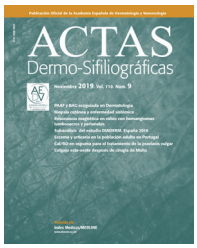
ACTAS Dermo-Sifiliográficas 116 (2025) T291–T300

ACTAS
Dermo-Sifiliográficas

Full English text available at
www.actasdermo.org



BRIEF COMMUNICATION

[Translated article] Photoprotection Knowledge, Habits, and Attitudes Among Spanish and Italian Medical Students

J.J. Durán-Ávila[a], **T. Montero-Vilchez**[a,b,c,*], **C. Durán-Ávila**[d], **S. Arias-Santiago**[a,b,c], **A. Buendía-Eisman**[a]

[a] *Facultad de Medicina de la Universidad de Granada, Granada, Spain*
[b] *Servicio de Dermatología del Hospital Universitario Virgen de las Nieves, Granada, Spain*
[c] *Instituto de Investigación Biosanitaria ibs.GRANADA, Granada, Spain*
[d] *Hospital Universitario de Jaén, Jaén, Spain*

Received 19 June 2023; accepted 9 October 2023

KEYWORDS
Skin cancer;
Knowledge;
Photoprotection;
Students;
Sun exposure;
Habits;
Prevention

Abstract Exposure to UV radiation is a major risk factor for the development of malignant skin neoplasms. Currently, there are no studies available on sun-exposure habits among different countries. We conducted a cross-sectional survey among medical students from the University of Rome, Italy and the University of Granada, Spain to compare their photoprotection knowledge, habits, and attitudes. A total of 215 medical students (114 Spanish, and 101 Italian) were included. Spanish students considered the Sun to be the main cause of skin cancer (83.3% vs 61.4%; $p = .003$) and they looked at their skin more often than Italian students did (32.5% vs 9.9%; $p < .001$). The latter received information on photoprotection mainly from their dermatologist (34.7%, 35/101) vs Spaniards who received such information from their university (39.5%, 45/114; $p < .001$). After studying dermatology, Spaniards used sunscreen more frequently than Italians did (76.8% before vs 88.1% after; $p = .007$), and recognized the need to implement other measures as well (44.9% vs 67.2%; $p = .025$).

PALABRAS CLAVE
Cáncer de piel;
Conocimiento;
Fotoprotección;
Estudiantes;
Exposición solar;
Hábitos;
Prevención

Conocimientos y hábitos sobre fotoprotección en estudiantes de Medicina españoles e italianos

Resumen La exposición a la radiación ultravioleta es un factor de riesgo fundamental en el desarrollo de neoplasias malignas de la piel. Actualmente, no disponemos de estudios que comparen los hábitos de exposición solar entre diferentes países. Se realizó un estudio transversal mediante encuesta en el que se incluyeron a estudiantes de Medicina de la Universidad de Roma y de Granada y se compararon sus hábitos y conocimientos sobre fotoprotección. Se incluyeron 215 estudiantes (114 españoles y 101 italianos). Los estudiantes españoles consideraron que

DOI of original article: https://doi.org/10.1016/j.ad.2023.10.048
* Corresponding author.
E-mail address: tmonterov@gmail.com (T. Montero-Vilchez).

https://doi.org/10.1016/j.ad.2024.12.002

la principal causa de cáncer de piel era el sol (83,3 vs. 61,4%, p = 0,003) y, examinaron más veces su piel (32,5 vs. 9,9%, p < 0,001). Los italianos recibieron información sobre fotoprotección fundamentalmente a través de su dermatólogo (34,7%, 35/101), los españoles en su universidad (39,5%, 45/114, p < 0,001). Los españoles usaron más frecuentemente una crema fotoprotectora después de cursar Dermatología (76,8% antes vs. 88,1% después, p = 0,007) y, reconocieron que eran necesarias otras medidas (44,9 vs. 67,2%, p = 0,025).

Introduction

The most common malignant skin neoplasms are categorized into cutaneous melanoma and non-melanoma skin cancer, with exposure to UV radiation being the primary risk factor.[1] In recent years, the increase in solar exposure by the population, changes in habits related to a greater tendency for tanning, and population aging have significantly increased the risk of skin cancer1. Since UV radiation is a modifiable etiological factor in the development of skin cancer, it is crucial to promote proper photoprotection as a preventive measure.[2,3]

Public knowledge about photoprotection has been studied by referencing various population groups, including swimmers,[2] adolescents,[4] and athletes.[5] Although training programs on the use of photoprotection measures have not decreased the incidence of skin cancer, they have actually improved attitudes toward skin cancer prevention.[6] Among university populations, it has been observed that these measures are not adequate.[7–9] Studies with Italian students reveal that they are aware of the risks of solar exposure, but they consider tanning to produce a pleasant esthetic effect.[10,11] In other countries such as Jordan, Romania, or Peru, medical students demonstrated higher knowledge vs the general population, yet solar exposure habits were often inadequate.[12–14]

The objective of this study was to compare the knowledge and habits of photoprotection between Spanish and Italian students.

Materials and methods

We conducted an observational, descriptive, cross-sectional study through a self-administered closed-response questionnaire on paper (Supplementary data). We included medical students from the 4th, 5th, or 6th year (University of Rome ''La Sapienza'') and 3rd, 4th, and 5th year (Universidad of Granada), corresponding respectively to ''before studying Dermatology,'' ''while studying Dermatology,'' and ''after studying Dermatology.'' Study methods are shown in Supplementary data.

Results

Descriptive analysis

A total of 215 students were included in the study, 114 of whom were Spanish (53%) and 101, Italian (47%). The patients' mean age was 23.28 (SD, 2.99); a total of 74.4% of participants were women (160/215) and 25.6%, men (55/215).

A total of 32.1% (69/215) of students studied filled out the questionnaire ''before studying Dermatology,'' 36.7% (79/215) filled out the ''while studying Dermatology,'' questionnaire and 31.2% (67/215) the ''after studying Dermatology'' one.

Regarding knowledge, a total of 70.7% (152/215) of participants thought that sun exposure could be both healthy and dangerous, and they considered it the main cause of skin cancer (73.0%, 157/215). Similarly, the vast majority, 81.9% (176/215), knew that the most dangerous time for sun exposure was between 12:00 and 16:00 h; 80% (172/215) said that it was of paramount importance to prevent solar exposure at early ages, and 93.5% (201/215) thought that sunscreen should be used in children; a total of 74% (159/215) of students had received information about photoprotection in the last year.

Regarding photoprotection habits, a total of 52.1% (112/215) of the students showed interest in tanning. Most (72.6%, 156/215) ''always'' or ''almost always'' used sunscreen with a protection factor $\geq$ 30; a total of 60.9% (131/215) reported having had some sort of sunburn throughout their lifetime, and 38.6% (83/215) said they never examined their skin for malignant lesions. Only 14.9% (32/215) had a family history of skin cancer, and 10.2% (22/215) a family history of melanoma.

Differences across multiple countries among medical students are shown in Table 1.

Differences in knowledge and habits about photoprotection were observed between Spanish and Italian students. Italian students were older than the Spanish ones (25.18 vs 21.60 years, $p < 0.001$).

Regarding knowledge, 83.3% (95/114) of Spanish students considered the sun was the main cause of skin cancer vs 61.4% (62/101) of Italian students ($p = 0.003$). On the other hand, Spanish students mainly received information through college (39.5%, 45/114), while Italians received it mostly from their dermatologist (34.7%, 35/101, $p < 0.001$).

Regarding habits and behaviors, Spanish students examined their skin more frequently through self-examination (32.5% vs 9.9%, $p < 0.001$). Additionally, a higher percentage of Italians never used sun protection (8.4% vs 27.7%, $p = 0.002$).

Sex differences across medical students are shown in Table S1. Supplementary data.

Men had a lower phototype than women did (31.9% women vs 50.9% men with phototype II, $p = 0.034$).

Table 1 Student responses by country.

Variable	Total ($n = 215$)	Italy	Spain	p
Age (Mean)	Median 23.28 (SD, 2.99)	Median 25.18	Median 21.60	<0.001
Gender				0.793
Male	55 (25.6%)	76 (75.2%)	84 (73.7%)	
Female	160 (74.4%)	25 (24.8%)	30 (26.3%)	
Course				0.909
Before studying Dermatology	69 (32.1%)	33 (32.7%)	36 (31.6%)	
While studying Dermatology	79 (36.7%)	38 (37.6%)	41 (36%)	
After studying Dermatology	67 (31.2%)	30 (29.7%)	37 (32.5%)	
1. Do you like being tanned?				0.807
Yes	112 (52.1%)	52 (51.5%)	60 (52.6%)	
No	39 (18.1%)	17 (16.8%)	22 (19.3%)	
Indifferent	64 (29.8%)	32 (31.7%)	32 (28.1%)	
2. The sun that burns the most				<0.001
From 10 a.m. to 2 p.m.	17 (7.9%)	16 (15.8%)	1 (0.9%)	
From 12 p.m. to 4 p.m.	176 (81.9%)	81 (80.2%)	95 (83.3%)	
From 2 p.m. to 6 p.m.	12 (5.6%)	1 (1%)	11 (9.6%)	
All times are the same	8 (3.7%)	2 (2%)	6 (5.3%)	
I don't know	2 (0.9%)	1 (1%)	1 (0.9%)	
3. Exposing yourself to the sun is				<0.001
Healthy	2 (0.9%)	2 (2%)	0 (0%)	
Healthy and dangerous	152 (70.7%)	86 (85.1%)	66 (57.9%)	
Dangerous	33 (15.3%)	10 (9.9%)	23 (20.2%)	
Very dangerous	28 (13%)	3 (3%)	25 (21.9%)	
4. Main cause of skin cancer				0.003
The sun	157 (73%)	62 (61.4%)	95 (83.3%)	
Hereditary	2 (0.9%)	2 (2%)	0 (0%)	
I don't know	2 (0.9%)	1 (1%)	1 (0.9%)	
Several of the above	54 (25.1%)	36 (35.6%)	18 (15.8%)	
5.1. I don't like the texture of sunscreen cream				0.630
Agree	29 (13.5%)	37 (36.6%)	70 (61.4%)	
Partially agree	75 (34.9%)	38 (37.6%)	27 (23.7%)	
Disagree	70 (32.6%)	16 (15.8%)	12 (10.5%)	
Indifferent	41 (19.1%)	10 (9.9%)	5 (4.4%)	
5.2. At the beach, I prefer to be in the shade				0.004
Agree	107 (49.8%)	32 (58.2%)	75 (46.9%)	
Partially agree	65 (30.2%)	16 (29.1%)	49 (30.6%)	
Disagree	28 (13%)	1 (1.8%)	27 (16.9%)	
Indifferent	15 (7%)	6 (10.9%)	9 (5.6%)	
5.3. I do not use sunscreen to tan				0.151
Agree	10 (4.7%)	8 (7.9%)	2 (1.8%)	
Partially agree	22 (10.2%)	11 (10.9%)	11 (9.6%)	
Disagree	174 (80.9%)	79 (78.2%)	95 (83.3%)	
Indifferent	9 (4.2%)	3 (3%)	6 (5.3%)	
5.4. To protect myself from the sun, sunscreen is enough				0.278
Agree	14 (6.5%)	9 (8.9%)	5 (4.4%)	
Partially agree	83 (38.6%)	49 (48.5%)	34 (29.8%)	
Disagree	115 (53.3%)	42 (41.6%)	73 (64%)	
Indifferent	3 (1.4%)	1 (1%)	2 (1.8%)	
5.5. Young children do not need sunscreen				0.035
Agree	4 (1.9%)	3 (3%)	1 (0.9%)	
Partially agree	2 (0.9%)	2 (2%)	0 (0%)	
Disagree	201 (93.5%)	93 (92.1%)	108 (94.7%)	
Indifferent	8 (3.7%)	3 (3%)	5 (4.4%)	

Table 1 (*Continued*)

Variable	Total ($n = 215$)	Italy	Spain	p
5.6. Sunbathing helps prevent health issues and is, therefore, healthy				0.048
Agree	30 (14%)	16 (15.8%)	14 (12.3%)	
Partially agree	140 (65.1%)	72 (71.3%)	68 (59.6%)	
Disagree	43 (20%)	12 (11.9%)	31 (27.2%)	
Indifferent	2 (0.9%)	1 (1%)	1 (0.9%)	
5.7. If I am tan, I don't need sunscreen				0.210
Agree	0 (0%)	0 (0%)	0 (0%)	
Partially agree	13 (6%)	9 (8.9%)	4 (3.5%)	
Disagree	196 (91.2%)	90 (89.1%)	106 (93%)	
Indifferent	6 (2.8%)	2 (2%)	4 (3.5%)	
5.8. Avoiding the sun in central hours is the best way to protect myself				0.132
Agree	62 (28.8%)	23 (22.8%)	39 (34.2%)	
Partially agree	116 (54%)	63 (62.4%)	53 (46.5%)	
Disagree	34 (15.8%)	14 (13.9%)	20 (17.5%)	
Indifferent	3 (1.4%)	1 (1%)	2 (1.8%)	
5.9. Avoiding the sun at a young age reduces the risk of skin cancer				<0.001
Agree	119 (55.3%)	38 (37.6%)	81 (71.1%)	
Partially agree	53 (24.7%)	32 (31.7%)	21 (18.4%)	
Disagree	24 (11.2%)	20 (19.8%)	4 (3.5%)	
Indifferent	19 (8.8%)	11 (10.9%)	8 (7%)	
6. Information received				<0.001
No information received	56 (26%)	34 (33.7%)	22 (19.3%)	
From my dermatologist and university	10 (4.7%)	0 (0%)	10 (8.8%)	
From my dermatologist	41 (19.1%)	35 (34.7%)	6 (5.3%)	
From university	45 (20.9%)	0 (0%)	45 (39.5%)	
Other sources (TV, radio, press, etc.)	63 (29.3%)	32 (31.7%)	31 (27.2%)	
7.1. Used sunscreen with SPF $\geq$ 30				0.747
Always	67 (31.2%)	34 (33.7%)	33 (28.9%)	
Almost always	89 (41.4%)	39 (38.6%)	50 (43.9%)	
Sometimes	40 (18.6%)	20 (19.8%)	20 (17.5%)	
Almost never	14 (6.5%)	5 (5%)	9 (7.9%)	
Never	5 (2.3%)	3 (3%)	2 (1.8%)	
7.2. Wore a t-shirt				0.808
Always	23 (10.7%)	9 (8.9%)	14 (12.3%)	
Almost always	55 (25.6%)	28 (27.7%)	27 (23.7%)	
Sometimes	64 (29.8%)	30 (29.7%)	34 (29.8%)	
Almost never	37 (17.2%)	19 (18.8%)	18 (15.8%)	
Never	36 (16.7%)	15 (14.9%)	21 (18.4%)	
7.3. Wore a cap or hat				0.503
Always	17 (7.9%)	8 (7.9%)	9 (7.9%)	
Almost always	38 (17.7%)	20 (19.8%)	18 (15.8%)	
Sometimes	61 (28.4%)	28 (27.7%)	33 (28.9%)	
Almost never	53 (24.7%)	20 (19.8%)	33 (28.9%)	
Never	46 (21.4%)	25 (24.8%)	21 (18.4%)	
7.4. Wore sunglasses				0.058
Always	65 (30.2%)	39 (38.6%)	26 (22.8%)	
Almost always	53 (24.7%)	26 (25.7%)	27 (23.7%)	
Sometimes	43 (20%)	14 (13.9%)	29 (25.4%)	
Almost never	30 (14%)	13 (12.9%)	17 (14.9%)	
Never	24 (11.2%)	9 (8.9%)	15 (13.2%)	
7.5. Stayed in the shade				0.164
Always	37 (17.2%)	18 (17.8%)	19 (16.7%)	
Almost always	100 (46.5%)	54 (53.5%)	46 (40.4%)	
Sometimes	65 (30.2%)	26 (25.7%)	39 (34.2%)	

Table 1 (*Continued*)

Variable	Total (*n* = 215)	Italy	Spain	*p*
Almost never	12 (5.6%)	3 (3%)	9 (7.9%)	
Never	1 (0.5%)	0 (0%)	1 (0.9%)	
7.6.1. How many hours were you exposed to the sun between 12 and 16 h?				0.693
0 h	13 (6%)	7 (6.9%)	6 (5.3%)	
<1 h	97 (45.1%)	49 (48.5%)	48 (42.1%)	
1–2 h	79 (36.7%)	34 (33.7%)	45 (39.5%)	
2–4 h	26 (12.1%)	11 (10.9%)	15 (13.2%)	
7.6.2. How often were you exposed during this time?				0.403
Every day	8 (3.7%)	2 (2%)	6 (5.3%)	
Most days (≥5/week)	29 (13.5%)	12 (11.9%)	17 (14.9%)	
3–4 days a week	47 (21.9%)	26 (25.7%)	21 (18.4%)	
<2 days/week or occasionally	121 (56.3%)	55 (54.5%)	66 (57.9%)	
None	10 (4.7%)	6 (5.9%)	4 (3.5%)	
8. Sunburns in the past year				0.312
No sunburns	74 (34.4%)	39 (38.6%)	35 (30.7%)	
1–3 sunburns	131 (60.9%)	59 (58.4%)	72 (63.5%)	
4–6 sunburns	10 (4.7%)	3 (3%)	7 (6.1%)	
9. How many with blisters involved?				0.130
None	207 (96.3%)	94 (93.1%)	113 (99.1%)	
1–3	6 (2.8%)	5 (5%)	1 (0.9%)	
4–6	1 (0.5%)	1 (1%)	0 (0%)	
>7	1 (0.5%)	1 (1%)	0 (0%)	
10. Phototype				0.915
Phototype I	46 (21.4%)	23 (22.8%)	23 (20.2%)	
Phototype II	79 (36.7%)	36 (35.6%)	43 (37.7%)	
Phototype III	58 (27%)	29 (28.7%)	29 (25.4%)	
Phototype IV	22 (10.2%)	9 (8.9%)	13 (11.4%)	
Phototype V	10 (4.7%)	4 (4%)	6 (5.3%)	
Phototype VI	0 (0%)	0 (0%)	0 (0%)	
11. Outdoor physical exercise				<0.001
Never	73 (34%)	31 (30.7%)	42 (36.8%)	
1 or 2 days a week	74 (34.4%)	22 (21.8%)	52 (45.6%)	
3 or 4 days a week	32 (14.9%)	15 (14.9%)	17 (14.9%)	
1 or 2 times a month	36 (16.7%)	33 (32.7%)	3 (2.6%)	
12. If you exercise, how often do you protect yourself from the sun?				0.002
Always	43 (23.4%)	17 (16.8%)	26 (31.3%)	
Almost always	37 (20.1%)	18 (17.8%)	19 (22.9%)	
Sometimes	35 (19%)	23 (22.8%)	12 (14.5%)	
Almost never	34 (18.5%)	15 (14.9%)	19 (22.9%)	
Never	35 (19%)	28 (27.7%)	7 (8.4%)	
13. Family history of skin cancer				0.814
Yes	32 (14.9%)	16 (15.8%)	16 (14%)	
No	168 (78.1%)	79 (78.2%)	89 (78.1%)	
Don't know	15 (7%)	6 (5.9%)	9 (7.9%)	
14. Family history of melanoma				0.659
Yes	22 (10.2%)	12 (11.9%)	10 (8.8%)	
No	171 (79.5%)	80 (79.2%)	91 (79.8%)	
Don't know	22 (10.2%)	9 (8.9%)	13 (11.4%)	
15. Skin self-examination last year				<0.001
Never	83 (38.6%)	44 (43.6%)	39 (34.2%)	
Once	53 (24.7%)	34 (33.7%)	19 (16.7%)	
2–3 times	32 (14.9%)	13 (12.9%)	19 (16.7%)	

Table 1 (*Continued*)

Variable	Total ($n = 215$)	Italy	Spain	p
16. UVA tanning booths				0.555
Yes	5 (2.3%)	3 (3%)	2 (1.8%)	
No	210 (97.7%)	98 (97%)	112 (98.2%)	
17. If answered yes, frequency of UVA sessions				0.329
Once every 4–5 months	1 (20%)	0 (0%)	1 (50%)	
Once a year or less	1 (20%)	1 (33.3%)	0 (0%)	
Only went once	3 (60%)	2 (66.7%)	1 (50%)	

Table 2 Responses of students based on the academic year they were in during their medical degree.

	Before studying Dematology	While studying Dematology	After studying Dematology	p
Age	Mean 22.03	Mean 22.87	Mean 25.04	0.135
Gender				0.059
Man	13 (18.8%)	18 (22.8%)	24 (35.8%)	
Woman	56 (81.2%)	61 (77.2%)	43 (64.2%)	
Country				0.909
Spain	36 (52.2%)	41 (51.9%)	37 (55.2%)	
Italy	33 (47.8%)	38 (48.1%)	30 (44.8%)	
1. Do you like being tanned?				0.283
Yes	42 (60.9%)	39 (49.4%)	31 (46.3%)	
No	12 (17.4%)	12 (15.2%)	15 (22.4%)	
Indifferent	15 (21.7%)	28 (35.4%)	21 (31.3%)	
2. The sun that burns the most				0.793
From 10 a.m. to 2 p.m.	5 (7.2%)	7 (8.9%)	5 (7.5%)	
From 12 p.m. to 4 p.m.	59 (85.5%)	63 (79.7%)	54 (80.6%)	
From 2 p.m. to 6 p.m.	4 (5.8%)	3 (3.8%)	5 (7.5%)	
All times are the same	1 (1.4%)	5 (6.3%)	2 (3%)	
I don't know	0 (0%)	1 (1.3%)	1 (1.5%)	
3. Exposing yourself to the sun is				0.110
Healthy	0 (0%)	0 (0%)	2 (3%)	
Healthy and dangerous	54 (78.3%)	58 (73.4%)	40 (59.7%)	
Dangerous	10 (14.5%)	10 (12.7%)	13 (19.4%)	
Very dangerous	5 (7.2%)	11 (13.9%)	12 (17.9%)	
4. Main cause of skin cancer				0.337
The sun	46 (66.7%)	59 (74.7%)	52 (77.6%)	
Hereditary	1 (1.4%)	1 (1.3%)	0 (0%)	
I don't know	0 (0%)	2 (2.5%)	0 (0%)	
Several of the above	22 (31.9%)	17 (21.5%)	15 (22.4%)	
5.1. I don't like the texture of sunscreen cream				0.047
Agree	6 (8.7%%)	7 (8.9%)	16 (23.9%)	
Partially agree	23 (33.3%)	29 (36.7%)	23 (34.3%)	
Disagree	28 (40.6%)	23 (29.1%)	19 (28.4%)	
Indifferent	12 (17.4%)	20 (25.3%)	9 (13.4%)	
5.2. At the beach, I prefer to be in the shade				0.196
Agree	32 (46.4%)	35 (44.3%)	40 (59.7%)	
Partially agree	19 (27.5%)	25 (31.6%)	21 (31.3%)	
Disagree	12 (17.4%)	13 (16.5%)	3 (4.5%)	
Indifferent	6 (8.7%)	6 (7.6%)	3 (4.5%)	
5.3. I do not use sunscreen to tan				0.007
Agree	4 (5.8%)	5 (6.3%)	1 (1.5%)	
Partially agree	12 (17.4%)	9 (11.4%)	1 (1.5%)	
Disagree	53 (76.8%)	62 (78.5%)	59 (88.1%)	

Table 2 (*Continued*)

	Before studying Dematology	While studying Dematology	After studying Dematology	*p*
Indifferent	0 (0%)	3 (3.8%)	6 (9%)	
5.4. To protect myself from the sun, sunscreen is enough				0.025
Agree	6 (8.7%)	8 (10.1%)	0 (0%)	
Partially agree	31 (44.9%)	32 (40.5%)	20 (29.9%)	
Disagree	31 (44.9%)	39 (49.4%)	45 (67.2%)	
Indifferent	1 (1.4%)	0 (0%)	2 (3%)	
5.5. Young children do not need sunscreen				0.178
Agree	0 (0%)	1 (1.3%)	3 (4.5%)	
Partially agree	1 (1.4%)	1 (1.3%)	0 (0%)	
Disagree	67 (97.1%)	75 (94.9%)	59 (88.1%)	
Indifferent	1 (1.4%)	2 (2.5%)	5 (7.5%)	
5.6. Sunbathing helps prevent health issues and is, therefore, healthy				0.523
Agree	12 (17.4%)	13 (16.5%)	5 (7.4%)	
Partially agree	46 (66.7%)	48 (60.8%)	46 (68.7%)	
Disagree	11 (15.9%)	17 (21.5%)	15 (22.4%)	
Indifferent	0 (0%)	1 (1.3%)	1 (1.5%)	
5.7. If I am tan, I don't need sunscreen				0.312
Agree	0 (0%)	0 (0%)	0 (0%)	
Partially agree	5 (7.2%)	4 (5.1%)	4 (6%)	
Disagree	64 (92.8%)	73 (92.4%)	59 (88.1%)	
Indifferent	0 (0%)	2 (2.5%)	4 (6%)	
5.8. Avoiding the sun in central hours is the best way to protect myself				0.753
Agree	18 (26.1%)	21 (26.6%)	23 (34.3%)	
Partially agree	42 (60.9%)	42 (53.2%)	32 (47.8%)	
Disagree	8 (11.6%)	15 (19%)	11 (16.4)	
Indifferent	1 (1.4%)	1 (1.3%)	1 (1.5%)	
5.9. Avoiding the sun at a young age reduces the risk of skin cancer				0.243
Agree	31 (44.9%)	43 (54.4%)	45 (67.2%)	
Partially agree	19 (27.5%)	20 (25.3%)	14 (20.9%)	
Disagree	11 (15.9%)	9 (11.4%)	4 (6%)	
Indifferent	8 (11.6%)	7 (8.9%)	4 (6%)	
6. Information received				<0.001
No information received	20 (29%)	26 (32.9%)	10 (14.9%)	
From my dermatologist and university	1 (1.4%)	2 (2.5%)	7 (10.4)	
From my dermatologist	18 (26.1%)	12 (15.2%)	11 (16.4%)	
From university	7 (10.1%)	12 (15.2%)	26 (38.8%)	
Other sources (TV, radio, press, etc.)	23 (33.3%)	27 (34.2%)	13 (19.4)	
7.1. Used sunscreen with SPF $\geq$ 30				0.373
Always	17 (24.6%)	25 (31.6%)	25 (37.3%)	
Almost always	26 (37.3%)	34 (43%)	29 (43.3%)	
Sometimes	19 (27.5%)	14 (17.7%)	7 (10.4%)	
Almost never	6 (8.7%)	4 (5.1%)	4 (6%)	
Never	1 (1.4%)	2 (2.5%)	2 (3%)	
7.2. Wore a t-shirt				0.065
Always	5 (7.2%)	8 (10.1%)	10 (14.9%)	
Almost always	20 (29%)	18 (22.8%)	17 (25.4%)	
Sometimes	18 (26.1%)	21 (26.6%)	25 (37.3%)	
Almost never	9 (13%)	21 (26.6%)	7 (10.4%)	
Never	17 (24.6%)	11 (13.9%)	8 (11.9%)	
7.3. Wore a cap or hat				0.304
Always	5 (7.2%)	9 (11.4%)	3 (4.5%)	
Almost always	13 (18.8%)	8 (10.1%)	17 (25.4%)	
Sometimes	17 (24.6%)	24 (30.4%)	20 (29.9%)	
Almost never	19 (27.5%)	22 (27.8%)	12 (17.9%)	

Table 2 (*Continued*)

	Before studying Dematology	While studying Dematology	After studying Dematology	*p*
Never	15 (21.7%)	16 (20.3%)	15 (22.4%)	
7.4. Wore sunglasses				0.260
Always	23 (33.3%)	19 (24.1%)	23 (34.3%)	
Almost always	19 (27.5%)	25 (31.6%)	9 (13.4%)	
Sometimes	12 (17.4%)	16 (20.3%)	15 (22.4%)	
Almost never	6 (8.7%)	12 (15.2%)	12 (17.9%)	
Never	9 (13%)	7 (8.9%)	8 (11.9%)	
7.5. Stayed in the shade				0.054
Always	9 (13%)	9 (11.4%)	19 (28.4%)	
Almost always	36 (52.2%)	34 (43%)	30 (44.8%)	
Sometimes	18 (26.1%)	30 (38%)	17 (25.4%)	
Almost never	6 (8.7%)	5 (6.3%)	1 (1.5%)	
Never	0 (0%)	1 (1.3%)	0 (0%)	
7.6.1. How many hours were you exposed to the sun between 12–16 h?				0.236
0 h	4 (5.8%)	5 (6.3%)	4 (6%)	
<1 h	29 (42%)	33 (41.8%)	35 (52.2%)	
1–2 h	25 (36.2%)	36 (45.6%)	18 (26.9%)	
2–4 h	11 (15.9%)	5 (6.3%)	10 (14.9%)	
7.6.2. How often were you exposed during this time?				0.846
Every day	2 (2.9%)	2 (2.5%)	4 (6%)	
Most days (≥5/week)	8 (11.6%)	12 (15.2%)	9 (13.4%)	
3–4 days a week	14 (20.3%)	20 (25.3%)	13 (19.4%)	
<2 days/week or occasionally	40 (58%)	42 (53.2%)	39 (58.2%)	
None	5 (7.2%)	3 (3.8%)	2 (3%)	
8. Sunburns in the past year				0.524
No sunburns	22 (31.9%)	25 (31.6%)	27 (40.3%)	
1–3 sunburns	43 (62.3%)	49 (62%)	39 (58.2%)	
4–6 sunburns	4 (5.8%)	5 (6.3%)	1 (1.5%)	
9. How many with blisters involved?				0.305
None	64 (92.8%)	76 (96.2%)	67 (100%)	
1–3	3 (4.3%)	3 (3.8%)	0 (0%)	
4–6	1 (1.4%)	0 (0%)	0 (0%)	
>7	1 (1.4%)	0 (0%)	0 (0%)	
10. Phototype				0.144
Phototype I	10 (14.5%)	18 (22.8%)	18 (26.9%)	
Phototype II	29 (42%)	30 (38%)	20 (29.9%)	
Phototype III	22 (31.9%)	23 (29.1%)	13 (19.4%)	
Phototype IV	6 (8.7%)	6 (7.6%)	10 (14.9%)	
Phototype V	2 (2.9%)	2 (2.5%)	6 (9%)	
Phototype VI	0 (0%)	0 (0%)	0 (0%)	
11. Outdoor physical exercise				0.690
Never	25 (36%)	30 (38%)	18 (26.9%)	
1 or 2 days a week	21 (30.4%)	26 (32.9%)	27 (40.3%)	
3 or 4 days a week	9 (13%)	11 (13.9%)	12 (17.9%)	
1 or 2 times a month	14 (20.3%)	12 (15.2%)	10 (14.9%)	
12. If you exercise, how often do you protect yourself from the sun?				0.659
Always	13 (23.2%)	13 (19.1%)	17 (28.3%)	
Almost always	9 (16.1%)	16 (23.5%)	12 (20%)	
Sometimes	14 (25%)	9 (13.2%)	12 (20%)	
Almost never	9 (16.1%)	15 (22.1%)	10 (16.7%)	
Never	11 (19.6%)	15 (22.1%)	9 (15%)	
13. Family history of skin cancer				0.816
Yes	9 (13%)	11 (13.9%)	12 (17.9%)	
No	54 (78.3%)	62 (78.5%)	52 (77.6%)	

Table 2 (*Continued*)

	Before studying Dematology	While studying Dematology	After studying Dematology	*p*
Don't know	6 (8.7%)	6 (7.6%)	3 (4.5%)	
14. Family history of melanoma				0.583
Yes	10 (14.5%)	5 (6.3%)	7 (10.4%)	
No	52 (75.4%)	65 (82.3%)	54 (80.6%)	
Don't know	7 (10.1%)	9 (11.4%)	6 (9%)	
15. Skin self-examination last year				0.320
Never	25 (36.2%)	36 (45.6%)	22 (32.8%)	
Once	21 (30.4%)	16 (20.3%)	16 (23.9%)	
2–3 times	9 (13%)	14 (17.7%)	9 (13.4%)	
More than 3 times	14 (20.3%)	13 (16.5%)	20 (29.9%)	
16. UVA tanning booths				0.828
Yes	1 (1.4%)	2 (2.5%)	2 (3%)	
No	68 (98.6%)	77 (97.5%)	65 (97%)	
17. If answered yes, frequency of UVA sessions				0.287
Once every 4–5 months	0 (0%)	1 (50%)	0 (0%)	
Once a year or less	0 (0%)	1 (50%)	0 (0%)	
Only went once	1 (100%)	0 (0%)	2 (100%)	

Regarding knowledge, a higher number of women indicated that despite being tanned, topical sunscreens were required (96.3% vs 76.4%, $p < 0.001$) and that using only sunscreen was not enough to protect from the sun (58.1% vs 40%, $p = 0.041$).

On photoprotection habits, women were more concerned about tanning (58.8% vs 32.7%, $p = 0.003$), used sunscreen ''always'' or ''almost always'' with a factor of 30 or higher (76.9% vs 60%, $p = 0.008$), but also spent more hours in the sun than men did (55.6% vs 29.1% exposure to the sun > 1 h, $p = 0.003$). Men sought shade more often than women did (46.9% vs 58.2%, $p = 0.020$).

Course differences among medical students are shown in Table 2.

Regarding knowledge, students before and during the Dermatology course received information about photoprotection mostly through social media or television (34.2% vs 19.4%, $p < 0.001$), while those who had already taken the subject mostly received information through the university (38.8% vs 15.2%, $p < 0.001$).

In terms of photoprotection habits, more students used sunscreen after studying Dermatology (88.1% vs 76.8%, $p = 0.007$). Additionally, a higher percentage of students thought that additional measures (beyond using sunscreen) were necessary to protect from the sun after taking Dermatology (67.2% vs 49.4%, $p = 0.025$).

Country differences among medical students are shown in Table S2. Supplementary data.

In terms of knowledge, in Spain, the importance of avoiding the sun in childhood was greater after taking the course (52.8% before vs 89.2% after, $p = 0.045$), unlike Italy, where it was similar (36.4% vs 40.0%, $p = 0.879$). Information about photoprotection primarily came from the media in Spanish students before studying Dermatology (41.7% vs 8.1%, $p = 0.001$), while university information was more prevalent in Spanish students after studying Dermatology (19.4% vs 70.3%, $p = 0.001$).

Regarding photoprotection habits, in Spain, a higher number of students showed an interest in tanning before taking Dermatology vs those who had already studied the subject (61.1% before vs 43.2% after, $p = 0.009$), with similar percentages in Italy. Spanish students used caps almost always after studying the subject (8.3% before vs 35.1% after, $p = 0.002$).

Discussion

This study shows that there are differences among medical students regarding knowledge and photoprotection habits across different countries and sexes. Furthermore, taking Dermatology increases knowledge and improves habits regarding photoprotection.

Spanish students had more knowledge about sun exposure due to their university training, while Italians acquired it from their dermatologist. Additionally, Spanish students examined their skin more frequently and used topical photoprotectors to protect vs the risk of skin cancer in childhood. Former studies conducted among Spanish university students in Gran Canaria (Canary Islands)[15] similarly found that students had a high level of knowledge about photoprotection, yet almost three-quarters of them had suffered sunburns. However, this study does not demonstrate a corresponding improvement in knowledge or photoprotection habits as students advance through their medical degree. This lack of change may partly be due to the fact that Gran Canaria students acquire knowledge about photoprotection before starting their college degree or because during the Dermatology course, less emphasis is placed on sun-related problems and photoprotection measures. On the other hand, a study conducted at Universidad de Zaragoza (Zaragoza, Spain) evaluated the impact of the educational program *SolSano*16, an educational project on photoprotection aimed at children aged 6–12 years in Primary Education. This study found that there were few differences in photoprotection

knowledge between college students who had studied in *SolSano* program-affiliated schools and those who had not, stressing the need to continue emphasizing photosafe habits in later stages of education, such as university level.[16]

Women demonstrated adequate knowledge of photoprotection and used sunscreen with SPF $\geq$ 30 more frequently. However, they also showed more interest in tanning and spent more hours in the sun. Similar results were found by the study conducted by Fagundo et al.,[17] in which women demonstrated higher sun exposure and a greater risk of melanoma.

Both Spanish and Italian college students showed that the Dermatology course improved their knowledge about photoprotection and changed their habits to achieve better sun protection, which may be due to campaigns on healthy habits and skin cancer prevention, directed by Fundación Piel Sana endorse by the Spanish Academy of Dermatology and Venereology (specifically the Euromelanoma campaign). In former studies, we found that college students improve their perception of Dermatology and the role of the dermatologist after taking the Dermatology course, recognizing the importance of dermatological diseases.[18] Moreover, it has been demonstrated that the most effective way to prevent skin cancer is through primary prevention educational programs.[19]

Conclusions

There are differences in knowledge and photoprotection habits between students of both countries. Spanish students have better knowledge and photoprotection habits, as a higher percentage considers solar radiation to be the main risk factor for the development of skin cancer and uses topical photoprotectors more frequently. Taking Dermatology can help improve photoprotection habits (greater use of sunscreen and implementation of additional measures to protect from solar radiation) in both Spain and Italy.

Funding

None declared.

Conflicts of interest

None declared.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.ad.2024.12.002.

References

1. Martín-García E, Arias-Santiago S, Serrano-Ortega S, Buendía-Eisman A. Evolución de la incidencia del cáncer de piel y labio durante el período 1978–2007. Actas Dermosifiliogr. 2017;108:335–45.
2. de Troya-Martin M, de Galvez-Aranda MV, Rivas-Ruiz F, Blazquez-Sanchez N, Fernández-Morano MT, Padilla-España L, et al. Prevalence and predictors of sunburn among beachgoers. Photodermatol Photoimmunol Photomed. 2018;34:122–9.
3. Baron E. Selection of sunscreen and sun-protective measures. UpToDate. 2022.
4. Buendia-Eisman A, Conejo-Mir J, Prieto L, Castillejo I, Moreno-Gimenez JC, Arias-Santiago S. Buen Rayito Study: awareness, attitudes and behavior of teenagers to sunlight through a web based system in Spain. Eur J Dermatol. 2013;23:505–9.
5. Fernandez-Ruiz J, Montero-Vilchez T, Buendia-Eisman A, Arias-Santiago S. Knowledge behaviour and attitudes related to sun exposure in sportspeople: a systematic review. Int J Environ Res Public Health. 2022;19:10175.
6. Serpone N. Sunscreens and their usefulness: have we made any progress in the last two decades? Photochem Photobiol Sci. 2021;20:189–244.
7. Castilho IG, Sousa MA, Leite RM. Photoexposure and risk factors for skin cancer: an evaluation of behaviors and knowledge among university students. An Bras Dermatol. 2010;85:173–8.
8. Lopez-Ravello BM, Buendia-Eisman A, Arias-Santiago S, Fernández Pugnaire MA, Serrano Ortega S. Estudio epidemiológico de los nevus en estudiantes de la Facultad de Medicina de la Universidad de Granada. Actual Méd. 2011;96:6–14.
9. Lopez-Ravello BM, Arias-Santiago S, Fernandez-Pugnaire MA, Ortega SS, Buendia-Eisman A. Prevalence of common and atypical melanocytic nevi in young adults and its relationship with sun protection and exposure habits. Eur J Dermatol. 2015;25:45–51.
10. Monfrecola G, Fabbrocini G, Posteraro G, Pini D. What do young people think about the dangers of sunbathing, skin cancer and sunbeds? A questionnaire survey among Italians. Photodermatol Photoimmunol Photomed. 2000;16:15–8.
11. Stinco G, Favot F, Quinkenstein E, Zanchi M, Valent F, Patrone P. Children and sun exposure in the northeast of Italy. Pediatr Dermatol. 2005;22:520–4.
12. Seetan K, Khamees A, Migdadi A, Abu Shqeer M, Hasan MJ, Shatnawi LA. Knowledge, attitude, and practice toward skin cancer prevention and detection among Jordanian medical students: A cross-sectional study. J Skin Cancer. 2022;2022:6989827.
13. Rodriguez-Gambetta P, Moscoso-Porras MG, Taype-Rondan A. Factors associated with regular sunscreen use by medical students of a Peruvian university. J Prev Med Hyg. 2016;57:E172–7.
14. Bota I, Popescu R, Solovan C. A study on sun exposure and photo-protection behavior of medical students in a western Romanian university center. Rom. J Clin Exp Dermatol. 2017;3:138–41.
15. Ponce S, Jodar A, Borrego L, Saavedra P. Comportamientos, actitudes y conocimientos relacionados con la exposición solar en estudiantes de medicina de la Universidad de Las Palmas de Gran Canaria. Actas Dermosifiliogr. 2019;110:372–84.
16. Sirera Rus MP, Ipiens Serrate JR, Ferrer Gracia E, Teruel Melero P, Gallego Dieguez J, Gilaberte Y. Effectiveness of SolSano program on sun protection habits, knowledge, and attitudes among university students. Actas Dermosifiliogr (Engl Ed). 2020;111:381–9.
17. Fagundo E, Rodriguez-Garcia C, Rodriguez C, Gonzalez S, Sanchez R, Jimenez A. Analysis of phenotypic characteristics and exposure to UV radiation in a group of patients with cutaneous melanoma. Actas Dermosifiliogr. 2011;102:599–604.
18. Montero-Vilchez T, Molina-Cabrerizo M, Ortega-Olmo R, Serrano-Ortega S, Arias-Santiago S, Buendia-Eisman A. What do medical students think about dermatology? A prospective observational study. Actas Dermosifiliogr. 2022. S0001-731000256-3.
19. Alonso-Belmonte C, Montero-Vilchez T, Arias-Santiago S, Buendia-Eisman A. Current state of skin cancer prevention: a systematic review. Actas Dermosifiliogr. 2022;113:781–91.