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Recent Skin Self-Examination and Doctor Visits in Relation to Melanoma Risk and Tumor Depth

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Abstract

Background—Little is known about the potential benefit of skin self-examination for melanoma prevention and early detection.

Objectives—To determine whether skin self-examination is associated with reduced melanoma risk, self-detection of tumors, and reduced risk of deeper melanomas.

Methods—We used data from a population-based case-control study (423 cases, 678 controls) to assess recent skin self-examination in relation to self-detection, melanoma risk and tumor depth (<1 mm; ≥1 mm). Logistic regression was used to estimate odds ratios (OR) and confidence intervals (CI) for associations of interest.

Results—Skin self-examination conducted 1–11 times during a recent year was associated with a possible decrease in melanoma risk (OR: 0.74; 95% CI: 0.54, 1.02). Melanoma risk was decreased for those who conducted skin self-examination and saw a doctor (OR: 0.54; 95% CI: 0.38, 0.79). Among cases, those who examined their skin were twice as likely to self-detect the melanoma (OR: 2.23; 95% CI: 1.47, 3.38), but self-detection was not associated with shallower tumors. Tumor depth was reduced for those who conducted skin self-examination 1–11 times during a recent year (OR: 0.39; 95% CI: 0.18, 0.81), but was not influenced by seeing a doctor, or by conducting skin self-examination and seeing a doctor.

Conclusions—Risk of a deeper tumor and possibly risk of melanoma were reduced by skin self-examination 1–11 times annually. Melanoma risk was markedly reduced by skin self-examination coupled with a doctor visit. We cannot, however, exclude the possibility that our findings reflect bias or confounding. Additional studies are needed to elucidate the potential benefits of skin self-examination for melanoma prevention and early detection.

Keywords

Melanoma; Self-examination; Cancer prevention; Intervention

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Introduction

Unlike most potentially lethal cancers, cutaneous melanoma and its precursors can be readily visualized. Consequently, skin self-examination provides a potential opportunity for early intervention or prevention. Substantial research has been invested in improving the public's ability to conduct skin self-examination and detect early melanomas [1–7]; these efforts have been motivated by studies showing that the largest proportion of melanomas are detected by laypersons [8–16]. A myriad of skin cancer organizations and websites promote skin self-examination, and many suggest specific examination frequencies to optimize early melanoma detection. Nevertheless, very little is known about the benefits of skin self-examination. A few previous reports have evaluated the influence of skin self-examination on melanoma tumor depth [8,15–17], but only one described skin self-examination in relation to melanoma risk[18].

We used data from a population-based case-control study[19] to assess the frequency of skin self-examination in relation to melanoma risk and tumor depth. We were also able to assess the association between skin self-examination practices and the modality of detection (i.e., who first detected the melanoma), as well as the association between modality of detection and melanoma depth.

Materials and Methods

This study was approved by the Committee for the Protection of Human Subjects at Dartmouth College. Participants in this case-control study were enrolled from 1997 through 2001. The optimal number of cases and controls was determined using power analyses supporting a case-control study of atypical moles. All participants gave verbal consent for the interview and written consent for a study-related skin examination and for medical record release. Individuals with an incident diagnosis of first primary cutaneous melanoma (cases) occurring at ages 20 through 69 were ascertained through the New Hampshire (NH) State Cancer Registry and assessed for study enrollment. Eligibility criteria included NH residence, a working telephone number, and ability to participate in an English-speaking interview. We sent a letter to the physician of record requesting permission to contact the patient. If an objection was not received within a month, a letter introducing the study was mailed to the case, followed within 2 weeks by a telephone call from the interviewer. Using this approach, we enrolled 444 of 579 (77%) potentially eligible cases; 15 (3%) were excluded at their physician's request, 26 (4%) could not be reached, 30 (5%) had died, and 64 (11%) declined to participate. Twenty-one enrolled cases were deemed ineligible; of these, 7 had a previous diagnosis of melanoma, 4 had an unknown primary site, 2 had tumors of acral lentiginous histology, and for 8 persons the diagnosis of melanoma was not definitive. Thus, 423 cases of first primary cutaneous melanoma were available for analysis. The median time between melanoma diagnosis and study enrollment was 24 months.

Controls were ascertained from lists of licensed drivers obtained through the NH Department of Motor Vehicles and were selected at random to achieve a gender and age (in 5-year age groups) distribution similar to that of case subjects. To allow a separate study within the control group, controls were oversampled, relative to cases. Potentially eligible controls were NH residents with a working telephone and able to participate in an English-speaking interview. A letter introducing the study was sent to potential participants, followed within 2 weeks by a telephone call from the interviewer. We enrolled 684 of 1121 (61%) potentially eligible controls; 87 (8%) could not be reached, 13 (1%) controls had died, and 337 (30%) declined to participate. Of the 684 control participants, 6 were deemed

ineligible due to a prior diagnosis of melanoma. Thus, 678 controls were available for analysis.

Study participants were assigned reference dates. For cases, the reference date was one year preceding the diagnosis. Controls were randomly assigned a reference date based on the distribution of reference dates in the case group. Most exposures, including sun exposure and sunburn, were assessed over the participants' lifetime up to the reference date. However, questions regarding skin self-examination captured this activity during the calendar year prior to the diagnosis/reference year. This approach allowed assessment of usual practice during the most recent and therefore relevant time period.

To assess the exposure variables of interest, participants were asked, "Did you ever (during the reference year) deliberately examine your skin other than your face?" Those who answered yes were also asked the following questions: "When you examined your skin, did you pay particular attention to your moles?"; "How often (during the reference year) did you examine your skin?"; and "Did you use a mirror, for example, to see your back, when you examined your skin (during the reference year)?" We also asked participants, "Did you visit a doctor or health care provider (during the reference year)?".

Among cases only, we assessed detection modality by asking: "Who first noticed the mark on your skin that turned out to be the (first) melanoma?" Response categories were self, spouse, family member, friend, other (non health professional), and health professional. Due to sparse data, spouse/family member/friend/other were treated as one category ("other layperson"), resulting in three categories of detection modality: self, other layperson, health care professional. Following the interview, participants were asked to release medical records related to the melanoma diagnosis. Melanoma tumor depth was available for 378 cases.

Preliminary analyses included frequency distributions and descriptive statistics. T-tests and ANOVA were used to compare mean tumor depths. Odds ratios (OR) and 95% confidence intervals (CI) were computed from logistic regression models to estimate associations of interest. For analysis of melanoma risk as an outcome, skin self-examination was compared for cases and controls. The analysis of tumor depth as an outcome compared cases with a tumor depth of ≥1 mm to those with a tumor depth of <1 mm. We chose these categories to approximate current TNM staging (≤1mm, >1mm) while increasing the number of cases in the reference group to stabilize the statistical analysis. The analysis of detection modality assessed each of the final categories (self, other layperson, and health care professional) in comparison to all others combined. Observations with missing data were omitted from the analysis.

Factors associated with melanoma risk in our previous analyses [12] were treated as potential confounders (lifetime hours of recreational sun exposure and episodes of peeling sunburn from age 10 up to the reference age, hair color at age 20, eye color, the presence of freckles at age 15, skin reaction to acute sun exposure (four levels), family history of melanoma in a first degree relative, and the presence of atypical moles). We found minimal evidence of confounding by these variables (OR changed < 15%), so the results reported here are based on age and gender adjusted models.

Results

Slightly more than half of cases and controls were males; most participants were of ages 40 to 59. Overall, 55% of participants, including 53% of cases and 56% of controls, had examined their skin during the reference year. The data suggested that deliberate skin self-examination 1 to 11 times during the year prior to diagnosis, compared to none, might be

protective (OR: 0.74; 95% CI: 0.54, 1.02), but the association fell short of statistical significance. There was no evidence of increasing benefit with more frequent examination. Using a mirror or paying attention to moles during skin self-examination, compared to not conducting skin self-examination, was not associated with melanoma risk. (Table 1).

A comparably high percent of cases (89%) and controls (90%) reported at least one doctor visit (reason unspecified) during the reference year, with no influence on melanoma risk (OR: 0.88; 95% CI: 0.59, 1.32). However, melanoma risk was halved (OR: 0.52; 95% CI: 0.30, 0.90) for those who conducted skin self-examination and visited a doctor (11% of cases, 18% of controls), compared to those who had done neither.

In analysis restricted to cases, 42% of cases were the first to notice their melanoma. For 29% of cases, the lesion was first noticed by another layperson (60% of whom were spouses) and for 29%, the melanoma was first noticed by a health care professional. Although the data suggested that detection by a layperson (other than the self) might reduce risk of deeper tumors, the finding was not of statistical significance (OR: 0.68; 95% CI: 0.40, 1.15). We found no evidence that self- or physician-detection reduced risk of a deeper melanoma.

Compared to cases who did not practice skin self-examination during the year prior to the melanoma diagnosis, cases who did were more than twice as likely to self-detect their melanoma (OR: 2.23; 95% CI: 1.47, 3.38). Cases who practiced skin self-examination, compared to those who did not, were 60% less likely to have their melanoma first detected by another layperson (OR: 0.40; 95% CI: 0.26, 0.63), while the likelihood of first detection by a health professional was unaffected (OR: 0.98; 95% CI: 0.63, 1.50). Also among cases, women were twice as likely as men to self-detect the melanoma (OR: 2.09; 95% CI: 1.39, 3.16) and half as likely to have their melanoma detected by another layperson (OR: 0.45; 95% CI: 0.28, 0.71). Men and women were similar with regard to the likelihood of detection by a health professional (OR: 0.91; 95% CI: 0.59, 1.40). We found no association between age and any mode of melanoma detection (data not shown).

The mean melanoma tumor depth was 0.68 mm among cases who practiced skin self-examination and 0.91mm among those who did not ($p = 0.08$). Among cases, risk of a deeper tumor was significantly reduced (OR: 0.39; 95% CI: 0.18, 0.81) for those who conducted skin self-examinations from 1 to 11 times in the year prior to diagnosis (Table 2). Risk of a deeper tumor did not decrease monotonically with more frequent skin self-examinations. Compared to cases that did not conduct skin self-examination, risk of a deeper tumor appeared to be lower for those who used a mirror and those who paid attention to moles during their skin self-examination, but the findings were not of statistical significance. Risk of a deeper tumor was not reduced for cases who saw a doctor at least once during the reference year, compared to no doctor visits (OR: 0.84; 95% CI: 0.40, 1.77), nor was it reduced for those who had conducted skin self-examination and visited a doctor at least once during the reference year, compared to those who had done neither (OR: 0.91; 95% CI: 0.31, 2.70).

Comment

Nearly all melanomas occur on the skin and the largest proportion are self-detected, offering an unrealized opportunity for prevention and early detection through skin self-examination [20]. Despite its potential benefits, only one previous report, a population-based case-control study in Connecticut, USA, assessed skin self-examination in relation to melanoma risk[18]. The results of that study showed a protective effect of ever conducting a thorough and deliberate skin self-examination, but the finding was difficult to interpret, in part because the timing and frequency of conducting skin self-examinations were unknown [21]. In this study, we found no overall association between melanoma risk and skin

self-examination conducted during a recent and relevant time frame – the year prior to melanoma diagnosis. Our findings suggested a possible reduced risk of melanoma for those who examined their skin 1–11 times during the year prior to diagnosis, but the confidence intervals were wide, and we saw no evidence of greater benefit with more frequent skin self-examination.

Skin self-examination would reduce risk of melanoma only if precursor lesions were removed by a physician, and in this study, risk was markedly lower for those who examined their skin and saw a physician during the reference year. Although it seems reasonable to infer that suspicious lesions were found during skin self-examination, brought to a physician's attention, and removed, we do not know the purpose of the physician visit, nor its temporal relationship to the skin self-examination. Also, high risk precursors would be extremely rare among controls during a one-year time-frame. Thus, we cannot exclude the possibility that this finding reflects bias or the confounding influence of correlated protective behaviors, such as wearing sunscreen or protective clothing.

Our study suggested a markedly reduced risk of deeper tumors for those who conducted skin self-examination 1–11 times during the year prior to diagnosis, but there was no additional benefit with more frequent examinations. The lack of increasing protection reduces confidence in this finding, although conceivably, overly frequent examinations reduce sensitivity to subtle skin changes occurring over brief periods of time. A population-based case series in Queensland, Australia showed that melanomas were thinner for those who conducted a deliberate skin self-examination during the previous three years [8], and a study in Italy found a reduced risk of thick tumors (≥ 1mm) for those who practiced skin self-examination during an unspecified time frame[17]. Neither of these studies, however, assessed the frequency of skin self-examination. A study of clinic patients in California and Michigan showed a reduced risk of deeper tumors for those who practiced routine or thorough skin self-examination, or used a picture aid during the examination[15,16]. The frequency of skin self-examination was not assessed in that study, but there was no association between tumor depth and the frequency of examining moles.

Previous studies [8–16], nearly all of which were institution-based [9–16], indicated that the largest proportion of melanomas were identified by the patient or another layperson. Our population-based data, arising from a region with moderate melanoma incidence rates, indicated that 42% of cases had self-detected their tumors. Remarkably similar results (44%) were reported from Queensland[8], an area with the world's highest melanoma incidence rates[23]. Consistent with findings reported by others [8, 9–11,13,14], the women in our study were more likely than men to self-detect their melanoma, and less likely than men to have their melanoma detected by another layperson.

We also found that skin self-examination increased the likelihood of self-detecting the melanoma. However, similar to others[8,16,17], we found no evidence that self-detection was associated with shallower tumors.. A few previous studies have shown that self-detection may result in delayed melanoma diagnosis[10,14] and possibly with deeper tumors[24]. Collectively, this evidence suggests that self-detection may not mediate the protective association between skin self-examination and melanoma depth. Thus, as in the setting of skin self-examination in relation to melanoma risk, we cannot rule-out the possibility that the inverse association between skin self-examination and tumor depth reflects the influence of bias or confounding.

Previous studies suggest that skin examination performed by a physician can reduce risk of a deeper melanoma. The case series in Queensland noted a decreased risk of thicker tumors for those who received a whole body clinical examination in the three years prior to

melanoma diagnosis[22]. Similarly, the study conducted in California and Michigan found shallower tumors for those who had a physician-conducted skin examination during the year before diagnosis[16], particularly in men of age 60 or more. In this study, we found no evidence that visiting a physician during the reference year reduced risk of a deeper tumor. However, our data reflect usual medical care over the course of a year in a population-based sample, so the reason for the visits, the specialty of practitioners, and the nature of the physical examination were likely to be varied. In contrast to the reduced melanoma risk we observed for those who examined their skin and saw a doctor during the reference year, we found no evidence that these combined activities reduced risk of a deeper tumor among melanoma cases.

We also found no evidence that melanomas were shallower when first detected by physicians. In several previous studies[8,9,16,17,24,25], including the population-based Queensland study[8], melanomas detected by physicians were shallower than those detected by laypersons. A study in Connecticut[24] found that melanomas were significantly shallower when detected by a physician, compared to self-discovery. In the same study, tumors were shallower when discovered by a dermatologist, as compared to a nondermatologist physician. In addition, a study in Italy[17] noted a benefit for dermatologist detection, compared to any other mode of discovery. In our study, the absence of any benefit from physician detection may reflect a lower proportion of dermatologist visits by our study participants, reduced melanoma awareness among physicians, and/or a decreased prevalence of skin examination during physician visits.

Our analyses were based on self-reported skin self-examination data, but good concordance has been shown between self-reported and actual skin self-examination occurring during a recent time period [26]. The data for our study were collected 11–15 years ago. However, there have been no interim public health campaigns in our state dealing with either skin self-examination or melanoma detection. Thus, it seems unlikely that skin self-examination practices or their relation to melanoma risk or tumor depth would have changed substantially over time. We did not ask participants whether they examined all areas of skin, but we did ask whether they used a mirror, a good surrogate for examining areas that are difficult to visualize. We also specified our interest in “deliberate” skin examination, excluding the face (to eliminate examinations motivated by cosmetic concerns). Although we did not ask participants why they conducted skin self-examinations, most study participants who examined their skin reported paying attention to moles, consistent with concern about melanoma. Our assessment of skin self-examination targeted the most relevant time frame while excluding the diagnosis year. Other strengths of our study include the population-based design, the availability of extensive covariate information, and pathology confirmation of tumor depth.

In conclusion, our data, arising from a population-based study, suggest that skin self-examination, when conducted less than monthly but at least annually, may reduce melanoma risk and the risk of deeper tumors, but there was no evidence of linear trend in either setting. Melanoma risk was markedly reduced for those who combined skin self-examination with a doctor visit, but it remains uncertain whether this finding reflects removal of self-detected, high risk lesions among controls, or possibly bias or confounding by other preventive behaviors. Skin self-examination increased the likelihood of self-detection, but this was not associated with shallower tumors, suggesting that self-detection is not the mechanism through which skin self-examination exerts protective effects. Further research is needed to enhance the potential benefit of skin self-examination in melanoma prevention, and to elucidate the cascade of events leading to the early detection of these highly visible tumors.

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References

1. Friedman RJ, Rigel DS, Silverman MK, Kopf AW, Vossaert KA. Malignant melanomas in the 1990's: the continued importance of early detection and the role of physician examination and self-examination of the skin. CA Cancer J Clin. 1991; 41:201–226. [PubMed: 2049635]
2. Robinson J, Stapleton J, Turrisi R. Relationship and partner moderator variables increase self-efficacy of performing skin self-examination. J Am Acad Dermatol. 2008; 58:755–62. [PubMed: 18258332]
3. Koh HK, Geller AC. Public health interventions for melanoma. Hem Onc Cl N Am. 1998; 12:904–929.
4. Oliveria SA, Chau D, Christos PJ, Charles CA, Mushlin AI, Halpern AC. Diagnostic accuracy of patients in performing skin self-examination and the impact of photography. Arch Dermatol. 2004; 140:57–62. [PubMed: 14732661]
5. Weinstock MA, Risica PM, Martin RA, Rakowski W, Dube C, Berwick M, Goldstein MG, Acharyya S, Lasater T. Melanoma early detection with thorough skin self-examination. The "Check It out" randomized trial. Am Jour Prev Med. 2007; 32:517–24. [PubMed: 17533068]
6. Girardi S, Gaudy C, Gouvernet J, et al. Superiority of a cognitive education with photographs over ABCD criteria in the education of the general population to the early detection of melanoma: a randomized study. Int Jour Cancer. 2006; 118:2276–80. [PubMed: 16331608]
7. Branstrom R, Hedblad MA, Krakaua J, Ullen H. Laypersons perceptual discrimination of pigmented skin lesions. Jour Am Acad Dermatol. 2002; 46:667–73. [PubMed: 12004305]
8. McPherson M, Elwood M, English DR, Baade PD, Youl PH, Aitken JF. Presentation and detection of melanoma in a high-risk population. Jour Am Acad Dermatol. 2006; 54:783–92. [PubMed: 16635658]
9. Brady MS, Oliveria SA, Christos PJ, Berwick M, Coit DG, Katz J, Halpern AC. Patterns of detection in patients with cutaneous melanoma. Cancer. 2000; 89:342–7. [PubMed: 10918164]
10. Carli P, De Giorgi V, Maurichi A, Orlandi MP, Imberti G, Stanganelli I, Dioguardi D, Catricala C, Betti R, Bottoni U, Lo Scocco G, Scalvenzi M, Giannotti B. Self-detected cutaneous melanomas in Italian patients. Clin Exp Dermatol. 2004; 29:593–6. [PubMed: 15550129]
11. Epstein DS, Lange JR, Gruber SB, Mofid M, Koch SE. Is physician detection associated with thinner melanomas? JAMA. 1999; 281:640–3. [PubMed: 10029126]
12. Koh HK, Miller DR, Geller AC, Clapp RW, Mercer MB, Lew RA. Who discovers melanoma? Patterns from a population-based survey. J Am Acad Dermatol. 1992; 26:914–9. [PubMed: 1607408]
13. Richard MA, Grob JJ, Avril MF, Delaunay M, Gouvernet J, Wolkenstein P, Souteyrand P, Dreno B, Bonerandi JJ, Dalac S, Machet L, Guillaume JC, Vilmer C, Chevron B, Aubin F, Guillot B, Beylot-Barry M, Lok C, Raison-Peyron N, Chemaly P. Delays in diagnosis and melanoma prognosis (I): the role of patients. Int Jour Cancer. 2000; 89:271–9. [PubMed: 10861504]
14. Blum, A.; Brand, CU.; Ellwanger, U.; Schlangerhauff, B.; Stroebel, W.; Rassner, G., et al. Awareness and early detection of cutaneous melanoma: an analysis of factors.
15. Pollitt, Ricardo A.; Geller, Alan C.; Brooks, Daniel R.; Park, ER.; Swetter, SM. Efficacy of skin self-examination for melanoma detection. Cancer Epidemiol Biomarkers Prev. 2009; 18:3018–23. [PubMed: 19861521]
16. Swetter S, Pollitt RA, Johnson TM, Brooks DR, Geller AC. Behavioral determinants of melanoma detection. Cancer. 2012; 118:3725–34. [PubMed: 22179848]
17. Carli P, De Giorgi V, Palli D, Maurichi A, Mulas P, Orlandi C, Imberti GL, Stanganelli I, Soma P, Dioguardi D, Catricala C, Betti R, Cecchi R, Bottoni U, Bonci A, Scalvenzi M, Giannotti B.

Dermatologist detection and skin self-examination are associated with thinner melanomas. Arch Dermatol. 2003; 139:607–12. [PubMed: 12756097]

18. Berwick M, Begg CB, Fine JA, Roush GC, Barnhill RL. Screening for cutaneous melanoma by skin self-examination. J Nat Cancer Inst. 1996; 88:17–23. [PubMed: 8847720]
19. Titus-Ernstoff L, Perry AE, Spencer SK, Gibson JJ, Cole BF, Ernstoff MS. Pigmentary characteristics and moles in relation to melanoma risk. Int J Cancer. 2005; 116:144–9. [PubMed: 15761869]
20. Weinstock MA. Early detection of melanoma. JAMA. 2000; 284:886–9. [PubMed: 10938181]
21. Elwood JM. Skin self-examination and melanoma. J Nat Cancer Inst. 1996; 88:3–5. [PubMed: 8847722]
22. Aitken JF, Elwood M, Baade PD, Youl P, English D. Clinical whole-body skin examination reduce the incidence of thick melanomas. Int Jour Cancer. 2010; 126:450–8. [PubMed: 19609948]
23. Australian Institute of Health and Welfare Australasian Association of Cancer Registries. Cancer in Australia 2001. Canberra: Australian Institute of Health and Welfare; 2003.
24. Fisher NM, Schaffer JV, Berwick M, Bolognia JI. Breslow depth of cutaneous melanoma: Impact of factors related to surveillance of the skin, including prior biopsies and family history of melanoma. Am J Acad Dermatol. 2005; 53:393–406.
25. Schwartz JL, Wang TS, Hamilton TA, Lowe L, Sondak VK, Johnson TM. Thin primary cutaneous melanoma. Cancer. 2002; 95:1562–8. [PubMed: 12237926]
26. Aitken JF, Youl PH, Janda M, Elwood M, Ring IT, Lowe JB, Firman DW. Validity of self-reported skin screening histories. Am J Epidemiol. 2004; 159:1098–1105. [PubMed: 15155295]

What is already known on this topic?

- Previous studies, most of which were clinic-based, suggested that skin self-examination was associated with reduced risk of melanoma and of deeper melanoma tumors.

What does this study add?

- This study was population-based.
- We assessed melanoma risk and melanoma tumor depth in relation to the
- frequency of skin self-examination during the year prior to melanoma diagnosis.
- We also assessed skin self-examination in relation to self-detection of the melanoma.

Table 1

Participant characteristics and odds ratios * (OR) and 95% confidence intervals (CI) for skin self-examination and doctor visits in relation to melanoma risk

Characteristic	Cases N = 423 n (%)	Controls N = 678 n (%)	OR (95% CI)
Gender			
Female	200 (47.3)	330 (48.7)	n/a
Male	223 (52.7)	348 (51.3)	
Age			
< 39	94 (22.2)	158 (23.3)	n/a
40 – 59	214 (50.6)	331 (48.8)	
> 60	115 (27.2)	189 (27.9)	
Skin self-examination			
No	198 (47.6)	300 (44.7)	1.00 --
Yes	225 (53.2)	378 (55.8)	0.91 (0.71, 1.16)
1–11 per year	88 (21.2)	180 (26.8)	0.74 (0.54, 1.02)
12–51 per year	73 (17.5)	91 (14.9)	1.23 (0.86, 1.76)
52+ per year	57 (13.7)	100 (27.0)	0.87 (0.60, 1.27)
Used a mirror **	117 (53.7)	193 (52.0)	0.93 (0.69, 1.24)
Paid attention to moles ***	187 (85.8)	287 (77.4)	1.01 (0.78, 1.31)
Doctor/health care provider visit			
None	48 (11.4)	68 (10.1)	1.00 --
Any	374 (88.6)	607 (89.9)	0.88 (0.59, 1.32)

* OR adjusted for age and gender. Differences in column totals reflect missing data (7 cases and 13 controls). Percents calculated based on available data.

** Used a mirror during skin self-examination, compared to no skin self-examination

*** Paid attention to moles during skin self-examination compared to no skin self-examination.

Table 2

Odds ratios* (OR) and 95% confidence intervals (CI) for skin self-examination and doctor visits in relation to melanoma tumor depth ≥1mm.

Characteristic	Tumor≥1mm N = 89 n (%)	Tumor<1mm N = 287 n (%)	OR (95% CI)
Skin self-exam			
No	48 (53.9)	128 (44.3)	1.00
Yes	41 (46.1)	161 (55.7)	0.68 (0.42, 1.10)
1–11 per year	10 (11.5)	70 (24.6)	0.39 (0.18, 0.81)
12–51 per year	19 (21.8)	48 (16.8)	1.09 (0.58, 2.04)
52+ per year	10 (11.5)	39 (13.7)	0.69 (0.32, 1.50)
Used a mirror	20 (22.5)	84 (29.3)	0.64 (0.36, 1.17)
Paid attention to moles	38 (42.7)	130 (45.9)	0.79 (0.48, 1.29)
Doctor/health care provider visit			
None	30 (10.38)	11 (12.36)	1.00
Any	259 (89.62)	78 (87.64)	0.84 (0.40, 1.77)

*OR adjusted for age and gender. Analyses conducted in 378 cases for whom melanoma tumor depth and exposure variables were available.

**Used a mirror during skin self-examination, compared to no skin self-examination

***Paid attention to moles during skin self-examination compared to no skin self-examination.