

SKIN CANCER KNOWLEDGE, ATTITUDE AND BEHAVIOR TOWARDS SUN EXPOSURE AMONG YOUNG ADULTS IN LITHUANIA

WIEDZA NA TEMAT RAKA SKÓRY, POSTAW I ZACHOWAŃ WOBEC EKSPOZYCJI NA SŁOŃCE WŚRÓD MŁODYCH OSÓB DOROSŁYCH NA LITWIE

Ieva Laniauskaitė¹, Agnė Ožalinskaitė¹, Rasa Strupaitė¹,
Matilda Bylaitė^{1,2}

¹*Clinic of Infectious diseases, Dermatovenereology and Microbiology, Faculty of Medicine, Vilnius University, Vilnius, Lithuania*

²*Centre of Dermatovenereology, Vilnius University Hospital Santariškių Klinikos, Vilnius, Lithuania*

Corresponding author: Dr. Matilda Bylaitė matilda.bylaite@gmail.com

Our Dermatol Online. 2011; 2(4): 188-194

Date of submission: 06.03.2011 / acceptance: 17.04.2011

Conflicts of interest: None

Abstract

Objective: The aim of the study was to assess young adult's knowledge about skin cancer and its risk factors, attitude towards sun exposure and the interactions of various behaviors in the sun.

Material and methods: The anonymous questionnaire-based inquiry of 750 respondents was created according to the anonymous form filled-in during the annual Euromelanoma Day campaign.

Results: 708 questionnaires were filled-in correctly: 328 (46.3%) by men, 380 (53.7%) by women. Median of age was 21 (women – 22, men – 21). During the sunny days 93.2% of respondents sometimes seek shade, 17.5% of young adults never try to get a tan from 11 a.m. to 3 p.m. Sunglasses are worn in 52.4% of cases, however 63.1% of them with UV filters. 8.1% of respondents always wear T-shirts, 30.6% cover head in the beach. While sun-bathing one third (32.9%) wear sun protection cream, while working or doing sports outdoors – 8.9%. Majority (57.4%) apply sun protection cream when coming to the beach, 31.4% of them don't use it repeatedly. Those who knew, what is melanoma, were more likely to wear sunglasses ($p=0.003$) with UV filters ($p=0.006$), T-shirts ($p=0.046$), covered head ($p<0.0001$) and seeked shadow ($p=0.002$) on the beach; used sun protection cream while working ≥ 1 hour outdoors ($p=0.001$) or sunbathing ($p<0.0001$), and choosed a sun protection cream according to SPF value ($p<0.0001$).

Conclusion: The data of this study showed that respondents behave careless in the sun. One third of respondents always wear sun protection cream, the majority do not know how to use it properly. More responsible behavior in the sun depends on better knowledge of skin cancer.

Streszczenie

Cel: Celem pracy była ocena wiedzy młodych dorosłych na temat raka skóry i czynników ryzyka, w stosunku do ekspozycji na słońce i interakcji na różne zachowania na słońcu.

Materiał i metody: Stworzono anonimowy kwestionariusz badania oparty na 750 respondentach, którzy anonimowo wypełniali formularz w ciągu całorocznej kampanii Euromelanoma Day.

Wyniki: 708 ankiet wypełniono prawidłowo: 328 (46,3%) przez mężczyzn, 380 (53,7%) przez kobiety. Mediana wieku wynosiła 21 lat (kobiety - 22, mężczyźni - 21). Podczas słonecznych dni w 93,2% respondenci czasami szukali cienia, 17,5% młodych ludzi nigdy nie starało się uzyskać opalenizny między godziną 11.00, a godziną 15.00. Okulary noszone były w 52,4% przypadków, jednak 63,1% z nich posiadały filtry UV. 8,1% respondentów zawsze nosiło T-shirty, a 30,6% nakrycia głowy na plaży. Natomiast jedna trzecia (32,9%) używała krem ochronny przed słońcem, a w czasie pracy lub uprawiania sportu na świeżym powietrzu - 8,9%. Większość (57,4%) stosuje krem przeciwsłoneczny, na plaży, 31,4% z nich nie używa go wielokrotnie. Ci, którzy wiedzieli, co to jest czerniak, byli bardziej skłonni nosić okulary ($p = 0,003$) z filtrami UV ($p = 0,006$), T-shirty ($p = 0,046$), nakrycia głowy ($p < 0,0001$) i szukali cienia ($p = 0,002$) na plaży, używali krem ochronny przed słońcem podczas pracy ≥ 1 godziny na wolnym powietrzu ($p = 0,001$) lub opalania ($p < 0,0001$) i wybierali krem ochrony przeciwsłonecznej SPF według wartości ($p < 0,0001$).

Wnioski: Dane z badania wskazują, że respondenci zachowywali się nieostrożnie na słońcu. Jedna trzecia respondentów zawsze nakładała krem ochronny przed słońcem, jednak większość nie wie jak go używać prawidłowo. Bardziej odpowiedzialne zachowanie się na słońcu zależy od lepszej wiedzy na temat raka skóry.

Key words: skin cancer; melanoma; sun protection; health education; Euromelanoma Day

Słowa kluczowe: rak skóry; czerniak; ochrona przed słońcem; edukacja zdrowotna; Euromelanoma Day

Introduction

Over the past few decades the incidence of skin cancer has been rising in Lithuania at an alarming rate. Skin cancer is the most common type of cancer in white population across the globe [1], whereas a non-melanoma skin cancer (NMSC) – most expensive to treat [2]. In 2009, 2272 new cases of skin cancer and 269 of melanoma were registered in Lithuania, while the number of such cases in 1992 were only 938 and 147 respectively [3]. The increase is most likely a result of several factors: depletion of the protective ozone shield due to climate change [4] and people's careless behavior in the sun [5]. Moreover, in the nearest future in Lithuania the incidence of skin cancer might increase even more because of the change in sunbathing habits, e.g. increased frequency of vacations in sunny resorts. It must be acknowledged that the growth in recorded numbers may also be due to better detection methods as well as campaigns for skin cancer prevention, such as annual "Euromelanoma Day" campaign in Lithuania.

Melanoma is considered to be the most serious form of skin cancer due to its rapid metastasis and a rising morbidity among younger people [6]. This cancer is completely curable if detected at the early stage of disease, unfortunately it is fatal if allowed to progress and spread. The key risk factor for melanoma and NMSC is ultraviolet sun radiation [7]. The majority of lifetime UV exposure is received before the 18 years of age [8].

Extended sun exposure during childhood increase the probability of skin cancer in adulthood [9]. For instance, more than 1 severe sunburn in childhood is associated with a two-fold increase in melanoma risk [10,11]. A higher risk of developing skin melanoma is indicated in fair-haired, blue-eyed, freckled and prone to severe sunburns people, as well as in those who are living closer to the equator, who have experienced severe sunburns once or several times, and in those who are spending their holidays in hot climate zones [12].

Primary prevention through identification of people at high risk [13], as well as by health education programs aiming to modify behavior in the sun and to promote protective measures, is a long-term approach to avoiding skin cancer in the future [14].

The aim of this study was to ascertain and evaluate knowledge and attitudes of Lithuanian young adult's regarding skin cancer, sun exposure and the interactions of their various behaviors in the sun.

Material and methods

The method employed was anonymous questionnaire-based inquiry. The questionnaire, consisting of 47 questions, was created according to the anonymous form filled in during annual Euromelanoma Day campaign. A pilot study phase enabled us to make possible choices more relevant and appropriate. Exclusion criteria used in this study were: respondents younger than 18 and older than 75; mental or movement disorder that would impair the ability to understand and complete the questionnaire. The following demographical data was asked: gender, age, education and profession. The respondents were asked to evaluate their skin type (Fitzpatrick classification) [15]. In order to check basic knowledge of skin cancer and sun

exposure we asked the participants what is melanoma, ABCD criteria, SPF letters on cosmetics, whether skin cancer is contagious and which factors increase the probability of it. The opinion if tanned people are more beautiful and healthier, as well as if respondents pay enough attention to sun protection was also asked. We found out such peculiarities of respondents behavior in the sun: if they wear sun glasses (with or without UV filter) during a sunny day, seek shade in order to avoid direct sun rays, avoid sunbathing from 11 a.m. until 3 p.m., wear T-shirts and head covers (hats, caps, kerchiefs or wide-brimmed sunbonnets) in the beach. We also ascertained the duration of time spent outside on weekdays and weekends as well as whether they experienced sunburns to blisters under 18 years old.

Study included 708 respondents: students of Vilnius University, Vilnius Gediminas Technical University, and Vilnius Pedagogical University, pupils of Vilnius Lyceum, Vilnius High School of Salomeja Neris, Vilnius Jesuit and Garliava Jonuciai High Schools as well as randomly selected 18-75 years old people. The statistical analysis was performed using SPSS 17.00. Distribution of bias was graphically assessed. Analysis of data was performed using X^2 test or Mann-Whitney test. A p value of <0.05 was considered statistically significant.

Results

708 (94.4%) questionnaires out of 750 were filled in correctly and included into data analysis. 328 (46.3%) respondents were men and 380 (53.7%) women. The age of participants ranged between 18 and 75 years, vast majority of them (87.4% (619/708)) were younger than 30 years old. Median of age was 21 (for women – 22 and men – 21). 71.3% (505/708) of participants were either pupils or students. Majority of respondents (80.5% (570/708)) attributed themselves to II or III skin type according to Fitzpatrick scale (Fig. 1).

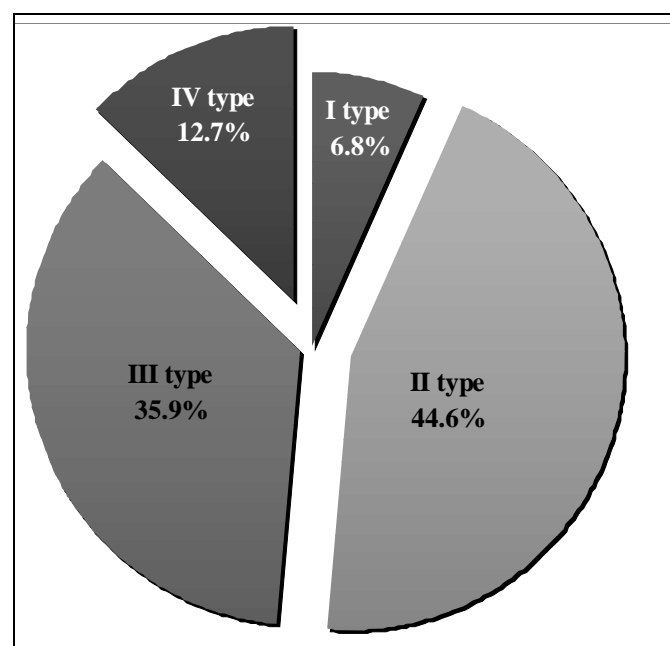


Figure 1. Skin type according to Fitzpatrick

Overall, 45.3% (321/708) of respondents did not know that melanoma is a skin cancer. 83.3% (583/708) did not consider that ABCD criteria define appearance of the atypical mole. Less than half of respondents (46.9% (332/708)) explained that SPF letters on cosmetics is abbreviation of “sun protection factor”, only 7.5% (53/708) correctly converted sun protection cream’s with SPF30 duration of protection from harmful sun’s rays. Only 3.2% (23/708) correctly named all mentioned skin cancer risk factors (Tabl. 1), 98.6% (698/708) of them knew that skin cancer is not contagious.

The number of females, who answered that melanoma is a type of skin cancer, was significantly greater than men: 70.3% (267/380) and 36.6% (120/328) respectively ($p<0.0001$). Women significantly more frequently correctly answered that skin cancer is not contagious 94.2% (358/380) compared to men 83.2% (273/328) ($p<0.0001$). Females also more often named all skin cancer risk factors (females 5.0% (19/380) vs. males 1.2% (4/328)) ($p=0.005$). Males better answered the question, what ABCD criteria define, (female 76.3% (290/380) vs. male 88.1% (289/328) ($p<0.0001$) and counted sun protection cream’s with SPF30 duration of protection from harmful sun’s rays (female 50.0% (190/380) vs. male 74.4% (244/328) ($p<0.0001$)). The number of respondents, who were ≥ 30 years old more often correctly named all risk factors of skin cancer (7.9% (7/89)) than people who were 18-29 years old (2.6% (16/619) ($p<0.0001$)). Respondents, who correctly answered what is melanoma, had significantly higher education degree (graduated/still studying at university) 59.9% (224/374) compared to the people who graduated/still learning at high school 48.6% (161/333) ($p=0.003$). Furthermore, people with higher education claimed more often that skin cancer is not a contagious disease (respectively 93.1% (350/376) vs. 84.6% (281/332) ($p<0.0001$)) and correctly answered what is

SPF (respectively 96.5% (363/376) vs. 93.1% (309/332) ($p=0.036$)). No other significant differences were noticed among demographical data, skin type and knowledge about skin cancer and sun exposure. Respondents, considering that tanned people are more beautiful, think more frequently that tanning is healthy compared to people who believe that suntan is not related to beauty standards: 31.0% (149/480) and 8.0% (7/87) respectively ($p<0.0001$) (Fig. 2).

Almost half (47.1% (263/708)) of respondents have been sunburned to blisters at least once before they reached 18 years old. Majority of respondents usually spend ≥ 1 hour in the sun in a typical weekday 66.4% (470/708), whereas on weekend this number reached 85.3% (604/708). 55.9% (396/708) of respondents admitted not paying enough attention to skin cancer prevention. During the sunny days 84.0% (595/708) of respondents sometimes and 9.2% (65/708) of respondents always seek shade and only 17.5% (124/708) never try to get a suntan from 11 a.m. to 3 p.m. Sunglasses are worn in 52.4% (371/708) of cases, however, only 63.1% of them (234/371) have UV filters. Only 8.1% (57/708) of respondents always wear T-shirts and about one third of them (30.6% (217/708)) cover head on the beach. While sunbathing 32.9% (233/708) wear sunscreen, while working or doing sports outdoors – only 8.9% (63/708). 33.3% (172/516) use sunscreen with SPF 12-30. Majority (57.94% (296/516)) of respondents apply sunscreen when coming to the beach, 31.4% (162/516) of them don't use it repeatedly. Respondents, who correctly answered what is melanoma, were more likely to wear sunglasses ($p=0.003$) with UV filters ($p=0.006$), to wear T-shirts ($p=0.046$), to cover their head ($p<0.0001$) and to seek shadow ($p=0.002$) on the beach, to use sunscreen while working ≥ 1 hour outdoors ($p=0.001$) or sunbathing, and to choose sunscreen according to SPF value ($p<0.0001$) (Fig. 3) (Tabl. 2).

No	Knowledge statements	Correct answer	No (%) (n = 708)
1	Light skin	True	266 (37.6)
2	Presence of family members skin cancer	True	425 (60.0)
3	Fungal disease of face skin	False	49 (6.9)
4	>50 body skin moles	True	343 (48.4)
5	Acne during adolescence	False	20 (2.8)
6	Moles and freckles	True	244 (34.5)
7	Severe skin sunburn during childhood	True	204 (28.8)
8	Long duration sunbathing	True	564 (79.7)
9	Frequent visits of tanning salons		595 (84.0)
	Overall, correctly answered		23 (3.2)

Table 1. Knowledge regarding risk factors of skin cancer

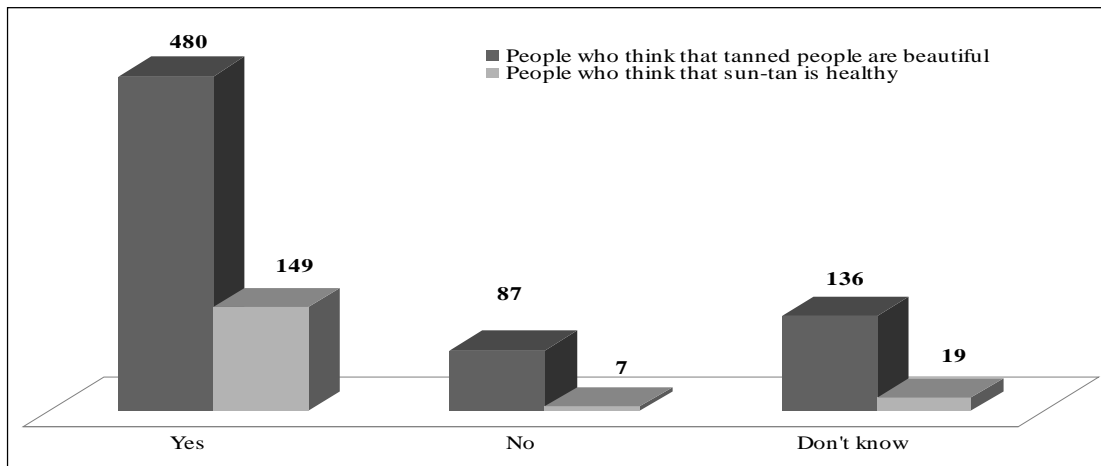


Figure 2. Respondents, who consider that tanned body is a beauty standard, statistically more often think that it is also healthy (31.0% (149/480) vs. 8.0% (7/87) ($p < 0.0001$))

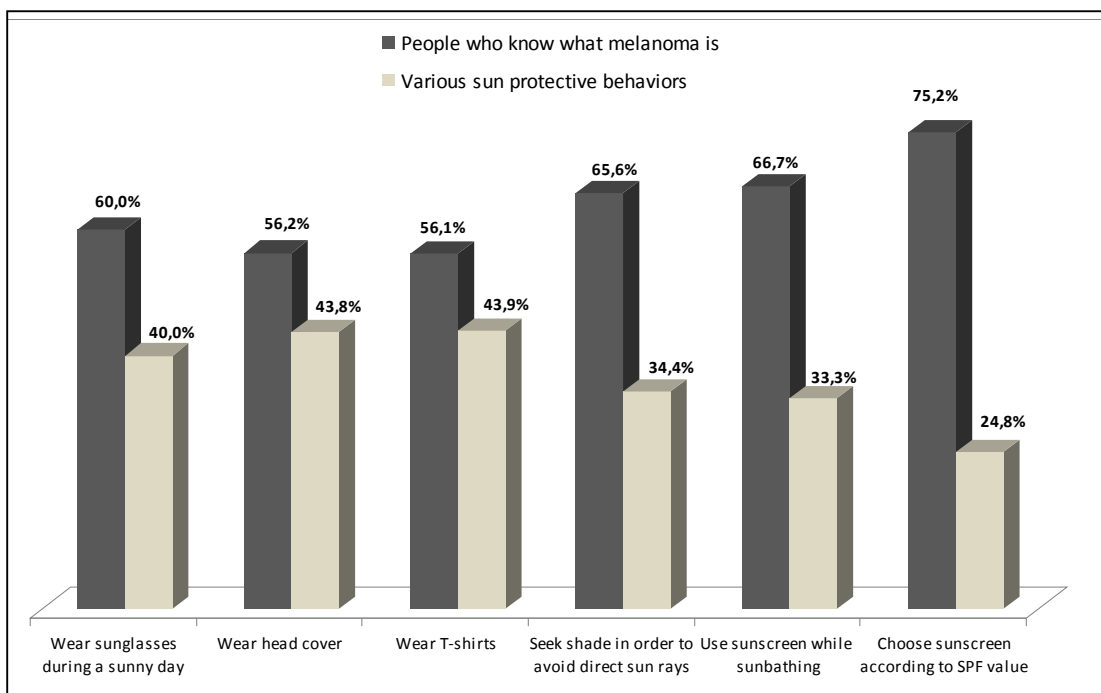


Figure 3. Respondents, who correctly answered what is melanoma, were more likely to wear sunglasses ($p = 0.003$) and T-shirt ($p = 0.046$), to cover head ($p < 0.0001$) and seek shadow ($p = 0.002$) on the beach, to use sunscreen while sunbathing, to choose sunscreen according to SPF value ($p < 0.0001$)

When you go to the beach do you use sun protection cream?	No (%) (n = 708)
1. Never	192 (27.1)
2. Seldom	283 (40.0)
3. Always	233 (32.9)
When do you apply sun protection cream?	No (%) (n = 516)
1. Half an hour before going outside	137 (26.6)
2. When I go outside	41 (7.9)
3. On the beach	296 (57.4)
4. When I get suntan or sunburn	42 (8.1)
Do you repeatedly apply sun protection cream?	No (%) (n = 516)
1. No	162 (31.4)
2. Yes, once in 2 hours	279 (54.1)
3. Yes, once in 4 hours	75 (14.5)

Table 2. Peculiarities of sun protection cream usage

Discussion

The results of the performed study showed that careless behavior, such as staying on the beach between 11 a.m. and 3 p.m. (the dangerous time period for exposure to the highest UVR intensity) without sun-protective clothing was very common. With regard to sun protection cream and its usage, the situation was terrifying as the vast majority of present study respondents used sunscreen infrequently, inconstantly and incorrectly. The main reason for such behavior might be insufficient knowledge concerning sun's effect on health and the measures which help to protect the skin from harmful sun exposure. This should be a matter of great concern.

Furthermore, 82.4% of respondents were not aware of a simple self-examination ABCD rule for atypical mole and melanoma. Self-examination of moles is important because a mole which is changing in size, shape or colour may develop into melanoma [16]. It is necessary to know how to distinguish mole from melanoma.

The results of this study are comparable to similar studies worldwide. We found that the respondents from Lithuania seem to be less knowledgeable as far as melanoma is concerned. While only 55% of the participants reported knowing what is melanoma, in other countries the percentage of those with this knowledge was much higher (in Australia - 66% [20], in New Zealand - 75% [21], in USA - 80% [22] (Fig. 4).

The generalization of the results also showed that in our country the frequency of sunscreen usage while being on the beach is not high (only 32.9%) compared to other countries (e.g. Israel, Australia, USA) [23-25]. For instance, the reported frequency of sunscreen usage in USA is 83.0%. It is recommended to use sunscreen in order to protect from sun exposure and to prevent sunburn [26]. The usage of sunscreen can prevent squamous cell carcinoma [27] and reduce the number of acquired nevi that are associated with sun exposure as a risk marker for melanoma [28].

Likewise, Lithuanians wear sun-protective clothing and sunglasses with UV filter disappointingly rarely. For instance, a wide-brimmed sunbonnet (a head cover, which gives the best sun protection) was worn on the beach only by 11.6% of young adults. These findings are similar to Lithuanian schoolchildren's. They wear sunbonnets in 10.8% of the cases [29]. In accordance with the results of similar studies, the findings show that a great part of population in many countries fails to avoid intensive sun exposure, and Lithuanians are not an exception. It has been determined that 49% of the present study participants experienced sunburn at least once till 18 years old. These results are similar to the sunburn incidence reported in the studies

from France (46%) [30] and Greece (56%) [31]. In similar study performed in USA [32], a sunburn incidence percentage was very high - 83% (Fig. 5).

The majority of the respondents reported that a tanned body is a beauty standard (67.7%). The present findings are identical with the results of study conducted in Greece (67.7%) [31].

Young people from all over the world are likely to stay in the sun for extended periods, especially those aged 13-19 years [33]. Since it has been shown that adults have the lowest probability for change in behavior [33,34], educational efforts should focus mainly on students [25].

A review of recent activities of Lithuanian dermatologists shows that great efforts are being made to assess one's knowledge, attitude and to understand UVR and its effects on the skin as well as to implement education programs. A health education program "Let's know the sun better" was implemented in several Kaunas city secondary schools. The evaluation of its results proved both the efficiency and the necessity of the prepared educational program [29]. Furthermore, the annual pan-European campaign of free skin examination "Euromelanoma" was successfully organized in Lithuania for the third time. Its goal, which is consistent with WHO [35] guidelines, is to raise awareness of extended sun exposure risks and to educate the public about the protective measures [36].

On the basis of present study results, we recommend the national cancer prevention program to devote special attention to skin cancer prevention in children (through school curricula) and in the rest of the society through mass media, as it is the main source of information [35].

A few limitations of the study should be noted. A larger sample size and country-wide participation of adult respondents would provide more data about the knowledge about skin cancer and attitude towards sun exposure. The interview of other groups (e.g. younger pupils, parents and teachers) would allow the comparison of their beliefs with the present study participants.

Conclusions

The knowledge about skin cancer and harmful effects of the sun among Lithuanian young adults is insufficient. The irresponsible behavior in the sun should be a matter of great concern. Furthermore, many young Lithuanians associate suntans not only with beauty but also with health. To sum up, poor knowledge, risky behavior and a dangerous standpoint must be challenged by health education and promotion programmes in order to reduce the epidemic of skin cancer in Lithuania in the nearest future.

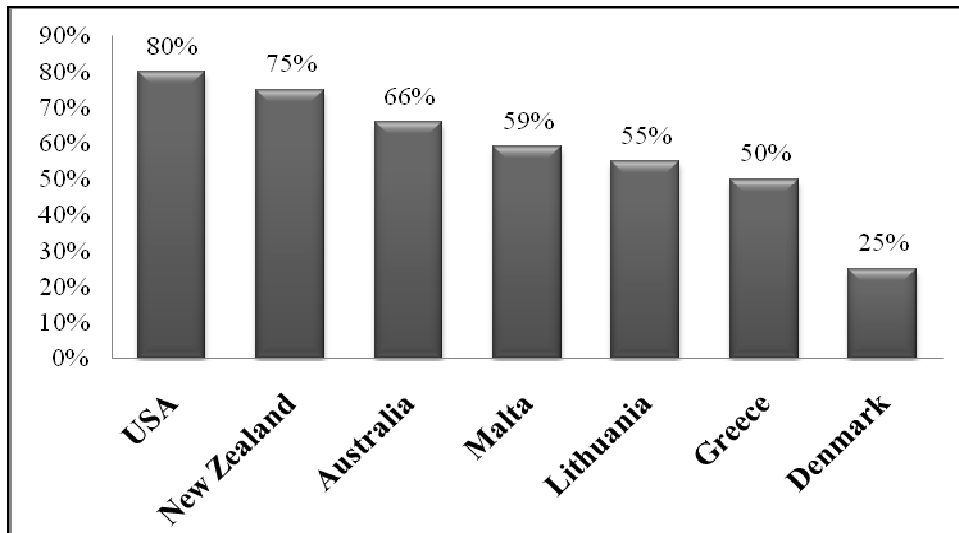


Figure 4. Knowledge of what melanoma is, according to country
 *Adapted from M. Saridi et al article [31]

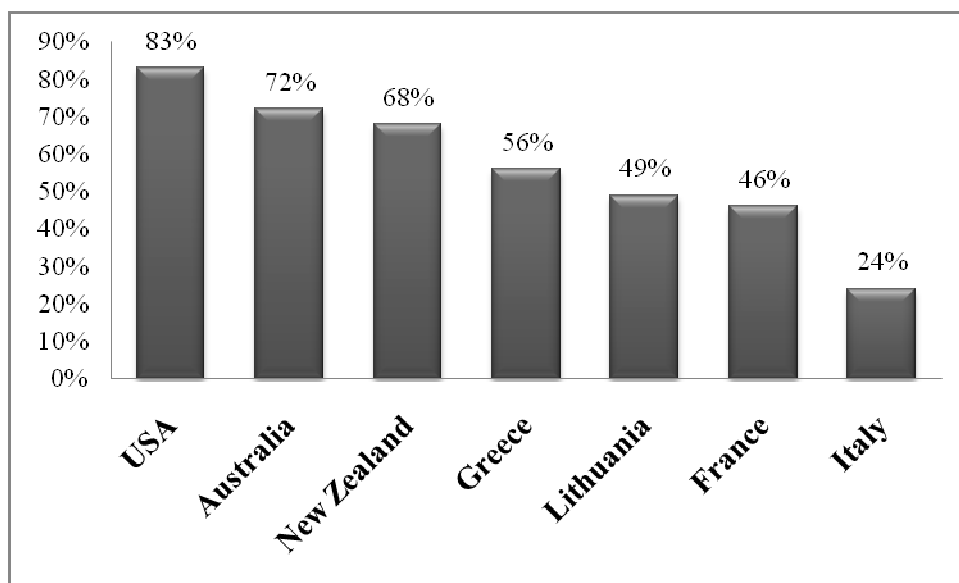


Figure 5. Sunburn incidence, according to country
 *Adapted from M. Saridi et al article [31]

REFERENCES:

1. Leiter U, U, Garbe C: Epidemiology of melanoma and nonmelanoma skin cancer-the role of sunlight. *Adv Ex Med Biol* 2008; 624: 89-103.
2. Australian Institute of Health and Welfare. Health system expenditures on cancer and other neoplasms in Australia, 2000–01. Health and Welfare Expenditure series no. 22; AIHW cat no HWE 29. Canberra, ACT: AIHW, 2005.
3. Lietuvos vėžio registras. (Lithuanian Cancer Registry). Available from: URL: <http://www.vuoi.lt>.
4. Ziemke JR. Investigator of Aura OMI tropospheric ozone from the U.S. Science Team, NASA, Total Ozone Mapping Spectrometer. NASA Contractor Report. Baltimore, MD: NASA, 2005.
5. Michel JL, Magant E: Evaluation of the understanding of sun risk among 241 adolescents. *Ann Dermatol Venereol* 2000; 127: 371-375.
6. Bastuji-Garin S, Diepgen TL: Cutaneous malignant melanoma, sun exposure, and sunscreen

- use:epidemiological evidence. *Br J Dermatol* 2002; 146(Suppl 61): 24-30.
7. World Health Organization. Solar and ultraviolet radiation. IARC monographs on the evaluation of carcinogenic risks to humans, vol.55. Lyon: International Agency for Research on Cancer; 1992.
8. Godar DE: UV doses of American children and adolescents. *Photochem Photobiol.* 2001; 74: 787-793.
9. Marks R, Jolley D, Leclerc S, Foley P; The role of childhood exposure to sunlight in the development of solar keratoses and nonmelanocytic skin cancer. *Med J Aust* 1990; 152: 62-66.
10. Armstrong BK, Kricger A. The epidemiology of UV induced skin cancer. *J Photochem Photobiol B.* 2001; 63: 8-18.
11. English DR, Armstrong BK, Kricger A, Fleming C: Sunlight and cancer. *Cancer Causes Control.* 1997; 8: 271-283.

12. MacKie RM, English J, Aitchison TC, Fitzsimons CP, Wilson P: The number and distribution of benign pigmented moles (melanocytic naevi) in a healthy British population. *Br J Dermatol* 1985; 113: 167-74.
13. Lock-Andersen J, Drzewiecki KT, Wulf HC: Eye and hair colour, skin type and constitutive skin pigmentation as risk factors for basal cell carcinoma and cutaneous malignant melanoma. A Danish case-control study. *Acta Derm Venereol* 1999; 79: 74-80.
14. Glanz K, Saraiya M, Wechsler H: Guidelines for school programs to prevent skin cancer. *MMWR Recomm Rep*. 2002; 51: 1-18.
15. Fitzpatrick TB: Soleil et Peau. *J Med Esthet* 1975; 2: 33034.
16. McKinlay AF, Allen SG, Cox R, Dimbylow PG, Mann SM, Muirhead CR, et al; National Radiological Protection Board. Health Effects from Ultraviolet Radiation. *Aust N Z J Public Health* 2006; 200: 13-19.
17. Boldeman C, Branstrom R, Dal H, Kristjamsson S, Rodvall Y, Ansson B, et al: Tanning habits and sunburn in a Swedish population age 13–50 years. *Eur J Cancer* 2001; 37: 2441-2448.
18. Jacobsen S, Owen J; Ultraviolet radiation and the risks of cutaneous malignant melanoma and non-melanoma skin cancer: perceptions and behaviors of Danish and American adolescents. *Eur J Cancer Prev* 2005; 14: 57-62.
19. Stinco G, Favot F, Quinkenstein E, Zanchi M, Valent F, Patrone P: Children and sun exposure in the northeast of Italy. *Pediatr Dermatol* 2005; 22: 520-524.
20. McDermott LJ, Lowe JB, Stanton W, Clavarino AM: Suntans and sun protection in Australian teen media: 1999 to 2000. *Health Educ Res* 2005; 32: 504-513.
21. Jacobsen S, Owen J: Ultraviolet radiation and the risks of cutaneous malignant melanoma and non-melanoma skin cancer: perceptions and behaviors of Danish and American adolescents. *Eur J Cancer Prev* 2005; 14: 57-62.
22. Cokkinides V, Weinstock M, Glanz K, Albano J, Ward E, Thun M: Trends in sunburns, sun protection practices, and attitudes toward sun exposure protection and tanning among US adolescents, 1998-2004. *Pediatrics* 2006; 118: 853-864.
23. El Sayed F, Ammouy A, Nakhle F, Dhaybi R, Marguery MC: Photoprotection in teenagers. *Photodermatol Photoimmunol Photomed* 2006; 22:18-21.
24. Livingston PM, White V, Hayman J, Dobbinson S: Sun exposure and sun protection behaviours among Australian adolescents: trends over time. *Prev Med* 2003; 37: 577- 584.
25. Buller DB, Reynolds K, Yaroch AL, Cutter G, Hines JM, Geno CR, et al: Effects of the Sunny Days, Healthy Ways Curriculum on students in grades 6–8. *Am J Prev Med* 2006; 30: 13-22.
26. Hall HI, Jones SE, Saraiya M; Prevalence and correlates of sunscreen use among US high school students. *J Sch Health*. 2001; 71: 453-457.
27. Green A, Williams G, Neale R, Hart V, Leslie D, Parsons P, et al: Daily sunscreen application and betacarotene supplementation in prevention of basal-cell and squamous-cell carcinomas of the skin: a randomised controlled trial. *Lancet*. 1999; 354: 723-729.
28. Gallagher RP, Rivers JK, Lee TK, Bajdik CD, McLean DI, Coldman AJ; Broad-spectrum sunscreen use and the development of new nevi in white children: a randomized controlled trial. *JAMA*. 2000; 283: 2955-2960.
29. Zaborskis A, Petrauskienė A, Valiukevičienė S. Skin cancer prevention: children's health education on protection from sun exposure and assessment of its efficiency. *Medicina* 2004; 40: 386-393.
30. Esteve E, Armingaud P, Baranger JM, Bellier N, Darchy M, Delavierre C, et al: Sunshine at school: a network for training on sun exposure. Assessment of knowledge among 683 children. *Annales de dermatologie et de vénéréologie* 2003; 130: 171-176.
31. Saridi M, Pappa V, Kyriazis I, Toska A, Giolis A, Liachapoulou A, et al: Knowledge and attitudes to sun exposure among adolescents in Korinthos, Greece. *Rural Remote Health* 2009; 9: 1162.
32. Balk SJ, O'Connor KG, Saraiya M: Counselling parents and children on sun protection: a national survey of pediatricians. *Pediatrics* 2004; 114: 1056-1064.
33. Wright C, Reeder AI, Gray A, Cox B: Child sun protection: sun related attitudes mediate the association between children's knowledge and behaviours. *J Pediatr Child Health* 2008; 44: 692-698.
34. Robinson JK, Rigel DS, Amonette RA: Trends in sun exposure knowledge, attitudes, and behaviors: 1986 to 1996. *J Am Acad Dermatol* 1997; 37: 179-186.
35. Gordon B, Mackay R, Rehfuess E: Global solar UV index, an educational tool to reduce risks of skin cancer and cataract. In: *Who Chronicle*. Geneva: World Health Organization, 2002.
36. Euromelanoma Lithuania. Available from URL: <http://www.euromelanoma.org/lithuania/>