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Communication about Melanoma and Risk Reduction after Melanoma Diagnosis

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Abstract

Objective—Melanoma patients are advised to perform regular risk reduction practices including sun protection as well as skin self-examinations (SSE) and physician-led examinations.

Melanoma-specific communication regarding family risk and screening may promote such behaviors. To this end, associations between patients' melanoma-specific communication and risk reduction were examined.

Methods—Melanoma patients (N=169) drawn from a population-based cancer registry reported their current risk reduction practices, perceived risk of future melanoma, and communication with physicians and relatives about melanoma risk and screening.

Results—Patients were, on average, 56 years-old and 6.7 years' post-diagnosis; 51% were male, 93% reported “fair/very fair” skin color, 75% completed at least some college, and 22% reported a family history of melanoma. Patients reported varying levels of regular (*always/nearly always*) sun protection: sunscreen use (79%), shade-seeking (60%), hat use (54%), and long-sleeve shirts use (30%). Only 28% performed thorough SSE regularly, whereas 92% reported undergoing physician-led skin examinations within the past year. Participants who were female, younger, and had a higher perceived risk of future melanoma were more likely to report past communication. In adjusted analyses, communication remained uniquely associated with increased sunscreen use and SSE.

Conclusions—Encouraging melanoma patients to have a more active role in discussions concerning melanoma risk and screening with relatives and physicians alike may be a useful strategy to promote two key risk-reduction practices post melanoma diagnosis and treatment. Future research is needed to identify additional strategies to improve comprehensive risk reduction in long-term melanoma patients.

Keywords

melanoma; communication; risk reduction; cancer; oncology; survivorship

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Background

Melanoma skin cancers are among the six most common cancers in the U.S. with 76,380 estimated new cases in 2016 [1]. If detected and treated early, melanoma is often curable; however, a prior personal history of melanoma increases the risk of recurrence as well as new primary disease [2]. According to SEER (Surveillance, Epidemiology, End Results) data, over one million individuals are currently living with melanoma, and this figure is likely to rise [1]. Improved survival is due, in part, to the advent of more widespread melanoma screening efforts and earlier detection and treatment [3]. Additionally, immunotherapies have revolutionized the treatment of advanced melanomas increasing survival for many patients [4]. As these numbers continue to grow, risk reduction becomes a critical aspect of melanoma follow-up care [5].

Current behavioral risk reduction recommendations for melanoma patients include regular sun protection as well as self and physician-led skin examinations [6]. Prior research indicates that although melanoma patients are almost nine times more likely to develop subsequent melanomas [7], by many measures they are no more likely to engage in risk reduction than the general population [8-10]. Furthermore, adherence to comprehensive risk reduction remains largely inconsistent in this high-risk group. With some exceptions [11], population-based studies conducted with melanoma patients within five years of diagnosis have generally documented low-to-moderate engagement in regular risk reduction practices, with 13-59% of patients engaging in regular sun protection and only 17-22% of patients performing regular skin self-examinations (SSE) [12,13]. Physician-led skin examinations are also a critical component of optimal skin surveillance in melanoma patients [14]. In contrast to skin self-examination estimates, Bowen and colleagues found that a much larger proportion of patients (88%) undergo physician-led full body skin examinations [12]. As such, there is a need to identify covariates associated with regular risk reduction adherence to develop interventions that address inconsistent risk reduction practices among long-term melanoma patients.

Prior work has identified several psychosocial factors associated with risk reduction practices in melanoma patients: age and sex (older and female patients engage in risk reduction more regularly), having greater risk reduction self-efficacy, and greater perceived risk of recurrence [12,13,15,16]. Another potentially relevant but little investigated promoter of risk reduction is communication about melanoma. For instance, research has found that melanoma patients whose physician recommended SSE, demonstrated how to perform SSE, and showed what lesions to look for were almost three times more likely to engage in SSE compared to patients whose physicians did not engage in these discussions [15]. Utilizing a family systems perspective as our framework, it is also likely that risk reduction behaviors in the melanoma patient would be supported and encouraged by communication practices in the family. A few studies have found that melanoma patients engage in conversations about melanoma risk and prevention with family members, and often target those first-degree relatives (FDRs) who are at greatest risk [17,18]. In another study, 94% of melanoma patients reported initiating skin cancer risk discussions to provide risk information to FDRs and 82% reported doing so to encourage them to seek skin cancer screening [19]. Taken together, these findings highlight the potential for communication to serve as both a support

to patient risk reduction as well as a vector for the promotion of risk reduction practices in the broader family system.

Accordingly, in this study we examine whether patient-initiated discussions concerning melanoma risk and screening are associated with patient's engagement in risk reduction practices. We aimed to (1) examine associations between risk reduction and melanoma communication, and (2) characterize the risk reduction practices of long-term melanoma patients. We operationalized risk reduction as regular sun protection (i.e., sunscreen use, shade-seeking, hat use, long-sleeve shirts use) 'always' or 'nearly always', skin self-examinations at least once every two months, and having had a physician-led skin examination within the past year. We hypothesized that greater patient-initiated melanoma communication would be associated with more regular risk reduction practices. Evidence for this association would support the design practical educational interventions that utilize communication to promote preventive action. We expand on previous work by specifically examining such associations among melanoma patients who are generally more than five years' post-diagnosis.

Methods

Participants and Procedures

Adult melanoma patients ($N=329$) previously recruited in 1998-2000 from the New Jersey State Registry for the Genes, Environment and Melanoma (GEM) study [20] were re-contacted by letter in 2006-2007 to request their participation in a brief telephone survey. Of the 329 patients contacted, 169 (51%) completed the 15-minute psychosocial survey; 86 were unreachable, 27 were deceased, 4 were unable to participate due to medical issues, and 43 refused. Study procedures were approved by Memorial Sloan Kettering Cancer Center's Institutional Review Board.

Measures

Demographic and clinical variables—Demographic variables assessed included; age, sex, education level, and family history of melanoma in FDRs. Patient clinical data was also collected and included: time since diagnosis, primary status, site of melanoma, skin color, eye color, hair color. Lastly, we asked patients to self-report their propensity to burn as well as their ability to tan.

Perceived risk of future melanoma—Patients reported whether they considered their risk of having melanoma in the future to be (1) much less; (2) slightly less; (3) about the same; (4) slightly more; or (5) much more than same age and sex others [21,22].

Communication about melanoma—Participants were asked four dichotomous (yes/no) questions adapted for melanoma-specific communication [23]: Have you ever (1) talked to your doctor about the risk for melanoma in your children, siblings, or parents?; (2) talked to your doctor about whether your children, siblings, or parents should be screened for melanoma?; (3) talked with any of your FDRs about arranging physician screening for melanoma?; and (4) talked with any of your FDRs about telling their physician that there

was a recent melanoma diagnosis? Given a high correlation between communication with physicians and communication with FDRs ($r = .63$), a global communication score was created ($\alpha = 0.82$). Scores ranged from 0 to 4 with higher scores indicating broader melanoma communication.

Risk reduction practices

Sun protection: Participants were asked how often they engaged in the following behaviors while outside on a sunny summer day for more than an hour: using sunscreen, seeking shade, wearing a hat, and wearing long-sleeved shirts [24]. Participants rated the frequency with which they engaged in each behavior using a 5-point Likert-scale (1 = *never*, 5 = *always*). A rating of '*always*' or '*nearly always*' represented *regular* adherence to each sun-protective behavior.

Skin self-examinations: We assessed the frequency (1 = *never*, 5 = *always*) with which participants performed deliberate and systematic SSE at least once every two months for 9 body parts [25,26]. Scores were summed and averaged so that higher scores indicated greater adherence to SSE ($\alpha = 0.93$). For descriptive purposes, we also calculated a dichotomous SSE score (adherent, not adherent) for each patient, such that patients reporting having examined "all but one" of the 9 body sites '*always* or '*nearly always*' were considered adherent to comprehensive SSE [26,27].

Physician-led skin examinations: Physician-led skin examinations were assessed with a dichotomous item (yes, no): "Does your doctor (general practitioner/dermatologist, other specialist) examine all the areas of your skin (described above), even when you don't have a specific skin problem or concern?" [24] For patients who answered affirmatively, a follow-up question asked: "when was the last time your physician examined all the areas of your skin in the absence of a specific skin problem?" Responses included (1) in the past month; (2) in the past three months; (3) in the past six months; (4) in the past year; and (5) more than a year ago.

Data Analysis

Descriptive statistics were calculated for all study variables. Independent samples t-tests explored whether use of specific risk reduction practices differed by melanoma site (i.e. head/neck, arms, trunk/pelvis, or legs) or primary status (i.e., single vs. multiple primaries). Bivariate associations were examined with Pearson and point-biserial correlations. Multiple linear regressions assessed associations among melanoma communication, sun protection and SSE. Five separate hierarchical regression models were performed with each risk reduction practice (i.e., sunscreen use, shade-seeking, hat use, long-sleeve shirt use, SSE frequency) as the outcome. Prior to conducting our multivariate analyses, we evaluated the association between our socio-demographic variables (presented in Table 1) and the variables of interest. Socio-demographic variables that were significantly associated with either our predictor and/or outcome measures were included as covariates (i.e., age, sex, time since diagnosis, primary status, and propensity to burn) in all regression models. In addition, given prior literature on the association between perceived risk of melanoma and risk reducing behaviors in this population [12,15] and its association with our predictor and

outcome measures we have added perceived risk of future melanoma as a covariate in all analyses. Covariates were entered on the first step of the linear regression followed by melanoma communication as the predictor on the second step. Lastly, to examine associations among melanoma communication and physician-led skin examinations, adjusted logistic regressions were performed. A criterion significance level of $p < .05$ was used for all analyses.

Results

Sample characteristics

Participants were on average 56 years old ($SD = 13.8$; range = 20-84 years) and 6.7 years' post-diagnosis ($SD = 0.91$; range = 4.6-9.4 years) at survey completion. The sample was 51% male. Half were diagnosed with single and half with multiple primary melanoma(s) based on study design [20]. Most participants reported their skin color as "fair/very fair" (93%), and 22% reported a family history of melanoma. Three-quarters of participants (76%) reported having completed at least some college. On average, participants rated their perceived risk of future melanoma to be 'slightly more' than same sex and age others ($M = 4.01$, $SD = 1.15$). Table 1 presents complete demographic information.

Melanoma communication

Melanoma communication with family members was slightly higher than melanoma communication with physicians. Over half of participants reported having talked to FDRs about arranging melanoma screenings (63%) and about notifying their doctor about their family history of melanoma (57%). Fewer reported having talked to their doctor about the risk of melanoma for their relatives (49%) and about whether FDRs should be screened for melanoma (47%). Being female ($r_{pb} = .19$, $p = .02$), younger ($r_{pb} = -.43$, $p < .001$), and having a greater perceived risk of future melanoma ($r = .34$, $p < .001$) was significantly associated with communication about melanoma.

Associations between melanoma communication and risk reduction

Sunscreen use ($r = .28$, $p < .001$), SSE ($r = .33$, $p < .001$) and physician-led skin examinations ($r_{pb} = .15$, $p < .05$) were the only risk reduction practices associated with melanoma communication in bivariate analyses. Moreover, as time since diagnosis increased so did patients' reported sunscreen use ($r = .16$, $p < .05$) and communication about melanoma ($r = .28$, $p < .001$).

In adjusted analyses, melanoma communication was significantly associated with greater sunscreen use ($\beta = .25$, $p < .01$) and engagement in SSE ($\beta = .26$, $p < .01$), however, communication was not associated with shade-seeking, hat use, or long-sleeve shirt use (p 's $> .05$). Table 2 presents findings for all multiple linear regression analyses. Of note, similar results were found when examining communication with physicians and FDR's separately rather than with the global melanoma communication score as reported above.

Lastly, a logistic regression adjusting for covariates revealed no significant association between melanoma communication and whether patients had undergone a physician-led skin

examination in the past ($b = 0.42$, Wald $\chi^2 = 2.7$, $p = .10$). To examine this further, we performed another adjusted logistic regression with frequency of physician examinations (within past year vs. more than a year) as the outcome. Similarly, no significant association between melanoma communication and frequency of physician-led skin examinations was found ($b = 0.03$, Wald $\chi^2 = 0.02$, $p = .88$).

Risk reduction practices

Overall, 39% of melanoma patients reported engaging in regular sun protection ‘always’ or ‘nearly always’ to at least three of the four behaviors assessed. Regular sunscreen use (78.7%) was the most frequently used strategy followed by regular shade-seeking (60.4%), regular hat use (54.4%), and regular long-sleeve shirt use (30.2%) (see Table 3). The proportion of patients who reported engaging in sun protection irregularly (‘never, seldom, or sometimes’) ranged from 21% to 69%.

Most participants reported regular examination of their arms and face (80.1%), and front (75.2%) and side (63.3%) of legs when conducting SSE, with lesser attention paid to other sites, especially those areas that may require the use of a mirror or help from another person (See Table 2). SSE did not differ by primary status, $t(167) = 0.26$, $p = .79$. The prevalence of comprehensive body self-examinations was relatively low. Only 28.4% of participants performed comprehensive SSE regularly. In contrast, physician-led skin examinations were much more prevalent, with a majority of patients reporting having a physician examine all areas of their body (92.3%) regardless of whether they had a specific concern or skin problem. Almost all melanoma patients reported having a physician-led skin examination during within the past year (96%).

Notably, participants showed different patterns of regular sun protection behavior based on disease characteristics. Patients with a primary melanoma in the head and/or neck used hats more frequently than patients with melanoma in other body parts, $t(167) = -1.98$, $p = .04$. Likewise, patients with an arm melanoma wore long-sleeve shirts more often than patients with melanoma in other body parts, $t(167) = -3.16$, $p = .002$. Additionally, melanoma patients with multiple primary melanomas used hats, $t(167) = -2.64$, $p = .01$, and long-sleeve shirts, $t(167) = -2.12$, $p = .04$, for sun protection more often than patients with single primary disease.

Discussion

To our knowledge, this is one of the first studies evaluating whether communicating about melanoma is associated with risk reduction practices among melanoma patients, particularly those who have lived five or more years beyond their initial diagnosis. Our findings highlight a significant link between patient-initiated melanoma communication and two important risk reduction strategies: sunscreen use and skin self-examinations. Despite it being a small effect, melanoma communication was significantly associated with patients' engagement in these behaviors in both bivariate and multivariate analyses. Communication, however, was not associated with other sun-protective strategies (i.e., shade-seeking, protective hat or long-sleeve shirt use) or physician-led skin examinations. With recent work showing heavy reliance on and promotion of sunscreen use over other sun protection methods [28], patients

may view sunscreen as the most proactive way to reduce risk and thus communicate accordingly.

From a family systems perspective, melanoma diagnosis can create a ripple effect that significantly impacts and increases melanoma risk for first-degree relatives [17,29]. Bowen and colleagues [30] further suggest that this increased risk triggers discussions and promotes awareness of risk within families, facilitating patients' adoption of risk reduction practices. It is also possible that patients who communicate with others about melanoma, particularly with family members, are more engaged and invested in maintaining their own health and more likely to perform optimal risk reduction [31,32]. Patients who purposefully discuss melanoma risk and screening may hold stronger attitudes concerning risk reduction, and thus behave in accordance to these views [33]. Bearing in mind patients' increased risk of recurrence [2], an important research goal is to identify cost-effective ways to improve risk reduction practices in melanoma patients who are post-treatment. Our results suggest that melanoma-specific communication may be considered one potential strategy to encourage adherence to several recommended risk reduction behaviors in melanoma patients. However, in light of the cross-sectional nature of our study, additional research is needed to examine the predictive influence of communication on risk reduction practices. Future research examining the context and content of these melanoma-specific discussions may also provide additional insights into what motivates melanoma patients to maintain and observe regular risk reduction practices long-term.

Previous research has also found an association between patient-initiated skin cancer risk discussions with relatives and high levels of self-efficacy and response-efficacy for melanoma-related prevention behaviors [19]. In light of this, it is possible that discussing melanoma with FDRs and/or physicians enhances the patients' confidence to perform risk reduction, prompting more regular sunscreen use and SSE in particular. Alternatively, patients who feel a greater sense of self-efficacy in their risk reduction behaviors may be more likely to communicate with others about the importance of melanoma risk and screening in their family. Prospective studies are needed to better understand these potential pathways. It is also plausible that in following such communication, relatives are more inclined to remind or cue patients via social encouragement to engage in regular risk reduction practices [34]. Furthermore, recent work suggests that targeting communication in educational interventions may be an effective way to improve risk reduction. Bowen and colleagues evaluated a web-based communication intervention to improve risk reduction practices in melanoma-affected families and found that patients randomized to the intervention arm significantly improved several risk reduction practices (i.e., wearing long-sleeve shirts, hat and sunglasses use, and shade-seeking) and SSE. [30]. This intervention consisted of a website where melanoma patients and their relatives could access information on personalized risk for melanoma as well as receive training on how to communicate with family members and providers about melanoma. Although authors did not directly report on whether the communication training portion of the intervention independently led to improved outcomes, their findings support a link between a communication-based intervention with melanoma patients and improved risk reduction practices.

Results showed relatively high rates of adherence to regular sun protection practices among melanoma patients compared to prior work examining melanoma patients [35] and the general population [36]. This is noteworthy considering our sample was drawn from a population-based state cancer registry of patients generally more than five years' post-diagnosis. Still, a significant proportion of patients did not engage in consistent sun protection. For example, 69% of patients did not consistently wear long-sleeve shirts for sun protection. Furthermore, about three-quarters of patients did not perform regular SSE. However, melanoma patients were overwhelmingly adherent to physician-led skin examinations. Given the prevalence of inconsistent risk reduction in this patient sample, particularly for less popular methods (i.e., protective clothing/head gear and skin self-examinations), it is possible that those who already use one preventive method (e.g., sunscreen use or physician-led examinations) may feel other methods (i.e., shade-seeking, wearing protective clothing, regular SSE) are redundant or unnecessary [30,37]. Notably, although sun protection and skin self-examinations are heavily recommended strategies for melanoma patients [6], evidence is inconsistent regarding the relative value of these strategies to prevent new or recurrent melanomas [38]. Therefore, future research is needed to determine which strategies are, in fact, protective.

Moreover, findings revealed that the site of the patient's melanoma may dictate the risk reduction strategy chosen. In particular, we found evidence that patients with a primary melanoma on their head and/or neck used hats more regularly, whereas those with melanoma on their arms used long-sleeve shirts more regularly. Furthermore, patients with both single and multiple primary disease did not differ in terms of sunscreen use, shade-seeking behaviors, or SSE; however, melanoma patients with multiple primaries used hats and long-sleeve shirts more regularly than patients with single primaries. These findings suggest a selective strategy to prioritize risk reduction according to important disease characteristics such as melanoma site and primary status. More work is needed to address patients' decision-making surrounding their selection and differential use of melanoma risk reduction methods.

Study strengths and limitations

Melanoma communication as it relates to risk reduction is understudied. Our study is one of the first to examine the unique associations between melanoma-specific communication and risk reduction among long-term melanoma patients, and is strengthened by the analysis of a population-based sample of melanoma patients with both single and multiple primary melanomas. The present study is limited, however, by a cross-sectional design that does not allow causal inferences. We cannot discount the possibility that engaging in more risk reduction practices may also promote greater patient-initiated discussions about melanoma. To this end, longitudinal research that specifically investigates the directionality of the relation between communication and risk reduction behaviors is warranted. Our communication items limited our ability to explore the specific content and range of these patient-initiated discussions. Research that unpacks the nature of these discussions is needed. As these items were family-centric in nature it will also be important for studies to examine whether the type of information communicated (e.g., patient's risk/screening practices vs. family's risk/screening practices) differentially influence the adoption of

patients' risk reduction behaviors in the long term. We were also unable to examine risk reduction behaviors of at-risk FDRs of melanoma patients. Future work is needed to evaluate the effect of patient-initiated communication about melanoma and FDRs engagement in skin cancer-related behaviors. Lastly, our analysis of communication and physician screening had limited power given the nearly universal adherence to this risk reduction strategy.

Conclusions

This is one of the first studies to link patient-initiated communication about melanoma and risk reduction practices. Melanoma communication was significantly yet modestly associated with risk reduction among melanoma patients, mainly the performance of regular sunscreen use and SSE. Encouraging patients to have a more active role in discussions concerning family risk and screening for melanoma with relatives and physicians alike may be a simple, cost-effective, and useful strategy to promote key risk reduction practices for long-term melanoma patients.

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References

1. National Cancer Institute. [Accessed April 22, 2016] SEER Stat Fact Sheets: Melanoma of the Skin. 2016. <http://seer.cancer.gov/statfacts/html/melan.html>
2. Mrazek AA, Chao C. Surviving cutaneous melanoma: a clinical review of follow-up practices, surveillance, and management of recurrence. *Surg Clin North Am.* 2014; 94(5):989–1002. vii–viii. [PubMed: 25245963]
3. Oliveria SA, Hay JL, Geller AC, Heneghan MK, McCabe MS, Halpern AC. Melanoma survivorship: research opportunities. *J Cancer Surviv.* 2007; 1(1):87–97. [PubMed: 18648948]
4. Ugurel S, Rohmel J, Ascierto PA, et al. Survival of patients with advanced metastatic melanoma: The impact of novel therapies. *Eur J Cancer.* 2016; 53:125–134. [PubMed: 26707829]
5. Watts CG, Dieng M, Morton RL, Mann GJ, Menzies SW, Cust AE. Clinical practice guidelines for identification, screening and follow-up of individuals at high risk of primary cutaneous melanoma: a systematic review. *Br J Dermatol.* 2015; 172(1):33–47. [PubMed: 25204572]
6. Trotter SC, Sroa N, Winkelmann RR, Olencki T, Bechtel M. A Global Review of Melanoma Follow-up Guidelines. *J Clin Aesthet Dermatol.* 2013; 6(9):18–26.
7. Bradford PT, Freedman DM, Goldstein AM, Tucker MA. Increased risk of second primary cancers after a diagnosis of melanoma. *Arch Dermatol.* 2010; 146(3):265–272. [PubMed: 20231496]
8. Idorn LW, Datta P, Heydenreich J, Philipsen PA, Wulf HC. A 3-year follow-up of sun behavior in patients with cutaneous malignant melanoma. *JAMA Dermatol.* 2014; 150(2):163–168. [PubMed: 24080851]
9. Lau SC, Chen L, Cheung WY. Protective skin care behaviors in cancer survivors. *Curr Oncol.* 2014; 21(4):e531–540. [PubMed: 25089104]
10. Lazovich D, Vogel RI, Berwick M, Weinstock MA, Warshaw EM, Anderson KE. Melanoma risk in relation to use of sunscreen or other sun protection methods. *Cancer Epidemiol Biomarkers Prev.* 2011; 20(12):2583–2593. [PubMed: 22016471]

11. Mayer D, Layman A, Carlson J. Sun-protection behaviors of melanoma survivors. *J Am Acad Dermatol.* 2012; 66(1):e9–10. [PubMed: 22177654]
12. Bowen D, Jabson J, Haddock N, Hay J, Edwards K. Skin care behaviors among melanoma survivors. *Psychooncology.* 2012; 21(12):1285–1291. [PubMed: 21780240]
13. Mujumdar UJ, Hay JL, Monroe-Hinds YC, et al. Sun protection and skin self-examination in melanoma survivors. *Psychooncology.* 2009; 18(10):1106–1115. [PubMed: 19142859]
14. Cromwell KD, Ross MI, Xing Y, et al. Variability in melanoma post-treatment surveillance practices by country and physician specialty: a systematic review. *Melanoma Res.* 2012; 22(5): 376–385. [PubMed: 22914178]
15. Manne S, Lessin S. Prevalence and correlates of sun protection and skin self-examination practices among cutaneous malignant melanoma survivors. *J Behav Med.* 2006; 29(5):419–434. [PubMed: 16855870]
16. Palesh O, Aldridge-Gerry A, Bugos K, et al. Health behaviors and needs of melanoma survivors. *Support Care Cancer.* 2014; 22(11):2973–2980. [PubMed: 24879390]
17. Harris JN, Hay J, Kuniyuki A, Asgari MM, Press N, Bowen DJ. Using a family systems approach to investigate cancer risk communication within melanoma families. *Psychooncology.* 2010; 19(10):1102–1111. [PubMed: 20119933]
18. Hay J, Shuk E, Brady MS, Berwick M, Ostroff J, Halpern A. Family communication after melanoma diagnosis. *Arch Dermatol.* 2008; 144(4):553–554. [PubMed: 18427057]
19. Hay J, Ostroff J, Martin A, et al. Skin cancer risk discussions in melanoma-affected families. *J Cancer Educ.* 2005; 20(4):240–246. [PubMed: 16497137]
20. Begg CB, Orlow I, Hummer AJ, et al. Lifetime risk of melanoma in CDKN2A mutation carriers in a population-based sample. *J Natl Cancer Inst.* 2005; 97(20):1507–1515. [PubMed: 16234564]
21. Weinstein ND. Unrealistic optimism about future life events. *Journal of Personality and Social Psychology.* 1980; 39(5):806–820.
22. Weinstein ND, Lachendro E. Egocentrism as a source of unrealistic optimism. *Personality and Social Psychology Bulletin.* 1982; 8(2):195–200.
23. Schroy PC 3rd, Lal SK, Wilson S, Heeren T, Farraye FA. Deficiencies in knowledge and familial risk communication among colorectal adenoma patients. *J Clin Gastroenterol.* 2005; 39(4):298–302. [PubMed: 15758623]
24. Glanz K, Yaroch AL, Dancel M, et al. Measures of sun exposure and sun protection practices for behavioral and epidemiologic research. *Arch Dermatol.* 2008; 144(2):217–222. [PubMed: 18283179]
25. Berwick M, Begg CB, Fine JA, Roush GC, Barnhill RL. Screening for cutaneous melanoma by skin self-examination. *J Natl Cancer Inst.* 1996; 88(1):17–23. [PubMed: 8847720]
26. Weinstock MA, Martin RA, Risica PM, et al. Thorough skin examination for the early detection of melanoma. *Am J Prev Med.* 1999; 17(3):169–175. [PubMed: 10987631]
27. Weinstock MA, Risica PM, Martin RA, et al. Reliability of assessment and circumstances of performance of thorough skin self-examination for the early detection of melanoma in the Check-It-Out Project. *Prev Med.* 2004; 38(6):761–765. [PubMed: 15193896]
28. Koch S, Pettigrew S, Strickland M, Slevin T, Minto C. Sunscreen Increasingly Overshadows Alternative Sun-Protection Strategies. *J Cancer Educ.* 2016
29. Peterson SK. The role of the family in genetic testing: theoretical perspectives, current knowledge, and future directions. *Health Educ Behav.* 2005; 32(5):627–639. [PubMed: 16148209]
30. Bowen DJ, Burke W, Hay JL, Meischke H, Harris JN. Effects of web-based intervention on risk reduction behaviors in melanoma survivors. *J Cancer Surviv.* 2015; 9(2):279–286. [PubMed: 25425205]
31. Hibbard JH, Greene J. What the evidence shows about patient activation: better health outcomes and care experiences; fewer data on costs. *Health Aff (Millwood).* 2013; 32(2):207–214. [PubMed: 23381511]
32. Hibbard JH, Mahoney ER, Stock R, Tusler M. Do increases in patient activation result in improved self-management behaviors? *Health Serv Res.* 2007; 42(4):1443–1463. [PubMed: 17610432]

33. Loescher LJ, Crist JD, Siaki LA. Perceived intrafamily melanoma risk communication. *Cancer Nurs.* 2009; 32(3):203–210. [PubMed: 19295423]
34. Shuk E, Burkhalter JE, Baguer CF, et al. Factors associated with inconsistent sun protection in first-degree relatives of melanoma survivors. *Qual Health Res.* 2012; 22(7):934–945. [PubMed: 22645220]
35. Nahar VK, Allison Ford M, Brodell RT, et al. Skin cancer prevention practices among malignant melanoma survivors: a systematic review. *J Cancer Res Clin Oncol.* 2015
36. National Cancer Institute. [Accessed April 22, 2016] UV Exposure and Sun Protective Practices. 2015. http://progressreport.cancer.gov/prevention/sun_protection
37. Andreeva VA, Reynolds KD, Buller DB, Chou CP, Yaroch AL. Concurrent psychosocial predictors of sun safety among middle school youth. *J Sch Health.* 2008; 78(7):374–381. quiz 408-310. [PubMed: 18611212]
38. Berwick M, Reiner AS, Paine S, et al. Sun exposure and melanoma survival: a GEM study. *Cancer Epidemiol Biomarkers Prev.* 2014; 23(10):2145–2152. [PubMed: 25069694]

Table 1
Sample characteristics (N = 169)

	<i>n</i>	%
<i>Age</i>		
60 years	97	57.4
> 60 years	72	42.6
<i>Sex</i>		
Male	86	51.9
Female	83	49.1
<i>Education^a</i>		
High school or less	41	24.4
At least some college	127	75.6
<i>Family History of Melanoma in a FDR^a</i>		
Yes	37	22.0
No	131	78.0
<i>Time Since Diagnosis</i>		
< 5 years	7	4.1
5 to 7 years	151	89.4
8 to 9 years	11	06.5
<i>Primary Status</i>		
Single (primary melanoma)	85	50.3
Multiple (secondary primary melanoma)	84	49.7
<i>Site of First Melanoma</i>		
Head/Neck	31	18.3
Trunk/Pelvis	66	39.1
Arms	37	21.9
Legs	35	20.7
<i>Skin Color</i>		
Very Fair	46	27.2
Fair	111	65.7
Light Olive	12	7.1
<i>Propensity to Burn^a</i>		
Light burn/No burn	86	54.8
Burn easily (peel)/Blister	71	45.2
<i>Ability to Tan^a</i>		
Deeply/Moderately Tan	90	55.2
Freckles/Occasionally Tan	73	44.8
<i>Eye Color^a</i>		
Blue	73	43.4
Green	15	8.9
Hazel	48	28.6

	<i>n</i>	%
Brown	32	19.0
<i>Hair Color^a</i>		
Red	19	11.3
Blond/Fair	39	23.2
Light Brown	60	35.7
Dark Brown	48	28.6
Black	2	1.2

Note:

^aN is <169 due to a small number of missing data.

Table 2
Multiple linear regressions examining associations between communication about melanoma and risk reduction practices

	Sunscreen Use			Shade-Seeking			Hat Use			Long-Sleeve Shirt Use			Skin Self-Examination		
	R ²	β		R ²	β		R ²	β		R ²	β		R ²	β	
Step 1	.15**			.07			.10*			.02			.16**		
Age		-.16			.06			.11			.19			-.19*	
Sex		.26**			.28**			-.20**			-.03			.16*	
Time since diagnosis		.18*			-.01			.10			.01			-.05	
Primary status		-.03			.12			.07			.05			.10	
Propensity to burn		-.01			.04			-.05			.10			.14	
Perceived risk		.07			-.08			-.16*			-.02			.23**	
Step 2	.04**			.002			-.004			.003			.04**		
Melanoma Communication		.25**			-.08			.06			.09			.26**	
Total R ²	.19**			.07			.10			.02			.20**		

Note:

* $p < .05$;

** $p < .01$. Sex was coded 0 for males and 1 for females.

Table 3
Adherence to regular sun protection behaviors and skin examinations

	<i>n</i>	%	<i>M</i>	<i>SD</i>
Sun Protection ^a				
Sunscreen Use	133	78.7	4.19	1.25
Shade-seeking	102	60.4	3.70	0.97
Hat Use	92	54.4	3.39	1.55
Long-sleeve Shirt Use	51	30.2	2.67	1.49
Skin Self Examination (SSE) ^a				
Arms and face	137	80.1	4.31	1.13
Front of legs	127	75.2	4.13	1.24
Side of legs	107	63.3	3.73	1.35
Side of body	83	49.1	3.51	1.36
Back of legs	80	47.3	3.33	1.42
Upper back and shoulders	73	43.2	3.15	1.50
Back of thighs	65	38.5	2.99	1.50
Mid and lower back	63	37.3	2.95	1.48
Bottom of feet	47	27.8	2.36	1.62
Comprehensive SSE ^b				
Adherent	48	28.4		
Physician-led Skin Examination				
No	13	7.7		
Yes	156	92.3		
Past month	39	25.0		
Past 3 months	52	33.0		
Past 6 months	43	27.6		
Past year	16	10.3		
More than a year	6	3.8		

Note:

^aBased on ratings of 4 = “nearly always” or 5 = “always;”

^bNumber of patients who reported SSE in “all but one” of the body sites captured.