



HOW MUCH DO WE KNOW ABOUT HEALTHY TANNING WITHOUT MELANOMA? A QUESTIONNAIRE STUDY

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ABSTRACT

Melanoma develops rapidly from epidermal skin cells known as melanocytes, proceeding in a short time to the advanced stage of disease. Furthermore, it reveals an alarming increase in annual incidence. The essential solution is focused on appropriate prevention and lifestyle. The aim of the following study is the assessment of the prophylaxis use during exposure to detrimental ultraviolet radiation. The research enrolled 208 randomly selected respondents in an online survey, who answered 25 single and multiple-choice questions about melanoma prevention. The questionnaire was conducted in Poland between 29th November 2016 and 10th January 2017. There was no introductory information for the surveyed before responding. The participants were asked about their constant behavior during exposure to UV rays, such as frequency of sunbathing, application of sunscreen products, regularity of check-ups with a dermatologist as well as self-assessment of skin marks. Achieved results were compared in a few groups considering gender, Fitzpatrick skin scale and education. Up to 56% of participants sunbathe during the highest values of UV Index. 86% claim to apply sunscreen before exposure to UV radiation. 86% of respondents have been sunburned at least once in a life. 75% admit to not controlling skin lesions at a dermatologist. More than half of the respondents (54%) have not ever heard about the ABCDEs of melanoma. The awareness of safe tanning is moderate. The majority of respondents apply sunscreen products but to a large extent people disregard the principles of their proper use.

BACKGROUND

Melanoma develops rapidly from epidermal skin cells known as melanocytes, proceeding in a short time to the advanced stage of disease. Furthermore, it reveals an alarming increase in annual incidence. The essential solution is focused on appropriate prevention and lifestyle. The aim of the following study is the assessment of the prophylaxis use on exposure to detrimental ultraviolet radiation [1, 2].

MATERIAL AND METHODS

Online survey with 25 questions about melanoma prevention. The questionnaire was conducted in Poland between 29th November 2016 and 10th January 2017. Statistical results were received in Microsoft Excel by applying a Chi-square test, with the level of significance of 0.05.

RESULTS

The questionnaire enrolled 208 randomly selected respondents with 136 (65%) females and 72 (35%) males. The median age range is estimated to be at 18 - 29 years old (table 1.) with 160 (77%) participants fitting into this bracket. University students constitute the majority of the research participants (60%).

The Fitzpatrick skin scale is based on the appearance and characteristics of a person's skin, including color, exposure to UV radiation, tanning and protective behaviors. It has been successfully applied as a standard for self-assessment of sun sensitivity. The current Fitzpatrick skin type classification is represented by six phototypes (table 2.) [3]. According to the Fitzpatrick scale the Central European phototype constitutes the majority of participants being the phototype of 124 respondents (60%, table 3.). The second most significant phototype is Northern European with 60 (29%) individuals.

The Global Solar UV Index (UVI) describes the level of solar UV radiation at the Earth's surface. The index value indicates the detrimental potential of UV rays to the skin. The risk of occurrence of sun damage is significant for higher values of UVI. The strength of UV radiation and therefore the values of the index vary throughout the day. The maximum level of radiation occurs during the four-hour period around the solar noon [4]. Alarming a majority of respondents decide to sunbathe when values of UVI are at their highest: 10:00 – 12:00 (52%, figure 1.) and 12:00 – 15:00 (56%). At the same time, 42% of participants claim to sunbathe carefully and moderately (table 4.). Furthermore 32% try to avoid the sunlight in case of getting sunburn. This indicates participants' misunderstood approach of proper prophylaxis against the damaging effects of UV radiation (figure 2.). 192 (92%) surveyed people do not apply indoor tanning. Among the 8% frequency of indoor tanning application it is used minimally, a few times a year (44%) and even more rarely (56%).

Additionally, the research reports the most sensitive parts of the body to UV radiation. The surveyed mostly indicate a face (59%, figure 3.), shoulders (55%) and a nape

(32%), which are frequently exposed to UV radiation by its revealed localization.

Sunscreens are cosmetic products to protect skin from harmful solar radiation by absorbing or reflecting UV radiation. The American Food and Drug Administration (FDA) requires attaching a Sun Protection Factor (SPF) label on sunscreen products [5]. 179 (86%) respondents apply cosmetics with SPF before sunbathing. 91 (44%) surveyed people claim to use sunscreens before sunbathing and after swimming (figure 4.). 93 (45%) respondents choose cosmetics with SPF 15 – 25 (figure 5). Statistically people with Northern European phototype choose higher value of SPF in sunscreens than respondents with Central European phototype, who prefer lower values of SPF ($p = 0.026$). 147 (71%) respondents admit the cream with UV factor is the best form of cosmetic product (table 5.). The main 3 reasons why people use cosmetics with UV filter are: avoiding sunburn (88%, figure 2.), protecting skin from melanoma development (63%) and prevention of the skin from wrinkles and premature aging (46%). Sun protective clothing is generally evaluated on the basis of clothing indices which is actually a UV protection factor (UPF). Fabric UPF is similar to sunscreen SPF, where sunscreen is replaced by fabric to protect the skin [5]. Popular methods of protection other than sunscreens are: staying in the shade (71%, figure 6.), wearing sunglasses with UV filter (69%), wearing a cap/hat (66%), wearing baggy clothes, covering shoulders (47%). 167 (80%) respondents know that melanoma may develop in a human eyeball. More women are aware of this condition than men ($p = 0.00001519$).

According to researches, an increasing number of sunburns during a whole lifetime is a risk of increased incidence of melanoma. Prevention efforts should focus on reducing all sunburns, regardless of what age they are acquired [6, 7]. Up to 179 (86%) respondents at least once in a life have been sunburned. The survey reveals that 144 (69%) respondents mostly get sunburn during reckless sunbathing (table 6.).

Clinicians can diagnose up to 80% of melanoma cases using the ABCDE rule (asymmetry, border, color, diameter over 6 mm, evolving) [8]. 112 (54%) participants don't know the ABCDEs of melanoma. Nevertheless, 175 (84%, figure 7.) respondents claim that early melanoma may evolve in its structure which means the pigmentary skin mark might change in any way. Positions such as an asymmetric structure, uneven borders and a variety of color have similar frequency. The least popular answer (104 respondents, 50%) is a big size of a skin mark (over 6 mm). Statistically more women know ABCDEs than men ($p = 0.0001$).

Dermoscopy is a simple in vivo technique detecting malignant submicroscopic structures. The diagnostic accuracy of dermoscopy in melanoma is up to 30% better than visual inspection of skin marks [8]. Only 52 (25%) surveyed people admit to control their pigmentary skin nevi at a dermatologist. The majority of respondents (75%) don't check up their moles with a specialist. However, the research reveals that 75% claim to self-assess skin marks. The research reveals that gender is statistically significant and has an impact on the

likelihood of regular control of pigmentary skin marks at a dermatologist ($p = 0.018$), as well as in self-assessments ($p = 0.00002313$). More women tend to control their skin lesions than men.

In the respondents' opinion the prophylaxis against melanoma should include the following statements: avoid sunburns (90%, figure 8.), apply sunscreens (88%) and regular check-ups at a dermatologist (85%). There were also 3 answers intentionally misleading and excluding melanoma prevention: quitting smoking (32%), supplementation of vitamin D (26%), removing every single mole (6%). 66% of respondents would like to improve their knowledge about melanoma prevention. Statistically people who are not familiar with the ABCDEs are more interested in improving their knowledge about melanoma prevention than other respondents ($p = 0.002$).

DISCUSSION

This study demonstrates objective information about preventive behaviors and habits during exposure to UV radiation. The participants shared their current knowledge with no introductory information before answering.

The alarming amount of respondents who declare to sunbathe during high values of UVI may be reduced by proper education. A similar study (Rodrigues A. M. et al., 2017) enrolled the guidelines of the World Health Organization (WHO) from 2014 during interview about safe tanning. The directions were included in the following sections: seeking shade during strong radiation (between 10 a.m. and 4 p.m.), wearing protective clothing (including hats, sunglasses, loose fitting clothes) and applying a broad-spectrum sunscreen (at least SPF 15) and reapplying every 2 hours or after physical activity (including swimming, walking, outdoor exercising). The participants' knowledge of proper exposure to UV radiation had been checked and then the statements of the WHO followed. The respondents could immediately amend their declarations about proper sunbathing [8].

Another finding confirms that women are apparently more aware of UV prophylaxis than men. The research (Heerfodt I. et al., 2017) reveals that females apply sunscreens 2.24 times more often than males ($p < 0.0001$) [10].

In the respondents' opinion the face is the most fragile part of the body. According to another study (Pratt et al., 2017) effective application of external parts is crucial and areas that are routinely missed have an increased risk of UV damage. 57 participants were imaged with a UV sensitive camera before and after sunscreen application. Analyses revealed eyelid and periorbital regions to be disproportionately missed during routine sunscreen application (median 14% missed in eyelid region vs 7% in rest of face, $p < 0.01$) [11].

The occurrence of sunburn is an important short-term marker for excessive sun exposure. Likewise, the risk of melanoma increases with the number of sunburns during one's lifespan, not just in childhood [6, 7, 12]. The use of tanning-facilitating agents can accelerate the process of absorbing solar radiation, causing deeper and more

severe damage. The ideal product should contain moisturizing and solar protection agents. As these products are substantially more expensive, poorer and less-educated segments of the population usually improvise with dangerous replacements [12, 13].

Self-examination of the skin may facilitate an early diagnosis of melanoma [8, 14]. Recent finding (Kamińska-Winciorek et al., 2015) indicates that approximately 60% of respondents have been sunburned at least once in their life and only 18.4% declare regular self-assessments of skin marks [14]. Self-control is the result of the following factors: higher education, a sensitive skin phototype, sun-safe tanning rules and a past medical history of surgical excision of naevi [14, 15]. Regular self-assessments are not a common practice, whilst the knowledge about the clinical features of melanoma is varied. Therefore, promotion of regular skin self-examination and education should be performed.

CONCLUSIONS

The awareness of safe tanning is moderate. The majority of respondents notice the need of applying sunscreens. Unfortunately, it is still a rarity to control skin lesions at a dermatologist, as well as knowing the ABCDEs. The dissemination of information about healthy tanning by health care providers should be considered.

CITE THIS AS

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ABBREVIATIONS

FDA – Food and Drug Administration
SPF – Sun Protection Factor
UPF – Ultraviolet Protection Factor
UV – Ultraviolet
UVI – UV Index
WHO – World Health Organization

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TAB. 1. THE AGE RANGE OF RESPONDENTS.

Age range	Respondents
< 18	1
18 – 29	160
30 – 39	18
40 – 49	7
50 – 59	8
60 – 69	13
70 <	1

TAB. 2. THE FITZPATRICK SKIN TYPE CLASSIFICATION.

Phototype	Characteristics
Celtic (I)	Very fair, burns easily, never tans
Northern European (II)	Fair, burns easily, tans with difficulty
Central European (III)	White, burns moderately, tans moderately
Southern European (IV)	Olive, burns minimally, tans easily
Middle Eastern (V)	Moderate brown, burns rarely, tans easily and profusely
African (VI)	Dark brown or very dark, never burns, tans profusely

TAB. 3. RESPONDENTS' PHOTOTYPES ACCORDING TO THE FITZPATRICK SKIN SCALE.

Phototype	Respondents
Celtic	5
Northern European	60
Central European	124
Southern European	18
Middle Eastern	1
African	0

FIG. 1. WHAT TIME DO YOU SUNBATHE? (MULTIPLE CHOICE).

How often do you sunbathe?	Respondents
Very often, every sunny weather.	5
Often, usually when it's sunny.	33
I sunbathe carefully and moderately.	87
Rarely, I hide in the shadow and don't want to get a sunburn.	66
I don't sunbathe.	17

FIG. 2. WHY DO YOU USE COSMETICS WITH UV FILTER? (PLEASE CHOOSE 3 ANSWERS).

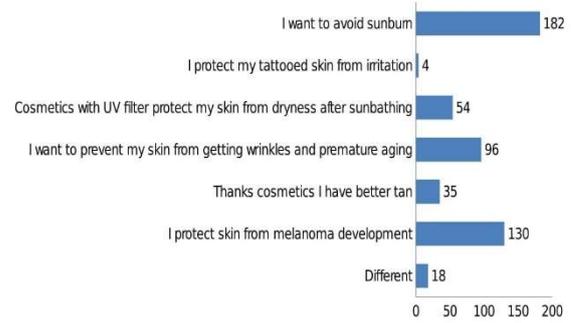


FIG. 3. WHAT IS YOUR THE MOST SENSITIVE PART OF THE BODY TO UV RADIATION? (MULTIPLE CHOICE).

The frequency of sunburns.	Respondents
Very often, usually before first sunbathing in a year and even later	10
Often, usually before first sunbathing in a year	28
Rarely, generally during reckless sunbathing	144
It doesn't sunburn	26

FIG. 4. HOW OFTEN DO YOU USE SUNSCREENS?.

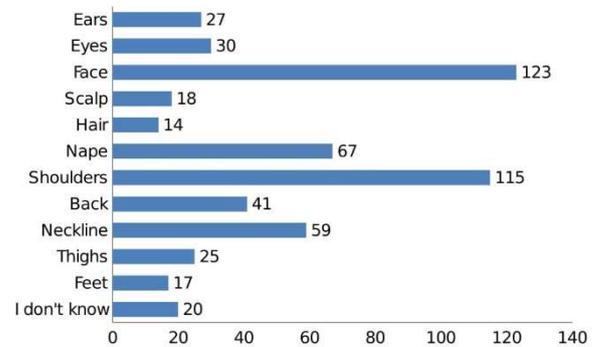


FIG. 5. HOW OFTEN DO YOU USE SUNSCREENS?.

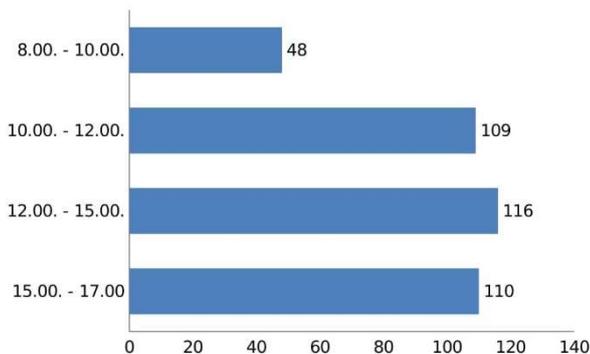


FIG. 6. HOW OFTEN DO YOU USE SUNSCREENS?.

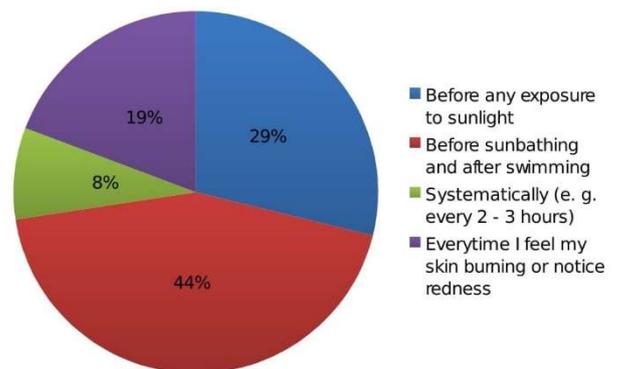


FIG. 5. WHAT IS THE VALUE OF SPF IN SUNSCREEN PRODUCTS, WHICH YOU USUALLY APPLY DURING SUNBATHING?.

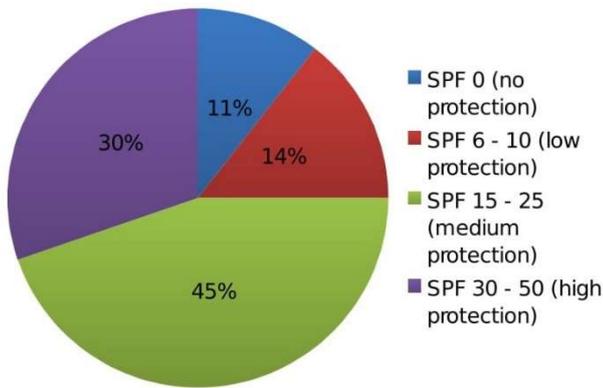


FIG. 8. WHAT IN YOUR OPINION SHOULD MELANOMA PREVENTION INCLUDE? (MULTIPLE CHOICE).

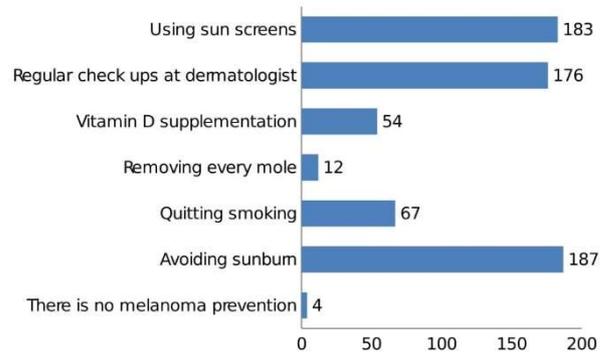


FIG. 6. WHAT ARE THE OTHER METHODS OF PROTECTION EXCEPT SUNSCREENS THAT YOU USE DURING EXPOSURE TO SUNLIGHT? (MULTIPLE CHOICE).

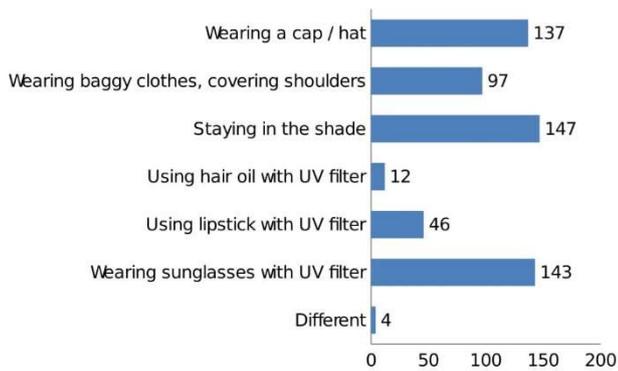
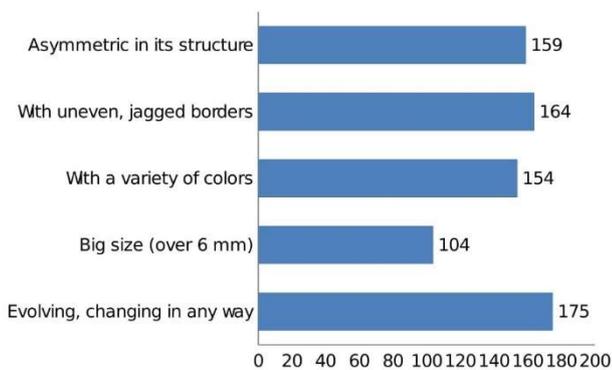


FIG. 7. A QUESTION OF MULTIPLE CHOICE: HOW IN YOUR OPINION MAY A SKIN MARK WITH AN EARLY STAGE OF MELANOMA LOOK LIKE?.





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