



ACTAS Derma-Sifiliográficas

Full English text available at
www.actasdermo.org



ORIGINAL ARTICLE

Effectiveness of the SolSano Program on Sun Protection Habits, Knowledge, and Attitudes Among University Students[☆]



M.P. Sirera Rus,^a J.R. Ipiens Serrate,^b E. Ferrer Gracia,^b P. Teruel Melero,^c
J. Gállego Diéguez,^b Y. Gilaberte^{d,*}

^a Medicina Familiar y Comunitaria, Centro de Salud Pirineos, Huesca, Spain

^b Dirección General de Salud Pública, Gobierno de Aragón, Zaragoza, Spain

^c Departamento de Psicología y Sociología, Facultad de Educación, Universidad de Zaragoza, Zaragoza, Spain

^d Servicio de Dermatología, Hospital Universitario Miguel Servet, IIS Aragón, Zaragoza, Spain

Received 8 July 2019; accepted 7 August 2019

Available online 12 June 2020

KEYWORDS

Photoprotection;
Sunscreen;
Sunburn;
Attitudes;
Habits;
Knowledge

Abstract

Background and objective: The SolSano (HealthySun) project is a primary school sun education program that has been running in Aragon, Spain, since 2000. In the short term, it has proven to be effective at promoting sun protection behaviors and heightening awareness in childhood. The aim of this study was to evaluate the long-term effectiveness of the SolSano program.

Participants and methods: Retrospective, observational, analytical, cohort study of students at the University of Zaragoza between 2015 and 2016. The students answered a previously validated, purpose-designed, online questionnaire. We calculated descriptive statistics for all variables and performed bivariate and multivariate analyses to test for differences between students who had attended a primary school that ran the SolSano program and those who had not.

Results: Data for 324 students were analyzed. Mean age was 22.9 years and 78% of the respondents were women. In total, 44% of the students had participated in the SolSano program at primary school. Half of the respondents (50.5%) had experienced 1 or 2 sunburn episodes the previous summer. Significant differences were only observed for some aspects addressed by the questionnaire between SolSano participants and nonparticipants.

[☆] Please cite this article as: Sirera Rus MP, Ipiens Serrate JR, Ferrer Gracia E, Teruel Melero P, Gállego Diéguez J, Gilaberte Y. Efectividad del programa SolSano en los hábitos, conocimientos y actitudes en materia de fotoprotección de los universitarios. Actas Dermosifiliogr. 2020;111:381–389.

* Corresponding author.

E-mail address: ygilaberte@salud.aragon.es (Y. Gilaberte).

PALABRAS CLAVE

Fotoprotección;
Fotoprotector;
Quemaduras;
Actitudes;
Hábitos;
Conocimientos

Conclusions: This is the first study to evaluate the long-term effectiveness (15 years) of a primary school sun protection program. The absence of significant differences in our sample might be explained by non-continuation of the program into adolescence and the existence of sun protection campaigns outside the school.

© 2020 Published by Elsevier España, S.L.U. on behalf of AEDV. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Efectividad del programa SolSano en los hábitos, conocimientos y actitudes en materia de fotoprotección de los universitarios

Resumen

Antecedentes y objetivo: El proyecto SolSano es un proyecto educativo escolar que se realiza en Aragón desde el año 2000 y que ha demostrado promover hábitos de protección solar y aumentar conocimientos en los niños a corto plazo. El objetivo de este estudio es valorar la efectividad del programa SolSano a largo plazo.

Sujetos y métodos: Estudio analítico observacional de cohortes retrospectivo realizado en alumnos de la Universidad de Zaragoza durante el curso 2015-2016. El instrumento de valoración fue un cuestionario validado y adaptado para nuestro objetivo al que accedían a través de Internet. Se realizó una descripción univariante, así como un análisis bivariante y multivariante para estudiar las diferencias entre los participantes que habían estudiado Educación Primaria en un centro escolar donde se realizaba SolSano o no.

Resultados: Trescientos veinticuatro estudiantes universitarios participaron. La edad media fue 22,9 años, un 78% de respuestas procedieron de mujeres. El 44% había acudido a un centro donde se realizó el programa SolSano. El 50,5% de los estudiantes habían sufrido 1 o 2 quemaduras solares el verano anterior. Solo se observaron diferencias estadísticamente significativas en algunos aspectos entre los que asistieron a centros educativos donde se desarrolló el programa SolSano y los que asistieron a otros centros.

Conclusión: Es el primer estudio para valorar la efectividad de un programa educativo escolar en materia de fotoprotección a largo plazo (15 años). La falta de continuidad del programa en la adolescencia y la existencia de campañas de fotoprotección fuera de la escuela son posibles causas de la ausencia de diferencias en nuestra muestra.

© 2020 Publicado por Elsevier España, S.L.U. en nombre de AEDV. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

According to the World Health Organization, skin cancer is the most common type of cancer in the world.¹ In recent years, its incidence has been increasing, with that of melanoma increasing even more rapidly.² Based on clinical and histological criteria and number of tumors rather than persons affected, the incidence rate for basal cell carcinoma in Spain is 253.23 (95% CI, 273.01–269.45) per 100 000 persons per year, that of squamous cell carcinoma is 38.16 (95% CI, 31.72–39.97) per 100 000 persons per year, and that of melanoma is 8.76 (95% CI, 7.50–10.02) per 100 000 persons per year.³

Exposure to UV radiation is the main risk factor for skin cancer and is responsible for almost 65% of melanomas and 90% of nonmelanoma skin cancer.^{1,4} In addition, as it is the only modifiable factor, prevention and raising awareness among the general public are essential.

Exposure to sunlight during childhood and adolescence plays a key role in the development of skin cancers and is associated with an increase in the number of melanocytic nevi.^{5–7} Children and adolescents are more exposed than adults.⁸

Several educational programs have been aimed at children. The first was SunSmart, which was created in 1960 in Australia⁹ and aimed to reduce the incidence and morbidity and mortality of skin cancer, change personal attitudes, and control the disease.¹⁰ Using a series of questionnaires and activities, the program attempted to raise awareness about the importance of sun protection.⁷ Today, SunSmart has improved sun protection habits among the public and has even reduced the incidence of skin cancer.¹¹ Similar programs include SunSafe and Sun Protection Fun.^{2,12}

SolSano (HealthySun), which was started in Aragón in 2000, is the first sun protection program in Spain.¹³ It is aimed at primary school children (6–12 years) and is run in schools by teachers. The main objectives of SolSano are to educate and to influence sun exposure habits in children and their families. It also aims to show how to enjoy sunshine in a healthy way and to reduce the frequency of adverse effects of UV radiation in the short term (sunburn) and in the long term (skin cancer).¹⁴ Some 5000 children take part every year. SolSano was able to increase the use of sun protection methods, reduce the number of cases of sunburn, and diminish interest in tanning within only a few months of completing the program.^{13,14} However, it is essential to

determine whether these improvements remain in force in the long term. This information is essential, since the main objective of the program is to reduce the incidence of skin cancer in the future. Therefore, our objective was to investigate sun protection habits and knowledge among university students in Aragon who had attended a primary school where SolSano was run and to compare our results with those of schools that did not implement the program.

Patients and Methods

Design and Population

We performed an analytical retrospective study of a cohort of undergraduates at the University of Zaragoza during the academic year 2015–2016. Patients from other autonomous communities were excluded. Our aim was to obtain a cohort of students who had completed their primary education during the period 2000–2006, when SolSano was implemented in schools in Aragon.

Protocol

In order to evaluate habits, knowledge, and attitudes with respect to the risk of solar radiation and sun protection, we used the validated questionnaire of Troya-Martín et al.,¹⁵ to which we added questions from the SolSano program (Supplementary Material). The questionnaire was designed in an online format using Google Forms and forwarded to the students via the Research Unit and the lecturers who participated in the project.

Statistical Analysis

We performed a univariate analysis of the variables. We then evaluated the associations between attendance at a school where the SolSano program had been implemented and sun protection knowledge and habits. Qualitative variables were analyzed using the χ^2 test and relative risk; ordinal variables were analyzed using the Mann-Whitney and Kruskal-Wallis tests. The same tests were used to evaluate risk factors and variables associated with sun protection. Lastly, we used logistic regression to analyze the role of significant variables in the bivariate analysis. The data were analyzed using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp.). Statistical significance was set at $P < .05$.

Ethics

The study was approved by the Clinical Research Ethics Committee of Aragon (PI16/0151), and all the participants gave their informed consent before participating in the survey.

Results

Sample Characteristics

Table 1 shows the main characteristics of the sample. We obtained 324 responses, of which 78% were from women

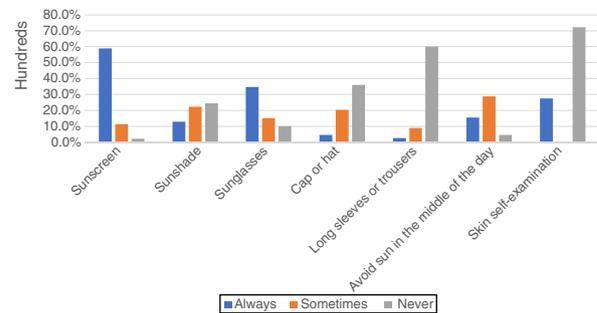


Figure 1 Frequency of sun protection habits.

($n = 252$) and 22% were from men ($n = 72$). The mean age was 22.9 years (range, 16–59 years). The most common degree course was medicine ($n = 79$, 24.5%). Of the students who responded, 83.9% ($n = 271$) were from those whose primary education had been in Aragon, and 44% ($n = 142$) had attended a school where the SolSano program had been run, although 89.8% ($n = 290$) reported that they were not acquainted with it.

In 65% of cases ($n = 210$), the students had received information on sun protection during their time at school, mainly during the secondary stage (41.5%, $n = 134$), followed by the primary stage. A similar percentage of participants had received information on sun protection from their parents (65.9%, $n = 213$) and the media (50.5%, $n = 163$).

As for exposure to sunlight, 30.7% ($n = 99$) sunbathe on between 6 and 15 days per year, and 24.1% ($n = 78$) sunbathe on more than 30 days per year. The most frequent duration of exposure was 30 minutes to 1 hour ($n = 106$, 32.8%), although when this was between 12:00 and 16:00, it usually lasted less than 1 hour ($n = 148$, 45.7%). Slightly more than half (50.5% [$n = 163$]) had been sunburned once or twice the previous summer, and 36.8% ($n = 119$) had not.

The main sun protection habits were always using sunscreen (59.1% [$n = 191$]) and sunglasses (34.7% [$n = 112$]) and avoiding sunlight in the middle of the day (15.5% [$n = 50$]). As for the least common sun protection habits, 24.5% ($n = 79$) reported never using a sunshade and 60.1% ($n = 194$) reported never using long sleeves or trousers (Fig. 1). Regarding secondary prevention of skin cancer, 72.4% reported not performing an annual skin self-examination.

Analysis of attitudes to sun protection revealed that 65.9% of respondents ($n = 213$) thought their clothes looked better on them when they were tan, around 50% ($n = 160$) considered tan people to be more attractive, 60.3% ($n = 195$) did not find sun cream unpleasant, and the vast majority (82.4%, $n = 266$) believed that it is worthwhile using cream, even if you do not tan (Supplementary Material).

Knowledge about sun protection was fairly good, and most participants identified solar radiation as the main cause of skin cancer (95.4%, $n = 308$) and patches on the skin (98.1%, $n = 317$). They also reported that avoiding exposure to sunlight during the middle of the day was the most effective way to protect oneself from the sun (86.4%, $n = 279$) (Supplementary Material).

Table 1 Characteristics of the Study Sample.^a

	Frequency	Percentage
<i>Sex</i>		
Male	71	22.0
Female	252	78.0
<i>Mean (SD) age, y</i>	22.9 (6.10)	
<i>University degree</i>		
Science	20	6.2
Educational science	61	18.9
Health and sports science	17	5.3
Law	4	1.2
Business studies, economics, and management	8	2.5
Nursing	49	15.2
Engineering	48	14.9
Medicine	79	24.5
Nutrition	3	0.9
Other	34	10.5
<i>Do you know about the SolSano program?</i>		
Yes	33	10.2
No	290	89.8
<i>Did you attend a school where the SolSano program was run?</i>		
Yes	142	44.0
No	181	56.0
<i>While at school, did you receive any information on sun protection?</i>		
Yes	210	65.0
No	113	35.0
<i>When did you receive it?</i>		
Kindergarten	36	11.1
Primary school, first cycle	76	23.5
Primary school, second cycle	97	30.0
Primary school, third cycle	108	33.4
Secondary school, first cycle	134	41.5
Secondary school, second cycle	53	16.4
<i>Who provided the information?</i>		
Parents	213	65.9
Pediatrician	65	20.1
Dermatologist	93	28.8
Nurse	12	3.7
Teachers	137	42.4
Media	163	50.5
<i>If you did receive information, what were you recommended?</i>		
Use creams	265	82.0
Use a cap	200	61.9
Use protective clothing	91	28.2
Staying in the shade	132	40.9
I received information about the dangers of the sun	182	56.3
<i>Which of the following best defines your skin color?</i>		
Very pale	57	17.6
Pale	160	49.5
Olive	61	18.9
Dark	45	13.9
<i>How does your skin react the first time you are exposed to sunlight in summer for 1 h at midday?</i>		
Sunburn, pain, no tan	62	19.2
Sunburn, pain, and slight tan	51	15.8

Table 1 (Continued)

	Frequency	Percentage
Slight burning and moderate tan	128	39.6
No burning and good tan	82	25.4
<i>For how many days on average did you sunbathe?</i>		
None	30	9.3
1 to 5 d	55	17.0
6 to 15 d	99	30.7
16 to 30 d	61	18.9
More than 30 d	78	24.1
<i>For how many hours a day do you sunbathe?</i>		
<30 min	83	25.7
30 min to 1 h	106	32.8
1 to 3 h	101	31.3
More than 3 h	33	10.2
<i>How many times were you sunburned last year?</i>		
None	119	36.8
1 to 2 times	163	50.5
3 to 5 times	35	10.8
6 to 10 times	5	1.5
More than 10 times	1	0.3
<i>Have any members of your family (grandparents, parents, siblings, uncles/aunts, cousins) had skin cancer?</i>		
Yes	34	10.5
No	289	89.5

^a The distribution of the replies to all of the questions on the questionnaire is provided in the supplementary material.

Sun Protection Habits and Knowledge Depending on Whether or Not the Participant Had Attended a School Where SolSano Was Run

Sun protection habits were quite similar in both groups, except for the use of sunscreen, which was more common in the group that had not attended a school where SolSano had been implemented (82.3% vs. 75.4%), although the differences were not statistically significant (Table 2).

As for knowledge, students from SolSano centers scored higher for the item "Sunscreen prevents aging of the skin caused by sunlight" (80.3% vs. 73.5%) and "The use of total protection sunscreen does not mean that exposure to sunscreen is free of risk" (90.8% vs. 88.4%). The percentage of correct responses to the remaining questions was higher among students who had not attended a SolSano center, although the difference was only statistically significant for the item "Sunlight causes patches on the skin".

Factors Associated With Sunburn

The multivariate analysis revealed a statistically significant association between having been sunburned at least once during the previous summer and having a pale skin tone, being male, thinking that the sun produced a pleasant sensation, and considering tanned people to be more attractive (Table 3).

Discussion

The results obtained show that sun protection habits and, more particularly, knowledge about sun protection among the students surveyed are good. However, no statistically significant differences were observed between those who attended a school where the SolSano program had been implemented and those who had not. This absence of differences may be because SolSano is not the only means of providing training on sun protection; in fact, the main sources of information were parents and the media. Furthermore, the period between attending a school that ran the program and the survey was more than a decade.¹⁴ Programs do not usually evaluate their efficacy in the long term. Jones et al.¹⁶ analyzed the effectiveness of the SunSmart program after 5 years and identified a significantly greater use of hats and sunscreen. Olson et al.² evaluated the SunSafe program 2 years after completion and found that significantly more participants used sunscreen. An evaluation of SolSano 5 months after completion revealed less frequent use of sunglasses, clothes, and staying in the shade as sun protection strategies, a greater incidence of sunburn, and a reduced desire to tan.¹⁴ In all cases, the comparison was made to determine whether the program improved the habits and knowledge of a group of children, although there were no comparisons with a control group that had not undergone the program, as in the present study.

One of the secondary objectives of our study was to know the sun protection habits of university students. The most widely used were sun cream and sunglasses. This finding is consistent with those of Ponce

Table 2 Sun Protection Habits and Knowledge and Their Association With Having Attended a School Where the SolSano Program Was Run.

Knowledge	School Running SolSano (Responds in Accordance)	School not Running SolSano (Responds in Accordance)	Statistical Significance
Sunscreen prevents aging of the skin caused by sunlight	80.3% (<i>n</i> = 114)	73.5% (<i>n</i> = 144)	<i>P</i> = .153
Sunlight is the main cause of skin cancer	95.1% (<i>n</i> = 135)	95.6% (<i>n</i> = 176)	<i>P</i> = .829
Sunlight causes patches on the skin	95.8% (<i>n</i> = 136)	100% (<i>n</i> = 181)	<i>P</i> = .007
Avoiding sunlight in the middle of the day is the most effective way of protecting skin from the sun	85.9% (<i>n</i> = 122)	86.7% (<i>n</i> = 157)	<i>P</i> = .830
Reducing exposure to sunlight before age 18 reduces the risk of skin cancer by 80%	59.2% (<i>n</i> = 84)	67.4% (<i>n</i> = 122)	<i>P</i> = .126
The use of total protection sunscreen does not mean that exposure to sunlight is free of risk	90.8% (<i>n</i> = 129)	88.4% (<i>n</i> = 160)	<i>P</i> = .477
Once my skin is tan, it is necessary to use sunscreen	97.9% (<i>n</i> = 139)	100% (<i>n</i> = 181)	<i>P</i> = .084
Habits			
Sunshade	32.4% (<i>n</i> = 46)	37.6% (<i>n</i> = 68)	<i>P</i> = .334
Sunglasses	62.0% (<i>n</i> = 88)	60.8% (<i>n</i> = 110)	<i>P</i> = .826
Cap or hat	15.5% (<i>n</i> = 22)	16.0% (<i>n</i> = 29)	<i>P</i> = .897
Long sleeves and trousers	5.6% (<i>n</i> = 8)	5.5% (<i>n</i> = 10)	<i>P</i> = .966
Avoiding exposure in the middle of the day	45.8% (<i>n</i> = 65)	44.8% (<i>n</i> = 81)	<i>P</i> = .854
Use of a product with sun protection factor >15	75.4% (<i>n</i> = 107)	82.3% (<i>n</i> = 149)	<i>P</i> = .121
Skin self-examination in the previous year	27.5% (<i>n</i> = 39)	27.6% (<i>n</i> = 50)	<i>P</i> = .975

Table 3 Association Between Different Variables and Having Experienced Sunburn.

Variable	Coefficient	OR	95% CI	P Value
Sex	0.630	1.878	1.027–3.432	.041
Skin tone	0.929	2.532	1.509–4.247	.000
Beliefs: tanned people are more attractive	0.508	1.661	1.020–2.705	.041
Beliefs: sunbathing generates a pleasant sensation	0.609	1.838	1.068–3.164	.028
Use of a sunshade	0.438	1.550	0.943–2.547	.084
Knowledge of the SolSano program	0.102	1.107	0.496–2.472	.804
Attending a center where SolSano was run	0.198	1.219	0.738–2.015	.440

Abbreviation: OR, odds ratio.

et al.¹⁷ for university students in the Canary Islands and of Murphy¹⁸ and Kirk and Greenfield¹⁹ for university students in Ireland and the UK. Sunscreens are thought to be the most widely used method because of marketing campaigns in the media.¹⁵ In fact, most respondents in our survey said that the information they receive on sun protection came from their families and from the media.

Slightly more than half of the students (50.5%) reported having been sunburned once or twice the previous summer. A similar finding was reported for the SunSmart program in secondary school students, i.e., 2 of every 3 students reported having been sunburned the previous summer.¹⁰ The results of the study show that findings for sunburn were statistically significant for specific student profiles, namely, males with pale skin who liked to sunbathe. These results are similar to those of Saridi et al.,²⁰ who found that the desire to tan was a risk factor for sunburn, as well as going to the beach during the middle of the day. Another interesting result is that women were less frequently sunburned than men, as reported by Ponce et al.¹⁷ and Geller et al.²¹ This seems to be consistent with the finding that adolescent females develop better sun protection habits and knowledge than adolescent males after receiving a sun education program.

Only 27.6% of those surveyed reported self-examining their skin annually. Some studies indicate that the incidence of skin cancer is increasing in young people²²; therefore, we should insist on self-examination in this age group. Nahar et al.²³ highlight that 17.5% of young people examine their skin annually, although this is not a complete examination, since they overlook large areas such as the back.

One objective of educational programs on sun protection is for participants not to desire a tan and not to consider it attractive. In our study, 65.4% of the students wished to have a suntan. Kirk and Greenfield¹⁹ highlight that 80% of university students in Birmingham, UK wished to have a suntan. SunSmart reduced this percentage from 68% to 36% in 20 years and the percentage who consider tanned people more attractive from 61% to 35%. SolSano also reduced this desire for a suntan from 48.3% to 43.8%, although in the short term.¹⁴

Students from the University of Zaragoza are knowledgeable about sun protection. Our findings are similar to those of Rodriguez et al.,²⁴ who found that 97% of Peruvian students acknowledge that solar radiation is the main cause of skin cancer. Furthermore, 92.7% of Brazilian university students are aware of the risks of UV radiation and the association with skin cancer,²⁵ and most Saudi Arabian university

students say that exposure to sunlight should be avoided in the middle of the day.²⁶ One study performed among Spanish university students highlighted that 94.3% are aware of the risk of exposure to sunlight on the skin.²⁷ However, knowledge is not the same as behavior, and the incidence of sunburn is high (50.5% in our study and 70.6% in the study by Ponce et al.¹⁷).

Our results indicate that the SolSano program does not seem to achieve its long-term objective, at least as far as reducing the frequency of sunburn is concerned. SolSano is run in primary schools. However, it seems necessary to implement other educational interventions in higher education cycles, since students are more aware of the risk of developing skin cancer in the future.¹⁰ In addition, extension of SolSano to areas outside schools (e.g., health care and sports) would ensure that the program had a greater impact.²⁸

Our study is subject to limitations and biases. First, the number of participants was low (324). The University of Zaragoza has 27 571 students, and since we do not know how many received the link to the questionnaire, we cannot calculate the response rate. Second, the fact that most respondents were studying medicine could lead to bias, although several studies performed in Spain found that while medical students are more knowledgeable in this area, their sun protection habits are no better than those of other students²⁷ and their incidence of sunburn is not lower.¹⁷

It is also important to remember that the survey was carried out some 15 years after the respondents participated in the program; therefore, the results may be subject to recall bias (65% reported having received information on sun protection while at school, mainly during the first stage of the secondary cycle [41.5%]). The only program that has proven effective in the long term is SunSmart, which was implemented in Australia, not only in schools, but also in the areas of leisure, sports, and health care.²⁸

In conclusion, students from the University of Zaragoza are aware of the main risks of exposure to sunlight and report having appropriate sun protection habits, although most experience sunburn, wish to be tan, and do not perform skin self-examination. While the SolSano educational program has proven effective at improving children's habits and knowledge in the short term, this effect does not seem to make a difference in the future. Further educational interventions are necessary in higher school cycles and areas other than school if we are to ensure that the changes promoted by SolSano

remain valid over time and, more particularly, that the frequency of sunburn decreases among our university students.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

The study was performed as part of the Research Group acknowledged by the Government of Aragon, B18.17D. We are grateful to all of the lecturers at the University of Zaragoza who participated in the study.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.adengl.2019.08.002.

References

- Valdivielso-Ramos M, Herranz JM. Update on photoprotection in children. *An Pediatr (Barc)*. 2010;72:282, <http://dx.doi.org/10.1016/j.anpedi.2009.06.013>, e1–9. Epub 2010 Jan 6.
- Olson A, Gaffney C, Starr P, Gibson JJ, Cole BF, Dietrich AJ. SunSafe in the middle school years: a community-wide intervention to change early-adolescent sun protection. *Pediatrics*. 2007;119:e247–56, <http://dx.doi.org/10.1542/peds.2006-1579>.
- Tejera-Vaquero A, Descalzo-Gallego MA, Otero-Rivas MM, Posada-García C, Rodríguez-Pazos L, Pastushenko I, et al. Incidencia y mortalidad del cáncer cutáneo en España: revisión sistemática y metaanálisis. *Actas Dermosifiliogr*. 2016;107:318–28, <http://dx.doi.org/10.1016/j.ad.2015.12.008>.
- D’Orazio J, Jarrett S, Amaro-Ortiz A, Scott T. UV radiation and the skin. *Int J Mol Sci*. 2013;14:12222–48, <http://dx.doi.org/10.3390/ijms140612222>.
- Gilaberte Y, Carrascosa JM. Sun protection in children: realities and challenges. *Actas Dermosifiliogr*. 2014;105:253–62, <http://dx.doi.org/10.1016/j.ad.2013.05.004>.
- Miller KA, Langholz BM, Ly T, Harris SC, Richardson JL, Peng DH, et al. SunSmart: evaluation of a pilot school-based sun protection intervention in Hispanic early adolescents. *Health Educ Res*. 2015;30:371–9, <http://dx.doi.org/10.1093/her/cyv011>. Epub 2015 Mar 22.
- Dudley DA, Winslade MJ, Wright BJ, Cotton WG, Mckver JL, Jackson KS. Rationale and study protocol to evaluate the SunSmart policy intervention: a cluster randomised controlled trial of a primary school-based health promotion program. *BMC Public Health*. 2015;15:42, <http://dx.doi.org/10.1186/s12889-015-1371-8>.
- Nole G, Johnson AW. An analysis of cumulative lifetime solar ultraviolet radiation exposure and the benefits of daily sun protection. *Dermatol Ther*. 2004;17 Suppl.:57–62.
- Montague M, Borland R, Sinclair C. Slip! Slop! Slap! and SunSmart, 1980–2000: skin cancer control and 20 years of population-based campaigning. *Health Educ Behav*. 2001;28:290–305, <http://dx.doi.org/10.1177/109019810102800304>.
- Lowe JB, Borland R, Stanton WR, Baade P, White V, Balanda KP. Sun-safe behaviour among secondary school students in Australia. *Health Educ Res*. 2000;15:271–81, <http://dx.doi.org/10.1093/her/15.3.271>.
- Makin JK, Warne CD, Dobbins SJ, Wakefield MA, Hill DJ. Population and age-group trends in weekend sun protection and sunburn over two decades of the SunSmart programme in Melbourne, Australia. *Br J Dermatol*. 2013;168:154–61, <http://dx.doi.org/10.1111/bjd.12082>.
- Tripp MK, Herrmann NB, Parcel GS, Chamberlain RM, Gritz ER. Sun Protection is Fun! A skin cancer prevention program for preschools. *J Sch Health*. 2000;70:395–401.
- Gilaberte-Calzada Y, Teruel-Melero MP, Pardo-Martínez C, Pueyo-Ascano A, Doste-Larrull D, Coscojuela-Santaliestra C, et al. Efectividad del programa educativo escolar «Solsano» para la prevención del cáncer de piel. *Actas Dermosifiliogr*. 2002;93:313–9.
- Gilaberte Y, Alonso JP, Teruel MP, Granizo C, Gallego J. Evaluation of a health promotion intervention for skin cancer prevention in Spain: The SolSano program. *Health Promot Int*. 2008;23:209–19, <http://dx.doi.org/10.1093/heapro/dan020>.
- Troya-Martín M, Blázquez-Sánchez N, Rivas-Ruiz F. Validación de un cuestionario en español sobre comportamientos, actitudes y conocimientos relacionados con la exposición solar: «Cuestionario a pie de playa». *Actas Dermosifiliogr*. 2009;100:586–95.
- Jones SB, Beckmann K, Rayner J. Australian primary school’s sun protection policy and practice: evaluating the impact of the National SunSmart Schools Program. *Health Promot J Austr*. 2008;19:86–90.
- 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*. 2018, <http://dx.doi.org/10.1016/j.ad.2018.10.002>.
- Murphy GM. Photoprotection: public campaigns in Ireland and the U.K. *Br J Dermatol*. 2002;146 Suppl. 61:31–3, <http://dx.doi.org/10.1046/j.1365-2133.146.s61.7>.
- Kirk L, Greenfield S. Knowledge and attitudes of UK University students in relation to ultraviolet radiation (UVR) exposure and their sun-related behaviours: a qualitative study. *BMJ Open*. 2017;7, <http://dx.doi.org/10.1136/bmjopen-2016-014388>, e014388.
- Saridi M, Bourdaki E, Rekleiti M. Young students’ knowledge about sun protection and its relation with sunburn incidence. A systematic review. *Health Sci J*. 2014;8:4–21.
- Geller AC, Shamban J, O’Riordan DL, Slygh C, Kinney JP, Rosenberg S. Raising sun protection and early detection awareness among Florida High Schoolers. *Ped Dermatol*. 2005;22:112–8, <http://dx.doi.org/10.1111/j.1525-1470.2005.22204.x>.
- WHO. Global solar UV index. An educational tool to reduce risks of skin cancer and cataract, Fact Sheet 271, 2002.
- Nahar VK, Wilkerson AH, Ghafari G, Martin B, Black WH, Boyas JF, et al. Skin cancer knowledge, attitudes, beliefs, and prevention practices among medical students: a systematic search and literature review. *Int J Womens Dermatol*. 2018;4:139–49.
- Rodríguez P, Moscoso MG, Taype A. Factors associated with regular sunscreen use by medical students of a Peruvian university. *J Prev Med-Hyg*. 2016;57:E172–7.
- Castilho IG, Sousa MA, Leite RM. Photoexposure and risk factors for skin cancer: an evaluation of behaviours and knowledge among university students. *An Bras Dermatol*. 2010;85:173–8, <http://dx.doi.org/10.1590/s0365-05962010000200007>.
- Othman Bhakim NA, Ghanem Alanazi B, Aleid MY, Bader Alaql A, Abdulla Al-Ogail N, Abdullah Alghulaydhawi F. Sun exposure behaviours, attitudes and protection practices among Prince Sattam bin Abdulaziz University students—a survey study. *J Pak Med Assoc*. 2016;66:1528–34.

27. Rodríguez-Zamorano P, Puebla-Tornero L, Martín-Santos LM, Román-Villaizán ML, Guerra-Tapia A. Estudio transversal sobre la repercusión de la información educativa en los hábitos de fotoprotección tópica en estudiantes de medicina. SEMERGEN. 2018, <http://dx.doi.org/10.1016/j.semerg.2018.02.004>.
28. Eisemann N, Waldmann A, Geller AC, Weinstock MA, Volkmer B, Greinert R, et al. Non-Melanoma skin cancer incidence and impact of skin cancer screening on incidence. J Invest Dermatol. 2014;134:43–50, <http://dx.doi.org/10.1038/jid.2013.304>.