VIA MEDICA
PRACA ORYGINALNA
Forum Dermatologicum
2016, tom 2, nr 4, 155–158

ISSN 2451–1501

The assessment of students' knowledge about the harmfulness of sun exposure and prophylactic measures

Ocena wiedzy uczniów na temat szkodliwości promieniowania słonecznego oraz działań profilaktycznych

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ABSTRACT

Introduction: Ultraviolet radiation has a significant influence on human health. UVA is responsible for skin aging, while UVB for sunburns. The frequency of sun exposure correlates with the amount of pigmented moles and the incidence of skin cancer. The aim of the study was to evaluate and compare the medical and non-medical students' knowledge on the danger of solar radiation and the implementation of this knowledge in practice.

Materials and methods: The study included students aged between 18 and 30, studying at medical universities in Poland and students from non-medical universities. All students completed a questionnaire investigating their knowledge about sun exposure and evaluating their actions associated with exposure to ultraviolet radiation.

Results: The harmful effect of sun was confirmed by about 90% of students of both, medical (90.0%) and non-medical universities (88.1%); 61% of students admit to sunbathing. A total of 6.8% of students in non-medical fields, and 8.7% of medical students, admit to use a sunbed. More than 90% of respondents used sunscreens at least occasionally, however, regular application was observed in only 11.8% non-medical college students and 14.8% of medical schools.

Conclusions: Students from non-medical universities demonstrated comparable knowledge about the harmful effects of UV radiation on the skin. There were no significant differences between students from medical and non-medical universities as in respect to implementation of their knowledge in practical conditions.

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Key words: sun protection, SPF, ultraviolet

STRESZCZENIE

Wstęp: Promieniowanie ultrafioletowe ma znaczący wpływ na zdrowie człowieka. UVA jest odpowiedzialne za starzenie się skóry, a UVB za oparzenia słoneczne. Częstotliwość opalania koreluje z liczbą znamion barwnikowych i ryzykiem zachorowania na nowotwory skóry.

Celem badania była ocena i porównanie wiedzy studentów kierunków medycznych i niemedycznych o ryzyku związanym z opalaniem się oraz ze stosowaniem tej wiedzy w praktyce.

Materiał i metody: Badaniem objęto studentów w wieku od 18 do 30 lat, studiujących na uczelniach medycznych i niemedycznych w Polsce. Wszyscy studenci wypełniali kwestionariusz dotyczący wiedzy na temat zagrożeń związanych z ekspozycją na słońce oraz zachowań w trakcie takiej ekspozycji.

Wyniki: Szkodliwe działanie słońca na skórę zostało wskazane przez około 90% studentów zarówno uczelni medycznych (90,0%), jak i kierunków niemedycznych (88,1%). Do opalania przyznało się 61% studentów. Z solariów korzystało 6,8% studentów kierunków niemedycznych oraz 8,7% studentów kierunków medycznych. Ponad 90% respondentów stosowało filtry przeciwsłoneczne przynajmniej od czasu do czasu, jednak regularne stosowanie zaobserwowano jedynie u 11,8% studentów uczelni niemedycznych i 14,8% szkół medycznych.

Wnioski: Studenci z uczelni niemedycznych posiadali porównywalną wiedzę na temat szkodliwego wpływu promieniowania UV na skórę. Nie stwierdzono istotnych różnic między studentami z uniwersytetów medycznych i pozamedycznych w odniesieniu do zastosowania tej wiedzy w praktyce.

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Słowa kluczowe: ochrona przeciwsłoneczna, SPF, ultrafiolet

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INTRODUCTION

According to the National Cancer Registry the number of malignant neoplasms in Poland has risen more than twice over the last three decades, reaching in 2010 more than 140.5 thousand cases, of which about 70 thousands in men and 70.5 thousands in women. The number of registered cases of skin cancers in 2010 was more than 10,000, approximately 5,000 in men and 5,000 in women, which includes 6.8% men, and 7.5% women of all malignant cases [1]. The incidence of skin cancers shows an upward trend, similarly to the other cancers.. In both sexes and in all age groups a steady increase of the incidence of skin cancers has taken place, only with the exception of a group of middle-aged men (45–64 years), where the incidence remains at a constant level [1]. Similar situation is observed in malignant melanoma of the skin, which consists of approximately 1.7% of cancers in men and 1.9% in women. The incidence of melanoma continues to rise in both sexes — incidence rate in three decades has increased almost 3-fold [2].

Taking into account the upward trend of the incidence of cutaneous malignant tumors, the universality of tanning and perception of tanned skin as fashionable and desirable, and the fact, that the most important environmental factor of skin cancers is ultraviolet radiation (UVR), it seems reasonable to examine the students' knowledge about the dangers of solar radiation and the use of such knowledge in practice.

MATERIALS AND METHODS

The questionnaire-based survey was attended by 532 students aged from 18 to 30 years from medical and non-medical universities in Poland. Participants of the study were asked to complete the web-based questionnaire assessing the knowledge about ultraviolet radiation and behaviors related to sun exposure, as well as the prevention measures such as the use of sunscreen or avoiding of tanning (Annex 1). The survey was available in the period from 19th February, 2016 till 30th March 2016. The results were subjected to statistical analysis using Statistica 12.0 (StatSoft, Krakow). Any differences between the compared groups were verified with χ^2 test. P-values less than 0.05 were considered significant.

RESULTS

It has been shown that the vast majority of students from both medical schools (90.0%) and non-medical ones (88.1%) knew about the harmful effects of solar radiation on human skin ($p = 0.76$). The majority of students from both groups argued that exposing children to the sun can increase the risk of malignant melanoma and the number of moles on the skin, however, medical students confirmed the truth of this assertion more frequently (87.6%) than students of other universities (78.3%, $p = 0.02$). Among the students of medical universities, 45.6% indicated UVB radiation as erythemogenic, UVA was indicated by 34.3% of respondents and both fractions by 19.5%, while two people (0.6%) had no opinion on this subject. Among the non-medical students, only 31.8% mentioned UVB fraction as erythemogenic, 43.7% mentioned UVA, 22.7% indicated both fractions (UVA and UVB), and 3 (1.7%) patients did not indicate any kind of UV as responsible for the formation of sunburn ($p = 0.02$). Regarding the question concerning the fraction responsible for the skin aging, 26.8% of students from medical faculties indicated UVA, 20.9% — UVB, 51.3% — both factions of 0.9% did not mention any of them. Students from non-medical universities demonstrated similar knowledge: 28.2% ticked UVA, 23.0% — UVB, 48.3% — both factions, while 0.6% none ($p = 0.88$).

Habits related to sun exposure were similar in both groups. About 60% of the respondents confirmed that they sunbathed in the past (61.1% of respondents from medical schools and 60.0% of non-medical universities). Among60 percent of the respondents: 16% did so often, 36% rarely and 48% occasionally (students from medical schools: 16.2%, 36.1%, 47.7%, non-medical students: 15.7%, 36.1%, 48.2%, respectively; $p = 0.99$). Tanning beds were used by 6.8% of non-medical college students and 8.7% of medical students ($p = 0.45$). No significant differences were observed between men and women regarding sunbathing (66% women and 51% men from medical universities and 60% women and 60% men from non-medical faculties tanned in the past). The use of sunscreens was declared by 91.2% of non-medical college students (including 11.8% using them on a daily basis, 27.8% only during sunbathing, and remaining 60.4% occasionally) and 94.5% of medical schools (including 14.8% applying them every day, 29.7% only while sunbathing and 55.5% occasionally) ($p = 0.52$).

Most of the students were using sunscreens classified as moderate protection (SPF 15–30) (55.7% of students in medical schools and 48.0% of non-medical universities; $p = 0.14$). Sunscreens with SPF < 15 were used by 17.3% of students from medical schools and 16.0% from non-medical ones, and high-protection filters (SPF above 30) declared to be used by 27.0% of students from medical schools and 36.0% of non-medical students. About 40% of respondents used other UV protection measures (hats, etc.) (39.4% of students from medical schools and 40.3% of non-medical universities; $p = 0.93$).

DISCUSSION

UV light is nowadays considered as one of the most important hazardous environmental factor which can cause the development of malignancies [3–5]. UVB produces changes in the skin, by acting as carcinogen through DNA damage and epigenetic effects. Upon UVB exposure single-

-stranded breaks in DNA and intrastrand DNA base-cross--linking via formation of cyclobutane pyrimidine dimers and 6–4 pyrimidine-pyrimidone photoproducts are detected in DNA structure. In addition, both UVA and UVB induce cell damage inducing generation of reactive oxygen species [6]. Chronic exposure to UV also accelerates skin ageing and induces local and systemic immunosuppression [7]. All these effects should prompt people to protect their skin from sun exposure. However, our study clearly indicate that despite people are generally aware of the harmful effect of sun exposure, this knowledge is rather superficial, and, even more important, did not translate into use of proper UV protective behavior. Many of investigated students admitted that they had sunbathed in the past, usually only occasionally used sun-blockers and some of them also used tanning salons. Remarkably, no much differences were observed between students from medical and non-medical faculties, suggesting that the educational program at medical schools did not put enough focuson this important aspect of prophylactic measure regarding the development of skin cancers. Especially, health-care professionals should be well educated about the need of proper UV protection, as they are frequently responsible for educating other people, how to protect their skin from UV, especially those patients who are at the greater risk of getting malignancies due to sun exposure, as e.g. organ transplant recipients who have to be on a chronic immunosuppression. As we had demonstrated before, these patients are usually not consulted by dermatologist and in most case are educated by nurses or other health-care providers [8].

A very recent study by de Troya-Martín et al. [9] clearly indicated that many health-care professionals are not aware of the harmfulness of sun exposure, and that they frequently suffer from sunburns. Thus, a special educational program regarding sun exposure and sun protection should be better implemented in their professional education. Educational programs should be also promoted in the schools and for those subjects who are at greater risk of getting sun-induced skin cancers, like organ transplant recipients or outdoor workers [8, 10–12]. Interestingly, outdoor workers frequently apply proper UV protective measures while they are at work, but not during leisure activities at weekends [10]. Such phenomenon may be related to the fact that workplace policies force to use the sun protection, however, did not necessarily rely on people's knowledge about hazards of sun exposure.

One of the most commonly used method of sun protection is the application of sun-blockers. Several studies clearly demonstrated, that the regular use of sun-blockers diminishes the risk of getting melanoma, as well as other sun-induced cutaneous toxicities, e.g. lupus erythematosus lesions [13, 14]. However, they should be applied in proper amount (i.e. 2 mg/cm^2) to provide adequate sun protection indicated by the manufacture on the package. In one of our previous study we had clearly demonstrated, that the routine use of sun-blockers is much less than the recommended dose [15] and that the proper education may significantly improve their use [7].

Summarizing, in the current study we have shown that the knowledge of young people about the harmfulness of sun exposure is inadequate. As suggested by many other authors [16–20], a proper educational program about harmfulness of UV exposure and UV-protective measures should be better implemented in the basic as well as professional education process, as it may significantly reduce the risk of the development of various skin cancers and reverse the unwanted trend of steady increase of this cancer incidence in our society.

REFERENCES

1. Nowotwory skóry. W: Krajowy Rejestr Nowotworów. available at http://onkologia.org.pl/nowotwory-skory-c44/
2. Czerniak skóry. W: Krajowy Rejestr Nowotworów. available at http://onkologia.org.pl/czerniak-skory-c43/
3. International Agency for Research on Cancer Working Group on artificial ultraviolet (UV) light and skin cancer. The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers: A systematic review. Int. J. Cancer 2007; 120: 1116–1122.
4. Boniol M., Autier P., Boyle P., Gandini S. Cutaneous melanoma attributable to sunbed use: systematic review and meta-analysis. Br. Med. J. 2012; 345: e4757.
5. Seebode C., Lehmann J., Emmert S. Photocarcinogenesis and skin cancer prevention strategies. Anticancer Res. 2016; 36: 1371–1378.
6. Reich A., Lehmann B., Meurer M., Muller D.J. Structural alterations provoked by narrow-band ultraviolet B in immortalized keratinocytes: assessment by atomic force microscopy. Exp. Dermatol. 2007; 16: 1007–1015.
7. Reich A., Harupa M., Bury M., Chrzaszcz J., Starczewska A. Application of sunscreen preparations: a need to change the regulations. Photodermatol. Photoimmunol. Photomed. 2009; 25: 242–244.
8. Szepietowski J.C., Reich A., Nowicka D., Węgłowska J., Szepietowski T. Sun protection in renal transplant recipients: urgent need for education. Dermatology 2005; 211: 93–97.
9. de Troya-Martín M., Padilla-España L., Férnandez-Morano T. et al. Sun protection habits and attitudes among healthcare personnel in a Mediterranean population. J. Cancer. Educ. 2016; 31: 789–795.
10. Peters C.E., Koehoorn M.W., Demers P.A., Nicol A.M., Kalia S. Outdoor workers' use of sun protection at work and leisure. Saf. Health Work 2016; 7: 208–212.
11. Reeder A.I., McNoe B.M., Iosua E.E. Sun protection practices in New Zealand secondary schools: a 2014 baseline study. Prev. Med. Rep. 2016; 3: 257–263.
12. AlGhamdi K.M., AlAklabi A.S., AlQahtani A.Z. Knowledge, attitudes and practices of the general public toward sun exposure and protection: A national survey in Saudi Arabia. Saudi Pharm. J. 2016; 24: 652–657.
13. Green A.C., Williams G.M., Logan V., Strutton G.M. Reduced melanoma after regular sunscreen use: randomized trial follow-up. J. Clin. Oncol. 2011; 29: 257–263.
14. Patsinakidis N., Wenzel J., Landmann A. et al. Suppression of UV-induced damage by a liposomal sunscreen: a prospective, open-label study in patients with cutaneous lupus erythematosus and healthy controls. Exp. Dermatol. 2012; 21: 958–961.
15. Szepietowski J.C., Nowicka D., Reich A., Melon M. Application of sunscreen preparations among young Polish people. J. Cosmet. Dermatol. 2004; 3: 69–72.
16. Johnson K., Davy L., Boyett T., Weathers L., Roetzheim R.G. Sun protection practices for children: knowledge, attitudes, and parent behaviors. Arch. Pediatr. Adolesc. Med. 2001; 155: 891–896.

17. Scerri L., Aquilina S., Amato G.A., Dalmas M. Sun awareness and sun protection practices in Malta. J. Eur. Acad. Dermatol. Venereol. 2002; 16: 47–52.
18. Klostermann S., Bolte G.; GME Study Group. Determinants of inadequate parental sun protection behaviour in their children-results of a cross-sectional study in Germany. Int. J. Hyg. Environ Health 2014; 217: 363–369.
19. Wan M., Hu R., Li Y. et al. Attitudes, beliefs, and measures taken by parents to protect their children from the sun in Guangzhou city, China. Photochem. Photobiol. 2016; 92: 753–759.
20. Seite S., Del Marmol V., Moyal D., Friedman A. Public primary and secondary skin cancer prevention, perceptions and knowledge: An international cross-sectional survey. J. Eur. Acad. Dermatol. Venereol. 2017; doi: 10.1111/jdv.14104. [Epub ahead of print].

APPENDIX 1

„Ankieta słoneczna" (ankieta dotycząca wiedzy studentów na temat wpływu promieniowania słonecznego na skórę i ich zachowań w trakcie ekspozycji na słońce)

„Sun questionnaire" (the questionnaire investigating students' knowledge about the effects of sun exposure on the skin and their actions associated with exposure to sun)

Płeć: Wiek: Studia: Rok studiów:

☐ kobieta
☐ mężczyzna

☐ medyczne
☐ pozamedyczne

Czy uważasz, że promieniowanie słoneczne jest szkodliwe dla skóry?
- ☐ tak
- ☐ nie
- ☐ nie wiem

Co sądzisz na temat zdania: „Opalenizna jest skutkiem oparzenia skóry":
- ☐ prawda
- ☐ fałsz
- ☐ nie mam zdania

Czy sądzisz, że eksponowanie dzieci na promieniowanie słoneczne może zwiększać ryzyko czerniaka oraz liczbę znamion barwnikowych?
- ☐ tak
- ☐ nie
- ☐ nie wiem

Które promieniowanie odpowiada za przyspieszone starzenie się skóry?
- ☐ UVA
- ☐ UVB
- ☐ obydwa
- ☐ żadne z powyższych

Które promieniowanie w największym stopniu przyczynia się do powstawania rumienia (oparzenia słonecznego)?
- ☐ UVA
- ☐ UVB
- ☐ obydwa
- ☐ żadne z powyższych

Czy opalasz się na słońcu w celu uzyskania opalenizny (np. leżysz na plaży, na tarasie)?
- ☐ tak
- ☐ nie

Jeśli odpowiedziałeś tak, to jak często?
- ☐ sporadycznie (do 2 razy w roku)
- ☐ rzadko
- ☐ często

Czy korzystasz z solarium?
- ☐ tak
- ☐ nie

Jeśli odpowiedziałeś tak, to jak często?
- ☐ sporadycznie (do 2 razy w roku)
- ☐ rzadko
- ☐ regularnie (przynajmniej raz w miesiącu)

Czy stosujesz kremy z filtrem?
- ☐ tak
- ☐ nie

Jak często stosujesz kremy z filtrem?
- ☐ na co dzień
- ☐ tylko do opalania
- ☐ sporadycznie (w przypadku dużej ekspozycji na promienie słoneczne — np. wakacje)

Jak silne filtry stosujesz?
- ☐ do SPF 15
- ☐ SPF 15–30
- ☐ powyżej 30 SPF

Czy w słoneczne dni chronisz się przed słońcem w jakiś inny sposób (np. kapelusz, chusta na głowę)?
- ☐ tak
- ☐ nie
- ☐ sporadycznie, tylko w przypadku dużej ekspozycji