Original Articles

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Assessment of university students' knowledge of photoprotection and exposure to the sun

Avaliação do conhecimento sobre fotoproteção e da exposição solar de estudantes universitários

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ABSTRACT

Introduction: The number of cases of cutaneous carcinoma has been steadily increasing, which calls for the necessity of improving cost effective health strategies aimed at preventing that disease and related complications.

Objective: To perform a cross-sectional study with data collected directly from the participants, through the application of a questionnaire.

Methods: Once the data was collected, the bivariate logistic regression was used to calculate the odds ratio (OR) and the 95% confidence interval (CI) between the independent variables and the risk behavior, which corresponded to the non-daily use of sunscreen and/or other photoprotection method. The sample consisted of 200 students – of which 50% studied mathematical sciences and 50% studied biological sciences.

Results: There was no significant difference between the students' behavior according to the different science field they were studying. Women presented lower risk behavior as compared to men (OR = 0.07; CI 95% = 0.01 - 0.56).

Conclusions: Most university students do not protect themselves adequately when exposed to the sun, with this risk behavior being lower in women. Actions aimed at photo-educating students are important.

Keywords: Disease prevention; Skin; Solar radiation; Students

RESUMO

Introdução: *O número de casos de carcinoma cutâneo tem aumentado cada vez mais e vem determinando a necessidade de aprimorar estratégias de saúde economicamente eficazes para prevenir a doença e suas complicações.*

Objetivo: *Realizar estudo transversal, tendo os dados sido coletados diretamente com os participantes, por meio da aplicação de questionário.*

Métodos: *Com os dados coletados realizou-se o cálculo da regressão logística bivariada, obtendo-se a razão de chances (OR) e o intervalo de confiança (IC) 95% entre as variáveis independentes e o comportamento de risco, o qual foi determinado pela não utilização diária de filtro solar e/ou outros meios de fotoproteção. A amostra foi composta por 200 estudantes, 50% da área de exatas e 50% da área biológica.*

Resultados: *Não foi constatada diferença significativa entre o comportamento dos graduandos nas diferentes áreas analisadas. Mulheres apresentaram menor comportamento de risco em relação aos homens (OR=0,07; IC95%: 0,01-0,56).*

Conclusões: *A maior parte dos universitários não se protege da exposição solar adequadamente, sendo esse comportamento de risco inferior nas mulheres. Ações de fotoeducação são importantes entre os estudantes.*

Palavras-chave: *Estudantes; Pele; Prevenção de doenças; Radiação solar*

INTRODUCTION

The cases of cutaneous carcinomas have been steadily increasing all over the world, what represents a high social and economic costs for persons and health care systems.[1-3] Recognizing this increasingly higher impact has determined the need to improve cost-effective health strategies to prevent the disease and its complications.[1-3]

The etiology of skin cancer is mainly related to sun exposure, what occurs significantly during childhood.[3-8] The effects of the exposure to ultraviolet radiation represent a well-established risk factor for skin cancer and photoaging. Sun exposure during the first decades of life increases the vulnerability to harmful effects of the radiation .[3-8]

Considering a life expectancy of 78 years, 23% of ultraviolet radiation that one individual is submitted to takes place until in the first 18 years, 46% up to 40 years of age and 74% up to 59 years of age.[9] Guidelines on photo-education should include young people, children and their carers, so they can acquire healthy and sensible habits, therefore reducing the risk of developing a late problem caused by irresponsible sun exposure.[10,11] Photo-education is important for the maintenance of health in the adult population, mainly by the fact that the damage caused by ultraviolet radiation is cumulative throughout life.[10]

Besides, young people usually expose excessively to solar radiation, since they spend a lot of time outdoors. Therefore, it is important to understand the behavior of university students in order to increase awareness, because if the exposure is inappropriate it can constitute a risk factor for skin cancer.[12,13]

The objective of this study was to investigate sun exposure and protection practices and factors associated in university students in Campinas, São Paulo, Brazil.

METHODS

Design

It is a cross-sectional study conducted with undergraduate students of the Universidade Estadual de Campinas (UNICAMP) in 2016.

Context

UNICAMP is a public university in inland São Paulo, Brazil. The participants in the research were undergraduate students of the courses of Pharmacy, Biology, Medicine, Food Engineering, Statistics, integrated elementary and secondary education, Chemistry, Chemical Engineering, Mechanical Engineering and integrated degrees in Chemistry and Physics. Interviews were conducted during the months of April, June, September, October and November 2016 during the mornings and afternoons in the university facilities.

Participants

Students of the exact and biological/health sciences of any age and both genders were considered eligible. Participants were selected by convenience sampling when the interviewer was present at the site of recruitment.

Variables

Demographic and knowledge on photoprotection variables were collected, including: gender (male or female), age (in years, subsequently categorized into 17- 18; 19-20 and >21 years), daily use of sunscreen and when intentional exposure occurred (never, sometimes, always), use of other measures of photoprotection daily and during intentional exposure (yes or no), photoprotection measures besides sunscreen (yes or no, and descriptive answer if yes), exposure to artificial tanning booths (never, once or more times), knowledge on how much of the product to apply and on the difference of ultraviolet radiation A and B, opinion whether tanning is healthy (yes or no, and descriptive answer if yes) and use of sunscreen on cloudy days (yes or no).

Source of data, measurements and quality control

Data were collected directly from the participants with a paper questionnaire applied by the interviewer, Pharmacy student. The semi-structured questionnaire was prepared based on previous studies[4] and made by identification questions (name, university, course, gender and age) and open- and closed-ended questions about photoprotection habits.

The conclusion of the study pointe to a risk behavior in relation to the sun protection of the interviewed, defined as the answers "sometimes" or "no" in the closed-ended questions that evaluated the use of daily sunscreen or other photoprotection measures, intentional exposure and on cloudy days and exposure to tanning booths. The absence of answers on the questions regarding the use and description of other photoprotection measures, besides the photoprotective formulation was considered as "no". Open-ended questions were used to evaluate the participants' knowledge about the required amount of photoprotective formulation to be applied, as well as the knowledge about the difference and importance of photoprotection against ultraviolet radiations A and B.

After data collection, the answers obtained were tabulated in Microsoft Excel spreadsheets by the interviewer herself, with posterior typing review.

Size of the study

No calculation of the size of the sample was performed, with an estimation of a minimum of 100 participants from each area of study (exact and biological sciences).

Statistical methods

Descriptive statistics was initially performed, obtaining absolute and relative frequencies of each variable. Bivariate logistic regression was calculated to estimate the odds ratio (OR) and the 95% confidence interval (95% CI) between the solar exposure risk behavior and the independent variables. We adopted the level of $p < 0.05$ to define statistical significance.

Ethical aspects

The project was approved but the Committee of Ethics in Research of the Universidade Federal de São Paulo, under the

number and certificate presented to ethical assessment number 46273415.8.0000.5505.

All participants were instructed and signed the consent form, confirming participation in the study.

RESULTS

Two hundred university students were interviewed, 75.5% female, 50% from exact sciences and 50% from health and biological sciences; more than half (59%) up to 20 years of age.

The prevalence of risky behavior regarding sun protection among these students was of 83% (95% CI: 77.7- 88.3%); no students knew the difference between ultraviolet radiation A and B, 96% did not know the correct amount of sunscreen that should be applied and 23% believed that skin tanning is healthy, most of the subjects associating it to vitamin D production (Table 1).

The use of other photoprotection measures corresponds to 15.5% daily and 47.5% during intentional exposure. Moreover, 80% and 16% did not use sunscreen on the same situations and 67% did not use it on cloudy days (Table 1). None of the participants used artificial tanning booths.

The use of sunglasses was the most mentioned photoprotection measure besides sunscreen (54.3%) for daily protection, followed by opting to stay in the shade or do not expose (11.4%). On occasional situations of intentional exposure, 37.8% reported the use of caps or hats, 32.4% of sunglasses and 18.9% of an umbrella or beach umbrella (Table 2).

Gender was associated to risk behavior and was significantly lower in females OR = 0.07 (95% CI: 0.01-0.56). Age, study area, knowledge of the difference between ultraviolet radiation A and B, considering tanning healthy and knowledge on how much sunscreen to apply were not associated to risky sun exposure behavior (table 3).

Table 1: Characteristics of the population interviewed and frequency of individual variables part of the outcome

Variable	N	%
Demographic characteristics		
Gender		
Male	49	24.5
Female	151	75.5
Age (years)		
17-18	36	18
19-20	82	41
>21	82	41
Study area		
Exact sciences	100	50
Health and biological sciences	100	50
Daily habits of sun protection		
Sunscreen		
No	160	80
Yes	40	20
Other measures		
No	169	84.5
Yes	31	15.5
Sunscreen on cloudy days		
No	134	67
Yes	66	33
Sun protection habits during intentional exposures		
Sunscreen		
No	32	16
Yes	168	84
Other measures		
No	105	52.5
Yes	95	47.5
Knowledge on photoeducation		
Knows how to differentiate between ultraviolet radiation A and B		
No	200	100
Yes	0	-
Knows how much sunscreen to apply		
No	192	96
Yes	8	4
Considers tanning healthy		
No	154	77
Yes	46	23

DISCUSSION

In this study, 80% of the undergraduates interviewed had risky behavior regarding sun exposure. Among males, this behavior was significantly worse. Body worship, outdoor physical activities and the aesthetic value of tanning can lead young people to a prolonged sun exposure and, many times, without the adequate protection.

Limitations of this study include a convenience sample, lack of socioeconomic data and use of a non-validated questionnaire, what impairs data extrapolation.

Other studies also report low adherence to daily use of sunscreen among undergraduates. In a cross-sectional study with 2,622 people in Saudi Arabia in 2010 and 2011, AlGhamdi et al.[3] reported that 23.7% (of the total of 2,566) used sunscreen daily.[3] In the analytical cross-sectional study in a Brazilian university of the Midwest region, Castilho, Sousa and Leite[13] reported that around 25% of the 308 students interviewed used sunscreen daily.

In contrast with these results, in a study conducted in the metropolitan region of Porto Alegre, 85% of the 1,030 individuals interviewed confirmed using sunscreen in 2001.[12] In Italy, questionnaires were applied to students between 11 and 16 years of age, observing that 91% of the 379 teenagers confirmed using sunscreen, but only 50.4% reapplied it. The need for sunscreen use when the exposure is intentional, except for when at the beach was questioned and 52% believed that it would not be necessary.[7]

Table 2: Description of photoprotection measures daily and during intentional exposure used, except for sunscreen

Measures mentioned	Daily use		Occasional use	
	N	%	N	%
Cap/hat	3	8.6	56	37.8
Umbrella/sun umbrella	3	8.6	28	18.9
Make up	3	8.6	1	0.7
Clothing	3	8.6	9	6.1
Shade/no exposure	4	11.4	4	2.7
Sunglasses	19	54.3	48	32.4
Lip balm	0	-	2	1.4

Table 3: Odds ratio (OR) and 95% confidence interval (95%CI) of risk behavior according to the variables in the study

Variable	OR (95% CI)	P value
Demographic characteristics		
Gender		
Male	1	
Female	0.07 (0.01-0.56)	0.012
Age (years)		
17-18	1	
19-20	1.84 (0.67-5.06)	0.235
>21	1.28 (0.49-3.35)	0.620
Area		
Exact sciences	1	
Biological sciences	0.75 (0.36-1.58)	0.452
Knowledge on photoprotection		
Considers tanning healthy		
No	1	
Yes	1.90 (0.69-5.24)	0.213
Knows how much sunscreen to apply		
No	1	
Yes	0.60 (0.12-3.11)	0.543

In this study, adoption of other photoprotection measures was of 15.5% daily and 47.5% during intentional exposure. In contrast, in Saudi Arabia, 81.5% reported using sunscreen, 95% clothing coverage, 90% caps or hats and 97.9% sought shade to protect from the sun.[3] In a study performed in 2015 over the phone in Germany with teenagers and adults regarding sun protection behavior , it was found that the most used photoprotection measure was the use of long-sleeved clothing, mentioned by 54% of the 3,000 interviewed, and the least used was hats, only used by 18% of all interviewed.[8] In China, it was observed that women preferred using parasols and sunscreen for protection, whereas men opted to use long-sleeved clothing and to reduce sun exposure; both genders were not as concerned regarding eye protection.[14]

The influence of gender in risk behavior was also reported in studies conducted in Brazil (Porto Alegre, Piauí, Curitiba) and in other countries (Australia, Saudi Arabia, Germany and China), where women had better photoprotection habits and the non-use of sunscreen was higher in men.[2,3,8,12,14-16]

Few participants could tell the correct amount of sunscreen that should be applied. A study performed in the city of Natal, Rio Grande do Norte, Brazil, with 200 volunteers demonstrated that the amount of sunscreen applied affects its efficacy. The smaller amount applied, the lower is the protection, what demonstrates the need of knowing how much to be ised.[17] None of the undergraduates interviewed knew the difference between ultraviolet radiation A and B. Sun protection factor (SPF number) displayed in the packaging of photoprotection products refers only to protection against ultraviolet B, that can cause erythema, pain, dyspigmentation and peeling.[1,16] It is important that the user also seeks protection against ultraviolet A, that contribute more significantly to immunosuppression and early ageing, drying the skin and damaging its elasticity.[1,16]

A good part of undergraduates who consider healthy to have a tanned skin mentioned the importance of the sun for vitamin D synthesis, which occurs by photolysis in the epidermis with the action of ultraviolet B on ergosterol and cholesterol.[18] Lack of sun exposure can cause deficiency in the synthesis of vitamin D,[19] however, the exposure must be sensible, i.e., photoprotection measures should be used so as to take advantage of the benefits from this exposure, minimizing harm. In a study conducted in China, the importance of sun for vitamin D production was discussed, observing that men believed that tanned skin is healthier and more attractive, whereas women believed that tanned people look older.[14]

None of the participants used artificial tanning booths. This result can be explained by the awareness of the dangers of this method and the difficulty of access due to regulatory measures. In Taguatinga (Distrito Federal, Brazil), this habit was reported by 3.5% of 202 female students in 2007, close to 4.5% of the 379 teenagers interviewed in Italy in 2010, who confirmed using tanning booths and 7.4% in this study judged safe having artificial tanning before sun exposure.[7,13]

The area of study did not interfere with the risk behavior of undergraduates, similarly to a previous study conducted in Curitiba with 398 medical school students in 2012, who had already had the discipline of dermatology or not.[16] In contrast to these results, a cross-sectional study also with 398 Brazilian undergraduates in Teresina, Piauí in 2011 noticed that undergraduates of health sciences adopted better photoprotection measures.[15]

Australian studies with 101,449 teenagers interviewed in 1993, 1996, 1999 and 2002 demonstrated that care related to sun exposure got poorer over the years.[6] One study in Germany also observed that the risk behavior is more pronounced among younger people.[8] In Saudi Arabia, it was seen that young employees or students younger than 30 years of age used more sunscreen than those unemployed and older than 30 years.[3]

The participants in this study showed a high risk behavior, demonstrating the need for promotion of photoprotection. In the United States, it was also raised the need for adoption of sun protection, because it was observed that sun protection was not common in all levels of school, particularly for those in high school.[5]

A successful example of the dissemination of knowledge on the subject was the intervention done in Australia between 1992 and 1996, regarding daily sunscreen use for the prevention of skin cancer. In a subsequent study from 1997 to 2002, the participants showed improved compliance to the application of sunscreens and a safer behavior regarding sun exposure.[2]

Due to geographical characteristics and cultural trends, Brazilians are among the people who expose more to the sun.[20] Therefore, photoeducation measures should be encouraged and broadcasted in Brazil, in order to prevent the development of acute and chronic actinic damage, particularly because epidemiological data point towards a steady increase in the incidence of skin cancer.

CONCLUSION

Risk behavior regarding sun exposure is high among undergraduates and more common among males. The students have poor knowledge on photoprotection. Photoeducation activities are important for the young.

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