Dermatology Practical & Conceptual

Sun Protection Knowledge and Practices in Fifth-year Medical Students: Impact of Gender, Sunburn Experience and Sunscreen Use

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ABSTRACT

Introduction: Ultraviolet exposure is the most important modifiable risk factor for developing skin cancer.

Objectives: We evaluated the knowledge and behaviors of medical students regarding sun protection.

Methods: Between October 2023 and May 2024, fifth-year medical students filled a questionnaire on sun protection.

Results: This study included 255 students: 134 males and 121 females. Among them, 100 (39.2%) students stated that they always used sunscreen, 43.1% used sunscreen on sunny days and in the winter, whereas 42% applied it only to the face. Of the 135 students who knew the two-finger technique, 99 stated that they had learned this information from social media, and 218 (85.5%) took at least one other sun protection measure. In females, wearing sunscreen (P<0.001), reapplying it (P=0.003), using it in winter (P<0.001), knowing the two-finger technique (P<0.001), and taking other sun protection measures (P=0.020) were more frequent and duration of sunscreen use was longer (P<0.001) compared to males. Sunburn was more common in males and in those who stated that they did not go out during peak sun time (P=0.013, P=0.017, respectively). Statements on sun protection were similar in both sexes. For instance, 95.9% of females and 96.3% of males revealed that sun protection prevents skin cancer.

Conclusion: Although females used sunscreen and applied other sun protection methods more frequently than did males, appropriate sunscreen use was inadequate among all students. Updating the curriculum and providing educational social media sites where reliable information can be obtained may improve medical students' sun protection habits.

Introduction

Skin cancers are common malignancies and are grouped as melanoma and non-melanoma skin cancers. It has been reported that the incidence of melanoma and non-melanoma skin cancers has been increasing. Ultraviolet (UV) radiation is the main factor in the development of cutaneous malignancies [1]. Excessive sun exposure has been implicated as a causative agent in approximately 90% of patients with melanoma [2]. Especially getting sunburned and sun exposure during adolescence and adulthood have a direct relationship with increased risk of melanoma in one's lifetime. Although various factors such as family history, Fitzpatrick skin type, and immunosuppression play a role in the etiopathogenesis of cutaneous malignancies, UV exposure is the most important modifiable risk factor for melanoma occurrence [1,2].

Various methods have been suggested to prevent the harmful effects of UV radiation, such as using sunscreen, seeking shade, and wearing protective clothing. Proper use of sunscreen not only prevents skin cancer but also delays photoaging and contributes to the treatment of various skin diseases such as pigmentation disorders. Efforts are being made to raise awareness about sun protection through social projects and educational programs [3]. However, it has been suggested that more than half of college students reported sunburn in the previous year [2]. Improper use of sunscreens and inadequate photoprotection have been reported in university students, even in countries that receive high levels of UV radiation. Despite advances in medicine and high access to information, skin cancers remain an important public health problem due to their increasing frequency and the high mortality rate, especially in melanoma. Therefore, considering the knowledge especially of young individuals on the effects of UV radiation on health and sun protection practices is crucial to developing successful educational programs [4].

Objectives

Within this study, we aimed to evaluate the knowledge and behaviors of fifth-year medical students regarding sun protection. Since sun protection habits in this age group significantly affect the risk of developing skin cancer in the future, and medical doctors who will work in primary health care institutions immediately after graduation play an important role in raising the awareness of society about sun protection and in the management of skin cancer, our study aimed to provide useful information to review and update the medical school curriculum on dermatology and to contribute to skin cancer management.

Methods

Gazi University Ethics Committee approved this study (approval number: 2023-1185, date: 10.03.2023). It takes six years to graduate from medical school in our country. The dermatology course is given to all 5th-year medical students for a 3-week period during each academic year. Between October 2023 and May 2024, fifth-year medical students were included in this study, before the course in dermatology. The study was conducted prospectively. Age, sex, past medical history of skin diseases, systemic diseases and sunburn, solarium use, regular medication use, and family history of skin cancer or other skin diseases were noted. Fitzpatrick skin phototypes of the students were also examined [5]. The students completed a 14-item questionnaire assessing their knowledge and behaviors on sun protection, as stated below.

- Question 1 (Q1): Do you wear sunscreen? (yes/ no).
- Q2: How long have you been wearing sunscreen?
- Q3: Do you wear sunscreen in winter? (yes/ no).
- Q4: How often do you wear sunscreen? (always/ sometimes).
- Q5: Do you apply sunscreen on sun-exposed body areas other than the face? (yes/ no).
- Q6: How long before going out do you apply sunscreen? (just before going out/ within 30 minutes before going out/ after more than 30 minutes).
- Q7: Do you reapply sunscreen throughout the day? (yes/ no).
- Q7: What sun protection factor (SPF) do you use? (SPF less than 50/ SPF 50 and over).
- Q8: Do you know the "two-finger" technique used to apply adequate sunscreen? (yes/ no) [6].
- Q9: From what source did you learn the "two-finger" technique? (academic publications/ social media/ family/ friends/ other).
- Q10: Do you use the "two-finger" technique when applying sunscreen? (yes/ no).
- Q11: On which part of your body do you use the "two-finger" technique when applying sunscreen? (face/ other body parts).
- Q12: Do you take any sun protective measures other than using sunscreen? (yes/ no).
- Q13: If yes, specify: Wide-brimmed hats/ UV protective glasses/ umbrella/ long-sleeved and -legged clothes/ preferring shady areas/ not going out in peak sun time (yes/ no).
- Q14: Please mark your opinion regarding statements on sun protection: Sun protection prevents skin cancer/ Sun protection reduces skin aging/ Sunscreen use is recommended for the treatment of some skin diseases/ When you apply sunscreen and go out in the sun, the harmful

effects of the sun are completely blocked/ Applying sunscreen blocks vitamin D synthesis (yes/ no/ no idea).

In the "two-finger" technique, the amount of sunscreen applied along the index finger and middle finger constitutes a sufficient amount applied to 9% of the body surface area, such as the face, head, and neck region [6]. Statistical analysis was performed using SPSS version 29. Quantitative variables are expressed as mean ± standard deviation or median (interquartile range). Categorical variables are presented as counts and percentages. Kolmogorov-Smirnov test was used to assess the normality of the distribution of the data. The Mann-Whitney test, chi-squared test, and independent-samples t-test were used to determine the differences between the groups. P-values of <0.05 were considered statistically significant.

Results

This study included 255 students: 134 (52.5%) males and 121 (47.5%) females. The mean age of the students was 23±1.22 years (range: 21-32 years). The students mostly (40.4%) had Fitzpatrick skin phototype 3. The characteristics of the participants are stated in Table 1. A total of 185 (72.5%) students wore sunscreen. The median duration of sunscreen use was three years (range: 1-15 years); 172 (67.5%) students stated that they used sunscreen with SPF values of 50 and over. Nevertheless, 90 (35.3%) participants revealed that they had sunburn. The sun protection behaviors of the participants are stated in Table 2. When students' knowledge and behaviors regarding sun protection were evaluated by sex, it was determined that sunscreen use was more frequent in females than in males (P<0.001). Furthermore, sunscreen use in winter (P<0.001) and reapplying it throughout the day (P=0.003) were more frequent in females (Table 3). Student characteristics and sun protection habits were also evaluated according to whether they had sunburn or not (Table 4). Among the students who developed sunburn, 33 (27.3%) were females and 57 (42.5%) were males (P=0.013). No significant difference in Fitzpatrick skin types was observed between students with and without sunburn (P=0.063). Nevertheless, 29 (32.2%) students with sunburn and 29 (17.6%) without sunburn had comorbidities (P=0.008). When students who used and those who did not use sunscreen were compared, it was determined that those who used sunscreen also took other sun protection measures more frequently (P=0.007). Sunscreen use was more frequent among students who stated that sun protection reduces skin aging (P=0.009) (Table 5). The mean duration of sunscreen use was 4.54±2.96 years in those who always used sunscreen and 2.68±1.91 years in those who sometimes used it (P<0.001). No statistically significant difference was observed between students with and without skin disease or between students with and without a family history of skin disease in terms of Fitzpatrick skin phototype (P=0.324, P=0.567, respectively), taking other sun protection measures (P=0.404, P=0.578, respectively), use of sunscreen in winter (P=0.757, P=0.376, respectively), frequency of sunscreen use (P=0.685, P=0.614, respectively), sunscreen use on areas other than face (P=0.154, P=0.429, respectively), reapplying

Table 1. Characteristics of the Fifth-Year Medical Students Included in This Study.

	Participants (N=255)
Sex, N (%)	Male: 134 (52.5) Female: 121 (47.5)
Age (mean±SD) (range), years	23±1.22 (21-32)
Fitzpatrick skin phototype, N (%)	2: 60 (23.5) 3: 103 (40.4) 4: 79 (31) 5: 11 (4.3) 6: 2 (0.8)
Medical history, N (%)	Unremarkable: 197 (77.3) Acne: 21 (8.2) Seborrheic dermatitis: 6 (2.4) Urticaria: 5 (2) Depression: 5 (2) Hypothyroidism: 5 (2) Atopic dermatitis: 3 (1.2) Contact dermatitis: 3 (1.2) Diabetes: 2 (0.8) Vitiligo: 2 (0.8) Migraine: 2 (0.8) Alopecia areata: 1 (0.4) Lichen planopilaris: 1 (0.4) Keloid: 1 (0.4) Keratosis pilaris: 1 (0.4)
Medication use, N (%)	None: 233 (91.4) Levothyroxine: 5 (2) Antidepressants: 5 (2) Oral isotretinoin: 4 (1.6) Antihistamines: 4 (1.6) Metformin: 2 (0.8) Topical tretinoin: 2 (0.8)
Family history, N (%)	Unremarkable: 221 (86.7) Psoriasis: 10 (3.9) Contact dermatitis: 6 (2.4) Vitiligo: 4 (1.6) Seborrheic dermatitis: 4 (1.6) Atopic dermatitis: 3 (1.2) Rosacea: 3 (1.2) Basal cell carcinoma: 2 (0.8) Lichen planus: 1 (0.4) Melanoma: 1 (0.4)

Most of the students (40.4%) had Fitzpatrick skin phototype 3, followed by phototype 4 (31%). Of the 255 students, 197 had unremarkable medical history, whereas the most common comorbidity was acne. *Abbreviation:* SD = standard deviation.

Table 2. Knowledge and Behaviors of Medical Students Regarding Sun Protection.

	Participants (N=255)
Sunburn, N (%)	Yes: 90 (35.3) No: 165 (64.7)
Indoor tanning use, N (%)	Yes: 3 (1.2) No: 252 (98.8)
Sunscreen use, N (%)	Yes: 185 (72.5) No: 70 (27.5)
Duration of sunscreen use, median (IQR)	3 (3) years (range: 1-15 years)
The frequency of sunscreen use, N (%)	Always: 100 (39.2) Sometimes: 85 (33.3)
Time of applying sunscreen before going out, N (%)	Within 30 minutes before going out: 124 (48.6) Just before going out: 48 (18.8) More than 30 minutes: 13 (5.1)
SPF value of the sunscreen used, N (%)	SPF ≥50: 172 (67.5) SPF <50: 13 (5.1)
Reapplying sunscreen throughout the day, N (%)	Yes: 35 (13.7) No: 150 (58.8)
Sunscreen use on areas other than face, N (%)	Yes: 78 (30.6) students apply sunscreen on the body areas exposed to sun other than face No: 107 (42) apply sunscreen only to the face
Sunscreen use in winter, N (%)	Yes: 110 (43.1) students use sunscreen both on sunny days and in the winter No: 75 (29.4) use sunscreen only in the summer
Know the "two fingers" technique, N (%)	Yes: 135 (52.9) No: 120 (47.1)
Sources that "two-finger" technique was learned, N (%)	Social media: 99 (38.8) Friends: 14 (5.5) Academic publications: 13 (5.1) School: 8 (3.1) Family members: 1 (0.4)
Using "two-finger" technique when applying sunscreen, N (%)	Yes: 101 (39.6) No: 34 (13.3)
Body areas where the "two-finger" technique is used when applying sunscreen, N (%)	Face: 101 (39.6) Other body parts: 0
Taking other sun protection measures, N (%)	No: 37 (14.5) Yes: 218 (85.5) • Wide-brimmed hats Yes: 68 (26.7) No: 187 (73.3) • UV protective glasses Yes: 104 (40.8) No: 151 (59.2) • Umbrella Yes: 14 (5.5) No: 241 (94.5) • Long-sleeved and -legged clothes Yes: 93 (36.5) No: 162 (63.5) • Preferring shady areas Yes: 207 (81.2) No: 48 (18.8) • Not going out in the sun Yes: 159 (62.4) No: 96 (37.6)

Table 2. Knowledge and Behaviors of Medical Students Regarding Sun Protection. *(continued)*

	Participants (N=255)
Statements on sun protection, N (%)	• Sun protection prevents skin cancer Yes: 245 (96.1) No: 4 (1.6) No idea: 6 (2.4) • Sun protection reduces skin aging Yes: 248 (97.3) No: 3 (1.2) No idea: 4 (1.6) • Sunscreens are used to treat skin diseases Yes: 215 (84.3) No: 7 (2.7) No idea: 33 (12.9) • Sunscreens completely block the harmful effects of the sun Yes: 6 (2.4) No: 225 (88.2) No idea: 24 (9.4) • Sunscreens block vitamin D synthesis Yes: 70 (27.5) No: 130 (51) No idea: 55 (21.6)

While 72.5% of students revealed that they used sunscreen, the rate of those who always used it was only 39.2%. On the other hand, 99 of 135 students stated that they learned the "two-finger" technique from social media. It is also noteworthy that indoor tanning use was quite rare among students (1.2%). *Abbreviations:* IQR: interquartile range; SPF: sun protection factor; UV: ultraviolet.

Table 3. Comparison of Knowledge and Behaviors of Female and Male Students on Sun Protection.

	Females, N (%)	Males, N (%)	P-value
Age, mean±SD (range) years	23.06±1.09 (22-28)	23.39±1.32 (21-32)	0.051
Medical history	Unremarkable: 92 (76) Had a comorbidity: 29 (24)	Unremarkable: 105 (78.4) Had a comorbidity: 29 (21.6)	0.659
Family history	Unremarkable: 104 (86) Remarkable for a skin disease: 17 (14)	Unremarkable: 117 (87.3) Remarkable for a skin disease: 17 (12.7)	0.750
Fitzpatrick skin phototype	2: 32 (26.4) 3: 46 (38) 4: 40 (33.1) 5: 3 (2.5)	2: 28 (20.9) 3: 57 (42.5) 4: 39 (29.1) 5: 8 (6) 6: 2 (1.5)	0.372
Sunburn	Yes: 33 (27.3) No: 88 (72.7)	Yes: 57 (42.5) No: 77 (57.5)	0.011
Sunscreen use	Yes: 119 (98.3) No: 2 (1.7)	Yes: 66 (49.3) No: 68 (50.7)	<0.001
Duration of sunscreen use, median (IQR)	3 (3) years (range: 1-15)	2 (2.25) years (range: 1-10)	<0.001
The frequency of sunscreen use	Always: 91 (76.5) Sometimes: 28 (23.5)	Always: 9 (13.6) Sometimes: 57 (86.4)	<0.001
Time of applying sunscreen before going out	Within 30 minutes before going out: 92 (77.3) Just before going out: 18 (15.1) More than 30 minutes: 9 (7.6)	Within 30 minutes before going out: 32 (48.5) Just before going out: 30 (45.5) More than 30 minutes: 4 (6.1)	<0.001
SPF value of the sunscreen used	SPF ≥50: 113 (95) SPF <50: 6 (5)	SPF ≥50: 59 (89.4) SPF <50: 7 (10.6)	0.157

Table 3 continues

Table 3. Comparison of Knowledge and Behaviors of Female and Male Students on Sun Protection. *(continued)*

	Females, N (%)	Males, N (%)	P-value
Reapplying sunscreen	Yes: 30 (25.2) No: 89 (74.8)	Yes: 5 (7.6) No: 61 (92.4)	0.003
Sunscreen use on areas other than face	Yes: 50 (42) No: 69 (58)	Yes: 28 (42.4) No: 38 (57.6)	0.957
Sunscreen use in winter	Yes: 98 (82.4) No: 21 (17.6)	Yes: 12 (18.2) No: 54 (81.8)	<0.001
Know the "two-finger" technique	Yes: 106 (87.6) No: 15 (12.4)	Yes: 29 (21.6) No: 105 (78.4)	<0.001
Using "two-finger" technique when applying sunscreen	Yes: 87 (82.1) No: 19 (17.9)	Yes: 14 (48.3) No: 15 (51.7)	<0.001
Taking other sun protection measures	Yes: 110 (90.9) No: 1 (9.1)	Yes: 108 (80.6) No: 26 (19.4)	0.020
Wide-brimmed hats	Yes: 35 (28.9) No: 86 (71.1)	Yes: 33 (24.6) No: 101 (75.4)	0.439
UV protective glasses	Yes: 58 (47.9) No: 63 (52.1)	Yes: 46 (34.3) No: 88 (65.7)	0.028
Umbrella	Yes: 4 (3.3) No: 117 (96.7)	Yes: 10 (7.5) No: 124 (62.5)	0.146
Long-sleeved and -legged clothes	Yes: 54 (44.6) No: 67 (55.4)	Yes: 39 (29.1) No: 95 (70.9)	0.010
Preferring shady areas	Yes: 106 (87.6) No: 15 (12.4)	Yes: 101 (75.4) No: 33 (24.6)	0.013
Not going out in the sun	Yes: 76 (62.8) No: 45 (37.2)	Yes: 83 (61.9) No: 61 (38.1)	0.886
Statements on sun protection			
Sun protection prevents skin cancer	Yes: 116 (95.9) No: 2 (1.7) No idea: 3 (2.5)	Yes: 129 (96.3) No: 2 (1.5) No idea: 3 (2.2)	0.869
Sun protection reduces skin aging	Yes: 118 (97.5) No: 1 (0.8) No idea: 2 (1.7)	Yes: 130 (97) No: 2 (1.5) No idea: 2 (1.5)	0.810
Sunscreens are used to treat skin diseases	Yes: 102 (84.3) No: 3 (2.5) No idea: 16 (13.2)	Yes: 113 (84.3) No: 4 (3) No idea: 17 (12.7)	0.981
Sunscreens completely block the harmful effects of the sun	Yes: 1 (0.8) No: 115 (95) No idea: 5 (4.1)	Yes: 5 (3.7) No: 110 (82.1) No idea: 19 (14.2)	0.077
Sunscreens block vitamin D synthesis	Yes: 39 (32.2) No: 61 (50.4) No idea: 21 (17.4)	Yes: 31 (23.1) No: 69 (51.5) No idea: 34 (25.4)	0.051

Males were more prone to sunburn (P=0.011), while sunscreen use was more common in females (P<0.001). Females used sunscreen for longer periods of time than did males (P<0.001) and reapplied it more frequently (P=0.003). Furthermore, females were more likely to use the "two-finger" technique when applying sunscreen (P<0.001). *Abbreviations:* IQR = interquartile range; SD = standard deviation; SPF = sun protection factor; UV = ultraviolet.

sunscreen (P=0.766, P=0.925, respectively), and SPF value of the sunscreen used (P=0.285, P=0.687, respectively). Students who knew the "two-finger" technique were more likely to use sunscreen in winter, always use sunscreen, and take other sun protection methods than those who did not know the "two-finger" technique (P<0.001, each). Furthermore, of the participants who used sunscreen in winter, 96 (87.3%) always used sunscreen; of the participants who did not use sunscreen in winter, four (5.3%) always used it (P<0.001); 26 (23.6%) of those who used sunscreen in winter and nine (12%) of those who did not state that they reapplied sunscreen (P=0.048). Twenty-six (33.3%) students who applied

Table 4. Sun Protection Behaviors of Participants According to Whether They Have Had a Sunburn or Not.

	Had sunburn, N (%)	No sunburn, N (%)	P-value
Sex	Female: 33 (27.3) Male: 57 (42.5)	Female: 88 (72.7) Male: 77 (57.5)	0.013
Medical history	Unremarkable: 61 (67.8) Had a comorbidity: 29 (32.2)	Unremarkable: 136 (82.4) Had a comorbidity: 29 (17.6)	0.008
Family history	Unremarkable: 78 (86.7) Remarkable for a skin disease: 12 (13.3)	Unremarkable: 143 (86.7) Remarkable for a skin disease: 22 (13.3)	1.000
Sunscreen use	Yes: 59 (31.9) No: 31 (44.3)	Yes: 126 (68.1) No: 39 (55.7)	0.078
The frequency of sunscreen use	Always: 30 (50.8) Sometimes: 29 (49.2)	Always: 70 (55.6) Sometimes: 56 (44.4)	0.550
Time of applying sunscreen before going out	Within 30 minutes before going out: 40 (67.8) Just before going out: 15 (25.4) More than 30 minutes: 4 (6.8)	Within 30 minutes before going out: 84 (66.7) Just before going out: 33 (26.2) More than 30 minutes: 9 (7.1)	0.953
SPF value of the sunscreen used	SPF ≥50: 54 (91.5) SPF <50: 5 (8.5)	SPF ≥50: 118 (93.7) SPF <50: 8 (6.3)	0.599
Reapplying sunscreen	Yes: 12 (20.3) No: 47 (79.7)	Yes: 23 (18.3) No: 103 (81.7)	0.736
Sunscreen use on areas other than face	Yes: 23 (39) No: 36 (61)	Yes: 55 (43.7) No: 71 (56.3)	0.550
Sunscreen use in winter	Yes: 34 (57.6) No: 25 (42.4)	Yes: 76 (60.3) No: 50 (39.7)	0.729
Know the "two-finger" technique	Yes: 42 (46.7) No: 48 (53.3)	Yes: 93 (56.4) No: 72 (43.6)	0.139
Taking other sun protection measures	Yes: 79 (87.8) No: 11 (12.2)	Yes: 139 (84.2) No: 26 (15.8)	0.445
Wide-brimmed hats	Yes: 23 (25.6) No: 67 (74.4)	Yes: 45 (27.3) No: 120 (72.7)	0.767
UV protective glasses	Yes: 39 (43.3) No: 51 (56.7)	Yes: 65 (39.4) No: 100 (60.6)	0.542
Umbrella	Yes: 6 (6.7) No: 84 (93.3)	Yes: 8 (4.8) No: 157 (95.2)	0.543
Long-sleeved and -legged clothes	Yes: 29 (32.2) No: 61 (67.8)	Yes: 64 (38.8) No: 101 (61.2)	0.299
Preferring shade areas	Yes: 76 (84.4) No: 14 (15.6)	Yes: 131 (79.4) No: 34 (20.6)	0.325
Not going out in the sun	Yes: 65 (72.2) No: 25 (27.8)	Yes: 94 (57) No: 71 (43)	0.017
Statements on sun protection			
Sun protection prevents skin cancer	Yes: 87 (96.7) No: 0 No idea: 3 (3.3)	Yes: 158 (95.8) No: 4 (2.4) No idea: 3 (1.8)	0.745
Sun protection reduces skin aging	Yes: 87 (96.7) No: 0 No idea: 3 (3.3)	Yes: 161 (97.6) No: 3 (1.8) No idea: 1 (0.6)	0.651
Sunscreens are used to treat skin diseases	Yes: 77 (85.6) No: 3 (3.3) No idea: 10 (11.1)	Yes: 138 (83.6) No: 4 (2.4) No idea: 23 (13.9)	0.659

Table 4 continues

Table 4. Sun Protection Behaviors of Participants According to Whether They Have Had a Sunburn or Not. *(continued)*

	Had sunburn, N (%)	No sunburn, N (%)	P-value
Sunscreens completely block the harmful effects of the sun	Yes: 1 (1.1) No: 81 (90) No idea: 8 (8.9)	Yes: 5 (3) No: 144 (87.3) No idea: 16 (9.7)	0.823
Sunscreens block vitamin D synthesis	Yes: 27 (30) No: 39 (43.3) No idea: 24 (26.7)	Yes: 43 (26.1) No: 91 (55.2) No idea: 31 (18.8)	0.705

Sunburn was more common in males (42.5%) than in females (27.3%) (P=0.013). In addition, healthy participants were more likely to get sunburned compared to those with comorbidities (P=0.008). *Abbreviations:* SPF = sun protection factor; UV = ultraviolet.

Table 5. Comparison of Students Who Stated That They Used and Did Not Use Sunscreen.

	Use sunscreen, N (%)	No sunscreen use, N (%)	P-value
Medical history	Remarkable for a skin disease: 35 (18.9) Unremarkable: 150 (81.1)	Remarkable for a skin disease: 8 (11.4) Unremarkable: 62 (88.6)	0.155
Family history	Remarkable for a skin disease: 22 (11.9) Unremarkable: 163 (88.1)	Remarkable for a skin disease: 12 (17.1) Unremarkable: 58 (82.9)	0.272
Sunburn	Yes: 59 (31.9) No: 126 (68.1)	Yes: 31 (44.3) No: 39 (55.7)	0.065
Fitzpatrick skin phototype	2: 43 (23.2) 3: 77 (41.6) 4: 61 (33) 5: 4 (2.2)	2: 17 (24.3) 3: 26 (37.1) 4: 18 (25.7) 5: 7 (10) 6: 2 (2.9)	0.456
Taking other sun protection measures	Yes: 165 (89.2) No: 20 (10.8)	Yes: 53 (75.7) No: 17 (24.3)	0.007
Wide-brimmed hats	Yes: 54 (29.2) No: 131 (70.8)	Yes: 14 (20) No: 56 (80)	0.139
UV protective glasses	Yes: 91 (49.2) No: 94 (50.8)	Yes: 13 (18.6) No: 57 (81.4)	<0.001
Umbrella	Yes: 12 (6.5) No: 173 (93.5)	Yes: 2 (2.9) No: 68 (97.1)	0.257
Long-sleeved and -legged clothes	Yes: 76 (41.1) No: 109 (58.9)	Yes: 17 (24.3) No: 53 (75.7)	0.013
Preferring shady areas	Yes: 157 (84.9) No: 28 (15.1)	Yes: 50 (71.4) No: 20 (28.6)	0.014
Not going out in the sun	Yes: 119 (64.3%) No: 66 (35.7%)	Yes: 40 (57.1%) No: 30 (42.9%)	0.292
Statements on sun protection			
Sun protection prevents skin cancer	Yes: 179 (96.8) No: 2 (1.1) No idea: 4 (2.2)	Yes: 66 (94.3) No: 2 (2.9) No idea: 2 (2.9)	0.371
Sun protection reduces skin aging	Yes: 183 (98.9) No: 0 No idea: 2 (1.1)	Yes: 65 (92.9) No: 3 (4.3) No idea: 2 (2.9)	0.009
Sunscreens are used to treat skin diseases	Yes: 158 (85.4) No: 5 (2.7) No idea: 22 (11.9)	Yes: 57 (81.4) No: 2 (2.9) No idea: 11 (15.7)	0.428

Table 5. Comparison of Students Who Stated That They Used and Did Not Use Sunscreen. *(continued)*

	Use sunscreen, N (%)	No sunscreen use, N (%)	P-value
Sunscreens completely block the harmful effects of the sun	Yes: 3 (1.6) No: 168 (90.8) No idea: 14 (7.6)	Yes: 3 (4.3) No: 57 (81.4) No idea: 10 (14.3)	0.361
Sunscreens block vitamin D synthesis	Yes: 52 (28.1) No: 93 (50.3) No idea: 40 (21.6)	Yes: 18 (25.7) No: 37 (52.9) No idea: 15 (21.4)	0.815

Students who used sunscreen (89.2%) took other sun protection measures more frequently than students who did not use sunscreen (75.7%) (P=0.007). Among them, wearing UV protective glasses (P<0.001), long-sleeved and -legged clothes (P=0.013), and preferring shady areas (P=0.014) were prominent. *Abbreviation:* UV = ultraviolet.

sunscreen on areas other than the face and nine (8.4%) of those who applied sunscreen only to the face stated that they reapplied sunscreen (P<0.001). Taking other sun protection measures was also more common in those who used sunscreen on body areas other than the face (97.4%) than in those who applied sunscreen only to the face (83.2%) (P=0.002), for example, wearing a hat (P=0.042), using an umbrella (P=0.018), and seeking shade (P=0.005).

Conclusions

Studies have been published investigating the knowledge and behaviors of medical students on sun protection and the factors affecting them [7]. These studies generally included students in all years of medical school [8-10]. However, becoming senior students of the school has been associated with better knowledge on sun protection and the negative effects of the sun [11]. Moreover, it has been suggested that female students are more likely to use sunscreen than males [8, 12, 13]. Nevertheless, low levels of sunscreen use and a lack of knowledge on ultraviolet radiation have been reported in both sexes [14]. Within this study, we evaluated 255 fifth-year medical students with a mean age of 23±1.22 years. Although 72.5% of students stated that they used sunscreen, only 39.2% always used it. Most of the students (67.5%) used sunscreen with an SPF value of at least 50; however, only 13.7% reapplied, and 43.1% of students used sunscreen both on sunny days and in the winter, whereas 42% applied it only to the face. In addition, 135 (52.9%) students stated that they knew the "two-finger" technique, and it is noteworthy that 99 of them learned this information from social media. While most students (85.5%) took at least one other sun protection measure, the most common among them was a preference for shaded areas. In females, wearing sunscreen, reapplying it, using it in winter, knowing the "two-finger" technique, and taking other sun protection measures were more frequent, and the duration of sunscreen use was longer compared to males. Moreover, males (42.5%) were more likely to get sunburn than females (27.3%). Sunburn was also more common in those who stated that they did not go out during peak sun time (P=0.017). However, statements on sun protection were similar in both sexes. For instance, the majority of the females and males revealed that sun protection prevents skin cancer and reduces skin aging. On the other hand, 32.2% of females and 23.1% of males revealed that sunscreens block vitamin D synthesis. Nevertheless, the consideration of whether sunscreen inhibits vitamin D synthesis did not influence sunscreen use. However, in addition to the female sex, sunscreen use was more frequent among those who took other sun protection measures, such as wearing UV protective glasses, wearing clothing with long sleeves and legs, and preferring shaded areas. Besides sex differences, the results we obtained from the study may have been affected by various factors such as the general cultural structure of the participants, their behavioral assumptions, personality, and socioeconomic level. The fact that males had higher rates of sunburn and poorer sun protection habits may be due to sociocultural factors and barriers to sunscreen use, such as perceived stigma. Moreover, when compared to females, males may be less careful about their skin and less likely to follow a daily skin care routine. They may care less about sun effects such as premature aging, spots, and wrinkles. They may not like using cosmetic products such as creams and lotions and may do outdoor activities more often in the summer. The need to improve males' sunscreen use habits should be included in skin cancer awareness campaigns. In a study by Memon et al., which included medical students, the most of whom were female, 31.5% of the participants stated that they always or mostly used sunscreen, 30.7% of the students stated that they used sunscreen only in summer, and 57% did not reapply it. Sunscreen use was more common in females, who were more knowledgeable than males about the effectiveness of sunscreen in preventing sunburn and skin aging [8]. Seetan et al. evaluated 1st- to 6th-year medical students and reported that the students' sun protection behaviors were inadequate considering their

knowledge about skin cancer: 39.3% of students stated that they always used sunscreen, 20.3% avoided the sun during peak hours, 9.4% wore hats, 19.1% wore sunglasses, and 47.3% wore long pants and long-sleeved shirts [9]. Pearlman et al. reported that approximately 70.4% of 1st- to 4th-year medical students never used wide-brimmed hats, 53.2% did not wear protective clothing, and only 44.6% often or always used sunscreen. Pearlman et al. suggested that social media could be used as an effective method to increase medical students' sun protection practices since online media might affect sun protection behaviors, and medical students use social media sites for educational purposes [10,15,16]. In a study by Chapagain et al., sunscreen use was reported in 75.67% of medical students in years 1-4. Regular use was detected in 15.41% of the students, only facial application in 63.43%, and repeated application in 31.71%. Sunscreen use was more common among female students compared to males. Sunscreens with an SPF value of 30 were mainly used. Females used additional sun protection methods more frequently than males. Moreover, it was stated that 89.34% of the students knew the harmful effects of sun exposure without protection [12]. Rodríguez-Gambetta et al. reported regular sunscreen use during summer in 38.1% of the first-year medical students. High sunscreen use was associated with female sex, attendance of sun protection workshops, and being reminded by others to wear sunscreen. Moreover, using long trousers as a photoprotection method was more frequent in females than in males [13]. In a study from Australia, nearly two-thirds of medical students reported having experienced sunburn, and 29% revealed they applied the recommended amount of sunscreen, which was two tablespoons. As only 20% reapplied sunscreen every two hours, most were not following recommendations for the proper use of sunscreen. However, the frequency of applying sunscreen in the summer and sun protection behaviors such as wearing a hat and avoiding the sun at peak times increased with age [17]. Furthermore, in another study, getting sunburned was associated with increased sunscreen use and decreased sun exposure during peak hours [18]. It has been suggested that these results might be obtained as a result of the inadequate lectures on sun protection given in medical faculties; therefore, future doctors may have insufficient information to inform their patients on sun protection [19]. Although society's awareness about sun protection has recently increased through social projects and campaigns, continuous education on skin cancer and sun protection measures is crucial. Therefore, it has been stated that medical students could also take part in the creation of educational programs for the public [3]. An expanded curriculum on skin cancer and the effects of the sun on health can improve medical students' knowledge and behavior regarding sun protection [20].

Although the rate of sunscreen use among medical students was high in our study, its regular and proper use was insufficient. The fact that females were significantly more likely to apply sunscreen and use other sun protection methods than males and that sunburns were more common in males indicated that male students were at higher risk of exposure to the harmful effects of the sun. Updating the curriculum on sun protection and bearing in mind the high learning rate from social media, providing educational social media sites or platforms where reliable information can be obtained may improve medical students' sun protection habits and thus increase their contribution to raising public awareness on this subject. However, since social media are not a reliable educational tool, they can be organized as platforms created by medical schools, featuring informative videos or articles by faculty members and available only to students.

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