

Factors associated with regular sunscreen use by medical students of a Peruvian university

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Keywords

Sun protection • Sunscreen • Ordinal logistic regression

Summary

Introduction. Use of sunscreen is encouraged to reduce the risk of skin pathologies caused by radiation. It is important to acknowledge the associated factors that promote or hinder sunscreen use in young populations as to design better prevention policies.

Objective. To determine the factors associated with regular sunscreen use among first year medical students from a Peruvian university.

Materials and methods. A cross-sectional study was performed. Our population was first-year medical students from a Peruvian university. We administrated an electronic survey to evaluate socio-demographic data, as well as student knowledge, attitudes, and practices regarding photo-protection. We used ordinal logistic regression to analyze the factors associated with sunscreen use.

Results. Of 420 first-year students, 299 completed our survey. We found that 53.5% of the participants were less than 18 years old,

63.2% were female, 9.3% (females more than males) responded that a sunburn was worth it to look tan, and 38.1% always or almost always used sunscreen during the summer. Factors associated with sunscreen use in the ordered logistic adjusted regression were male sex (OR = 0.50, IC95% = 0.34-0.86), participation in photo-protection workshops within the last year (OR = 2.40, IC95% = 1.28-4.37), and having somebody to remind them the use of sunscreen during the last three months (OR = 3.80, IC95% = 1.28-11.20).

Conclusions. In our sample, a higher sunscreen use was more often observed among female participants, those who attended skin protection workshops, and those reminded to use sunscreen. This highlights the importance of educational and reminder activities in the adoption of protective habits, such as sunscreen use.

Introduction

Regulated sun exposure is beneficial to human beings because it prevents autoimmune diseases, helps produce vitamin D₃, is beneficial for certain skin diseases such as psoriasis, and increases the serum levels of endorphins [1]. However, excessive sun exposure is related to the development of skin cancer, skin damage, photoaging, eye problems, DNA mutations, and immune system damage [2].

Skin cancer is the major consequence of excessive sun exposure [3, 4]. According to the World Health Organization (WHO), one of every three cancers detected in the world is a skin cancer [5]. As such, WHO recommends many photo-protective methods such as: seeking shade, use of sunscreen, skin-covering clothes, hats, and sunglasses with UV filters [6].

Up to 80% of the radiation absorbed during one's entire life is absorbed during childhood and adolescence [7, 8]. So, the best way to prevent the consequences of excessive sun exposure, including skin cancer, is to promote regular use of photoprotective methods from early ages [3, 4].

Use of sunscreen is one of the most recommended photoprotective methods. Unfortunately, it is frequently sub-optimally utilized, especially among adolescents and young adults [9]. Use of sunscreen in teenagers and

young adults has been evaluated in several studies where the prevalence fluctuates between 26% and 78% [10-12]. It has been found that sunscreen use is related to some characteristics such as female sex, adult supervision, habits ingrained during childhood, prior awareness, previous sunburns, expertise in the topic, previous use of tanning beds, warmer climates, and skin color [12-16]. However, these factors are context-dependent, so they can vary between regions.

Little has been described about these factors in Latin America [14, 17]. This lack of information hinders the design and enhancement of public policies aimed to promote the use of photoprotective methods in young people, in order to prevent a variety of skin diseases, including skin cancer. Thus, the aim of this study is to assess the factors associated with the regular use of sunscreen in university medical students.

Materials and methods

STUDY DESIGN AND SETTING

During April 2014, we conducted a descriptive study among first year medical students from the Universidad de San Martín de Porres (USMP). The USMP is a private university located in Lima, the capital city of Peru.

Students are usually middle class and come from all over the country.

PARTICIPANTS

Participants were all first year medical students who were enrolled according to a USMP database. By 2014, a total of 420 students were registered at the university. We perform the survey in those who agreed to participate in the study after reading an informed consent. Participants whose surveys were less than 80% complete were excluded from the analyses.

PROCEDURE

Prior to the completion of this study, we obtained proper approval from the USMP ethics committee (IRB). We developed a consent form and survey based on the current literature. Both formats were posted on the USMP "virtual classroom", so all first-year students could access both documents with a personalized password. We approached first-year students during class periods in the computer lab to request their participation. The researchers were present during the survey completion to answer participants' questions. Students unable to take the survey during their class period were granted the opportunity to complete it outside class hours.

VARIABLES

Use of sunscreen

The use of sunscreen was measured by the statement: "during the last summer, when you were out in the sun, you used sunscreen...", and the options: "never, almost never, sometimes, almost always, or always". Later, this variable was categorized into three categories (Never/Almost never, Sometimes, and Always/Almost always) to perform the ordinal logistic regression.

For the record, Peruvian summer occurs during January-March, and the survey was completed during April.

Other variables

The survey included five sections: demographic data (sex, age, place of birth, diagnosed skin disease, familiar or known person with skin cancer), self-identified skin phototype according to the Fitzpatrick classification (18), attendance to a photoprotective workshop, having someone remind you to use sunscreen in the last three months, knowledge of sun protection, attitudes regarding sun exposure, and assessment of usual photoprotective methods (use of sunglasses with UV filters, hats or caps, umbrellas and long sleeves).

STATISTICAL ANALYSIS

Data from the surveys were extracted from the virtual classroom, and exported into a Microsoft Excel database. Subsequently, surveys with less than 80% completion were eliminated from the database.

Data was analyzed using STATA v13 (StataCorp, College Station, TX, US). For descriptive analysis, we used frequencies and percentages. For bivariate analysis, we

used Chi-squared tests with level of significance of 5% or Fisher's exact test when expected frequencies in contingency tables were less than five.

Finally, as the outcome variable (sunscreen use) had an ordinal level of measurement, we used crude and adjusted ordinal logistic regression after testing the proportional odds assumption to determine the associated factors. Adjusted regression included all variables tested in the crude analysis.

ETHICAL ISSUES

Participation in this study was voluntary, as stated in the consent form. To ensure the anonymity of the participants, personal data (such as names, numbers of identity documents, and so on) were not requested. Moreover, the database was handled only by the researchers.

Results

PARTICIPANTS CHARACTERISTICS

We requested the participation of all 420 first-year medical students enrolled in the USMP in 2014, from which 321 (76.4%) took the survey. After quality control, 22 surveys were eliminated for being incomplete; leaving 299 (71.2%) surveys for analysis.

Univariate analysis reveals that 53.5% of the participants were less than 18 years old, 63.2% were female, and 67.2% were born in Lima (capital city of Peru). With respect to the skin phototype, 46.1% had phototypes I, II or III, and 40.5% had phototype IV. With respect to the personal and familiar history, 15.7% had a skin disease, and 8.0% had a family member with known skin cancer (Tab. I).

KNOWLEDGE, ATTITUDES AND PRACTICES

Around 97.0% of the participants correctly answered that solar radiation is a major cause of skin cancer, but only 72.9% correctly answered that a sunscreen of SPF 15 is not better than one of SPF 30, moreover, only 23.1% correctly answered that on a cloudy day it is also necessary to use the sunscreen (Tab. II).

Regarding perceptions, 87.0% of the participants affirm that it is worth to use sunscreen to avoid future health problems, 18.2% believe that tan people look more attractive, and 9.3% responded that it is worth to get a sunburn to look tan. This last perception was higher among females than males ($p = 0.021$).

With respect to the use of photoprotective methods, we found that the respondents always or almost always walked in the shade (66.9%), used sunscreen (38.1%), and wore long pants (30.1%). The use of sunscreen and long pants were higher among females than males ($p = 0.010$ and $p = 0.011$, respectively) (Tab. III).

FACTORS ASSOCIATED WITH THE USE OF SUN PROTECTION

Factors directly associated with a higher use of sunscreen in the ordered logistic adjusted regression

Tab. I. Demographic data in first-year medical students at a private university in Lima, Peru 2014 (N = 299).

Characteristics	N (%)
Age	
< 18 years old	160 (53.5)
18-19	112 (37.5)
20 or more	27 (9.0)
Sex	
Female	189 (63.2)
Male	110 (36.8)
Place of birth	
Peru: Lima City	201 (67.2)
Peru: Other	81 (27.1)
Foreign	17 (5.7)
Fitzpatrick Skin phototype	
I-III	138 (46.1)
IV	121 (40.5)
V- VI	40 (13.4)
Diagnosed skin disease	
No	252 (84.3)
Yes	47 (15.7)
Familiar or known with skin cancer	
No	275 (92.0)
Yes	24 (8.0)
Have you ever attended to a workshop about photoprotective methods?	
Never	181 (60.5)
Yes / Long ago	66 (22.1)
Yes / This year	52 (17.4)
Did somebody remind you to use sunscreen in the last three months?	
Never	4 (1.3)
During childhood	11 (3.7)
During the last months	11 (3.7)
Both	273 (91.3)

Tab. II. Knowledge about solar exposure and the use of sunscreen in first-year medical students at a private university in Lima, Peru 2014.

Knowledge	Yes N (%)	Do not know N (%)	No N (%)
Solar radiation is a major cause of skin cancer?	290 (97.0)	6 (2.0)	3 (1.0)
A person with dark skin also needs to use sunscreen?	289 (96.7)	4 (1.3)	6 (2.0)
The use of sunscreen prevents skin cancer?	276 (92.3)	5 (1.7)	18 (6.0)
A sunscreen of SPF 15 is better than one of SPF 30?	22 (7.4)	59 (19.7)	218 (72.9)
On a cloudy day it is also necessary to use the sunscreen?	69 (23.1)	17 (5.7)	213 (71.2)
When using sunscreen, Can you expose to the sun without risk?	70 (23.4)	11 (3.7)	218 (72.9)

were: participation in at least one workshop about photoprotective methods in the last year (OR = 2.37, IC95% = 1.28-4.37) and having somebody to remind them the use of sunscreen during the last summer (OR = 3.78, IC95% = 1.28-11.21). While male sex (OR = 0.54, IC95% = 0.34-0.86) was inversely associated (Tab. IV).

Tab. III. Perceptions and practices about solar exposure and photoprotective methods in first-year medical students at a private university in Lima, Peru 2014.

	Total N = 299	Male N = 110	Female N = 189	p*
Perceptions (Agree with)				
It is worth to use sunscreen to avoid future health problems	260 (87.0)	96 (87.3)	164 (86.8)	0.526
Tan people is more attractive	54 (18.2)	24 (21.8)	30 (15.9)	0.129
It is worth it to get a sunburn to look tan	28 (9.3)	5 (4.6)	23 (12.2)	0.021
Tan people is more healthy	20 (6.7)	4 (3.6)	16 (8.5)	0.082
Practices during the last summer (Always/Almost always)				
Walk in the shadow	200 (66.9)	73 (66.4)	127 (67.2)	0.491
Sunscreen	114 (38.1)	32 (29.1)	82 (43.4)	0.010
Large pants	90 (30.1)	24 (21.8)	66 (34.9)	0.011
Sunglasses with UV filters	86 (28.8)	25 (22.7)	61 (32.3)	0.051
Not going out in the hours of higher radiation	86 (28.8)	28 (25.5)	58 (30.7)	0.203
Hats or caps	53 (17.7)	25 (22.7)	28 (14.8)	0.059
Umbrella	37 (12.4)	11 (10.0)	26 (13.8)	0.223
Long sleeves	24 (8.0)	11(10.0)	13 (6.9)	0.228

* Fisher's exact test

Tab. IV. Factors associated with the use of sunscreen in first-year medical students at a private university in Lima, Peru 2014.

Characteristics	Use of sun screen N (%)			Crude model			Adjusted model*		
	Never/ Almost never	Sometimes	Always/ Almost always	OR	IC 95%	p	OR	IC 95%	p
Age									
< 18 years	31 (19.4)	70 (43.7)	59 (36.9)	Ref.			Ref.		
≥ 18 years	37 (26.6)	47 (33.8)	55 (39.6)	0.92	(0.60-1.40)	0.700	0.82	(0.53-1.27)	0.383
Sex									
Female	33 (17.5)	74 (39.1)	82 (43.4)	Ref.			Ref.		
Male	35 (31.8)	43 (39.1)	32 (29.1)	0.50	(0.32-0.78)	0.002	0.54	(0.34-0.86)	0.009
Fitzpatrick Skin Phototype									
I-III	24 (17.4)	53 (38.4)	61 (44.2)	Ref.			Ref.		
IV	32 (26.4)	49 (40.5)	40 (33.1)	0.61	(0.39-0.96)	0.035	0.67	(0.41-1.09)	0.103
V-VI	12 (30.0)	15 (37.5)	13 (32.5)	0.56	(0.29-1.07)	0.080	0.58	(0.30-1.14)	0.115
Diagnosed skin disease									
No	59 (23.4)	95 (37.7)	98 (38.9)	Ref.			Ref.		
Si	9 (19.2)	22 (46.8)	16 (36.0)	0.96	(0.55 - 1.70)	0.899	1.00	(0.55-1.78)	0.971
Familiar or known with skin cancer									
No	60 (21.8)	110 (40.0)	105 (38.2)	Ref.			Ref.		
Si	8 (33.3)	7 (29.2)	9 (37.5)	0.75	(0.34 - 1.68)	0.489	0.8	(0.34-1.71)	0.509
Have you ever attended to a workshop about photoprotective methods?									
Never	47 (25.9)	70 (38.7)	64 (35.4)	Ref.			Ref.		
Yes/ Long ago	14 (21.2)	31 (47.0)	21 (31.8)	1.01	(0.60 - 1.70)	0.954	1.00	(0.59 - 1.71)	0.983
Yes/ In the last year	7 (13.5)	16 (30.8)	29 (55.7)	2.34	(1.29 - 4.27)	0.005	2.37	(1.28 - 4.37)	0.006
Did somebody remind you to use sunscreen during the last summer?									
No	9 (60.0)	3 (20.0)	3 (20.0)	Ref.			Ref.		
Yes	59 (20.8)	114 (40.1)	111 (39.1)	1.56	(0.49 - 2.62)	0.004	3.78	(1.28 - 11.21)	0.016

*Adjusted model include every variable presented

Discussion

KNOWLEDGE

In this study, we found that 97.0% of the participants knew about the relationship between sun exposure and skin cancer. These results are consistent with other studies completed in Australia where 80% of teenagers were competent regarding the dangers of sun exposure [16], and with research made in United States of America (USA), where 89% of the adolescents knew about the association between unprotected sun exposure and skin cancer [19].

Fewer participants answered correctly about adequate sunscreen use: 71.2% answered that on a cloudy day it is not necessary to use the sunscreen, and 7.4% answered that a sunscreen of SPF 15 is better than one of SPF 30. These percentages are similar to other studies [19], and reflect that information regarding correct sunscreen use is not yet widely dispersed. These results suggest the necessity to improve population-level knowledge on this subject, as previous studies have shown the positive association between high knowledge and a lower sunburn incidence [13].

PRACTICES AND PERCEPTIONS

The perception that it is worth to get a sunburn to look tan was higher among females than males. Results

were similar with other studies [13, 16]. This may be due to the arrainged social perceptions of beauty and fashion, which are especially strong in female adolescents [20, 21]. Educational campaigns must take this into consideration and make appropriate recommendations [22].

The most commonly used photoprotective methods were walking in the shade, use of sunscreen, and the use of long pants. Nevertheless, sunscreen was used "always" or "almost always" by only 38.1% of the population. These results are consistent with previous data, where only 31.4% of the adolescents used sunscreen frequently [19].

Nearly a third of the participants used sunglasses with UV filters "always" or "almost always". Similar results found in other studies was the use of sunglasses (32.2%) as one of the most common sun-protection behaviors [19]. Although not statistically significant ($p = 0.051$), our findings suggest that women are more likely to use sunglasses (32.3%) than with men (22.7%). These results were consistent with previous studies, where men use sunglasses less often [16]. This could reflect a difference in sun protection awareness, or in fashion customs, between males and females.

FACTORS ASSOCIATED WITH THE USE OF SUNSCREEN

In the multiple regression analysis, a higher use of sunscreen was associated with female sex. This result is similar to other studies [13, 16], and could be explained by differences in cultural roles between young males and females. Women are more concerned with personal care and skin protection than men [23].

Attending a sunscreen workshop in the last year was also associated with increased sunscreen use. Other studies found that adequate educational campaigns could eradicate myths and improve the quality of sunscreen use among young people [15, 17].

Other protective factor was having a person who has reminded them to use sunscreen in the last three months. In general, it seems that one of the biggest barriers hindering sunscreen use is forgetting to apply it [24] and lack of habit [14].

RECOMMENDATIONS

Our findings suggest that it is necessary to organize sunscreen educational activities for middle class urban children and adolescents. These activities should include information concerning the correct sunscreen use, and sex-specific recommendations, such as avoid tanning for women and use of photoprotective methods for men. These activities could be implemented in schools, universities, and recreational settings [25].

Although not all young people have somebody to remind them about this topic, there are new methods to inform youth about sun protection (i.e., text messages or Smartphone applications), which have already been used effectively [24]. These methods should be tested and implemented in young Peruvian population.

Nevertheless, the participants of this study are urban middle-class medical students. Therefore, our findings cannot be extrapolated to populations of lower socioeconomic status or rural dwellers who probably have different challenges in accessing educational and reminder activities that help to reinforce healthy habits.

LIMITATIONS

The present study has some limitations: first, it is possible that participants, well-educated medical students, have a greater interest and knowledge than the general Peruvian population. Moreover, the use of sunscreen as well as other variables were collected through an electronic survey, which are subjected to recall bias, as participants surveyed are in their first years of study, so we believe that their knowledge is not very different from that of other university freshmen.

Conclusions

In conclusion, our findings show that the main factors related to a higher sunscreen use in our population are being female, having attended safe-sun workshops, and having a person who reminds them to use sunscreen. Moreover, perceptions and practices related solar exposure and photoprotective methods differ according

to sex. These results should be taken into consideration when developing educational programs aimed at young middle class urban populations.

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Authors' contribution

PR-G and AT-R contributed to the conception and design of this study. PR-G planned and performed data collection and prepared the first manuscript draft. AT-R and MGM-P provided feedback for all the manuscript versions. MGM-P and AT-R performed the statistical analyses. All authors revised and approved the final version of the manuscript.

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