Assessing Romanian Medical Student Perspective on Sun Protective Behaviours: A Cross-Sectional Study

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Article

Assessing Romanian Medical Students' Outlook on Sun-Protective Behaviors: A Cross-Sectional Study

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Abstract: Background: Ultraviolet (UV) radiation from the sunlight can harm skin cells, causing short-term effects, such as sunburns and long-term effects, such as pigmentation changes, changes in the skin's immune responses, and increased risk of skin cancer. These conditions can be largely prevented with proper sun protection measures and behavioural changes. This study aims to assess the knowledge on sun protection behaviour and baseline knowledge of medical students from the "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania. Methods: Data in this cross-sectional study were collected through a Google Forms questionnaire, which was distributed from November 2023 to December 2023 via digital communication channels to students across all academic years. STROBE guidelines were consulted for data synthesis; Results: A total of 668 students responded. The student cohort demonstrated a commendable level of awareness of the risks associated with sun exposure and the advantages of employing sun protection factor (SPF); however, the incidence of sunburns remained notably elevated (72.3%). Further analysis revealed correlations among gender, academic year, presence of photosensitizing conditions, and adherence to SPF application. Additionally, there is a need to improve understanding of the appropriate application techniques for SPF, as only 11.5% of the students exhibited proficiency in this regard; Conclusions: As future healthcare providers, medical students hold significance in promoting healthy behaviours in the broader community. This study indicates that while their knowledge about sun protection is satisfactory, there is scope for enhancement.

Keywords: skin cancer; sun protection; prevention; healthy behaviours

1. Introduction

Cutaneous cancers are some of the most commonly seen in oncology, with basal cell carcinoma reigning as the most frequent of them all. While most of these cancers respond very well to treatment and usually surgical excision is enough of a curative approach, some stand as much more aggressive, such as melanoma, which is known to metastasize very quickly [1,2]. Skin cancers are among the most preventable malignancies; however, without raising awareness on risk factors and sun-protective behaviors, their incidence continues to rise in the general population. Some common examples of these preventive behaviors are the correct usage of broad-spectrum sun-screen, limiting sun exposure whenever a high (5,5-7,5) or very-high (>7,5) ultraviolet (UV) index occurs, avoiding both indoor and outdoor tanning and using protective clothing when direct exposure cannot be avoided [3,4].

In Romania's case, a country with a predominantly third phototype population [5], skin cancer is still predominantly diagnosed in advanced stages, due to a lack of education among the general population on this topic, as well as a high discrepancy between health-related practices among the rural versus urban population. This lack of healthy behaviors includes prolonged and unprotected occupational sun exposure, which likely stands as the most common cause of UV-induced skin cancers in the rural population, whereas in the urban areas the risky behaviors stem from a cosmetic background, such as intensive tanning [6].

The human skin reacts to UV exposure through various mechanisms, while also presenting several naturally protective pathways, all of which are commonly attributed to the cutaneous neuroendocrine system [7]. The skin's reaction to UV exposure is a complex process that is yet to be

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fully understood, involving multiple signalization pathways, including MAPK, NF-kB or tumor necrosis factor alpha (TNF-α), leading to local and systemic immunosuppression, inflammation and oxidative stress, along with DNA base modifications and cell cycle regulation damage [8]. On the other hand, there has been an increasing amount of data on naturally occurring protective mechanisms against these phenomena, especially pointing towards melanin as a protector against UV-induced damage and, more recently, describing the skin microbiome as an agent lowering UV-driven immunosuppression [9]. Melanin, a substance produced by melanocytes in specific cytoplasmic organelles, melanosomes, acts as a natural filter, reducing the UV penetration through the epidermis, while also being demonstrated to show antioxidant features. Moreover, it serves as a scavenger for reactive oxygen species, poses anti-inflammatory properties via lowering serum IL-1 levels and reducing TNF-α expression [10]. In addition, recent studies have shown that melanin could potentially present anti-tumoral effects, suggesting its potential usage in the field of cancer treatment development [11].

Besides the biomedical aspects of skin UV exposure, skin pigmentation has long been a social aspect of utmost importance in worldwide communities, leading to discernible behavioral patterns and socioeconomic inequalities among different subgroups of population. Thus, it served as a steady base for the development of social pressures regarding tanning and on-demand skin modification [12].

Sunscreens play a crucial role in shielding the skin from harmful ultraviolet (UV) radiation. They function by temporarily block UV radiation absorption, with two main categories of topically applied agents: organic and inorganic UV filters. While organic filters absorb UV radiation, inorganic filters scatter and reflect it. Typically, commercial sunscreens contain a blend of both types. [13]. Evaluating sunscreen efficacy ideally involves measuring its ability to prevent skin cancer, but due to the complexity of such studies, surrogate endpoints are often used. One common measure is the sun protection factor (SPF) system, which calculates the ratio of time to sunburn with and without sunscreen [14]. Generally, it takes around 15 to 20 minutes for sunscreen to reach optimal effectiveness after application, [15] but SPF tends to diminish over time, with about a 55% reduction after 8 hours of activity and a 25% reduction during indoor rest. [16]. Despite these factors, sunscreens have demonstrated their effectiveness in the prolonged prevention of conditions like actinic keratoses and squamous cell carcinomas [17,18]. Furthermore there is evidence that suggests the correlation between the sunscreen application and melanoma risk reduction. For instance, the overall count of nevi serves as a crucial risk indicator for melanoma development, and studies indicate that sunscreen usage can diminish the occurrence of nevi among children with fair skin [19]. A randomized controlled trial investigating the link between sunscreen use and melanoma risk has indicated that consistent sunscreen application might indeed reduce the likelihood of developing melanoma for a duration of up to 10 years [20].

Despite the primary purpose of sunscreen of photoprotection against the UV light damage which can lead to skin cancer, research suggests that sunscreens can also protect against premature aging caused by sun exposure, known as photoaging. Several studies have investigated this aspect. For instance, a study by Séité et al. found that using moisturizers with broad-spectrum sunscreen daily can prevent the activation of genes associated with skin aging (mainly MMP-1) and provide antioxidant protection against UV damage [21]. Hughes et al. showed in a randomized controlled trial that individuals who applied broad-spectrum SPF 15+ sunscreen daily for 4.5 years experienced a slower rate of skin aging compared to those who used sunscreen less frequently. The group using daily sunscreen showed 24% less visible signs of aging during the study period compared to a control group. These findings underline the importance of regular sunscreen use not only for preventing skin cancer but also for preserving skin health and youthful appearance [22].

This cross-sectional study focuses on assessing the knowledge regarding sun-protective behaviors in a cohort of 668 medical students from the largest medical university in Romania, as these future caregivers shall play an extensive role in the prevention and treatment of skin cancer in the future. Moreover, it strives to discover social patterns in terms of sun protection usage, as well as knowledge-based behaviours in our cohort. The outcomes of this study will support the development of university policies and curricula to provide students the necessary information to make healthy decisions regarding exposure to UV radiation.

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2. Materials and Methods

2.1. Study Design

We have conducted a cross-sectional questionnaire-based study, approved by the Research Ethics Committee of "Carol Davila" University of Medicine and Pharmacy (approval number 31758/24 October 2023). Informed consent was obtained digitally, previous to questionnaire completion, and respondents have been informed of their participation being completely voluntary, having the possibility to opt out of the study at any time, by requesting deletion of their data. 668 students were included in the study, by completing the Google Forms questionnaire, which was distributed via digital communication methods to students from all years of study. Exclusion criteria: students from other faculties than the Faculty of Medicine, respondents with incomplete questionnaires. To avoid possible answers of students from other universities, the Google Form was limited to be accessed only by the 'Carol Davila' University institutional email. The questionnaire included 24 multiple choice questions which assessed sun exposure and sun-protective behaviors among our cohort. The questionnaire was divided into three sections. One section focused on socio-demographic aspects, as well as relevant medical history and general sun protection factor (SPF)-related knowledge of the cohort. The second section was used to obtain data regarding the usage of sunscreen, while the third section assessed our responders' knowledge in regards to other sun-protective factors, benefits of solar protection and risks of uncontrolled sun exposure. The full structure of the questionnaire can be found in Appendix 1.

2. 2. Data Collection and Analysis

The answers retrieved from the questionnaire were digitally registered in a Microsoft Excel spreadsheet database. Afterwards, data were analyzed using the JAMOVI 2.3.28 software. Descriptive analysis and independent samples T-test were used in order to establish Mean Difference, SE difference and Confidence Interval. A value of $p < 0.05$ was used to determine statistical significance.

3. Results

In order to appropriately present our results, we have divided this section into 4 subsections, assessing demographic aspects of our cohort, relevant personal background of respondents, their knowledge regarding sun protective methods and, lastly, their behaviours and perspectives on the topic.

3.1. Demographics of Our Cohort

A total of 668 students have been included in the study, with 80.98% (n=541) women, 18.26% (n=122) men and 0.74% (n=5) respondents who preferred not to disclose their gender.

Building upon Baykal Selcuk et al.'s [23] discovery that women generally exhibit a higher inclination to sun protection compared to men, our study corroborates these findings. Statistically, women not only demonstrate a better understanding of SPF, but also display a greater likelihood to incorporate sunscreen protection into their routines ($p < 0.001$, Table 1). This tendency may be attributed to their greater familiarity with beauty and makeup, as well as their attentiveness with skin appearance. This observation may reflect a higher inclination toward risky behavior among young men.

Despite women's greater use of sunscreen, there is no apparent discrepancy in the occurrence of burns between men and women, suggesting that other factors may influence sunburn risk beyond sunscreen application frequency.

Table 1. Gender-based comparisons of SPF knowledge and sunscreen usage.

Gender	Total n (%)	Knowledge about SPF (%)	p-value	Sunscreen users (%)	p-value	Sunburns (%)	p-value
Male	122 (18.26)	100 (81.96)	<0.001	70 (57.37)	<0.001	85 (69.97)	0.537

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Female	541 (80.98)	513 (94.82)	495 (91.49)	391 (72.27)
Not specified	5 (0.74)	3 (60)	3 (60)	3 (60)

Participants were part of all years of study, predominantly first (29.04%, n=194), third (18.86%, n=126) and fourth (28.29%, n=189) years. When queried about their skin type on the Fitzpatrick scale, most students fell between types I (23.5%, n=157), II (42.81%, n=286) and III (28.59%, n=191).

3.2. Personal Background

When questioned about prior photosensitizing conditions, 551 of the respondents (82.48%) reported a negative history. Among those with a history of photosensitizing conditions, atopic dermatitis was the most common (n=46, 39.31%), with sun allergy coming in as the second most frequent (n=23, 19.65%), followed by rosacea (n=19, 16.23%) and others, such as psoriasis, acne or lupus. 117 students reported using photosensitizing medication, with antihistaminic drugs (n=52, 44.44%), NSAIDs (n=46, 39.31%) and contraceptives (n=27, 23.07%) being the most common answers. Other students reported using tricyclic antidepressants, thiazide diuretics or tetracycline antibiotics.

Medical students who are prone to photosensitivity do not demonstrate a notably more conscientious approach to the application of sunscreen, as evidenced by no statistical significance with a p-value of 0.16 (Table 2). This finding underlines the importance of a proactive engagement in sun protection practices, and a heightened awareness of the associated risks and the necessity for diligent skincare routines.

Table 2. SPF usage among students with photosensitivity background, in comparison to non-photosensitive students.

SPF usage	Photosensitive students n (%)	Non-photosensitive students n (%)	p-value
Yes	167 (90.76)	401 (82.85)	0.16
No	17 (9.24)	83 (17.15)	
Total	184 (27.54)	484 (72.45)	

Most students reported spending 1-5h/week (n=193, 28.89%) or 5-10h/week (n=199, 29.79%) outside, with only 11 students (1.64%) stating that they spend less than 1h/week in the open air. 51.64% (n=345) reported spending, on average, 1-2 hours during midday hours, 18.86% (n=126) usually spent less than 1h and 1.49% (n=10) stated they completely avoid spending time outside during midday hours.

3.3. Knowledge Regarding Sunscreen and Sun Protective Methods

When queried about SPF, 92.21% (n=616) responded affirmative to correctly knowing the meaning of the abbreviation and 85.02% (n=568) reported using sunscreen on a regular basis, most of them opting for the 50+ protection level (52.09%, n=348) and 30-50 level range (26.79%, n=179). 62.85% (n=357) of students who reported using sunscreen stated that they apply it every day, without correlation to season or weather. Most respondents only apply sunscreen on their face and neck (81.16%, n=461), while only 32.21% (n=183) use it on all sun-exposed areas of the body. More than 8 in 10 students responded that their sunscreen application occurs either 15 minutes (40.14%, n=228) or 15 to 30 minutes (41.90%, n=238) before sun exposure, however 55.80% (n=317) do not reapply sunscreen at all. Only 12.12% (n=81) of the respondents reported not using any additional sun

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protective measures, with the most frequently identified such means being sunglasses (62.87%, n=420), avoiding sun exposure during midday hours (53.89%, n=360) or wearing a hat or a cap (46.10%, n=308). When asked to put in balance the disadvantages and benefits of sunscreen usage, the most commonly mentioned disadvantages have been described as price (38.92%, n=260), texture (36.22%, n=242) and occurrence of acne (19.76%, n=132), while 33.38% (n=223) consider no disadvantages in using sun protection creams. Nonetheless, over 9 in 10 individuals correctly know that sunscreen reduces the risk of skin malignancy occurrence (95.20%, n=636), prevents skin aging (91.61%, n=612) and effectively protects against sun damage (95.80%, n=640).

3.4. Behaviours and Social Perspectives

47.15% (n=315) of our respondents reported not liking tanning, with the remaining stating that tanning improves their appearance (47.75%, n=319) and makes them feel more relaxed (13.32%, n=89). However, 88.02% (n=588) would not give up sunscreen usage for enhanced tanning. When interviewed about artificial tanning procedures, the vast majority of students, n=563 (84.28%) responded negatively about using such methods, while 14.37% (n=96) confirmed they have previously used tanning lotions. Encouragingly, only n=5 students (0.74%) have previously visited artificial tanning salons. Moreover, 52.54% (n=351) of students consider tanning bed exposure extremely harmful.

When it comes to personal history and beliefs, 71.85% (n=480) of the interviewees have had problems related to prolonged sun exposure, while more than 8 in 10 subjects consider sun-related burns to be dangerous or extremely dangerous.

The most common sources of information regarding sunscreen for our cohort were the internet (n=605, 90.56%), the university courses (n=249, 37.27%) and doctors (n=237, 35.47%). Ultimately, more than 9 in 10 consider that recommending sunscreen usage to friends and family members is a useful (n=102, 15.26%) or very useful (n=504, 75.44%) means of promoting this sun protective behaviour.

4. Discussion

SPF usage still stands as a multifaceted behaviour, influenced by a number of factors and implying a relatively important social component, thus being susceptible to common tendencies worldwide, as well as marketing campaigns. Our cross-sectional study comprehensively revealed the pattern of sun protective behaviours in our cohort and uncovered multiple correlations between underlying factors and students' attitudes towards sunscreen.

4.1. The Level of Knowledge

In the university, a significant emphasis is placed on theoretical instruction covering topics such as carcinogenesis, risk factor reduction across various domains, and particularly, prevention strategies. Nonetheless, this knowledge does not manifest in their behavior, attitudes, or the occurrence of sunburns.

It is notable that 89% of first-year students are aware of the significance of SPF (Table 3), even though not all of them use it, demonstrating the impact of certain factors from the surrounding environment on our knowledge, such as social media [24], friends, and family.

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Table 3. Comparison of SPF knowledge and sunscreen usage by year of study.

Academic year	Total n (%)	Knowledge about SPF (%)	p-value	Sunscreen users (%)	p-value
1st year	194 (29.04)	173 (89.17)	0.06	152 (78.3)	<0.001
2nd year	92 (13.77)	85 (92.39)		84 (91.3)	
3rd year	126 (18.86)	118 (93.65)		111 (88.09)	
4th year	189 (28.89)	176 (93.12)		163 (86.24)	
5th year	56 (8.38)	53 (94.46)		50 (89.28)	
6th year	11 (1.64)	10 (90.90)		8 (72.27)	

Regarding the knowledge of students prone to photosensitivity, they had an unsatisfactory response. Despite the conditions or medications they use, they do not have a more developed sun protection behaviour than others who are not at risk. Meanwhile, a study in the United Kingdom showed that photosensitive people use more sunscreen both at home and on cloudy days than the control group [25]. A heightened understanding of the various risk factors associated with sun exposure, coupled with a more education regarding the correct application of sunscreen, has the potential to significantly increase the effectiveness of sun protection measures and yield more favorable outcomes.

According to our research, we find that a percentage of 95.20% of students demonstrate an awareness of the correlation between sun exposure and cancer risk. In comparison to this result, a study conducted in the United States of America revealed that 89% of adolescents possessed a similar knowledge [26]. Furthermore, a high percentage of students possess knowledge about other benefits of sunscreen just like in other studies conducted in countries with a sunny climate and extreme temperatures [27]. While 33.38% consider that there are no disadvantages of using sunscreen, 19.76% of students believe that sunscreen is involved in the occurrence of acne. Strategies aimed at overcoming these barriers may include addressing misconceptions about sunscreen efficacy, and promoting the use of broad-spectrum, high-SPF formulations tailored to individual skin types.

4.2. Approach Based on Year of Study

We conducted a comparison between freshmen and the remaining academic cohort, revealing that both groups exhibited a solid understanding of SPF. Undergraduate initiates demonstrated an 89.17% comprehension, whereas students in the 2nd to 6th year achieved a slightly higher score of 93%. However, no statistically significant difference was observed, as indicated by a p-value of 0.06 (Table 3).

Although students in the first academic year possess some knowledge about SPF, they tend to have less favorable habits with only 78.3% incorporating sunscreen protection into their routine, while the students in the 2nd to 6th year have an impressive 87.76% sunscreen usage rate. The discernible variance between these groups bears statistical significance, substantiated by a compelling p-value under 0.001 (Table 3). This underscores the tangible impact and widespread acknowledgement of the importance of sunscreen and the biomolecular pathways of carcinogenesis within our academic community.

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4.3. Behaviours

Unlike Gambla et al. [28] who suggest that tanning continues to be prevalent in US students, 88.02% of medical students from "Carol Davila" University of Medicine Pharmacy Bucharest would not give up on SPF for a better tan. Despite that, 52.4% of them like to tan, appearance having the most influence in tanning behaviors (47.75%) due to promoted beauty standards [29] among other factors like feeling relaxed (13.32%) and health perceptions (4.19%).

Findings regarding sunscreen efficacy in reducing the frequency of sunburns fail to demonstrate significant results, with a p-value of 0.83 (Table 4). This may stem from various factors, including inconsistencies in sunscreen application methods, variations in sunscreen formulations and efficacy, individual differences in skin sensitivity to UV radiation, and behavioral factors such as inadequate reapplication or insufficient methods of body coverage.

Table 4. Correlation between SPF usage and sunburn occurrence.

SPF usage	Sunburn		p-value
	Yes (%)	No (%)	
Yes	409 (85.38)	159 (84.13)	0.83
No	70 (14.62)	30 (15.87)	
Total n	479	189	

Regarding the reapplication of SPF, only 11.26% correctly reapply SPF every 2 hours while exposed to the sun, whereas 30.80% reapply it at intervals exceeding 2 hours and a striking 55.8% neglect to reapply it altogether. The results speak for themselves, demonstrating that students are unaware of how to use SPF properly. Similar issues regarding reapplication have been noted in prior research studies [30] [31] [32]. Only 62.85% of students who reported using sunscreen stated that they apply it every day, without correlation to season or weather, only 32,21% use it on all exposed areas of the body.

Another aspect that could contribute to the frequency of sunburns is the insufficient understanding of proper sunscreen application. Sunscreen SPF is typically evaluated when applied at a thickness of 2 mg/cm2, yet many consumers tend to apply sunscreen at a thinner layer, ranging from 0.5 to 1.0 mg/cm2 [33].

Other methods assessed in the study, that help to prevent sunburns are: wearing sunglasses (62.87%), avoiding sun exposure during the afternoon (53.89%), wearing a cap or a hat (46.10%), long sleeves clothing and vitamin C cream, meanwhile 12.12% of students do not use any secondary method.

The observed lack of sunscreen correct application among medical students underscore the need for enhanced sun protection education within medical curricula. Incorporating dedicated training modules on skin cancer prevention, including the importance of sunscreen application practices, especially regarding reapplication and daily usage and regular skin checks, could better equip future healthcare professionals to promote sun safety practices among their patients. Particularly earlier research has demonstrated a positive correlation between high knowledge levels and reduced incidence of sunburns [34].

4.4. Future Perspectives

Our results prove the need for further development in terms of knowledge regarding sun-protective measures among medical students, as they shall serve as key informants in their communities in order to address the general population. Aside from students' self-documentation, the inclusion of several informative aspects regarding sun protection in preclinical courses could

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serve as a good base for students to gather important knowledge. On a more expansive level, media campaigns regarding sun-protective behaviors, whether implemented by private companies in the field, non-governmental organizations or state institutions, shall focus on appropriately explaining the risks associated with excessive sun exposure in the vernacular, targeting larger audiences. On the other hand, countries like Romania, with a generally low medical education level among the general population and limited access to healthcare in some regions, are the most in need for screening and surveillance campaigns, either via rural healthcare professionals or by organized medical caravans, thus having the potential to both diagnose skin pathologies in more incipient status and provide accurate medical information to the population.

While this study provides valuable insights into sunscreen beliefs and practices among medical students, several avenues for future research warrant exploration. Longitudinal studies tracking changes in sunscreen behaviors over time, interventions targeting specific barriers to sunscreen use, and assessments of the effectiveness of sun protection education within medical curricula represent promising areas for further investigation.

4.5. Limitations

This study poses several limitations that need to be taken into account, especially regarding bias risk. As the case with other cross-sectional studies, data collection relies on self-report from the cohort, thus being susceptible to bias and influenced by the respondents' honesty. Moreover, the cohort is formed by the authors' colleagues, which also poses a residual bias risk. Additionally, the participation rate was not very high, this cohort, while larger than the ones in other studies in the field, standing as only approximately 8% of the total students currently enrolled at the Faculty of Medicine of the 'Carol Davila' University. Another limitation of the study is the heterogeneous population composition, characterized by a disproportionately higher percentage of females, which may impact the generalizability of the findings.

5. Conclusions

Medical students, as future healthcare providers, play an important role in pro-moting healthy behaviours among the general population. This study reveals that, although medical students' knowledge regarding sun-protective habits lies at a good level, further education and awareness campaigns are needed to ensure that they practice these habits consistently and effectively. By expanding the reach of sunscreen promotion campaigns and emphasizing proper application techniques, we can significantly reduce the incidence of skin cancer and sun-related damage. Nonetheless, examining these patterns will provide valuable insight into the cultural and social factors that influence sun-protective behaviors, which is crucial for the development of effective public health interventions.

Abbreviations

UV - ultraviolet

SPF - sun protection factor

NSAIDs - nonsteroidal anti-inflammatory drugs

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Institutional Review Board Statement: This study has been conducted in accordance with the norms provided by the Research Ethics Committee of "Carol Davila" University of Medicine and Pharmacy, being registered 31758/24.10.2023.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. Written informed consent has been obtained from the patient(s) to publish this paper" if applicable.

Data Availability Statement: The data presented in this study are available on OpenScienceFramework (https://osf.io/s9rzq/?view_only=758ce23b26fa4ca9aee0b6b8f197c080).

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Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationship that could be construed as a potential conflict of interest.

Appendix A

Appendix A Content of the questionnaire.

Question number	Question	Possible answers
1	What is your gender?*	a. Male b. Female c. Prefer not to say
2	Which study year are you in?*	a. I b. II c. III d. IV e. V f. VI
3	Choose the Fitzpatrick skin type that suits you (Image of the scale shown)*	a. I b. II c. III d. IV e. V f. VI
4	Do you have any conditions that predispose you to photosensitivity?	a. None b. Solar allergy c. Lupus erythematosus d. Atopic dermatitis e. Psoriasis f. Rosacea g. Others, please specify
5	Do you use medication that cause photosensitivity	a. I don't use b. Antihistamines c. Contraceptives d. NSAIDs e. Sulfonamides f. Thiazide diuretics g. Tetracyclines h. Tricyclic antidepressants
6	How many hours do you spend outside in a week?*	a. Less than 1h b. 1-5h c. 5-10h d. 10-15h e. >15h
7	Time spent in sun during midday hours (10:00-16:00)*	a. None b. Less than 1h

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		c. 1-2h d. 2-4h e. >4h
8	Do you know what the number on SPF products means? *	a. Yes b. No
9	Do you use SPF? If yes, what type?*	a. <15 b. 15-30 c. 30-50 d. 50+ e. I don't use
10	When do you apply SPF?*	a. During summer b. At the seaside c. During sunny days d. Everyday, throughout the day
11	On which body parts do you use sunscreen?	a. Face and neck b. Upper limbs c. Lower limbs d. All exposed body parts e. Others, please specify
12	How long before sun exposure do you apply sunscreen?*	a. 15 minutes before sun exposure b. from 15 to 30 minutes before sun exposure c. more than 30 minutes before sun exposure d. during sun exposure
13	Do you reapply sunscreen throughout the day? If yes, how?*	a. I reapply once an hour b. I reapply it every 2 hours . I reapply it at intervals longer than 2 hours d. I do not reapply it
14	What additional sun protective methods do you use?	a. Hat/cap b. Vitamin C serum c. Long sleeved clothing d. Sunglasses Avoid sun exposure during noon hours f. None g. Others, please specify
15	What are the disadvantages of using sunscreen?	a. It is greasy b. The smell c. The price d. Causes acne e. None f. Others, please specify

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16	What are the benefits of using sunscreen?	a. Reduces the risk of skin cancer b. Prevents skin aging c. Protects against sunburn Limits the occurrence of dark spots and hyperpigmentation e. I don't know them f. Others, please specify
17	Do you like to sunbathe? If yes, why?	a. I feel more relaxed b. I like how I look tanned c. It is healthy for my body d. I don't like it e. Others, please specify
18	Would you give up sun protection to tan faster?*	a. Yes b. No
19	Which methods of artificial tanning have you used?	a. I haven't used any b. Tanning beds c. Tanning spray/lotions d. Injections e. Others, please specify
20	How dangerous do you think the use of artificial sun beds is?*	-not at all it helps me get the perfect tan 2 3 4 5-very dangerous, it should be avoided
21	Which sources did you learn about the risks of sun exposure from?	a. University b. Internet c. Friends d. Family e. Doctor f. I am not aware of them g. Others, please specify
22	Have you ever experienced problems due to prolonged sun exposure?*	a. Yes b. No
23	How dangerous do you think getting a sunburn is?*	1-not dangerous at all, it heals 2 3 4 5-very dangerous
24	How useful do you find it to recommend family members/friends to use SPF?*	1-I don't find it useful 2 3 4 5-Very useful

Note: All questions marked with * allow a single answer. The rest of the questions allow multiple answers.

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