

Habits related to sun exposure among physical education teachers working with water activities *

Hábitos relacionados à exposição solar dos professores de Educação Física que trabalham com atividades aquáticas

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Abstract: BACKGROUND: Ultraviolet radiation has been considered one of the most important risk factors for melanoma or nonmelanoma skin cancer. Thus, it has been accepted that professionals working with outdoor activities are at greater risk of developing skin cancer.

OBJECTIVE: To identify sun-exposure habits among teachers of physical education (PE) who work with water activities.

METHODS: We conducted an observational cross-sectional study with 123 male and female PE teachers aged between 20 and 58 years who have been working with water activities for at least a year using a questionnaire with open and closed-ended questions.

RESULTS: Of the respondents, it was observed that 64.2% work directly exposed to the sun and 13.0% in partially covered pools; out of these, 69.5% do so between 10 am and 4 pm. In the group exposed to the sun, it was found that only 17.9% always protect themselves. Men seem to be less careful, since 14.3% always protect themselves, while 23.1% of the women reported to always protect themselves. However, there were no statistically significant differences.

CONCLUSION: Based on the data collected, we conclude that the sample investigated may be at risk of developing skin cancer. Keywords: melanoma, skin cancer, workers.

Keywords: Melanoma; Skin neoplasms; Workers

Resumo: FUNDAMENTOS: A radiação ultravioleta tem sido considerada um dos mais importantes fatores de risco para o câncer de pele melanoma ou não melanoma. Dessa forma, tem sido aceito que os profissionais que trabalham em atividades ao ar livre apresentam maior risco de desenvolver câncer de pele.

OBJETIVO: Identificar os hábitos relacionados à exposição solar dos professores de Educação Física (EF) que trabalham com atividades aquáticas.

MÉTODOS: Realizou-se um estudo observacional do tipo transversal com 123 professores de EF, de ambos os sexos, que trabalham com atividades aquáticas, no mínimo, há um ano, com idades entre 20 e 58 anos, utilizando-se um questionário com perguntas abertas e fechadas.

RESULTADOS: Do total de informantes, observou-se que 64,2% trabalham diretamente expostos ao Sol e 13,0%, em piscinas com cobertura parcial, dos quais 69,5% o fazem entre 10h e 16h. Do grupo exposto ao Sol, verificou-se que apenas 17,9% sempre se protegem: 14,3% dos homens e 23,1% das mulheres. Contudo, não houve diferenças estatísticas significativas.

CONCLUSÕES: A partir dos dados coletados, é possível concluir que o grupo amostral estudado parece encontrar-se em situação de risco diante da possibilidade de desenvolver câncer de pele.

Palavras-chave: Melanoma, Neoplasias cutâneas, Trabalhadores

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INTRODUCTION

The skin is a heterogeneous organ and, therefore, skin cancer may present neoplasms of different types. According to Azulay et al.,¹ the most frequent types are basal cell carcinoma (70% of the diagnoses of skin cancer), which mainly affects adults older than 30 years of age; squamous cell carcinoma (20% of the cases), which is more frequent in males and in older adults; and those originating in the melanocytes (4% of the cases), which has been increasing rapidly among individuals of the white race. The first two types are called non-melanoma skin cancer, while the latter is called melanoma.

Basal cell carcinoma (BCC) is a malignant neoplasm that presents better prognosis, since it shows very slow growth, with localized invasive capacity, but without causing metastasis. Its preferred location is the head, with 27% of the cases occurring in the nasal region, followed by the trunk and then the limbs. The most characteristic lesion of BCC is a pearl-like bump, that is, a papular translucent and shiny lesion of a light yellowish color. Squamous cell carcinoma (SCC) has the capacity for local invasion and metastasis, which varies according to the lesion from which it originated (mucosa, semimucosa or skin - in order of severity). The most affected areas are those most exposed to the sun, like the face and back of hands. Initially, it appears as a small papule with some degree of keratosis and its growth is faster than in BCC. A melanoma arises from melanocytes, usually in cutaneous sites; there are also non-cutaneous forms. Highly metastatic and consequently lethal, this tumor can spread through the lymphatic system or blood. Its main location is the head, and the lesion has poorly defined borders.¹

However, in the three cases, the main risk factor is excessive exposure to the sun, especially to ultraviolet rays.^{2,3} According to Sasson,⁴ some studies have defended that ultraviolet radiation damages DNA and genetic material, produces free radicals, causes inflammation and weakens the immune response of the skin. Moreover, the author asserts that ultraviolet wavelengths greatly contribute to the formation of harmful effects to the skin. Azulay et al.¹ corroborate this idea and add that there is induction of cell mutations and development of malignancies as a consequence of the interaction of ultraviolet radiation with the skin. Sunlight includes various wavelengths, like infrared and ultraviolet. The latter is part of the non-ionizing electromagnetic spectrum and is divided into three spatial regions, dependent on wavelength: UVC (200 to 290nm), UVB (290 to 320nm) and UVA (320 to 400nm).

Most of the ultraviolet rays reaching the Earth's surface are UVA. Due to the continuing depletion of

the ozone layer, UVB rays have had increased incidence on the Earth. These rays are closely related to the occurrence of skin cancer. To date, it is believed that UVC rays, which are potentially more carcinogenic than UVB, are blocked by the ozone layer,⁴ although it can be admitted that the incidence of these rays has been increasing.⁵ UVA rays are independent of the ozone layer and can cause skin cancer in individuals who are regularly exposed to them for prolonged periods of time, during high incidence hours and over several years.⁵

Thus, it has been accepted that professionals working with outdoor activities and, therefore, often exposed to the sun, such as fishermen, farmers and lifeguards, are at high risk of developing skin cancer.⁶ Intermittent exposure to the sun is an important factor in melanoma and basal cell carcinoma types, different from squamous cell carcinoma, whose continuing exposure is more relevante¹. However, it has been found that cumulative and excessive exposure during the first 10 to 20 years of life increases the risk of skin cancer.⁵

Palma et al.⁹ observed an odds ratio of 12.77 (CI = 3.12 - 52.28) among physical education teachers who work with water activities, taking into account the gross rate of 85.97 cases per 100,000 inhabitants estimated by INCA for residents in the city of Rio de Janeiro in 2005. Similarly, Vishvakarman et al.¹⁰ found that, in Australia, physical education teachers are subject to greater risk of skin damage due to high exposure to ultraviolet radiation. Lazarov et al.¹¹ also corroborated this idea and concluded that hydrotherapists are too exposed to the risks of developing skin diseases and that they should be recognized as occupational diseases for these workers.

On the other hand, it seems that some protective measures could contribute to the prevention of skin diseases and more specifically to the prevention of skin cancer. Thus, studies have been conducted to examine the level of knowledge and protective behaviors in relation to sunlight and skin cancer. Geller et al.¹² found that the prevention program had a significant effect among those who worked with water activities, thus reducing sunburn. An investigation conducted by Hora et al.¹³ demonstrated that most of the individuals investigated knew about the risks and harm associated with sun exposure and the forms of protection, although they exposed themselves to those risks.

The aim of this study is, therefore, to identify sun-exposure-related habits among physical education (PE) teachers who work with water activities.

This study is relevant because there are few studies involving this topic and, possibly, none has as

its object of investigation physical education professionals working with water activities in Brazil. Moreover, the research could help to increase the level of knowledge and the PE teachers' efforts to protect themselves against skin cancer.

METHODS

Type of study

This is an observational cross-sectional study which attempted to observe sun-exposure-related habits adopted by physical education teachers who work with water activities.

Subjects

The size of the population of physical education teachers who work with water activities could not be accurately determined. However, considering the approximate number of teachers affiliated to the Regional Council of Physical Education (22,000), the confidence level of 95%, the margin of error of 5% and arbitrary distribution of 10%, the sample size was calculated as 138 teachers. Due to difficult access to the teachers' workplaces and a small mortality rate of the sample population, the sample became slightly smaller. Thus, 123 physical education teachers participated in the study. They included both men and women working with water activities in the city of Rio de Janeiro for at least a year.

The selection of respondents was based on convenience, since it was not possible to establish a list of teachers who work in this field for subsequent random selection. Furthermore, due to numerous difficulties encountered by the researchers during their visits to the teachers' workplaces, we sought to investigate the most accessible professionals.¹⁴

For the questionnaires, teachers were informed of the research objectives, the institution responsible for the research, and the confidential and voluntary nature of their participation in the study. Then, they received the invitation letter, the Free and Informed Consent Form, and the questionnaire, as determined by Resolution 196/96 of the National Health Council (CNS). This way, the researchers sought to meet the ethical principles contained in the Declaration of Helsinki.

Instrument

For data collection, we used an anonymous questionnaire with open and closed questions. The instrument included questions on the conditions of work organization and process, in addition to relevant aspects involving habits related to sun exposure. It was specifically created for this study. Reliability was tested through two measurements in a pilot group and estimated by the *Kappa (k) coefficient*.

Procedures

The questionnaires were handed in to the respondents in an envelope at their workplace, with the permission of the managers of the gym or club and consent from the part of the respondents themselves. Even though the questionnaires were self-administered, the researchers remained around whenever possible. The questionnaires were then returned inside the envelope, so that the researcher in charge could not identify the respondents. The researchers received adequate training for all of the procedures.

Statistical treatment

Normality of the distribution samples was determined by the Kolmogorov-Smirnov test. To evaluate the significance of the differences between observed and expected scores between two or more categories of occurrence or two or more groups, we used contingency tables (chi-square - X^2).

RESULTS

The sample investigated in this study included 123 physical education teachers with at least one year of professional experience in water activities. Of this total, 70 (56.9%) were male, while 53 (43.1%) were female. The age of the respondents was between 20 and 58 years (mean = 33.7 years, SD = 9.6).

Considering the working conditions, we observed that 79 (64.2%) teachers worked directly exposed to the sun; 16 (13.0%) gave lessons in swimming pools that had some kind of partial protection from the sun, such as tents or roofs over some small areas; and 28 (22.8%) worked in pools fully covered and free from sun exposure.

Of the total respondents who were exposed to solar radiation ($n = 95$), we observed that a considerable number did not adequately protect themselves from sun exposure and men seemed less wary, although there were no statistically significant differences ($p > 0.05$) (Graphs 1 and 2). Graph 3 presents the most common forms of protection from sun exposure adopted by these teachers. The use of sunscreen was significantly higher among women ($p < 0.05$). The same happened to staying in water in an attempt to find protection against sun exposure ($p < 0.05$). The region of the body protected by sunscreen among those exposed to the sun can be seen in Graph 4.

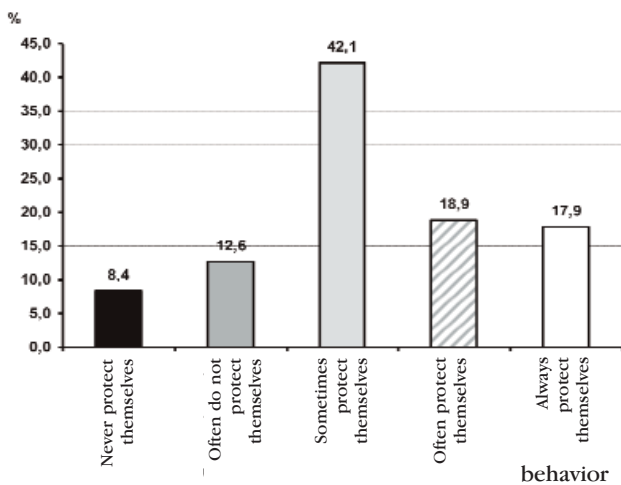
It was also observed that among those often exposed to the sun, 71 (74.7%) worked until 10 am, 66 (69.5%) worked between 10 am and 4 pm, and 73 (76.8%) worked after 4 pm. Among the 66 teachers who worked between 10 am and 4 pm, 7 (10.6%) have skin that "burns easily and never tans;" 6 (9.1%) have skin that "burns easily and tans slightly," 29 (43.9%)

have skin that “burns and tans moderately,” 16 (24.2%) have skin that “burns little and tans a lot,” 6 (9.1%) have skin that “rarely burns and tans a lot,” and 2 (3.0%) have skin that “never burns and tans intensely.” However, no significant differences were found in the behavior of teachers with different skin types concerning sun-exposure prevention ($p > 0.05$).

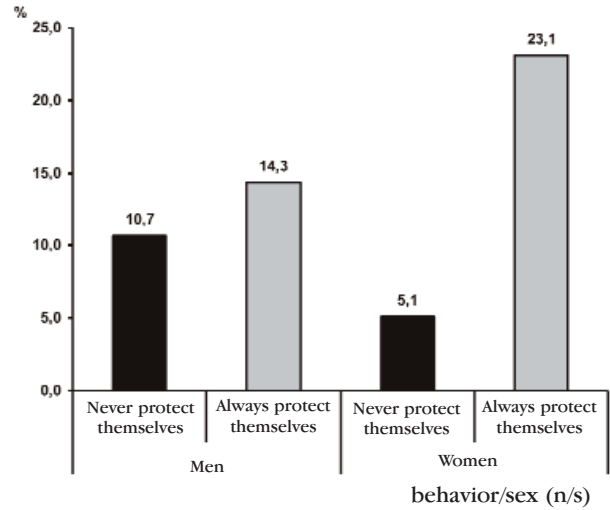
DISCUSSION

This research allows us to understand that the working conditions of physical education teachers who work with water activities are detrimental to the health of these professionals, since two-thirds reported working in outdoor swimming pools or in pools with partial shelters and therefore often exposed to sunlight. This situation gets worse when one notes that 69.5% of the teachers in this group work from 10 am to 4 pm, the most critical period of time. In this sense, the data show that this professional group is vulnerable to skin cancer. Different studies have shown significant associations between sun exposure and the occurrence of this kind of cancer, especially among those who work outdoors.^{11,15,16} Physical education teachers belong to the group of workers who carry out their tasks exposed to the sun and, therefore, are vulnerable to skin cancer^{16,17} These professionals, according to research conducted in the United States, may be exposed to the sun for 4.5 hours per day¹⁷, and according to a study conducted in Australia, they have been exposed to high levels of solar radiation.¹⁰

In athletes, frequent exposure to the sun has also been a concern.² Richtig et al.¹⁸ investigated 150 marathoners by means of a questionnaire and stan-

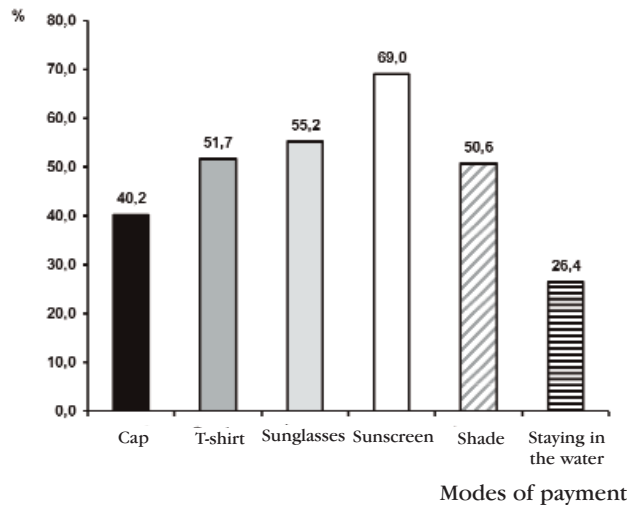


GRAPH 1: Behavior of teachers who work exposed to the sun in relation to protection from sun exposure

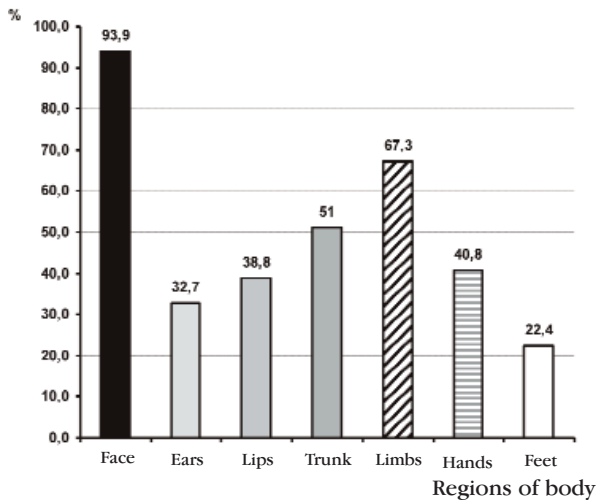


GRAPH 2: Teachers' behavior in relation to protection from sun exposure, by gender

dardized examination of the skin on the left shoulder and buttocks. The authors found a significant number of lentigines, as well as nevi, on the shoulder in contrast with none located on the buttocks. We also found three basal cell carcinomas and fourteen actinic keratoses. The authors, thus, suggest that there is a potential risk of developing melanoma among marathon runners. Ambros-Rudolph et al.¹⁹ drew similar conclusions after they investigated marathoners and a control group and observed that the runners show atypical melanocytic nevi, solar lentigines and lesions suggesting non-melanoma skin cancer more often.¹⁹ Nelemans et al.²⁰ observed that regular swimming during the summer months in outdoor swimming pools, rivers or seas before the age of 15 was sig-



GRAPH 3: Forms of prevention followed by teachers exposed to the sun



GRAPH 4: Body regions on which teachers exposed to the sun wear sunscreen

nificantly associated with the occurrence of melanoma.

A case-control study developed in the Netherlands and aiming to detect risk factors for different types of melanoma revealed that most melanoma patients had participated in water sports (such as fishing and sailing), tanning practices or taken vacation in countries with high solar radiation, although they had worked in areas protected from the sunlight. The authors defend, among other aspects, that intermittent exposure to the sun could also contribute significantly to the disease.²¹

In Brazil, a study carried out in order to identify differences in terms of the most common forms of protection from sun exposure in capitals of the five Brazilian regions found that men, the young (between 15 and 24 years old) and those physically active were most exposed to the sun in all the five regions.²² In relation to forms of protection, the present study has verified that among those who protect themselves regularly the most common forms of protection are using sunscreen, wearing sunglasses, staying in the shade and using a T-shirt. In order to compare the changes in terms of protection from sun exposure and sunburn rates among professionals working with water sports (teachers and lifeguards) after a specific intervention for prevention education, Geller et al.¹² observed a significant reduction in sunburns, although prevention behaviors had not changed significantly. As in the present study, the use of sunscreen, a hat or cap, T-shirt, sunglasses, and staying in the shade were also observed by the authors, but do not seem to have been influenced by the education program. On the other hand, Hall et al.⁷ found the use of sunglasses as the most common habit for prevent-

ing exposure to solar radiation among teachers and lifeguards, followed by the use of sunscreen, different from the present study in which sunscreen appeared as the main form of protection. Szklo's study shows that wearing a hat is the most important type of protection from sun exposure in most of the Brazilian capitals, exceeding sunscreen. However, these forms of protection in the city of Rio de Janeiro were almost similar. The authors also emphasize that the use of sunscreen was more pronounced among women, which is in accordance with this study.

In this sense, Geller et al.¹² and Hora et al.¹³ agree that despite knowing the risks and harm associated with sun exposure, the individuals remain without adequate protection. However, this research found that there is a large number of outdoor swimming pools without any kind of shelter which expose the teachers to excessive solar radiation. Thus, more than a risk behavior, it is perhaps a case of vulnerability of these professionals before inadequate working conditions. This way, we agree with Hall et al.⁷ when they consider that the organization and the environment can provide support for protection against sun exposure and burns or other more serious problems.

It should be noted that the forms usually employed as means of prevention, such as sunscreen, hat and shirt are questionable from the standpoint of their effectiveness concerning full body protection and even their effectiveness in protecting against keratoses²².

CONCLUSION

Based on the data collected, we conclude that the sample investigated appears to be at risk of developing skin cancer. Whether working with water activities (swimming, hydrogymnastics, surfing, etc), outdoor sports (beach volleyball, soccer, etc) or in schools, physical education teachers often find themselves exposed to solar radiation and, therefore, may be a group at high risk of developing skin cancer. Despite the fact that sun exposure can bring many health benefits, it has been widely accepted that both prolonged exposure and intense radiation may promote the occurrence of cancer. This way, this professional group should be given more attention and care in relation to prevention.

Finally, it is suggested that further studies with cohort characteristics be carried out considering physical education teachers who often work out in the sun and those that are not exposed (control), especially with more specific clinical tests to detect any condition associated with skin cancer. □

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