

## Knowledge, Attitudes, and Behaviors of Mostar University Students on the Harmful Effects of Ultraviolet Radiation Exposure – A KAB Study

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Received: June 5, 2018

Accepted: May 14, 2019

**ABSTRACT** Various reports suggest that adolescents seem to be obsessed with tanning. Existing evidence on attitudes demonstrate that young adults focus on improving appearance through a tan, with protective behaviors often being absent. The popularity of tanning, primarily among the young adult population, further promotes unsafe sun-related behaviors. The aim of this study was to determine the knowledge level of Mostar University students on the harmful effects of ultraviolet radiation (UVR), their attitudes and sun-related behaviors, and whether medical students are more likely to apply preventive measures against UVR in comparison with students from other faculties. The survey included a total of 140 undergraduate Mostar University students: 70 medical students and 70 non-healthcare-related faculty students. The data were collected by completing the personal design questionnaire created for this study. This study shows that Mostar University students have a high level of knowledge about UVR and skin cancer, but their behavior is not sufficiently preventive and appropriate to their knowledge. Medical students often use UV protection measures and employ more preventive behavior than that of other faculty students, but it is still at a low level of prevention. Findings concurred with existing evidence that the knowledge of associated risks from UVR was not sufficient to motivate safer sun-related practices.

**KEY WORDS:** UV radiation, tanning, skin cancer, attitudes, behavior, students

### INTRODUCTION

Ultraviolet radiation (UVR) is an environmental risk factor estimated to cause 86% of skin cancer cases, both non-melanoma (basal and squamous cell) and melanoma (1,2). While UV exposure occurs often during outdoor occupations, many individuals are exposed via intentional tanning (3). Varying sun

exposure patterns have been associated with each form of skin cancer. Squamous cell carcinoma has been most consistently associated with chronic UV exposure, whereas melanoma and basal cell carcinoma have traditionally been associated with intermittent sun exposure. Understanding environmental risk

factors for melanoma, particularly UV radiation, has been complicated by the strong relationship with the skin's sensitivity to the sun which has a major impact on behavior and possibly on tanning attitudes (4). Damage from UVR exposure experienced at younger ages significantly increases the relative risk of skin cancer later in life; particularly sunburn between 15 and 20 years of age (1,5-7). Various reports suggest that adolescents seem to be obsessed with tanning (3,8,9). Existing evidence on attitudes demonstrates young adults focus on improving appearance through a tan, with protective behaviors often absent (6,10-13). The popularity of tanning, primarily among the young adult population, further promotes unsafe sun-related behaviors (7,14,15). Like other health-risk behaviors, studies demonstrate that young people in particular, such as students, continue to expose themselves to large amounts of UVR, yet they protect themselves minimally despite widespread awareness of the harmful effects of UVR in terms of skin cancer and photoaging. In addition to knowledge, behaviors are determined in part by attitudes. Most of the behavioral health literature, including skin cancer prevention literature, focuses on health-related attitudes (16). Therefore, attitudes regarding the importance of appearance or attractiveness may be particularly salient to skin cancer prevention. Although some people who neglect to use sunscreen may have actually intended to protect themselves, a significant number of individuals ignore health information and purposely avoid sun-screen use in order to get a tan to enhance attractiveness (17-20).

Likewise, the perceived immediate and potent rewards of tanning for one's appearance tend to outweigh the delayed and perhaps less salient perceived benefits of protecting one's health (21-23). Thus, attitudes towards living in the present versus preparing for the future would also be important to consider when investigating behaviors related to skin cancer. Indeed, skin cancer prevention researchers have begun to recommend that skin protection interventions address current perceptions about appearance and attractiveness. However, the literature on this topic is scant (24-26). Prevention strategies need to account for psychological reasons for tanning and use of artificial UV tanning devices. Disease prevention strategies need to be based on a full understanding that includes scientific issues related to etiology along with an appreciation for how social and other considerations impact tanning behaviors (27).

## AIM

The aim of this study was to determine the knowledge of Mostar University students on the harmful

effects of UVR, their attitudes and sun-related behaviors, and whether medical students are more likely to apply preventive measures against UVR in comparison to students from other faculties.

## PARTICIPANTS AND METHODS

The study was conducted at the University of Mostar, in Bosnia and Herzegovina, among undergraduate university students of the School of Medicine, the Faculty of Economics, Faculty of Humanities and Social Sciences, and Faculty of Law during the academic year 2016/2017.

Caucasian, undergraduate students aged 18 years and above who voluntarily agreed to participate in the study and gave written consent were included. Participants not willing to give consent or younger than 18 years were excluded.

The survey included a total of 140 participants: 70 medical students and 70 non-healthcare-related faculty students. According to the data of the University of Mostar Self-evaluation Report, there were 505 students enrolled at the School of Medicine and a total of 5395 students enrolled at the Faculty of Economics Faculty of Humanities and Social Sciences and Faculty of Law in the academic year 2016/2017. Therefore, out of total student population targeted by the study, 13.9% of medical students and 1.3% of non-healthcare-related faculty students were enrolled into the current study. Sample size was determined by using the *a priori* test with power greater than 80% when 140 participants were included.

The data were collected by completing the personal design questionnaire created for this study. The questionnaire (Appendix 1) consisted of 27 particles including demographic questions (age, gender, eye, hair, and skin color), questions that evaluate the respondents knowledge about UVR and skin tumors, sun exposure and sunbeds usage, exposure to UV rays, and skin cancer prevention. Ethical review and approval were obtained from the Faculty of Medicine Research and Ethics Committee.

All the participants were given an explanation about the purpose of the study and the voluntary and confidential nature of the study was emphasized, as well as the option to withdraw at any time during the survey. Written consent was obtained prior to participation. All respondents were previously informed about the purpose and manner of research in the study. After agreeing to participate in the survey, participants were asked to fill out a questionnaire. The participants' anonymity was preserved.

The questionnaire consisted of 4 parts: Part I where general information were obtained (questions



**Appendix 1.** Ultraviolet radiation (UVR) exposure questionnaire.

**Ultraviolet radiation (UVR) exposure questionnaire**

I.

Age:

Gender:	Female	Male
Eye color:	Light	Dark
Hair color:	Light	Dark
Skin color:	Light	Dark

II.

1. Ultraviolet light exposure is an *important risk factor* in the development of skin tumors.  
YES NO
2. Melanoma is the most malignant skin tumor.  
YES NO
3. Sun exposure before the 20th year of age does not have a major impact on tumor occurrence later in life.  
YES NO
4. Skin tumors are increasingly appearing among young adults.  
YES NO
5. Mostly, UVB rays reach the Earth's surface.  
YES NO
6. Tanning beds use fluorescent bulbs that emit mostly UVA rays.  
YES NO
7. UV light exposure does not cause eye damage.  
YES NO

III.

1. Do you think you spend too much time in the sun?  
a) Strongly agree      b) Agree      c) Disagree      d) Strongly disagree
2. Do you find tanned skin healthy and beautiful?  
a) Strongly agree      b) Agree      c) Disagree      d) Strongly disagree
3. Do you think that sunbed tanning is safer than sun tanning?  
a) Strongly agree      b) Agree      c) Disagree      d) Strongly disagree
4. Do you think that sunbed tanning is protective against sunburn?  
a) Strongly agree      b) Agree      c) Disagree      d) Strongly disagree
5. Do you think dermatologists are exaggerating with sun hazard warnings and the necessity of using a sun-protective cream?  
a) Strongly agree      b) Agree      c) Disagree      d) Strongly disagree

IV.

1. How often do you sunbathe during the summer?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
2. Do you expose yourself to the sun between 10 am and 4 pm?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
3. Do you wear protective clothing (long sleeves, pants, hat) when you're exposed to the sun?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
4. Do you wear sunglasses?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
5. Do you apply sunscreen when you are on a holiday?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
6. Do you apply sunscreen during your daily activities?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
7. Do you reapply sunscreen?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
8. Do you apply tanning products when you are sunbathing (olive oil, walnut oil, chanterelle oil, etc.)?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
9. Do you use sunbeds?  
a) Always      b) Very often      c) Sometimes      d) Rarely      e) Never
10. Do you pay attention to your moles?

about age, sex, eye color, hair color, light or dark skin); Part II evaluated the respondents' knowledge about UVR and skin tumors; Part III evaluated respondents' attitudes towards tanning; and Part IV evaluated respondents' sun-related behaviors and skin cancer prevention.

Knowledge about the harmful effects of ultraviolet radiation exposure and skin tumors was assessed using 7 statements that participants had to recognize as correct or incorrect. Every correct answer was awarded with one point (without negative points for incorrect answers) and the knowledge score was calculated for each participant separately as the sum of acquired points (number of correct answers), that could range from 0 (minimum score) to 7 (maximum score).

In terms of attitudes towards tanning and respondents sun-related behaviors assessment, two Likert-type scale question sets were used. The first set consisted of 5 Likert items – questions that evaluated respondents attitudes (with 4 response alternatives) – while the second set comprised 10 Likert items – questions that evaluated respondents' sun-related behavior (5 response alternatives). Responses were then evaluated and each response was assigned a point value, with the lowest value assigned to the riskiest attitude or sun-related behavior and highest value assigned to the most secure attitude and the most appropriate behavior. The average score of attitudes and average score of sun-related behavior were then calculated for each participant as the mean value for attitude-assessing and behavior-assessing sets of questions, respectively. The average score of attitudes ranged from 1-4, while the sun-related behaviors average score ranged from 1-5. A higher number meant a more appropriate and more secure attitude towards sun radiation damage and a more appropriate

sun-related behavior, respectively. Differences between groups in attitude toward tanning and sun-related behavior were then analyzed by comparing these average scores, rather than by assessing each question separately.

Several Likert items were reverse-scored. A Likert rating scale measurement can be a useful and reliable instrument for measuring self-efficacy (28).

### STATISTIC ANALYSIS

Continuous variables are presented as mean ± standard deviation (SD) or median with interquartile range (IQR) and compared using Student's t-test or Mann-Whitney U test, as appropriate, unless otherwise stated. Chi-square test was used to compare categorical data. Kendall's tau ( $\tau$ ) test and Pearson test were performed to assess correlation between variables.

All tests were two-sided and  $P < 0.05$  was considered statistically significant. Statistical analyses were performed using GraphPad Prism version 6 for Windows (GraphPad Software Inc., La Jolla, CA).

### RESULTS

Out of 140 respondents, women ( $n = 90$ ; 64.3%) outnumbered men. Participants were aged between 18 and 25, with a mean age of  $20.6 \pm 1.7$ , and the most frequently skin types were 3 and 4 ( $n = 99$ ; 70.7%). There were no significant differences between medical and non-healthcare-related faculty students in gender or skin type, but medical students were slightly older than the non-healthcare-related student group (Table 1).

The overall median knowledge score of all the participant on the 0-7 point scale was 5.0 (IQR = 5.0-

**Table 1.** Demographic characteristics and skin types of all participants with comparison between medical and non-healthcare-related students

Demographic characteristics and skin types	All students	Medical students	Non-healthcare-related students	<i>P</i> *
Number; n	140	70	70	
Sex; n (%)				
Female	90 (64.3)	43 (61.4)	47 (67.1)	0.48 <sup>†</sup>
Male	50 (35.7)	27 (38.6)	23 (32.9)	
Age (years)				
Mean ± SD	20.6±1.7	21.3±1.7	19.9±1.2	<0.001 <sup>§</sup>
Range	18-25	18-25	18-24	
Skin type; n (%)				
Light (type I-II)	41 (29.3)	22 (31.4)	19 (27.1)	0.58 <sup>†</sup>
Dark (type III-IV)	99 (70.7)	48 (68.6)	51 (72.9)	

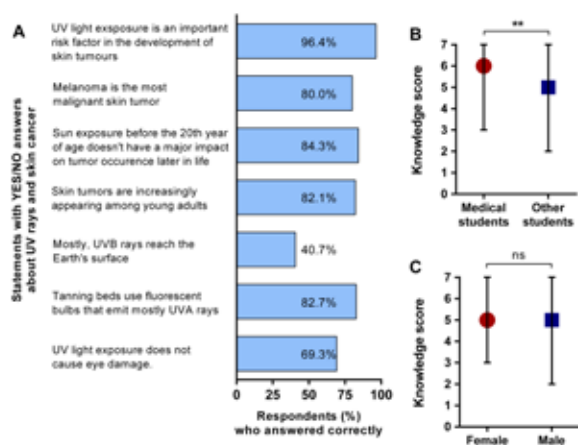
\*medical students vs. non-healthcare-related students; <sup>†</sup>Chi-square test; <sup>§</sup>Student's t-test; SD: standard deviation

6.0). The lowest score obtained was 2 and the highest 7 points. Of all the statements that evaluated the respondents knowledge, participants most accurately responded to the one regarding the importance of UVR as a risk factor for skin cancer ( $n = 135$ , 96.4%). On the other hand, the lowest percentage of correct answers was observed for the question on whether UVB radiation reaches the Earth's surface ( $n = 57$ , 40.7%; Figure 1, A).

When the knowledge scores of medical students and non-healthcare-related faculty students were compared, the medical students exhibited significantly higher knowledge scores on the topic of harmful effects of UVR exposure in comparison with non-healthcare-related faculty students (Mann-Whitney test;  $P=0.008$ ; Figure 1, B).

However, we found no significant difference in knowledge score between male and female subjects (Mann-Whitney test,  $P=0.72$ ; Figure 1, C).

Furthermore, no significant correlation between age of respondents and knowledge scores was found (Kendall's tau test,  $P=0.12$ ).



**Figure 1.** The respondents knowledge on the harmful effects of UVR and skin tumors. (A) The statements used to assess knowledge about UV radiation and skin tumors are shown together with the percentage of correct answers on each statement of all the respondents. The highest percentage of respondents recognized the importance of UVR as a risk factor for skin cancer, while less than half of the respondents knew whether UVB radiation reaches the Earth's surface. (B) Knowledge score on the harmful effects of UVR was compared between medical students and students from non-healthcare-related faculties. (C) Knowledge score comparison with respect to respondents sex. Knowledge score was calculated for each respondent and represents the number of correct answers given by the respondent. The median is represented by a symbol and the range by bars. Mann-Whitney test was used for comparison. \*\*  $P<0.01$ ; ns: non-significant.

Apart from the sun hazard knowledge score, respondents were also scored on attitudes towards tanning. The questionnaire consisted of 5 questions referring to sunlight exposure, the concept of healthy and beautiful skin, sunbed usage, and sun protection, with four response options (Figure 2, A). The average score of all participants was  $3.08 \pm 0.37$  points (Figure 2).

There was no significant difference in attitudes towards sun radiation damage between medical students and those from non-healthcare-related faculties (Student's t-test,  $P=0.69$ ; Figure 2, B).

No significant difference in attitudes towards tanning between male and female subjects was found (Student's t-test,  $P=0.30$ ; Figure 2, C).

However, there was a positive, but weak correlation when comparing attitudes towards sun radiation damage and age of the subjects ( $r=0.19$ ,  $P=0.024$ ).

Finally, a sun-related behavior score was calculated based on the questions that referred to the frequency of sunbed usage, sunlight exposure, sun protection, sunscreen and tanning product application, and mole monitoring, with five response options. The average score of all participants was  $2.93 \pm 0.50$  points (Figure 3).

Medical students achieved a significantly higher score on the sun-related behavior scale compared with students from non-healthcare-related faculties (Student's t-test,  $P=0.001$ ; Figure 3, A).

When comparing sun-related behavior in relation to sex, there was no significant difference between male and female subjects (Student's t-test,  $P=0.74$ ; Figure 3, B).

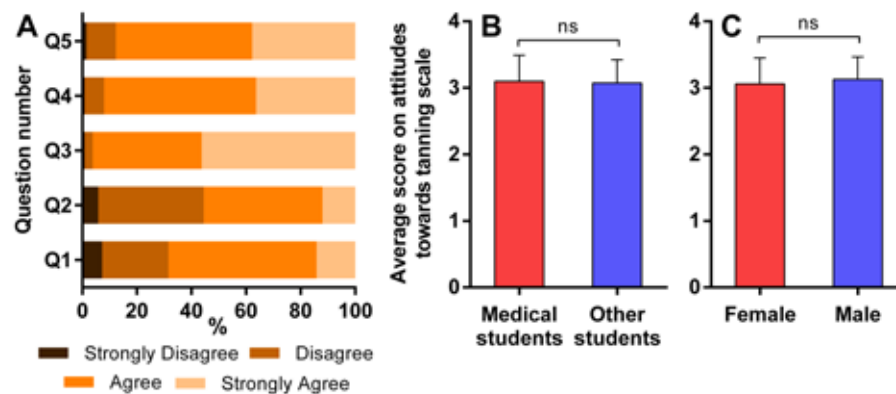
There was also no significant difference in the range of sun-related behavior among participants with light (type 1 and 2) and dark (type 3 and 4) skin (Student's t-test,  $P=0.13$ ; Figure 3, C).

However, when comparing men and women separately, men with light skin showed significantly better behavior than those with dark skin ( $3.33 \pm 0.54$  vs.  $2.80 \pm 0.41$ , respectively;  $P<0.001$ ), while for women there was no such difference ( $2.87 \pm 0.48$  vs.  $2.94 \pm 0.51$ ;  $P=0.56$ ).

The age of participants was not associated with their sun-related behavior, and we found no correlation between these two factors ( $r=0.15$ ,  $P=0.95$ ).

## DISCUSSION

This study investigated the knowledge of Mostar University students about the harmful effects of UV radiation (UVR) and their attitudes towards tanning and sun-related behavior. Findings concurred with existing evidence that knowledge on the harmful



**Figure 2.** The respondents attitudes towards tanning. (A) The percentage of responses of all the respondents to a particular question is shown (Part III of the questionnaire – see Appendix 1 for question details). (B) No significant differences were found between medical students and students from non-healthcare-related faculties in terms of attitudes towards tanning. (C) Comparison of attitudes towards tanning in respect to respondents sex. Average scores on attitudes towards tanning were calculated for each respondent and compared between groups using Student’s t-test. Data are presented as mean ± standard deviation. ns: non-significant.

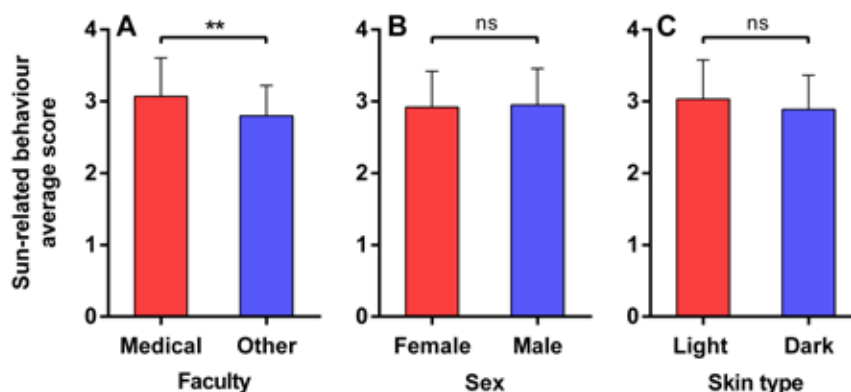
effects of UVR and skin tumors was not sufficient to motivate safer sun-related behaviors. Medical students often use UV protection measures and employ more preventive behavior than other faculty students, but it is still at a low level of prevention. Both women and men showed a tendency towards risky tanning behavior. Both were concerned about their skin tone and thus practiced sunbathing, visited tanning studios, and avoided using sunscreens to accelerate the effect of sun exposure.

Out of 140 respondents, female gender was more commonly represented (64.3%) than male. Participants were aged between 18 and 25, with a mean age of 20. A similar ratio of respondents was reported

in Heckman *et al.* on a sample of 406 students. Seventy-five percent of the sample were women, and the median age of participants was 19 (29).

The most frequent skin types of the study participants were skin type 3 and 4 (70.7%), which is consistent with the fact that people living in this part of Europe tend to have a darker skin type (type 3) (30). This is in correlation with the first published study on skin cancer prevention-related knowledge, attitudes, and behavior of graduating medical students in an Eastern European country (31).

In the part of the questionnaire that evaluated the respondents knowledge about the activity and type of UVR and its connection with skin tumors and eye



**Figure 3.** Results comparison of the sun-related behavior scores. (A) Medical students exhibited a significantly higher score in comparison with students from non-healthcare-related faculties when sun-related behaviors scores were compared. (B) No significant differences in sun-related behaviors were detected between sexes. (C) The comparison of sun-related behaviors score showed no difference between respondents of light and dark skin type. Sun-related behavior average score was calculated for each respondent. Data are presented as mean ± standard deviation and compared between groups using Student’s t-test. \*\*P<0.01; ns: non-significant.

damage as well as the effects of sunbed usage, questions concerning the harmful effects of UVR were answered correctly by 95.7% of respondents. This may be due to the high public awareness related to health risks posed by sun-related behaviors (1).

There was no significant difference in knowledge between genders, which differs from a study conducted by Francuzik on a sample of 718 medical students of the Poznan University of Medical Sciences, where women were more knowledgeable than men (32). Similar data were obtained by the findings of Wang and Dusza, who surveyed the healthy population of New Jersey (33). Furthermore, Douglas *et al.* reported significant differences in knowledge between genders in the population of 21-year-old New Zealanders (34).

Of all the questions that evaluated knowledge, participants most accurately responded at the question regarding the importance of UVR as a risk factor for skin cancer (96.4%). The lowest score was observed on the question whether UVB radiation reaches the Earth's surface (40.7%).

Medical students achieved a significantly higher score on the topic of knowledge on the harmful effects of UVR compared with students from non-healthcare-related faculties. Similar results were obtained in a Swedish study where medical students showed greater knowledge in comparison with students from other faculties. The study revealed excessive sun exposure among university students, but a high level of risk awareness did not lead to sun-protective behaviors (35).

A cross-sectional study of knowledge, attitude, practice, and perception among final year medicine and pharmacy students at the International Islamic University Kuantan, Malaysia, showed that the knowledge and perception of final year pharmacy students were significantly higher than the knowledge and perception of final year medical students with regard to sunscreen usage (36). In contrast to our findings, the study conducted by Kirk *et al.* showed no significant difference in knowledge between medical and non-healthcare-related faculty students, pointing to the possibility that students from other faculties are interested in topics about the harmful effects of the sun and therefore have a high level of knowledge about it (1). A high percentage of accuracy was observed in questions regarding the harmful effects of UVR on the eyes as well as increased risk of melanoma associated with sunburn during childhood/adolescence.

A Southern Californian study revealed that although many non-medical skincare professionals have a good understanding of sunbed usage and its

association with melanoma, only a little more than half were aware of the relationship between tanning bed use and melanoma of the eyes (37).

There were no statistically significant differences between the participants' gender when asked about attitudes towards tanning, but there was a positive association with the age of the participants. Both men and women enjoyed sunlight exposure equally and considered tanned skin to be appearance enhancing.

These findings are not consistent with a study on a sample of 718 medical students of the Poznan University in Poland. Their data showed that women were at higher risk of getting sunburn because they put a lot of effort into achieving a tanned appearance. This is because of a general belief that tanned skin is more attractive, and women would try to adapt to current social norms. Other key factors responsible for the tanning motivation in tanning studios might be related to relaxation, low costs, and socialization (32,38,39). Ultraviolet light is an established carcinogen yet evidence suggests that UV-seeking behavior has addictive features. According to the study conducted by Fisher *et al.*, repeated UV exposure produces an opioid receptor-mediated addiction due to elevations in circulating  $\beta$ -endorphin, numbing pain, and other sensations. Opiate-blocking drugs abruptly stopped this effect (40).

For all participants with a preference for tanning, a tan offered aesthetic enhancements in terms of healthy and beautiful skin. This is in correlation with the attitudes of UK university students in relation to UVR where many participants commented on skin color within the context of how tan represents a good and healthy lifestyle, ability to travel, and wealth (1). A central factor that motivates tanning bed use are beliefs about the benefits of a tan (e.g. looking healthy, having a healthy glow, looking attractive, thinner, younger, rich, wealthy, and having fun) (41).

Younger individuals tend to spend more time in the sun compared with their older peers. Similar results were obtained in the study conducted by Dennis *et al.* that discussed adolescent attitudes towards tanning. Age does matter regarding adolescent tanning practices. There was little or no use of artificial UV tanning devices at ages 13 and younger, with rates increasing from age 14 through college age and then declining around age 22. Studies in adults suggested a decline beginning between ages 23 and 30 (3).

It is believed that about 80% of cases of skin cancer can be prevented with the application of sun protection measures and appropriate behavior. Nevertheless, the incidence of skin cancer is still increasing (42,43).

The average score achieved on the sun-related behavior scale among participants indicates a low level of prevention. It is crucial to promote education on UV exposure risks. As proven by the Australian model, the media can increase awareness and the likelihood of taking precautions (44). More important, a body of research has documented that magazine reading significantly influences women's health and risk relevant beliefs and behaviors (45,46).

While appearance-focused prevention is recommended and has been found more effective than focusing on skin cancer risk, studies differ as to how best to demonstrate the dangers of UVR (1,25,47,48,49).

Medical students achieved a significantly higher score on the sun-related behavior assessment when compared with those from non-healthcare-related faculties. This is not consistent with the findings of Jerkegren *et al.* among Swedish university students, where medical students scored higher in knowledge than economy students, but did not differ in exposure score (1,35).

When comparing sun-related behaviors among genders, there was no significant difference between male and female subjects. Both women and men tended to report risky tanning behavior. Both were concerned about their skin tone and therefore practiced sunbathing, visited tanning studios, and avoided using sunscreens to accelerate the effect of sun exposure. Men used sunscreens less often than women.

The data in our study on risk behavior regarding gender strongly differed from a Swedish study where women used sunbeds more frequently than men (32,50). An interesting study by Thieden *et al.* who developed a model of sun behavior assessment by using personal dosimeters also showed that women received significantly more radiation measured in Standard Erythema Dose (SED) than men (32,51). Women respond to the pressure to fulfill social norms by following the behavior of the group and adjusting to beauty standards. Nowadays, beauty standards include a young, healthy, sun tanned appearance, which women try to achieve by visiting tanning studios (32). Erythema, which is already an early form of skin damage, is not considered an alarming sign, and students exceed the limits of "harmless" sun exposure. This correlates with the study by Melia *et al.* where sunburns were more frequently associated with tanning in women than in men, but men had more sunburns in total (32,52). Lack of compliance in using sunscreen products by men may derive from prejudice towards using cosmetic products (like sunscreens), because they may be considered "metrosexual" or less masculine (53).

There was no significant difference in the range of sun-related behavior among participants with light (type 1 and 2) and dark (type 3 and 4) skin. However, when comparing men and women separately, men with light skin showed significantly better behavior than those with dark skin, while for women there was no difference. These findings are in correlation with the study by Cottrell *et al.*, which indicated that participants with fair skin practiced more general sun protection and sunscreen behaviors than those with medium to dark skin (54).

Findings concurred with existing evidence that knowledge on the associated risks from UVR was not sufficient to motivate safer sun-related practices (1,7,10,11,55-58).

Beliefs related to tanning as a protective phenomenon and the ability to sunbathe safely with sunscreen indicate common misconceptions that need to be addressed at a public health level (1).

Several limitations of the study should be noted. Because our sample consisted of medical students that were significantly older than non-healthcare-related faculty students, they might be generally of higher educational level and therefore achieve significantly a higher score when knowledge or sun related behavior were assessed. However, we did not find a significant association between the respondents age and their knowledge, nor between age and behavior. We also cannot exclude the effect of education in dermatology as a potential factor influencing results, especially the knowledge score, because it has been shown that training in dermatology significantly increases the knowledge of medical students (31). Additionally, the issue of validity and reliability in self-reporting also deserves attention. It is possible that subjects did not accurately self-report on the various scales of the questionnaires.

## CONCLUSION

This study has shown that students have a high level of knowledge about UV radiation (UVR) and skin cancer, but their behavior is not sufficiently preventive and appropriate to their level of knowledge. Students of medicine often use UV protection measures and engage in more preventive behavior than other faculty students, but it is still at a low level of prevention. Interestingly, even though medical students exhibit a greater knowledge and behave more responsibly, they have similar attitudes towards tanning as their peers, suggesting that attitudes may be more difficult to change than behavior. Findings concurred with existing evidence that knowledge of the associated risks from UVR was not sufficient to motivate safer sun-related practices.





Beliefs related to tanning as a protective phenomenon and the ability to sunbathe safely with sunscreen show common misconceptions that need to be addressed at a public health level.

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