SKIN PHOTOTYPE AND SELECTED SOCIODEMOGRAPHIC FACTORS AND THEIR CORRELATION WITH HEALTH BEHAVIOURS CONNECTED WITH MELANOMA PREVENTION STRATEGIES

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ABSTRACT

Aim of the study: To assess the correlation between skin phototypes and selected sociodemographic factors and health behaviours connected with skin cancer prevention.

Material and methods: The study was conducted in a group of 267 patients. It was carried out with the application of a diagnostic survey method. The research technique was a survey and the research tool was a questionnaire designed by the authors.

Results: The study showed a correlation between skin phototype and following the rules of skin cancer prevention ($p < 0.001$): people with skin phototype I, characterised by pale white skin, were more likely to apply sun protection rules. The percentage of respondents with a higher level of health behaviours increased with the respondents' age ($p < 0.001$). The higher the respondents' education, the higher the percentage of them who took proper melanoma precautions ($p < 0.005$). The level of health behaviours was also higher in people who had been diagnosed with melanoma or had been treated for skin cancer in the past or whose family member or friend suffered from this type of cancer ($p < 0.001$).

Conclusions: Respondents with a phototype characterised by fair complexion were more likely to follow skin cancer prevention rules. The intensity of health behaviours aimed at cancer prevention increased with the respondents' age and level of education. Both melanoma diagnosis and the incidence of skin cancer in respondents' family or friends led to a higher level of their health behaviours.

Key words: melanoma, sociodemographic factors, skin phototype, health behaviours.

INTRODUCTION

Melanoma is a malignant skin tumour that starts with uncontrolled transformation of melanocytes [1]. Statistical data show a worldwide tendency of increasing skin cancer morbidity, including melanoma morbidity, which has been observed over the last decades [2, 3]. In Poland melanoma is diagnosed relatively rarely; the standardised morbidity rate approximates 6.0/100,000 [4]. In comparison, in Australia the morbidity rate is the highest in the world and reaches 50/100,000 for men and 37/100,000 for women [5]. An increase in morbidity and mortality rate results mainly from low social awareness of risk factors, not applying the rules of cancer prevention, as well as ignoring worrying symptoms, which causes a delay in detecting cancerous changes [6].

Just like almost all cancerous processes, melanoma has a complex aetiology including individual genetic predispositions and the influence of environmental factors [7]. The risk of initiating malignant proliferation of melanocytes is higher in people with phototype I or II according to the Fitzpatrick scale (white, pale skin colour, ginger hair, and blue eyes are specific risk factors that make people prone to the oncogenic influence of sunlight). Phototypes define particular skin types depending on the amount of melanin in skin. Following the classification developed by Thomas B. Fitzpatrick, an American dermatologist, it is possible to distinguish six skin phototypes characterised by specific clinical features. The lower the phototype, the fairer the skin, and consequently the lower the ability of the skin to tan and the higher its sensitivity to sunburn, which leads to a higher risk of

developing skin cancer [8]. An increased risk of developing melanoma can also be observed in elderly people, people with previous history of skin cancer, inhabitants of equatorial regions, people with two relatives with malignant melanoma, and people with dysplastic nevi on their skin. Specialists agree that underlying risk factors for developing a malignant melanoma is the exposure to both natural and artificial ultraviolet radiation (UV) and sunburn.

AIM OF THE STUDY

The aim of the study was to assess the correlation between skin phototypes and selected sociodemographic factors and health behaviours connected with melanoma prevention.

MATERIAL AND METHODS

The study was conducted in a group of 267 respondents. Their age ranged from 17 to 62 years. The study was carried out with the application of a diagnostic survey. The research technique was a survey, and the research tool was a questionnaire designed by the authors. The study was conducted online by means of an electronic version of the questionnaire, the link to which was posted on several social networking sites. Participation in the study was voluntary and unassisted, and the respondents were ensured full anonymity.

The questionnaire consisted of questions referring to respondents' age, gender, education, skin phototype, previous cancer history of the respondents as well as their relatives and friends, and also questions connected with prevention rules and early cancer detection. The questions referred to respondents' observation of their nevi, medical check-ups aimed at examining skin changes, seeking information about melanoma and its diagnosis, following sun protection rules on sunny days, using tanning salons, as well as knowledge and experience connected with cancer prevention programmes and declared willingness to self-control or have a medical examination of the whole body surface.

Every person who completed the questionnaire was classified as one of the six phototypes developed by Fitzpatrick. The classification criteria consisted of respondents' ticking at least three out of five physical characteristics given in the questionnaire. They included skin shade, eye colour, natural hair colour, skin ability to tan, and skin sensitivity to sunburn.

In order to assess respondents' health behaviours connected with melanoma prevention an analysis of respondents' replies to the questions included in the survey was carried out. Every answer was assigned a particular score depending on its rank in relation to others. The respondents could reach the score between 0 and 26 for their responses to questions connected with prophylactic behaviours.

In order to define the levels of health behaviours the following scale was applied: very good level of health behaviours: > 90%, good level: 75.1-90%, satisfactory level: 60-75%, unsatisfactory level: < 60% of total possible scores.

The findings obtained in the study were then examined with the application of a statistical analysis carried out by means of Microsoft Office Excel 2007 software, and the differences between the obtained data were verified with the application of the χ^2 test of independence and Pearson χ^2 test. As an assumption the significance level was set at $p = 0.05$.

RESULTS

The phototype of respondents' skin and their level of health behaviours connected with melanoma prevention

All respondents ($N = 267$) ticked at least three out of five physical characteristics according to the Fitzpatrick scale, which allowed us to classify them as one of the six skin phototypes. Most respondents were classified as phototype III – 116 people (43%), followed by skin phototype II – 72 people (27%), and finally phototype IV – 47 people (18%). The lowest number of respondents – only two people (1%) – declared physical characteristics which classified them as phototype VI. One-third of the respondents (33%) belonged to the group of phototype I or II, which makes them prone to developing skin cancer, including melanoma.

A correlation was observed between a skin phototype and following the rules of melanoma prevention ($p < 0.001$) (Table 1). People with skin phototype I usually followed the sun protection procedures very well. On the other hand, the darker the skin (the higher the phototype), the greater the ignorance of melanoma precautions, as we observed.

Skin phototype has a significant impact on following the rules of melanoma prevention. It can be particularly noticed in people with phototype I and phototype VI – the paler complexion is usually connected with taking more care as far as sun protection is concerned, whereas people with darker complexion are definitely more likely to ignore melanoma precautions.

Respondents' gender and the level of health behaviours connected with melanoma prevention

In the study group of 267 respondents there were 202 women (76%) and 65 men (24%). In the study examining the intensity of health behaviours unsatisfactory scores dominated both in women and men – 41.6% and 44.6%, respectively (Table 2). It was shown that the application of rules of melanoma prevention did not differ statistically between women and men.

Table 1. Correlation between respondents' skin phototype and the extent to which they follow the rules of melanoma prevention

Skin phototype	Level of health behaviours connected with melanoma prevention					χ^2	*p*-value
	Very good	Good	Satisfactory	Unsatisfactory	Total		
	n (%)	*n* (%)	*n* (%)	*n* (%)			
I	9 (39.0)	2 (4.5)	2 (2.0)	3 (3.0)	16	80.2	< 0.001*
II	3 (13.0)	20 (44.5)	23 (27.0)	26 (23.0)	72		
III	10 (44.0)	18 (40.0)	31 (36.0)	57 (50.5)	116		
IV	0 (0.0)	0 (0.0)	24 (28.0)	23 (20.0)	47		
V	1 (4.0)	5 (11.0)	4 (5.0)	4 (3.5)	14		
VI	0 (0.0)	0 (0.0)	2 (2.0)	0 (0.0)	2		
Total	23	45	86	113	267		

**statistically significant p-value*

Table 2. Correlation between respondents' gender and the extent to which they follow the rules of melanoma prevention

Gender	Level of health behaviours connected with melanoma prevention					χ^2	*p*-value
	Very good	Good	Satisfactory	Unsatisfactory	Total		
	n (%)	*n* (%)	*n* (%)	*n* (%)			
Women	22 (10.9)	30 (14.85)	66 (32.7)	84 (41.6)	202	7.2	0.07*
Men	1 (1.5)	15 (23.1)	20 (30.8)	29 (44.6)	65		
Total	23	45	86	113	267		

**statistically significant p-value*

Table 3. Correlation between respondents' age and the extent to which they follow the rules of melanoma prevention

Age (years)	Level of health behaviours connected with melanoma prevention					χ^2	*p*-value
	Very good	Good	Satisfactory	Unsatisfactory	Total		
	n (%)	*n* (%)	*n* (%)	*n* (%)			
< 18	0 (0.0)	3 (6.7)	10 (11.6)	14 (12.4)	27	86.7	< 0.001*
18-25	3 (13.0)	2 (4.4)	27 (31.4)	51 (45.1)	83		
26-40	4 (17.4)	27 (60.0)	32 (37.2)	32 (28.3)	95		
41-60	9 (39.1)	11 (24.4)	17 (19.8)	14 (12.4)	51		
> 60	7 (30.4)	2 (4.4)	0 (0)	2 (1.8)	11		
Total	23	45	86	113	267		

**statistically significant p-value*

Respondents' age and the level of health behaviours connected with melanoma prevention

The respondents were between 17 and 68 years old. The most numerous group consisted of respondents aged between 26 and 40 years – 95 people (36%), a slightly smaller was the group made up of respondents aged between 18 and 25 years – 83 people (31%) (Table 3). Almost 1/5 of respondents were between 41 and 60 years old – 51 people (19%). The least numerous was the group aged over 60 years – 11 respondents (4%). The others – 27 people (10%) – were minors under the age of 18 years. It was observed that in the groups of respondents under the age of 25 years a vast majority did not follow the rules of health behaviour connected with melanoma prevention to a satisfactory extent, and the group in which the level of these behaviours was very good or good was the least numerous. In the group of adults aged over 60 years the greatest percentage of respondents presented a very good level of following the prevention rules. These findings show that the older the respondents, the higher the level of introducing prevention rules into their everyday routine ($p < 0.001$).

Respondents' education and the level of health behaviours connected with melanoma prevention

Most of the people who decided to participate in the study had higher education – 146 participants in total, which is almost 55% of all the respondents. The smallest group of respondents had only elemen-

tary education – nine people (3.4%). The percentage of respondents who followed the rules of melanoma prevention increased along with respondents' education level ($p < 0.005$) (Table 4). None of the respondents from the groups with elementary, middle-school, or vocational education was found to follow the rules of melanoma prevention to a very good extent, whereas all the respondents classified on a very good level of health behaviours belonged to the groups with secondary and higher education. Similar situation could be observed in the group of respondents with a good level of health behaviours – the percentage participation in this group increased with the respondents' education.

To sum up, the higher the respondents' education, the higher the level of their health behaviours connected with melanoma prevention.

Respondents' current or previous skin cancer history and the level of health behaviours connected with melanoma prevention

The vast majority of respondents, i.e. 250 people (94%), had never suffered from skin cancer. From the group of the remaining 17 respondents who had had skin cancer, seven people (41.2%) confirmed melanoma in the medical interview. In the case of people who had suffered from skin cancer the level of health behaviours connected with the cancer prevention was usually very good ($p < 0.001$), in comparison with people who had never suffered from skin cancer, in which case the level of health behaviours was usually unsatisfactory (Table 5).

The incidence of skin cancer among respondents' family or friends and the level of health behaviours connected with melanoma prevention

As many as 81 respondents (30%) had, among their family and friends, people who suffered or had suffered from skin cancer. Almost one out of five respondents, 56 people altogether (21%), did not have such an experience and knowledge. In this population, the prevailing level of health behaviours among the relatives of people suffering from skin cancer was only satisfactory, and the good level of health behaviours was observed only in the second place (Table 6). However, the respondents who did not know people who suffered or had suffered from skin cancer tended to present an even lower level of health behaviours ($p < 0.001$). In this group most people were characterised by an unsatisfactory level of health behaviours, and a smaller number of people presented a satisfactory level.

All in all, there are noticeable differences in the attitude to the rules of melanoma prevention between people who had suffered from skin cancer or who had a relative or friend who had suffered from skin cancer and people who had no such experience, because the former tend to observe the rules of melanoma prevention more conscientiously than the latter.

Table 4. Correlation between respondents' education and the extent to which they follow the rules of melanoma prevention

Education	Level of health behaviours connected with melanoma prevention					χ^2	*p*-value
	Very good	Good	Satisfactory	Unsatisfactory	Total		
	n (%)	*n* (%)	*n* (%)	*n* (%)			
Elementary	0 (0.0)	0 (0.0)	2 (2.3)	7 (6.2)	9	28.3	< 0.005*
Middle school	0 (0.0)	1 (2.2)	8 (9.3)	14 (12.4)	23		
Vocational	0 (0.0)	3 (6.7)	5 (5.8%)	12 (10.6)	20		
Secondary	4 (17.4)	7 (15.6)	28 (32.6%)	30 (26.6)	69		
Higher	19 (82.6)	34 (75.6)	43 (50.0)	50 (44.3)	146		
Total	23	45	86	113	267		

**statistically significant p-value*

Table 5. Correlation between respondents' skin cancer history and the extent to which they follow the rules of melanoma prevention

Skin cancer history	Level of health behaviours connected with melanoma prevention					χ^2	*p*-value
	Very good	Good	Satisfactory	Unsatisfactory	Total		
	n (%)	*n* (%)	*n* (%)	*n* (%)			
Yes	14 (60.9)	1 (2.2)	1 (1.2)	1 (0.9)	17	125.9	< 0.001*
No	9 (39.1)	44 (97.8)	85 (98.8)	112 (99.1)	250		
Total	23	45	86	113	267		

**statistically significant p-value*

Table 6. The incidence of skin cancer among respondents' family or friends and the level of health behaviours connected with melanoma prevention

Skin cancer history among respondents' relatives and friends	Level of health behaviours connected with melanoma prevention					χ^2	*p*-value
	Very good	Good	Satisfactory	Unsatisfactory	Total		
	n (%)	*n* (%)	*n* (%)	*n* (%)			
Yes	20 (87.0)	25 (55.55)	32 (37.2)	4 (3.5)	81	91.4	< 0.001*
No	0	16 (35.55)	40 (46.5)	74 (65.5)	130		
I don't know	3 (13.0)	4 (8.9)	14 (16.3)	35 (31.0)	56		
Total	23	45	86	113	267		

**statistically significant p-value*

DISCUSSION

Melanoma is a form of cancer that can be prevented to a large extent. It is necessary to have appropriate knowledge about melanoma risk factors and to apply it in practice, introducing proper health behaviours into everyday routine. Skin phototype determined according to Fitzpatrick scale is a useful tool that can determine skin sensitivity to ultraviolet radiation. The lower the phototype, the higher the individual proneness to sunburn, and consequently the higher the risk of developing skin cancer [8]. All the respondents in their self-administered tests ticked at least three out of five physical characteristics and thus fulfilled the criteria that allowed for their classification as one of the six skin phototypes. In the study conducted by Klohsek only 32.6% of respondents were able to define their natural skin colour, and 18.4% of them did not know of the term "skin phototype" [9]. In the study carried out by the authors the largest group of respondents belonged to skin phototype III (43%), and 33% to skin phototype I or II. An analysis of the findings showed that in the case of 267 respondents their skin phototype had a significant impact on their application of melanoma prevention rules. This was most visible in the case of respondents with skin phototype I, because having a paler complexion involved taking more sun protective measures because of the necessity to protect their skin against possible sunburn. This idea was also mentioned in the study conducted in 2011 by Coups *et al.* in a group of 788 Latino Americans. According to the author, this population was less prone to skin irritation and cancer because of their skin colour. Consequently, only 17.6% of respondents carried out self-examination consisting of examining their own skin, and less than 9% had their skin changes examined by a doctor [10].

In the authors' own study conducted in a group of 202 women and 65 men, no statistically significant differences were found between men and women as far as the level of health behaviours was concerned. Similar conclusions were drawn from the survey carried out under the auspices of the Greater Poland Cancer Centre (Wielkopolskie Centrum Onkologii). It was proven in that study that there is no correlation between respondents' gender and their attitudes to the issues connected with healthy lifestyle. Moreover, no correlation was observed between the level of health behaviours and respondents' education [11], as opposed to the results of the authors' own studies, which showed that higher education is correlated with a higher level of health behaviours connected with melanoma prevention.

The correlation between respondents age and their following melanoma prevention rules, which was observed in the authors' own studies, is usually directly proportional. Entirely different conclusions were drawn by the authors who examined the level of knowledge about melanoma in a group of nurses working in University Children's Hospital of Cracow. According to their findings the older the respondents, the lower their knowledge about skin cancer prevention [12]. On the other hand, in the studies conducted by Klohsek in a group of teenagers aged between 13 and 18 years, more than half of the respondents (51.02%) had insufficient knowledge about the problem, and the assessment of behaviours connected with melanoma prevention was frequently correlated with the respondents' level of knowledge. The results of an analysis show a correlation between respondents' knowledge and their age and gender. Boys' level of knowledge was usually lower than girls', and the highest level of knowledge could be observed in teenagers aged between 17 and 18 years (64.29%). Respondents' knowledge was correlated with their health behaviours [9].

The authors' own studies also showed statistically significant differences in following the rules of melanoma prevention between people who suffered from skin cancer or had a person affected by this problem among their family or friends and people who had no such experience. The respondents who experienced the problem of skin cancer personally or their family or friends suffered from this disease were more likely to follow the rules of cancer pre-

vention than the other respondents. Similar results were obtained in the USA in a study examining siblings of people suffering from skin cancer, including melanoma, which showed that the level of preventive measures applied by them was higher than in the general population; however, there was still a need for focusing educational actions on increasing the level of knowledge [13]. Studies by other authors show that in the case of people living in western countries, suffering from melanoma in the past has a significant impact on changing their habits connected with following prevention rules. Two out of three people changed their attitude to sunbathing; however, for the other 30% sunbathing still did not belong to the group of perceived risk factors because, unfortunately, the fashion for suntan promoted by the media constitutes an impassable barrier for making practical use of the knowledge about skin cancer prevention. People who have recovered from the disease tend to self-check more frequently than the general population, but still the number of those who regularly examine their skin is too low – only 13.7-22% of the respondents do it once a year. However, as many as 88% of them had had their skin examined by a doctor within the last few years [14].

In the case of people whose relatives have suffered from skin cancer, the statistics are even lower. Only every third person applies sunscreen lotions, and over 60% of them rarely or never wear protective clothing. Such behaviours may result from lack of proper education for people suffering from skin cancer about the risk of the incidence of this form of cancer in other family members, and thus a lack of spreading this knowledge within the family [14].

The necessity of spreading knowledge about skin cancer prevention results from the fact that melanoma is one of the most aggressive forms of cancer and its morbidity rate is still increasing. Proper education involving spreading knowledge about skin phototypes and skin cancer risk factors would increase the level of health behaviours connected with melanoma prevention. It would be ideal if thorough knowledge was followed by conscientious implementation of health behaviours connected with melanoma prevention.

CONCLUSIONS

People with the phototype characterised by pale skin followed the cancer prevention rules to a greater extent.

The level of health behaviours connected with melanoma prevention increases with respondents' age and education.

The respondents with previous history of skin cancer or with a family member or friend suffering from skin cancer declared more health behaviours connected with melanoma prevention.

In the age of globalisation, education about health behaviours aimed at melanoma prevention should involve inhabitants of all continents.

Disclosure

The authors declare no conflict of interest.

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