

Impact of Melanoma Diagnosis on Sun-Awareness and Protection: Efficacy of Education Campaigns in a High-Risk Population

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Abstract

Background: Malignant melanoma is a significant cause of morbidity and mortality worldwide. Sun-awareness campaigns increase public knowledge but may not translate into behavioral changes in practice, which is particularly alarming when reported for individuals in high-risk groups. In particular, patients diagnosed with melanoma are at increased risk of developing subsequent primary melanomas compared with the general population.

Objectives: The study was undertaken (1) to assess whether patients with known risk factors for developing melanoma had been exposed to preventative campaign messages prior to their diagnosis, (2) to quantify whether the diagnosis of melanoma changed sun-related attitudes and behavior, and (3) to assess the adequacy of sun-related advice given to patients with melanoma, as well as their compliance with the advice.

Methods: Using an anonymous questionnaire, 217 patients previously diagnosed with melanoma were interviewed on the source and frequency of received sun-related advice, as well as on their knowledge, attitudes, and behavior toward sun protection before and after the diagnosis.

Results: The number of patients who reported receiving sun-related advice after being diagnosed with melanoma increased by 36% (52% pre-vs. 88% postDiagnosis), with advice being given more frequently and more often by a physician (19% pre- vs. 49% postdiagnosis). Furthermore, sun-related attitudes and behavioral practices were positively altered. Yet, patients with known risk factors were not preferentially targeted for advice before their diagnosis.

Conclusions: The diagnosis of melanoma leads to increased sunawareness and protection. While dermatologists should continue their efforts to promote and reinforce sun-awareness in patients with melanoma, additional emphasis on preventative targeting of high-risk individuals would be of marked benefit in decreasing the overall incidence of melanoma. Non-dermatologists, such as family physicians, can be key players in this preventative campaign, and can be educated to recognize and educate patients at risk, as well as direct them to be followed under dermatology care.

Sommaire

Antécédents: Le mélanome malin est une importante cause de morbidité et de mortalité dans le monde entier. Les campagnes de sensibilisation aux effets des rayons du soleil contribuent à augmenter les connaissances du public sans nécessairement mener à un changement dans le comportement des individus, ce qui est alarmant dans le cas des

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personnes appartenant à des groupes à risque élevé. Plus particulièrement, le risque de développer un mélanome primaire subséquent chez les patients qui présentent déjà un mélanome se trouve supérieur au risque couru par la population en général.

Objectifs: L'étude a été initiée en vue 1) d'évaluer si les patients ayant des facteurs de risque connus pour développer un mélanome ont été exposés aux messages des campagnes préventives avant leur diagnostic; 2) de quantifier le changement d'attitude et de comportement face aux rayons de soleil la suite du diagnostic du mélanome; et 3) d'évaluer la pertinence de l'avis concernant l'exposition au soleil que les patients ayant un mélanome ont reçu et de vérifier leur degré de conformité à un tel avis.

Méthodes: Au moyen d'un questionnaire anonyme, on a précédé à une entrevue auprès de 217 patients ayant déjà reçu un diagnostic de mélanome. Les questions portaient sur la fréquence à laquelle ils ont reçu des conseils relativement à l'exposition au soleil, à la source de ces conseils, ainsi que sur leurs connaissances, leurs attitudes et leur comportement à l'égard de la protection contre le soleil, avant et après le diagnostic.

Resultats: Le nombre de patients qui ont indiqué avoir reçu des conseils relativement à la protection contre le soleil après le diagnostic du mélanome avait augmenté de 36 % (52% avant, contre 88% après le diagnostic), avec les conseils prodigués de plus en plus fréquemment par le médecin (19 % avant, contre 49 % après le diagnostic). En outre, les attitudes et le comportement à l'égard de l'exposition au soleil avaient changé pour le mieux. Toutefois, les patients présentant des facteurs de risque connus n'étaient pas particulièrement visés par les conseils avant le diagnostic.

Conclusion: Le diagnostic du mélanome entraîne une hausse de la sensibilisation aux effets des rayons du soleil et une protection accrue contre le soleil. Alors que les dermatologues doivent poursuivre leurs efforts de promotion des effets néfastes du soleil auprès des patients souffrant de mélanome, une action plus dynamique, entreprise auprès des personnes présentant un risque élevé, aurait des effets positifs dans la réduction de l'incidence générale de mélanome. Les médecins qui sont pas dermatologues, tels que les médecins de famille peuvent être des acteurs clés dans les campagnes de prévention et peuvent être formés afin de reconnaître et d'éduquer les patients à risque ainsi qu'à les recommandés aux soins d'un dermatologue.

Excessive sunlight exposure has been implicated as the main environmental agent responsible for melanoma occurrence.^{1,2} Over the past decade, numerous public health campaigns have been launched, aimed at increasing the general public's knowledge and awareness of the dangers of sun exposure and of the benefits of sun protection.³⁻⁶ Primary prevention strategies have focused on decreasing deliberate and accidental sun exposure, on curbing tanning-salon usage, and on increasing the use of sunscreen, hats, and protective clothing. Early detection screening programs, as a form of secondary prevention, have also been implemented, concurrently serving to improve the participants' knowledge of the disease.⁷ In North America, the American Academy of Dermatology's successful annual national detection and prevention campaign for melanoma and skin cancer has been in place since 1985^{8,9} and several programs have been introduced in Canada.¹⁰⁻¹² Furthermore, as most of the harmful UV exposure is known to accumulate before adulthood, a number of school-based educational interventions have been established.¹³⁻¹⁵ However, despite widespread campaigns, the actual behavioral changes in sun-protective practices have been shown to lag behind, primarily because the physical attractiveness of a suntan is still alluring.¹⁶⁻¹⁸ General information to alter sun-

seeking behavior increases awareness¹⁹ but does not necessarily translate into behavioral changes in practice.^{18,20-25}

With major risk factors for melanoma documented, a number of studies have aimed to identify high-risk population subsets and examine their sun-related behavior.^{26,27} For instance, Brandberg et al.²⁸ investigated such behavior in patients with dysplastic nevus syndrome, reporting that despite awareness of being at increased risk, these individuals were still alarmingly careless about sun exposure. Importantly, patients previously diagnosed with melanoma are at a significantly higher risk of developing further primary lesions: up to 8.2% of them will present with subsequent primaries, which is considerably higher than the lifetime incidence of melanoma in the general populations.²⁹⁻³⁸ Sun-protective measures are of paramount importance for these patients; yet the impact of melanoma diagnosis on sun-awareness and protection, as well as the efficacy of education campaigns in this high-risk, population has not been previously assessed. We undertook a study to evaluate whether patients with known risk factors for developing melanoma had been exposed to preventative campaign messages prior to their diagnosis, to quantify whether the diagnosis of melanoma changed patients' sun-related

TABLE I

Questionnaire distributed to patients with melanoma	
1.	Age _____
2.	Gender <i>Female/Male</i>
3.	Age at diagnosis of melanoma _____
4.	The year that melanoma was diagnosed _____
5.	Location of the melanoma _____
6.	What is your natural skin color? <i>White/Light Brown/Brown/Black</i>
7.	Do you tan easily? <i>No, I burn easily / I burn first, then I tan / Yes, I tan easily</i>
8.	Did anyone in your family have non-melanoma skin cancer? <i>Y/N</i>
9.	Did anyone in your family have melanoma? <i>Y/N</i>
10.	Do you have dysplastic nevi (irregular moles)? <i>Y/N/Not sure</i>
11.	Did anyone in your family have dysplastic nevi (irregular moles)? <i>Y/N/Not sure</i>
	Before your diagnosis of melanoma
12.	Did you believe that a person looks healthier with a tan? <i>Y/N</i>
13.	What was your attitude towards sun exposure? <i>Appreciate/Avoid</i>
14.	Did you try to stay out of the sun? <i>Never/Sometimes/Often/Always</i>
15.	In the summer, did you avoid sun exposure between 11 AM and 2 PM? <i>Y/N</i>
16.	Did you use hats and protective clothing against the sun? <i>Y/N</i>
17.	Did you sunbathe? <i>Never/Sometimes/Often/A lot</i>
18.	Did you use sunscreen when outside for more than 1/2 hour on a sunny day? <i>Never/Sometimes/Often/Always</i>
19.	If yes, which sun protection factor number (SPF)? _____
20.	How did you apply it? <i>To all exposed areas/Only to the face</i>
21.	Did you use indoor tanning equipment? <i>Y/N</i>
22.	Were you ever given any advice on protecting your skin from sunlight exposure? <i>Y/N</i>
23.	On how many occasions? <i>1/2/3-4/more than 4</i>
24.	Who was the advice from? <i>Friends-family/Public media/Physician/Other</i> _____
25.	Had you seen any information about sun protection in books/newspapers/radio/TV? <i>Y/N</i>
26.	On how many occasions? <i>1/2/3-4/more than 4</i>
	After your diagnosis of melanoma
27.	Did you believe that a person looks healthier with a tan? <i>Y/N</i>
28.	What was your attitude towards sun exposure? <i>Appreciate/Avoid</i>
29.	Did you try to stay out of the sun? <i>Never / Sometimes / Often /Always</i>
30.	In the summer, did you avoid sun exposure between 11 AM and 2 PM? <i>Y/N</i>
31.	Did you use hats and protective clothing against the sun? <i>Y/N</i>
32.	Did you sunbathe? <i>Never/Sometimes/Often/A lot</i>
33.	Did you use sunscreen when outside for more than 1/2 hour on a sunny day? <i>Never/Sometimes/Often/Always</i>
34.	If yes, which sun protection factor number (SPF)? _____
35.	How did you apply it? <i>To all exposed areas/Only to the face</i>
36.	Did you use indoor tanning equipment? <i>Y/N</i>
37.	Were you ever given any advice on protecting your skin from sunlight exposure? <i>Y/N</i>
38.	On how many occasions? <i>1/2/3-4/more than 4</i>
39.	Who was the advice from? <i>Friends-family/Public media/Physician/Other</i> _____
40.	Had you seen any information about sun protection in books/newspapers/radio/TV? <i>Y/N</i>
41.	On how many occasions? <i>1/2/3-4/more than 4</i>
42.	Has the diagnosis of melanoma changed your attitude towards sun exposure? <i>Y/N</i> If so in what way? _____
43.	Would you like to receive more information about the relationship between sun exposure and melanoma? <i>Y/N</i>

attitudes and behavior, and to assess the adequacy of sun-related advice given to patients with melanoma, as well as their compliance with the advice.

Patients and Methods

The study was conducted at the McGill University Health Centre Melanoma Clinic, Montreal, Canada. A detailed 43-item questionnaire was distributed to melanoma patients during their followup visits to the multi-disciplinary clinic over a six-month period in 2002. The survey was organized into three sections: a set of questions on demographic information and two matching series of questions regarding sun-related knowledge, re-

ceived advice, attitudes, and behavior relating to pre- and postdiagnosis (Table I). No patient selection was undertaken as the questionnaire was voluntary and anonymous and was made available for all patients to fill out during their previsit waiting time. The study was not restricted to patients with only one melanoma and no exclusion criteria were applied. As Montreal is a bilingual city, equivalent English and French versions of the questionnaire were provided. The study was approved by the McGill University Health Centre Institutional Review Board. Two hundred seventeen patients completed the questionnaire, 48% (104) of them women and 52% (113) men. The mean age of respondents was 56 years, with the mean age of diagnosis of melanoma 50 years.

TABLE II

Received advice and sun-related attitudes in patients with melanoma [n (%)].

	<i>Prediagnosis</i>	<i>Postdiagnosis</i>	<i>Prediagnosis (high-risk patient cohort) 146/217 patients</i>
Received advice	113 (52)	190 (88)	77 (53)
Advice source			
Family/friends	59 (24)	65 (21)	42 (29)
Media	54 (22)	68 (22)	35 (24)
Physician	46 (19)	152 (49)	35 (24)
Exposure to media sun-awareness information	174 (80)	201 (93)	117 (80)
Occasions advice given by the media (average)	4.5	4.6	3.5
Attitude that tan looks "healthy"	133 (61)	59 (27)	85 (58)
Appreciation of sun exposure	147 (68)	26 (12)	90 (62)

TABLE III

Sun-related behavior in patients with melanoma n (%)

	<i>Prediagnosis</i>	<i>Postdiagnosis</i>	<i>Prediagnosis (high-risk patient cohort) 146/217 patients</i>
Tried to stay out of sun			
Never	41 (19)	4 (2)	25 (8)
Sometimes	108 (50)	33 (15)	71 (8)
Often	58 (27)	100 (46)	42 (9)
Always	9 (4)	78 (36)	7 (5)
Avoided sun from 11 AM to 2 PM	91 (42)	178 (82)	65 (45)
Use of protective clothing	74 (34)	184 (85)	58 (40)
Sunbathing			
Never	60 (28)	172 (79)	44 (30)
Sometimes	104 (48)	41 (19)	63 (43)
Often	35 (16)	2 (1)	25 (17)
Always	14 (7)	1 (1)	11 (8)
Indoor tanning	29 (13)	4 (2)	19 (13)
Sunscreen use			
Never	67 (31)	16 (7)	45 (31)
Sometimes	89 (41)	39 (18)	56 (39)
Often	38 (18)	53 (24)	28 (19)
Always	22 (10)	105 (48)	16 (11)
SPF			
Average	18	29	11
Median	15	30	15
Location of applied sunscreen			
All exposed areas	127 (59)	179 (83)	84 (58)
Face	21 (10)	15 (7)	11 (8)

Results

The profile of received sun-related advice and attitudes in patients with melanoma is depicted in Table II. Fifty-two percent of patients reported that they were given sun-protection advice prior to their diagnosis, which increased to 88% after diagnosis. The advice came more frequently from a physician rather than from other sources after the diagnosis (19% pre vs. 49% post), and 93% of patients recalled exposure to media-based educational messages after being diagnosed compared with 80% beforehand. Sixty-five percent of patients with melanoma still wanted more information about the relationship between sun exposure and their disease.

While 61% of respondents believed in looking healthier with a tan before their diagnosis of melanoma, this number dropped down significantly to 27% afterward. Sixty-eight percent of patients appreciated the sun prior and only 12% after their diagnosis, and 87% of patients reported that being diagnosed with melanoma had changed their overall attitude toward the sun.

Considering sun-related behavior, more patients stayed out of the sun and avoided the sun during peak hours and fewer purposely sunbathed after the diagnosis of melanoma (Table III). Furthermore, following diagnosis more patients reported using protective clothing and sunscreens, and the average SPF of the sunscreens

used increased from 18 to 29. Patients were more likely to apply sunscreen to all exposed body areas and not just to the face after their diagnosis. Thirteen percent of respondents used indoor tanning prior to diagnosis of melanoma, which subsequently dropped to 2%.

The profile of patients with melanoma who had known melanoma risk factors before they were diagnosed was then examined separately. One hundred forty-six out of 217 respondents (67%) had either personal or family history of dysplastic nevi, family history of melanoma, or reported burning easily, insinuating type I or II skin phototype. Comparison of responses to the "prediagnosis" section of the survey (i.e., exposure to sun-awareness campaigns, knowledge, attitudes, and behavior) for this high-risk group revealed a similar profile to that of the total cohort. For instance, 53% of high-risk patients reported having been exposed to sun-related advice prior to diagnosis compared with 52% of the total cohort (Tables II and III).

Discussion

Over the past decade, numerous sun-awareness campaigns have been implemented worldwide, aimed at promoting sun-cautious behavior through a variety of means such as media messages and pamphlet distribution.^{4,5,39} However, previous studies revealed that while these campaigns might increase public knowledge of the dangers of sun exposure, they do not necessarily lead to behavioral changes in practice,²⁰⁻²³ which is particularly alarming when reported for patients in high-risk subgroups for developing melanoma, for instance in those with dysplastic nevi.⁴⁰⁻⁴⁴ Brandberg et al.²⁸ used diary recordings to examine sun-related behavior in individuals with dysplastic nevus syndrome: 81% of them reported sunbathing with the intention of getting a tan on an average of 9.2 occasions over the month of recordings and 61% reported repeated sunburns, some of them up to 7 times.²⁸ Repeated information about preventive measures did not prevent these high-risk patients from engaging in hazardous sun-related activities. Failure to change behavior despite heightened awareness has been attributed mostly to the persistent attitude of having a tan as being healthy and attractive.^{18,21,23,45}

Patients with melanoma are known to be at significantly increased risk of developing further primary melanomas, with a documented incidence ranging from 0.5% to 8.2%.²⁹⁻³⁸ Importantly, the risk of a second primary melanoma in these patients is higher than that of the initial lesion recurrence.⁴⁶ Hence, careful followup surveillance and education on sun-protective measures are of paramount importance in this group, as they result in earlier detection of the disease.⁴⁷⁻⁵⁰ Lifelong close followup programs have been advocated for these individuals.

Our study set out to evaluate the impact of melanoma diagnosis on sun-awareness and protection, as well as to

assess the effects of disseminated information and education campaigns in patients with melanoma. The results are encouraging. Patients with melanoma reported being exposed to more sun-related advice from both health professionals and the media following their diagnosis. Of particular importance is that, after diagnosis, the advice came more frequently from a physician; such counseling has been shown to be associated with high sun-safety compliance.¹⁸ Sun-related attitude changed in 87% of patients following diagnosis, but, importantly, so did their actual behavior. Patients with melanoma were more aware of the need for sun protection, and 65% wanted further information about the relationship between the sun exposure and their disease.

Nevertheless, clearly there is room for improvement; prior to diagnosis, only 52% of patients with melanoma reported receiving sun-awareness advice, 61% believed in looking healthier with a tan, and 68% appreciated the sun. The attitude that having a tan is healthy was less prevalent after the diagnosis, yet almost one-third of our patients were still unconverted. This view favoring cosmetic appearance even in high-risk patients is consistent with the study by Brandberg et al.²⁸ As well, a recent study has reported that the most frequently patient-cited barriers to sun protection were sun-protective clothing being too hot, forgetting to use sunscreen, inconvenience, desire to be tanned, and sunscreen being too sticky or greasy.¹⁸ Obviously other factors must be altered to make patient compliance with sun protection easier and thus adhered to more often.

Limitations of our study are important to consider. First, it is possible that those patients who were, in fact, more sun-cautious after getting diagnosed with melanoma preferentially responded to the survey, just like more health-conscious individuals tend to attend public skin-cancer screening events. Second, as the questionnaire in the study was self-administered, it is also conceivable that the participants answered in a socially desired way, overestimating their sun-related awareness and behavior, even though the study was conducted anonymously to bolster truthfulness. Potential responder, reporting, and "social desirability" biases are inherent to a retrospective survey of this kind,⁵¹ and detailed prospective diary recordings might be able to lessen these in future studies.⁵² Another factor may be the interval from the date of diagnosis of melanoma to the time of the interview. If there were a significant amount of time since the initial diagnosis, the patients may have had the concept of sun protection repeatedly emphasized, resulting in behaviour modification. However, considering human nature, patients may also relax their vigilance against sun exposure with time, especially if no other malignant events have occurred. This would be an interesting avenue for further research. Finally, factors potentially unique to Montrealers attending the McGill Melanoma Clinic might potentially bias the external validity (generalizability) of the study; a multicenter collaboration

would provide for a more representative sample of patients with melanoma.

An important observation in the study came from a separate analysis of the "prediagnosis" answers' profile of the high-risk patient cohort, i.e., those with personal or family history of dysplastic nevi, family history of melanoma, or reported burning easily (which insinuated type I or II skin phototype), as these individuals are known to be at high risk of developing melanoma.^{41,42,53,54} The data suggest that their exposure to sun-awareness campaigns, as well as their "prediagnosis" knowledge, attitudes, and behavior, was akin to the total cohort. These patients did not seem to be more specifically targeted to receive increased sun-awareness advice prior to being diagnosed with melanoma.

In conclusion, the study demonstrates that patients with melanoma are more careful about sun exposure after their diagnosis is made, which is encouraging. While dermatologists should continue their efforts to promote and reinforce sun-cautious attitudes and behavior in patients with melanoma in view of their increased risk of developing further primaries, additional emphasis on preventative targeting of high-risk individuals from the general population would be of benefit in decreasing the overall incidence of melanoma. Nondermatologists, such as family physicians, who routinely see a number of patients at risk, can be key players in this preventative campaign by providing sun-awareness advice and referring patients with risk factors (i.e., those with dysplastic nevi and their family members) to be followed under dermatology care.

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