection tools and a larger sample from more diverse set of institutions are warranted to determine the overall picture in the target population of this study.

Keywords: Skin cancer, sun protection, sunscreen use, public health, behavior, knowledge.

Introduction

Skin cancers (more aggressive melanomas and less aggressive non-melanomas), one of the most common types of cancers worldwide, are a growing but preventable public health problem.^{1,2} Depletion of stratospheric ozone layer, which absorbs as much as 99.9% and 95% of ultraviolet (UV)-B and -A lights (280-320 and 320-400 nm), has led to an increase in global ground-level UV irradiation in the last decades^{3,4} and corresponding significant increases in the incidence of, in the number of treatments for, or in deaths due to skin cancers.^{1,5,6} Exposure to sunlight, which is valued as an important means to generate vitamin D, also carries a greater risk for DNA damage and mutations.⁷ Studies indicate that over 75-90% of skin cancers are considered to result from excessive exposure to outdoor or indoor UV radiation through sunlight or tanning beds.^{8,9} Accordingly, UV radiation is considered a significant preventable environmental risk factor for all types of skin cancers.^{9,10}

Sunscreens of different strengths (sun protection factor - SPF) are applied onto the skin in order to limit the exposure of skin cells to UV light. However, the method and amount of sunscreen applied have been shown to vary among individuals significantly and to have a negative impact on the actual level of protection.^{11,12} Moreover, public knowledge about and attitude towards UV protection practices are also important factors in attempts to protect the public from skin cancer and other harmful effects of UV exposure.^{13,14} Public education programs are commonly implemented to educate the public and to promote appropriate UV protection practices.^{15,16} On the other hand, the level of awareness among the students of medicine or their educators about UV protection practices is a subject of greater interest since they would be the ones delivering the information about this subject to the general public and shaping the public health policies. The aim of this study was to reveal the knowledge and attitudes of the faculty members and students of medicine and of arts/sciences at a Turkish university towards the effects of sun exposure, sun protection, and skin cancer in order to guide future educational programs and public health policies.

Materials and Methods

This descriptive cross-sectional study was conducted between October-December 2018 at Hitit University in Turkey. The university has over 14,000 students enrolled in undergraduate programs and accepts students in the mid-range for respective programs in terms of the nationwide entrance exam results. The participants were informed about the objectives and the procedures of the study, were given assurances of anonymity, and were asked to give their written approval. The local ethics committee for non-interventional studies at Hitit University approved this study (Approval #2018-77, Date 05.04.2018). The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in the approval by the institution's human research committee.

A 37-item anonymous questionnaire adapted from Şenel and Süslü^{13,17} was administered to faculty members and undergraduate students in the School of Arts/Sciences, School of Medicine, and Vocational School of Medical Sciences at Hitit University. The questions were formulated to evaluate participants' level of knowledge regarding the effects of sun exposure and protection, their behaviors related to environmental factors, and the source of their knowledge about these subjects. The questionnaire contained 26 statements presented to the participants as 5-point Likert-type items (S11, S18-S37, 'Strongly agree', 'Agree', 'Not sure', 'Disagree', 'Strongly disagree') along with yes/no questions and those inquiring about their socioeconomic background. The statements roughly covered the subjects related to the use and knowledge of solarium (S11ab, S30, S33, and S37), tanning (S32, S34, and S35), harmful effects of sun rays (S23, S24, S25, and S26), risk factors for skin cancer (S27, S28abcde, S29, and S36), protective measures in summer (S18, S19, S20, and S21), and sunscreen use (S22 and S31). Some of these statements were true to the scientific knowledge (S11b, S19, S20, S21, S22, S23, S24, S26, S27, S28abcde, S29, S35) while others were false (S11a, S18, S25, S30, S31, S32, S33, S34, S36, S37).

Statistical analyses were performed with SPSS (Version 22.0, SPSS Inc., Chicago, IL, USA). The normal distribution was examined by the Kolmogorov-Smirnov test. Descriptive statistics were presented as number and percentage for the demographic and other categorical variables and as mean \pm standard deviation or median (min-max) for continuous variables. Independent-samples t-test or analysis of variance (ANOVA) was used for the comparison of two or multiple groups regarding the continuous variables with normal distribution, respectively. Mann-Whitney U test was used for the comparison of two groups regarding the data without normal distribution (i.e., responses to the statements given in the questionnaire). Relationships were analyzed with Spearman's correlation coefficient between numerical variables or chi-square test for categorical variables. Results with $p < 0.05$ were considered statistically significant.

Results

A total of 217 participants were included in the study: 145 (66.82%) students and 72 (33.18%) faculty members. Of these, 118 (55.14%) were female, 151 (69.58%) were in medical fields (medical school or vocational school of health), and 139 (64.65%) had medium to dark skin tones (Table 1). The average age of participants was 26.02 ± 9.18 years. The great majority of the participants ($n=208$, 95.85%) did not have a close relative who had had skin cancer; none had skin cancer in the family.

Most of the participants ($n=117$, 53.92%) had 1-4 hours of daily sun exposure during summer and ($n=140$, 64.52%) had sunburn (Table 2). A great majority of the participants ($n=204$, 94.01%) had used sunscreens, and sunscreens with SPF>30 were the most commonly used ones (%44.61). No significant relationship was found between having sunburn and not using sunscreen (Fisher's exact test $p=0.775$).

Table 1. Demographic data of the students and faculty members.

Groups (N=217)	n	%
Student	145	66.82
School of Arts & Sciences	59	27.19
Vocational School of Health	28	12.90
Medical School	58	26.73
Faculty Member	72	33.18
Medical School	65	29.95
Arts & Sciences	7	3.23
Gender (N=214)	n	%
Male/Female	96/118	44.86/55.14
Students (M/F)	49/93	34.51/65.49
Faculty members (M/F)	47/25	65.28/34.72
Age, years (N=214) (Mean ± SD)	26.02 ± 9.18	
Students (n=144)	20.35 ± 1.77	p<0.001^a
Faculty members (n=70)	37.69 ± 6.95	
Skin Tones (N=215)	n	%
Fair	11	5.12
Light	65	30.23
Medium	79	36.74
Dark	60	27.91
Eye Color (N=213)	n	%
Hazel	37	17.37
Brown	148	69.48
Green	12	5.63
Black	8	3.76
Blue	7	3.29
Amber	1	0.47
Hair Color (N=209)	n	%
Blonde	11	5.26
Light brown	39	18.66
Black	82	39.23
Dark brown	63	30.14
Chestnut brown	6	2.87
Red	2	0.96
Gray	5	2.39
White	1	0.48
Family history of skin cancer (N=217)	n	%
No	208	95.85
Yes - Degree of kinship	9	4.15
Not specified	2	22.22
Grandparent	3	33.33
Aunt/Uncle	2	22.22
Cousin	2	22.22

SD: Standard deviation

^aIndependent samples t-test.

Table 2. Participants' behavior regarding sun exposure and sunscreen use.

Daily sun exposure during summer (N=217)	n	%
Not at all	17	7.83
<1 hr	44	20.28
1-4 hrs	117	53.92
5-9 hrs	39	17.97
History of sunburn (N=217)	n	%
No	77	35.48
Yes	140	64.52
Sunscreen use (N=217)	n	%
No	13	5.99
Yes - SPF used	204	94.01
Not known	69	33.82
<SPF 15	7	3.43
SPF 16-29	37	18.14
>SPF 30	91	44.61
Sunscreen-applied body parts daily (N=217)	n	%
None	84	38.71
Face	114	52.53
Upper extremities	15	6.91
Lower extremities	-	-
Trunk	4	1.84
Sunscreen-applied body parts at beach (N=217)	n	%
Face	174	80.18
Upper extremities	155	71.43
Lower extremities	104	47.93
Trunk	124	57.14
	Mean	±SD
Age at first sunscreen use (N=155)	16.61	±7.86
Sunscreen buying criteria (1st) (N=208)	n	%
Brand	94	45.19
Price	14	6.73
High SPF	96	46.15
Other	4	1.92
Sunscreen buying criteria (2nd) (N=76)	n	%
Brand	1	1.32
Price	21	27.63
High SPF	45	59.21
Perfume	2	2.63
Unscented	7	9.21
Sunscreen application time (N=206)	n	%
1 hr before exposure	26	12.62
Half hr before exposure	135	65.53
During sun exposure	35	16.99
After sun exposure	1	0.49
Other	9	4.37

SD: standard deviation, SPF: sun protection factor

Table 3. Participants' source of information and opinion regarding sun protection and UV light.

Most common source of information about the harmful effects of the sun (N=207)	n	%
Television	53	25.60
Internet	108	52.17
School	19	9.18
Family	8	3.86
Friends	5	2.42
Newspapers	1	0.48
Other	13	6.28
Knows that the UV light is responsible for the harmful effects of the sun (N=195)	n	%
No	5	2.56
Yes	190	97.44
Do you find it necessary to protect from the sun? (N=217)	n	%
No	24	11.06
Yes	193	88.94

UV: ultraviolet

Table 4. Comparison of behaviors of various subgroups of participants regarding sun exposure, sun protection, sunscreen use, etc.

Subgroups compared	N	Compared response	p-value
Gender Male vs. Female	214	Daily sun exposure during summer	0.113 ^a
	214	Sunscreen use	0.014 ^b
	203	Used sunscreen SPF	0.001 ^b
	214	Having sunburn	0.045 ^b
	205	Sunscreen buying criteria	0.489 ^a
	205	Source of information	0.090 ^a
Position Student vs. Faculty member	217	Daily sun exposure during summer	<0.001 ^a
	217	Sunscreen use	0.228 ^b
	204	Used sunscreen SPF	0.002 ^b
	217	Having sunburn	0.655 ^b
	208	Sunscreen buying criteria	0.006 ^b
	207	Source of information	<0.001 ^a
Area of study Medical vs. non-Medical	217	Daily sun exposure during summer	<0.001 ^a
	217	Sunscreen use	0.222 ^b
	204	Used sunscreen SPF	0.156 ^b
	217	Having sunburn	0.444 ^b
	208	Sunscreen buying criteria	0.261 ^b
	207	Source of information	0.031 ^a

SPF, sun protection factor.

^aPearson chi-square test.

^bFisher's exact test.

Table 5. Participants' opinions regarding sun exposure, sun protection, sunscreen use, and skin cancer.

Statement	N	S. agree		Agree		Not sure		Disagree		S. disagree	
		n	%	n	%	n	%	n	%	n	%
S11a. Solarium provides tanning without being harmed.	214	8	3.74	14	6.54	80	37.38	63	29.44	49	22.90
S11b. Solarium may cause skin cancer in the long term.	213	57	26.76	77	36.15	74	34.74	5	2.35		
S18. It is appropriate to go to beach between 10 AM - 4 PM during summer.	212	17	8.02	54	25.47	17	8.02	75	35.38	49	23.11
S19. It is appropriate to use sunglasses during summer.	215	102	47.44	94	43.72	10	4.65	8	3.72	1	0.47
S20. It is appropriate to use hats during summer.	214	81	37.85	109	50.93	15	7.01	6	2.80	3	1.40
S21. It is appropriate to use sunscreen outside the beach.	216	76	35.19	88	40.74	28	12.96	17	7.87	7	3.24
S22. Sunscreens should be used in children.	215	85	39.53	75	34.88	40	18.60	8	3.72	7	3.26
S23. Sunrays have harmful effects.	215	123	57.21	81	37.67	3	1.40	3	1.40	5	2.33
S24. Sunrays may cause formation of cataract in the eye.	215	49	22.79	45	20.93	117	54.42	3	1.40	1	0.47
S25. Sunrays may cause formation of kidney stone.	215	11	5.12	18	8.37	149	69.30	20	9.30	17	7.91
S26. Sunrays may cause skin cancer.	215	97	45.12	87	40.47	27	12.56	4	1.86		
S27. Some drugs increase the sensitivity to sunlight.	214	71	33.18	87	40.65	54	25.23	2	0.93		
S28a. Light skin increases the risk of developing skin cancer.	210	73	34.76	62	29.52	58	27.62	13	6.19	4	1.90
S28b. Presence of brown moles on the body increases the risk of developing skin cancer.	208	61	29.33	72	34.62	65	31.25	7	3.37	3	1.44
S28c. Sunburn increases the risk of developing skin cancer.	207	49	23.67	79	38.16	66	31.88	12	5.80	1	0.48
S28d. Working under the sun for a long time throughout life increases the risk of skin cancer.	207	81	39.13	88	42.51	33	15.94	5	2.42		
S28e. Having a family member with skin cancer increases the risk of developing skin cancer.	209	66	31.58	86	41.15	47	22.49	7	3.35	3	1.44
S29. Sunbathing for only a week or two in a year increases the risk of developing skin cancer.	215	24	11.16	23	10.70	121	56.28	39	18.14	8	3.72
S30. Solarium is a healthy way to tan.	214	6	2.80	14	6.54	66	30.84	79	36.92	49	22.90
S31. One can tan in the sun without an adverse effect when sunscreen is used.	213	13	6.10	81	38.03	46	21.60	64	30.05	9	4.23
S32. Tanning protects against the harmful effects of sunlight.	213	5	2.35	33	15.49	76	35.68	75	35.21	24	11.27
S33. Tanning in the solarium during winter prevents the harmful effects of the sun in summer.	214	4	1.87	12	5.61	94	43.93	68	31.78	36	16.82
S34. Gradual/slow tanning prevents the harmful effects of the sun.	213	19	8.92	72	33.80	83	38.97	32	15.02	7	3.29
S35. Tanning is a sign of sun damage.	213	18	8.45	61	28.64	90	42.25	36	16.90	8	3.76

S36. Having only two-three sunburns throughout life does not increase the risk of skin diseases.	214	9	4.21	45	21.03	100	46.73	41	19.16	19	8.88
S37. Ultraviolet rays in solarium are healthier than ultraviolet rays from the sun.	214	2	0.93	15	7.01	85	39.72	62	28.97	50	23.36

Those who used sunscreens started using them at the age of 16.61 ± 7.86 on average. Most of the participants ($n=114$, 52.53%) used sunscreen on face daily whereas 38.71% did not use sunscreen daily in a regular manner. When they sunbathed (i.e. at the beach), however, a great majority of the participants (80.18% and 71.43%, respectively) did apply sunscreen on the face and upper extremities. The majority of those who used sunscreens (65.53%) applied them half an hour before sun exposure. Brand and high SPF were the most frequently considered aspects (45.19% and 46.15%, respectively) when buying sunscreens. A great majority of the participants were aware that the UV radiation was responsible for the harmful effects of the sun (97.44%) and found it necessary to protect from the sun (88.94%) (Table 3). The Internet was found to be the most common source of information about the harmful effects of the sun (52.17%), followed by television (25.60%).

A comparison of subgroups of participants based on gender, position, and area of study indicated some differences in practices related to sun exposure and sun protection (Table 4). No significant difference was found between males and females regarding the duration of daily sun exposure in summer ($p=0.113$), but females had a higher rate of sunscreen use ($p=0.014$), a lower rate of sunburn ($p=0.045$), and used sunscreen with higher SPF ($p=0.001$). Students had longer daily sun exposure during summer ($p<0.001$) and used lower SPF sunscreens or were less aware of the sunscreen SPF they used ($p=0.002$) compared with faculty members. Students considered the price first when buying sunscreens while faculty members paid attention to the brand more often ($p=0.006$). Television and the Internet were the sources of information about sun exposure and protection more commonly for students than they were for faculty members who got information at school more often than students ($p<0.001$). Students and faculty members in non-medical departments had higher daily sun exposure during summer ($p<0.001$). Formal education at school was the source of information about sun exposure and protection more commonly for those in medical departments ($p=0.031$).

The participants' responses to various statements regarding solarium use, sun exposure, sun protection, sunscreen use, and skin cancer were given in Table 5. A graphical presentation of the participant responses was also given in Figure 1. Subgroups were also analyzed and compared in terms of their responses to the statements about the effects of ultraviolet exposure from the sun or at the solarium and the methods of protection (Table 6).

Table 6. Comparison of responses from various subgroups of participants to the statements about sun exposure, sun protection, sunscreen use, etc. Only the statements with significant differences between the groups' responses were given.

Subgroups	Statement	More correctly responding group	p-value ^a
Gender	S21	True Male	<0.001
	S27	True Female	0.006
	S28a	True Female	0.017
	S28e	True Female	0.042
Position	S11a	False Faculty member	<0.001
	S11b	True Faculty member	0.001
	S18	False Faculty member	0.048
	S19	True Faculty member	0.045
	S22	True Faculty member	<0.001
	S23	True Faculty member	0.002
	S24	True Faculty member	<0.001
	S26	True Faculty member	<0.001
	S27	True Faculty member	<0.001
	S28a	True Faculty member	<0.001
	S28b	True Faculty member	<0.001
	S28c	True Faculty member	<0.001
	S28d	True Faculty member	<0.001
	S28e	True Faculty member	<0.001
	S30	True Faculty member	<0.001
	S32	True Faculty member	<0.001
	S33	True Faculty member	<0.001
S36	True Faculty member	0.012	
S37	True Faculty member	0.003	
Area of study	S11a	False Medical	0.008
	S11b	True Medical	0.008
	S18	False Medical	0.013
	S24	True Medical	0.001
	S26	True Medical	0.035
	S27	True Medical	<0.001
	S28b	True Medical	0.001
	S28d	True Medical	<0.001
	S28e	True Medical	<0.001
	S30	False Medical	0.002
	S31	False Medical	0.003
	S32	False Medical	0.012
	S33	False Medical	<0.001
S37	False Medical	0.016	

^aMann-Whitney U test with numerically ranked responses (strongly agree=1, agree=2, not sure=3, disagree=4, strongly disagree=5).

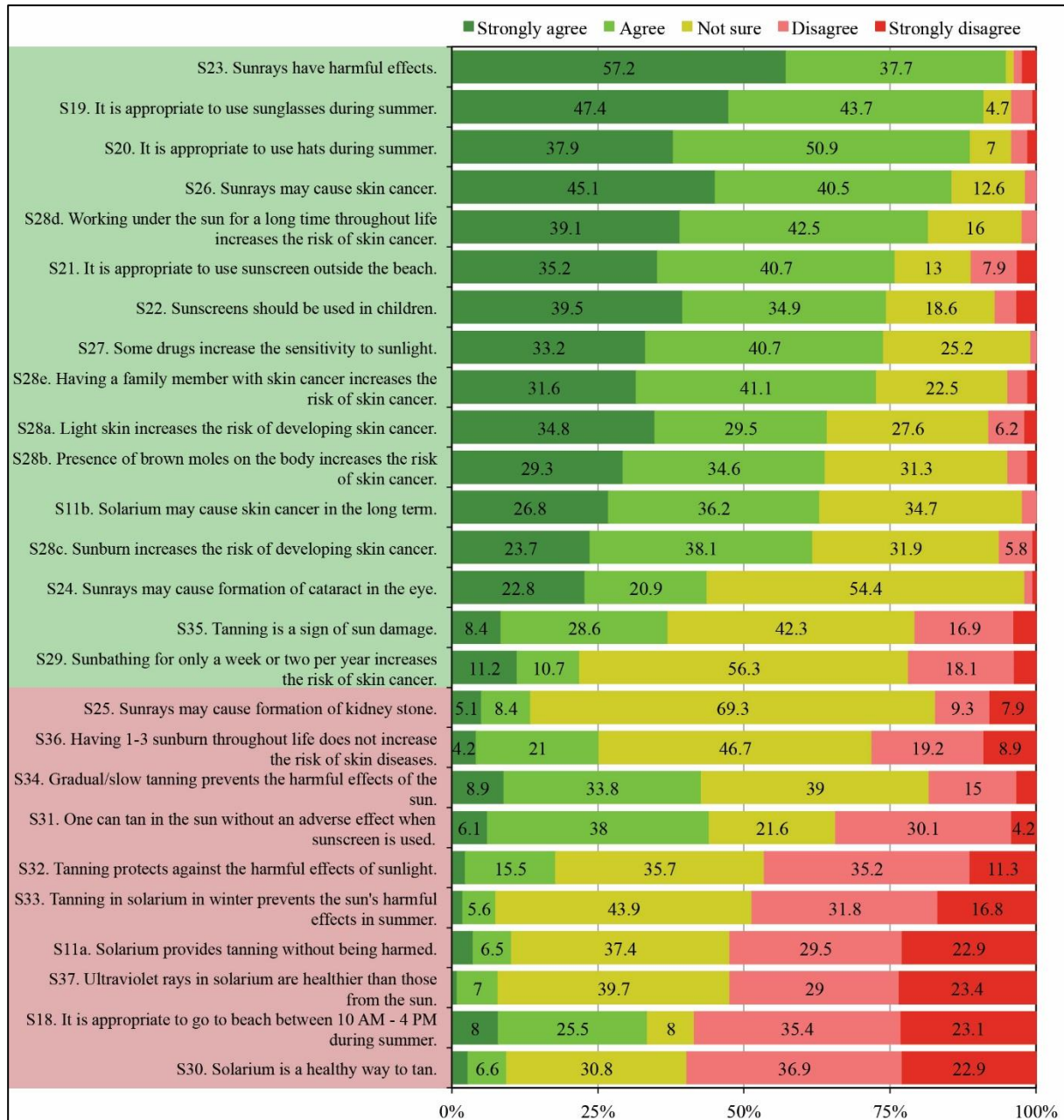


Figure 1. Stacked-bar graph showing the participants' opinions regarding sun exposure, sun protection, sunscreen use, and skin cancer. The statements were stratified as "True" (statements on y-axis were shaded in green) and "False" (statements on x-axis were shaded in red), and based on the percentages for consolidated response groups (Strongly agree & Agree, greens; Not sure, yellow; Disagree & Strongly disagree, reds).

Discussion

Effectiveness of the sunscreens applied onto the skin depends on the SPF and appropriate usage of the product, both of which are significantly influenced by the knowledge and awareness of the public.^{11,12,18} However, studies have indicated that sun exposure behavior was difficult to change, and non-adherence to medical advice was common even in the face of skin cancer risks.^{19,20} It is, therefore, necessary to implement public awareness programs at the right time, to the right audience, with the right message, and through the right channels. This study investigated the level of knowledge and awareness about UV protection practices among the students of medicine or their educators and compared them to those from non-medical areas of study. Although students and faculty members from medical areas were generally found to have a higher level of knowledge about the subject matter, there was still room for improvement.

The rate of sunscreen use among university students and faculty members was found to be quite high (92.41% and 97.22%), especially compared to those reported in previous studies on high school students (41.8%) and their teachers (81.9%) or other undergraduate populations (63.5%) in Turkey as well as other medical students in several other countries (range from 52% to 86%).^{17,21,22} The higher rate of sunscreen use in this study might be attributed to the differences in the target populations. Female participants were found to be more likely to use sunscreen, less likely to have a sunburn, and to use sunscreens with higher SPF compared to their male counterparts. A previous study similarly found a significantly higher rate of sunscreen use among female college students compared to males (73.3% vs. 52.5%).²¹ This trend is in parallel with more common sunscreen usage among females in previous studies and reviews covering diverse populations.²³⁻²⁷ However, no significant differences were found between males and females regarding their responses to the majority of the statements about sun exposure and protection, sunscreen use, and other health issues related to tanning practices. This suggests that the lack of knowledge is not likely to be the reason for a lower rate of sunscreen use or a higher rate of sunburns among males. Congruently, cosmetic reasons were reported in a previous study to be the main behavioral motivation rather than health concerns or skin cancer risk.²³ Although a low rate of sunscreen use might be associated with a higher rate of sunburns, we did not find a relationship between the two, which might be due to the fact that the number of participants who did not use sunscreens was very low.

Students and faculty members were found to have similar rates of sunscreen use and sunburn. Interestingly, a significantly higher number of students were found to consider price first when buying sun protection products, which contrasted the faculty members who more often indicated paying attention to brand name first. In a similar study, high school students were reported to considered price as a criteria in the selection of sunscreen more often than their teachers did.¹⁷ This is likely due to the financial differences between the two groups. In addition, the significantly higher unawareness among students about the SPF of the sunscreen product they used might be a manifestation of their price-focused attitude. Longer duration of daily sun

exposure of students might be attributed to the lifestyle differences between younger and older groups of participants (see the age difference in Table 1). Television and the Internet were more commonly the source of information about the issues related to sun protection for students compared to faculty members, which might also be attributed to age and lifestyle differences between the two groups. Previous studies on college students also reported that the internet and television were primary sources of information about sun protection.^{23,24,26} Therefore, awareness campaigns targeting such (i.e., younger) audiences should take into consideration the alternative media outlets fitting their age and lifestyle to reach them more effectively.²⁸

Lower daily sun exposure among the students and faculty members of medical departments might be due to a more demanding study and work schedule in medical fields. Formal education at school was more commonly the source of information about sun exposure and protection for the participants in medical departments as it was part of their subject of study and profession. Family was not found to be a significant source of information for the participants of our study (3.86%) although parents and family were indicated to be a common source of knowledge about sun protection behavior in previous studies.^{26,29} The differences might be due to the variations in the preferences of the populations targeted in other studies.

The participants were asked to respond to various statements regarding various aspects of UV exposure and protection. These statements covered the subjects related to the use and knowledge of solarium, tanning, harmful effects of sunrays, risk factors for skin cancer, protective measures in summer, and sunscreen use. Some of these statements were in parallel with clinical knowledge (true) while others contradicted the clinical knowledge and reflected some common misconceptions (false). It was found that six out of 16 correct statements were identified by three-quarters or more of the respondents; 13 out of 16 correct statements were identified by more than half of the respondents (bars in shades of green in Figure 1). Six out of ten false statements were identified by about half of the respondents (bars in shades of red in Figure 1). Most of the participants failed to set opinions on three of the correct statements (S23, S29, S35) and two of the false statements (S25, S36) (yellow bars in Figure 1). Some of these statements were related to sun-exposure-related risk factors for skin disease or cancer, which indicated a lack of knowledge about these issues. Almost half of the respondents identified two false statements as correct (S31, S34). These statements were related to the common misconceptions that one could tan in the sun without an adverse effect when sunscreen was used (S31) and that gradual/slow tanning prevented the harmful effects of the sun (S34).²²

Significant differences between the response patterns of males and females existed in only four statements (S21, S27, S28ae); female participants more correctly responded to three of these statements. Significant differences between the response patterns of students and faculty members existed in most of the statements; faculty members more correctly responded in all such cases. The participants from medical and non-medical

departments also exhibited significant differences in terms of their ability to respond correctly; those from medical fields responded more correctly in all such cases.

Although the majority of the responses from the participants in medical fields were in parallel with the clinical knowledge, there were instances where a significant portion of them responded incorrectly. Nine out of 16 correct statements were identified by three-quarters or more of the respondents (4 items for non-medical participants); 14 out of 16 correct statements were identified by more than half of the respondents (11 items for non-medical participants). Six out of ten false statements were identified by about half of the respondents (2 items for non-medical participants). Participants from medical fields failed to set opinions on two of the correct statements and one of the false statements (this was the case in 5 correct and 5 false statements for non-medical participants). Three statements, in particular, (“S18. It is appropriate to go to beach between 10 AM - 4 PM during summer”, “S31. One can tan in the sun without an adverse effect when sunscreen is used”, and “S34. Gradual/slow tanning prevents the harmful effects of the sun”), were erroneously taken as correct statements by a significant portion of the participants, even so among those from medical backgrounds. These findings indicate a need for educating students of medicine about skin cancer risks and preventive measures as emphasized by a recent comprehensive review of skin-cancer-related knowledge, attitudes, and practices among medical students.²²

This study has some limitations regarding the data collection tool. Although items and elements from other studies were adapted and used in this study, the fact that the questionnaire used in this study was not a validated scale to assess the participants’ behavior or knowledge regarding the hazards of sun exposure, protection from such hazards, and related subjects inhibited us from going beyond making a qualitative analysis and reaching some general conclusions.^{13,17,30} Another significant limitation of this study was the sample size and restriction of sampling to a single institution of higher education. Although the sample was believed to reflect the average among the institutions of higher education in Turkey in terms of behaviors and practices, this was not a confirmed assumption. Further studies with more comprehensive and well-managed data collection tools including a larger sample from a more diverse set of institutions are warranted to determine the knowledge and behaviors of the target population regarding the hazards of sun exposure and sun protection.

In conclusion, this study investigated the level of knowledge and awareness among the students of medicine and their educators about UV protection practices and compared them to those from non-medical areas of study. The results indicated that although students and faculty members of medical areas generally had higher level of knowledge about the issues surrounding sun exposure, sun protection, sunscreen use, and other tanning practices in comparison with those from non-medical backgrounds, there is still a significant knowledge deficit about the severity of the risks associated with sun exposure and some room for improvement

even among the students and faculty members of medical schools. The methods and media channels that would be used to increase public awareness should be adapted to the target audiences regarding the demographic characteristics.

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