RESEARCH ARTICLE

What Do Web Users Know about Skin Self-Examination and Melanoma Symptoms?

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Abstract

   <u>Background</u>: Skin self-examination (SSE) may facilitate early diagnosis of melanoma at a potentially curable stage. Little data are available concerning the SSE frequency and knowledge about the symptoms of melanoma in non-patient populations. The aim of our study was to assess the performance of skin self-examination, recognition of potential melanoma symptoms as well as behavior related to sun exposure among web users in Poland. <u>Materials and Methods</u>: A cross-sectional study was conducted among readers of a scientific portal. Invited respondents were asked to complete an online questionnaire. Finally, statistical analysis was conducted on 4,919 surveys towards potential clinical signs of melanoma and SSE performance. <u>Results</u>: Approximately 60% of respondents had ever performed SSE in their life. Only 18.4 % declared performance on a regular, monthly, basis. Factors promoting this activity were established to be bigger place of residence, higher education and sensitive skin phototype, higher level of knowledge concerning melanoma, safe tanning rules and, especially, past surgical excision of naevi. Declared longer use of tanning beds was linked to understanding better the importance of clinical features of melanoma. Awareness of hazardous behavior during sunbathing is associated with the attempts to change them. <u>Conclusions</u>: Regular SSE is not a common practice, whilst the knowledge about the clinical features of melanoma is varied. Therefore, constant pressure should be put on promotion of regular skin self-examination and teaching its proper techniques, including familiarity with the ABCD (asymmetry; border; color; diameter) rule and its extension of "EFG" (elevated, firm, progressive growth) criteria.

Keywords: skin self-examination - melanoma awareness - symptoms, pink lesion - ABCD rule - EFG rule

Introduction

   Along the reported and predicted global increase of melanoma incidence, the efforts to improve the early detection of this dangerous disease are still needed (Ferlay et al., 2013). As the primary lesion's wide surgical excision is the main method of treatment, the early diagnosis of locally advanced melanoma is associated with a much better prognosis (American Cancer Society, 2013). Among the patients with 0.01-0.5 mm thick melanoma, the 10-year survival is 96%, while for patients with tumor thickness greater than 6 mm, the 10-year survival rate is decreased to 42% (Edge et al., 2013). Having thinner tumors was associated with performing routine skin self-examination (SSE) and the assistance of pictures in the demonstration of melanoma's clinical appearance (Swetter et al., 2012).

   SSE for new melanocytic lesions or change in appearance of these already present may facilitate early diagnosis of the disease in potentially curable stage (Weinstock, 2006). Although at different frequencies, SSE is performed by the majority of patients diagnosed with melanoma or atypical melanocytic lesions (Hull et al., 2011). Little data is available concerning the SSE frequency in non-patient population. Unfortunately, these available highlighted that both SSE and skin examination performed by partner are an uncommon practice (Weinstock et al., 1999). The aim of our study was to assess the attitude towards the skin self-examination, recognition of potential melanoma symptoms and behaviors related to sun exposure.

Materials and Methods

   A dedicated web-based questionnaire was designed and a cross-sectional study was conducted among readers of a Polish scientific portal.

Data acquisition and study population
   Acquisition of the respondents' answers to the questionnaire was conducted from March 2, 2012 to June 1, 2012. After answering all of the required questions, the responses were saved in a spreadsheet.

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The Google Docs platform (http://docs.google.com/) was used for preparation and storage of the data. No data were stored that were likely to identify the respondents (e.g., IP addresses). The participants answered questions autonomously via a web browser. To reduce the risk of multiple participation by the same respondent, so-called 'cookies' were used, which allowed the storage of a declared consent to participate (or the absence of such approval). Each participant was informed about the purpose and the anonymous character of the survey.

The examined group of respondents consisted of 4,919 individuals in median age of 29.4, ranges from 11 to 92 years, 968 males and 3,951 females. Most of the interviewees (74.9%) lived in town. Almost every tenth respondent (10.8%) was an inhabitant of a town having less than twenty thousand of people. Towns with number of citizens ranging from 20 to 200 thousands were represented by 24.3% of surveyed. Cities with more than five hundred thousand of residents were inhabited by near quarter of surveyed (25.9%). Forty-seven point four percent of questioned declared to be the highest educated (master's degree and beyond). The other numerous group of respondents declared to have completed the high school

(10.2% having first and 37.9% with second degree). Poor education concerned only a small percent of the interviewees with 1.9% having no formal education and 2.7% reporting to have accomplished only the elementary school.

Structure of the e-questionnaire

The self-completion, user-friendly, web-based questionnaire contained a total of 61 questions that were mainly closed-ended (47 questions, Q). The questions were written in Polish and were divided into three different subsets related to demographic data, primary prevention responses, and secondary prevention. The respondents were asked about clinical types and symptoms that might indicate the development of melanoma.

Ethical issues

The Institutional Review Board from the Cancer Centre and Institute of Oncology in Gliwice (Poland) stated that this research did not require their approval.

Statistical analysis

The statistical analysis was conducted on fully

Table 1. Performance of Skin Self-Examination

Q50 Do you perform the self-examination of your skin			
Predictors	OR	CI 95 %	P
Q10 Do you regularly use sunscreen creams while sunbathing?	1.26	(1.09,1.46)	0.002
Q13 Do you repeat application of sunscreen cream during one sunbathe session?	1.21	(1.04,1.41)	0.012
Q15 Do you apply sunscreen cream after each out of the water?	1.17	(1.01,1.37)	0.036
Q20 Do you choose a sunscreen cream based on the SPF: PPD factor?	1.31	(1.15,1.5)	<0.001
Q28 Do you usually wear a special eye-glasses in a tanning bed?	1.16	(1.02,1.31)	0.02
Q30 Do you know that the history of sunburns increase the risk of melanoma up to five times?	1.55	(1.33,1.82)	<0.001
Q32 How many times have you experienced a sunburn before the age of 18?	0.98	(0.96,0.99)	0.002
Q33 Can you divide the skin into the phototypes depending on the response of skin to the sunlight: sunburn and the appearance of a tan?	1.63	(1.44,1.86)	<0.001
Q37 Did you know that melanoma is one of the most malignant cancer?	1.63	(1.36,1.95)	<0.001
Q51 Do you regularly observe the skin of the whole body in search of new and old pigmented moles?			
Q3 Place of residence	1.057	(1.02,1.095)	0.0011
Q4 Education - school completed	1.158	(1.088,1.233)	<0.001
Q13 Do you repeat application of sunscreen cream during one sunbathe session?	0.811	(0.727,0.905)	0.0001
Q20 Do you choose a sunscreen cream based on the SPF: PPD factor?	0.773	(0.692,0.862)	<0.001
Q30 Do you know that the history of sunburns increase the risk of melanoma up to five times?	0.69	(0.598,0.796)	<0.001
Q33 Can you divide the skin into the phototypes depending on the response of skin to the sunlight: sunburn and the appearance of a tan?	0.769	(0.685,0.862)	<0.001
Q34 How would you describe your skin phototype?	0.867	(0.8,0.939)	<0.001
Q37 Did you know that melanoma is one of the most malignant cancer?	0.771	(0.651,0.913)	0.0013
Q39 Have you ever used the advice of dermatologist or other medical specialties on the evaluation of the so-called pigmented moles?	0.592	(0.527,0.664)	<0.001
Q58 Would you consider examining your naevi (clinically, dermoscopic examination) after filling in this questionnaire?	0.474	(0.412,0.545)	<0.001
Q59 Have you ever had any naevi excised surgically?	0.38	(0.334,0.432)	<0.001

completed questionnaires using multivariate logistic regression with the R software (R Core Team, 2013). Interpretation of the results was based classically on the odds ratio (OR) and 95% confidence intervals (CI). The statistically significant (p<0.05) results are reported.

Results

The data regarding the skin self-examination, recognition of potential clinical symptoms of melanoma development, behaviors related to sun exposure as well as preventive influence of the questionnaire survey (measured by the respondents' willingness to undergo a medical examination, including dermoscopy after completing the survey) are presented (Tables 1-3).

Overall presentation of the data concerning respondents' awareness

The majority of respondents (94.5%) were of the opinion that regular sunlight exposure increases the risk of melanoma. Fairly common awareness that a history of sunburns increases the risk of melanoma up to five fold (78.6% of respondents) was observed. Only 46.4% surveyed declared to use sunscreens regularly, whilst slightly fewer (44.2%) applied them after swimming. Two thirds (65.6%) of questioned stated that they like sunbathing, meanwhile 18.8% reported to use tanning beds.

Skin self-assessment for detection of melanoma

Performing SSE (Q50) was more highly associated with regular use of a sunscreen creams and reapplying them during sunbathing as well as after swimming. Respondents performing SSE more frequently were choosing a sunscreen cream based on the SPF: PPD factor and also wore protective eyeglasses more regularly

when using tanning beds. The performance of skin self-examination was highly associated with the awareness that a history of sunburns increases the risk of melanoma, knowledge that melanoma was one of the most malignant types of cancer as well as acquaintance with the skin phototypes. The occurrence of sunburn before the age of 18 was also less often reported among individuals ever performing SSE (Q50, Table 1).

The regular skin assessment was more often performed by individuals who lived in more populous areas, were better educated and had more sensitive skin phototype. The statistically significant, positive relationship between past surgical excision of a naevi and current regular SSE performance was found. Those performing SSE habitually declared to choose a sunscreen cream based on the SPF: PPD factor and more frequently reapplied such creams during sunbathing sessions as well as were more likely to seek for a medical advice. In addition, they declared significantly more often to consider having their naevi examined after participation in our study, compared with these not taking care of the skin lesions (Q51, Table 1).

Knowledge of potential clinical symptoms of melanoma

Type of color (C) and dynamics (D2) of lesion's morphological changes proved to be the most recognizable clinical ABCDE symptoms (78% and 63.5%, respectively). Other clinical features such as asymmetry (A) and diameter (D1) >5 mm were recognized among only slightly over half of the respondents (55.9% and 56.1%, respectively). The sensory disturbances (e.g., itching and paraesthesia) proved to be the least known alarming symptoms (knowledge declared by 48.9% surveyed) while 84.3% were aware of change in color importance.

Respondents who knew that clinical feature C defined as a change of lesion's color is worrying and could indicate the development of melanoma more frequently chose a

Table 2. Attitute to the Symptoms of Melanoma and Behavior Related to Sun-Exposure

	OR	CI 95 %	P
Q52D2 Which features do you think are worrying and may indicate the development of melanoma- D2) dynamics of morphological changes in the lesion			
Predictors	OR	CI 95 %	P
Q16 Do you choose a sunscreen cream based on the value of the UVB factor - SPF (sun protection factor)?	1.16	(1,1.33)	0.043
Q32 How many times have you experienced sunburn before the age of 18?	1.02	(1.01,1.04)	0.009
Q53C Which features do you think are worrying and may indicate the development of melanoma C) change in color			
Q20 Do you choose a sunscreen cream based on the SPF: PPD factor?	0.83	(0.7,0.98)	0.028
Q32 How many times have you experienced sunburn before the age of 18?	1.03	(1.01,1.05)	0.014
Q8 Do you like sunbathing outside?	0.86	(0.76,0.98)	0.027
Q53F Which features do you think are worrying and may indicate the development of melanoma F) sensory disturbance (e.g., itching, and paraesthesia)			
Q6 How long (during a day) do you usually work outdoors?	0.96	(0.93,0.99)	0.01
Q8 Do you like sunbathing outside?	0.86	(0.76,0.98)	0.027
Q54C Which of the above would lead you to the dermatological consultation and dermoscopic evaluation C) The appearance of a pink nodule			
Q16 Do you choose a sunscreen cream based on the value of the UVB factor - SPF (sun protection factor)?	1.18	(1.03,1.36)	0.017
Q32 How many times have you experienced sunburn before the age of 18?	1.02	(1,1.03)	0.017

Table 3. Visiting a Doctor after this Survey

Q58 Would you visit a doctor for have your signs examined after filling in this questionnaire (clinically, dermoscopic examination)?			
Predictors	OR	CI 95 %	P
Q1 Your age (years)	1.02	(1.01,1.03)	<0.001
Q4 Education - school completed	1.22	(1.12,1.33)	<0.001
Q10 Do you regularly use sunscreen creams while sunbathing?	1.51	(1.25,1.81)	<0.001
Q11 If you use a sunscreen creams – tick since how many years	0.99	(0.98,1)	0.031
Q16 Do you choose a sunscreen cream based on the value of the UVB factor - SPF (sun protection factor)?	1.63	(1.34,1.98)	<0.001
Q17 What is the value of SPF used by you?	0.9949	(0.99,0.9998)	0.04
Q20 Do you choose a sunscreen cream based on the SPF: PPD factor?	1.34	(1.14,1.59)	<0.001
Q26 For how many years have you been using tanning bed regularly?	1.05	(1.01,1.1)	0.016
Q37 Did you know that melanoma is one of the most malignant cancer?	1.39	(1.15,1.68)	<0.001

sunscreen cream based on the value of UVA factor or anti-UVA-PPD, and also had been sunburned more often before the age of 18 (Q53C, Table 2).

Individuals aware of D2 (dynamics) clinical feature importance (defined as morphological changes in the lesion) expressed as potential indicator of the melanoma development were more frequently choosing sunscreens based on the value of the UVB factor - SPF. In addition, sunburns before the age of 18 were more common in this group of respondents (Q52D2, Table 2).

Individuals perceiving sensory disturbances (e.g. itching, and paraesthesia) regarding the lesion as threatening and potential indicator of the development of melanoma (Q53F, Table 2) much less liked sunbathing outdoors as well as used to work outdoors proportionally longer daily.

Respondents who indicated that the presence of a pink nodule would lead them to the dermatological consultation were choosing a sunscreen based on the UVB factor value - SPF more frequently and were more likely to be sunburned before the age of 18 (Q54C, Table 2).

Pro-health impact of taking part in the survey

Individuals who declared to consider having their skin examined (clinically or dermoscopically) after filling in this questionnaire study were more often older, better educated, chose sunscreens creams based on the SPF: PPD factor as well as used them more regularly during sunbathing. Representatives of this group more frequently were aware of the malignant nature of melanoma. Unfortunately, these surveyed had been using tanning beds for more years and sunscreens with lower SPF values, which had been applied for a shorter period of time (summary in years) (Q58, Table 3).

Discussion

As little is known about awareness, behaviors and does associated with SSE among non-patient population and only few papers were published concerning selected groups, therefore our aim was to perform such an evaluation (Al-Naggar et al., 2011; Andsoy et al., 2013; Walton et al., 2014).

The limitations of this study included: restricted sampling associated with having an internet access (62% of Polish citizens over the age of 15) and the need for the sufficient internet skills among surveyed (World Internet Project: Polska, 2013). Moreover, the nonresponse bias can not be excluded.

Overlooking the changes in existing or ignoring new skin lesions was stated to be the main reasons for the patient-related delay of diagnosis (Gajda and Kaminska-Winciorek, 2014). Unfortunately patients' attention was mostly paid to the late signs of melanoma such as presence of ulceration or bleeding (Krige et al., 1991). It was stated that patients who have no training in performing SSE were able to detect between 44-57% of melanomas (McPherson et al., 2006). Clinical "ABCD" (Asymmetry; Border; Color; Diameter) algorithm was reported to improve SSE sensitivity to 57-90% and the specificity to 59-90% (Rigel et al., 2010). Results coming from teaching with the use of photographs could be more efficient than these achieved with "ABCD" criteria (Grob and Richard, 2004). Our study showed that the best known symptom of melanoma was change in color (more than three quarters of respondents) whereas, quite surprisingly, the worst recognition concerned the asymmetry (slightly more than half of the surveyed) and especially sensory disturbances with report's frequency of 48.9%. As some melanomas do not meet basic clinical "ABCD" criteria (nodular, amelanotic melanoma occurring commonly as a pink nodular lesion) and even can mimic benign lesions leading to misdiagnosis and inappropriate treatment, it appears that the acquaintance with the additional criteria forming in the acronym "EFG" (elevated, firm, >1 month progressive growth) is advisable (Chamberlain et al., 2003; Giacomel et al., 2008). Taking into an account the fact that even clinical examination extended with dermoscopic evaluation does not provide 100% accuracy of melanoma diagnosis, therefore in such suspicious lesions cases, especially meeting the criteria of the EFG, the executing the excisional biopsy with subsequent histological examination seems to be required (Giacomel et al., 2008).

"Pink nodule" could be an alarming symptom, suggesting the probability of melanoma presence (Rader

et al., 2014). Part of our respondents were aware of that and proved their high knowledge in that way. They also relied on SPF value when choosing sunscreens. What's even more interesting, sunburns before the age of 18 had occurred slightly more frequent in this group (compared with those unaware of the pink nodule importance). As shown above, the same regularity occurred among individuals having knowledge of the clinical signs of C and D. On the other hand, surveyed who indicated sensory disturbances as the important symptoms that may suggest melanoma presence showed a lower propensity for sunbathing and outdoor work.

The importance of SSE is high, particularly for the detection of nodular melanoma, which is characterized by rapid growth between consecutive doctor's clinical examinations (Chamberlain et al., 2003). The overall impression of irregularities, the "ugly duckling" sign and a recent change of lesion are the most useful symptoms for melanoma recognition (Grob and Richard, 2004; Scope et al., 2008). Nearly two-thirds of our respondents (60.6%) declared to have performed SSE at least once in their life while 18.4% were examining their skin regularly (once a month). While recommendations for the frequency of skin self-examination are not unified, most authors recommend its monthly conducting (Goodson and Grossman, 2009). Our study established that bigger place of residence, education and having more sensitive skin phototype are SSE-promoting factors. Also the positive correlation between carrying out regular examination and the knowledge concerning melanoma and safe tanning rules was demonstrated. In Australia and United States (USA) not more than every fourth individual performs skin self-examination on a regular basis (Aitken et al., 2004; Weinstock et al., 2007). Recent study demonstrated the frequency of SSE to be similar in the group with no history of melanoma (28.1 and 30.7% of males and females, respectively) and slightly greater among individuals with positive family history of melanoma (36.5 and 43.6% of males and females, respectively) (Kasparian et al., 2012).

Most of surveyed were aware of the risks associated with sun exposure. Unfortunately, this awareness is not always associated with the regular use of sunscreen protection. Surveyed who had used the tanning beds often and had been applying sun protecting creams for shorter period of time, in addition with a lower SPF. Currently being better educated, they are aware of the threat posed by melanoma and declare more health-promoting behaviors related to sun exposure. Our research shows that this group of people is likely to consider examination of their skin and also use sunscreens based on the value of the SPF: PPD indicator regularly. The awareness of hazardous behaviors during sunbathing is associated with the attempts to change them. Surprisingly, declared longer use of tanning beds was related to the better understanding of the clinical features of melanoma. The frequency of regular SSE in studied population seems to be slightly lower compared with Australia or USA. The significant positive relationship between past surgical excision of a naevi and current regular SSE performance was demonstrated. Other identified SSE-promoting factors are: place of residence, education and skin phototype.

Moreover, positive correlation between the regular skin assessment and the knowledge concerning melanoma and safe tanning rules was demonstrated. The occurrence of a sunburn before the age of 18 was less likely in people who reported to perform SSE.

Educational campaigns aimed at raising awareness about melanoma and skin self-examination favor the diagnosis of tumors of smaller thickness (Mitchell and Leslie, 2013). The use of interactive patients' training in combination with teaching practical SSE techniques could improve the efficiency of self-examination maintained by patients (Aneja et al., 2012). Another solution which might have an influence on the skin self-examination improvement may be the use of e-Health services, including the use of mobile devices (Tyagi et al., 2012). We can assume that also our study motivated surveyed to check their lesions as more than 80% of them stated to consider having their skin examined (clinical or dermoscopic evaluation).

In conclusion, the knowledge about the clinical features of melanoma is varied. Moreover, monthly performig skin self-examination is uncommon. Therefore, constant pressure should be put on the promotion of conducting regular self-examination of the skin and teaching its proper techniques, including familiarity with the ABCD rule and its extension of "EFG" criterion. It is also important to adapt new methods that use technological advances in the screening for melanoma.

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100.0

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Newly diagnosed without treatment