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Patient-Reported Frequency of Acral Surface Inspection During Skin Examination in White and Ethnic Minority Patients

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Abstract

Background—Acral lentiginous melanomas (ALM) compose a higher proportion of melanomas and have a higher mortality in ethnic minorities than in whites. Early detection by acral surface inspection during skin examinations may lead to improved ALM outcomes.

Objective—This study compared patient-reported frequencies of acral skin examinations in ethnic and white populations.

Methods—Written surveys were collected from 1,040 dermatology clinic patients.

Results—More whites reported performing self-skin examinations (SSE) than ethnic minorities ($p<0.01$), but there was no difference in the rates of hand ($p=0.7$) or foot ($p=0.87$) inspection during SSE between whites and ethnic minorities. More whites (77.5%) than ethnic minorities (38.9%) reported having undergone a full body skin examination (FBSE) from a healthcare provider (HCP) ($p<0.01$). During their most recent FBSE by a HCP, more whites than ethnic minorities reported having their hands examined ($p=0.02$), but there was no difference in reported hand inspection ($p=0.06$) at any previous FBSE or foot inspection at any ($p=0.07$) or the most recent ($p=0.59$) FBSE between whites and ethnic minorities.

Limitations—Single-center study using a new unvalidated survey.

Conclusion—Whites were found to more frequently report SSE and FBSE than ethnic minorities, but significant differences in reported acral exams were not detected.

Keywords

acral lentiginous melanoma; ethnic skin; skin of color; skin examination; plantar surface inspection; patient survey

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Acral lentiginous melanoma (ALM) is a rare subtype of melanoma that predominantly affects the palms, soles, and nail beds. ALM can occur in any race but disproportionately affects ethnic groups with darker skin.[1–2] Although darker-skinned populations have a lower incidence of melanoma overall compared to whites, ALM represents a larger proportion of melanomas in darker-skinned populations, constituting 4–58% of melanomas in darker-skinned populations and only 0.8–1.0% in whites.[2–7] While reported frequencies of ALM in pigmented skin vary, studies agree that ALM represents a notable proportion of melanomas in ethnic minorities. Although ALM is rare, ALM patients usually have a worse prognosis than other melanoma patients, possibly due to delayed diagnosis or more aggressive behavior of ALM compared to other melanomas.[3,8] Bradford et al. found that 5-and 10-year survival rates for ALM were only 80.3% and 67.5% respectively, compared to 91.3% and 87.5% for all cutaneous melanomas combined.[3] Furthermore, a disparity in survival also exists within populations of patients that have ALM. Whites have been observed to have higher 5- and 10-year ALM survival rates compared to blacks, Hispanics, and Asian/Pacific Islanders.[3] Compared to whites, ethnic minorities are more likely to have thicker lesions and more advanced disease at the time of diagnosis.[4,9]

Skin examinations by patients or their health care providers (HCP) are the predominant pathway to melanoma diagnosis. In populations with darker skin, ALM affects the plantar surfaces more often than any other location.[3] Due to disparities in the risks and mortality rates of ALM, we sought to compare the rates of patient self-reported hand and foot surface inspection between whites and ethnic minorities.

Methods

Study Participants and Recruitment

All patients entering the waiting rooms of University of California, Los Angeles (UCLA) dermatology clinics were approached by study personnel to participate in the study. Patient recruitment occurred from June 14, 2011 to July 1, 2011. Participation in the study was voluntary, and patients were informed that their participation would remain anonymous and would not affect the medical care they received in the clinic. Participants were not compensated for their participation in the study. The study was approved by the UCLA local institutional review board (#11-00175). Patients were excluded from the study if they were under 18 years of age, had a medical condition that prevented them from completing the survey, were unable to understand English, or had participated in the study previously.

Study Design

Study participants were asked to complete an anonymous, 32-question, written survey about their age, gender, education level, history of skin cancer, and previous experiences with and preferences toward skin examinations. This survey was created de novo and did not undergo pilot or validation testing. Study participation was considered complete when each participant returned the survey. Patients were categorized under ethnic minority if they identified themselves in the survey as “Hispanic/Latino,” “Black/African American,” “Asian/Pacific Islander,” or “other ethnic minority”. Patients who selected more than one ethnic minority category were classified as “other ethnic minority”. The survey gathered

self-reported data regarding the frequency of self-skin examinations (SSE) and full body skin examinations (FBSE) performed by HCPs. Participants were also asked to report whether specific areas of the body were examined during SSE, during their most recent FBSE by a provider, and during any previous FBSE by a health care provider.

Data Analysis

Data from the survey were statistically analyzed using two-tailed t-tests, chi-square tests, Wilcoxon Rank Sum tests and logistic regression in the software program, R (http://www.r-project.org). The variable of age was analyzed using two-tailed t-tests, and the variables of gender, education level, personal history of skin cancer, and history of skin cancer in a family member or close friend were analyzed using chi-square tests. Wilcoxon tests were used to analyze skin type, frequency of SSE, and frequency of FBSE by a health care provider. Using multivariate logistic regression, data were controlled for the factors of age, gender, education level, personal skin cancer history, and history of skin cancer in a family member or close friend. Age was fitted as a continuous variable in logistic regression, whereas gender, education level, personal history of skin cancer, and family/close friend history of skin cancer were fitted as categorical variables. Statistical significance was indicated by p values less than 0.05.

Results

Study Demographics

A total of 1,318 patients were approached by study personnel. Of these patients, 1,085 (82.3%) agreed to participate, while 233 (17.7%) declined or were excluded from the study based on age, lack of English proficiency, medical conditions that precluded survey completion, or previous survey completion. An additional 45 participants failed to return completed surveys and thus were also excluded from the study. Completed surveys were collected for 1,040 patients, for an overall response rate of 78.9%. The self-identified ethnic backgrounds of the study participants are summarized in Table 1. The gender, age, education level, personal history of skin cancer, and family/close friend history of skin cancer of the study participants are summarized in Table 2. No significant differences were found in the gender of white and ethnic minority study participants. In comparison to ethnic minority study participants, white participants were older ($p<0.01$), more likely to have completed a college level education ($p=0.02$), and more frequently reported a more sun sensitive skin type ($p<0.01$). White participants were also more likely to report a personal history of skin cancer ($p<0.01$) or having a family member or close friend who has had skin cancer ($p<0.01$).

Experiences with Skin Examinations

Patient experiences with skin examinations are summarized in Tables 3 and 4. More white patients than ethnic minority patients reported having performed SSE ($p<0.01$), and whites reported performing SSE at a higher frequency than ethnic minorities ($p<0.01$). With regard to hand inspection during SSE, no statistically significant differences in hand inspection during SSE were found between white and ethnic minority patients, with 520/616 (84.4%) of white and 138/164 (84.1%) of ethnic minority patients reporting examining their hands

(p=0.9). There was also no significant difference (p=0.9) found in the reported rates of foot inspection during SSE, with 397/606 (65.5%) of white and 111/165 (67.3%) of ethnic minority patients reporting foot inspection.

More white than ethnic minority patients reported having undergone a FBSE from a HCP (p<0.01), and white patients reported undergoing FBSE by a HCP at a higher frequency than did ethnic minority patients (p<0.01). Of the patients who reported having undergone a FBSE by a HCP, more white (504/551, 91.5%) than ethnic minority patients (85/107, 79.4%) reported having their hands examined during their most recent FBSE from a HCP (p<0.01) or during any previous FBSE by a HCP (475/535, 88.8% vs. 74/101, 73.3%, p<0.01). In multivariate analysis, the difference between patient-reported hand inspection by HCPs at the most recent FBSE remained statistically significant (p=0.02), but at any previous FBSE was not statistically significant (p=0.06). Similarly, white patients were more likely than ethnic minority patients to report having had their feet examined by HCPs at their most recent FBSE (p<0.01), with rates of 421/544 (77.4%) for white and 67/105 (63.8%) for ethnic minority patients. These differences in inspection were also observed regarding any previous FBSE (409/523 [78.2%] for whites and 65/101 [64.4%] for ethnic minorities, p<0.01). However, differences between white and ethnic minority patients in patient-reported feet inspection by HCPs lost statistical significance in multivariate analysis (p=0.59 for most recent FBSE, p=0.07 for any previous FBSE).

Discussion

White patients were more likely than ethnic minority patients to report performing SSE and undergoing FBSE from a HCP. Recent data from the 2010 National Health Institute Survey also found rates of FBSE to be higher in non-Hispanic whites compared to ethnic minority patients (13.4–13.9% vs. 1.2–8.1%).[10] This disparity seems to correlate with the current circumstances of ethnic minority patients having more advanced melanomas at diagnosis and increased mortality.[2–3,6] Bradford et al observed ethnic minority patients to have lower 5- and 10-year ALM survival rates; however, there were no differences in survival rates between different racial groups when controlling for tumor thickness or stage.[3] This suggests that tumor thickness or stage at the time of diagnosis contributes to the differences in survival rates between racial groups. White patients are more likely to present with melanoma at the in situ stage or with local-stage melanoma. Conversely, Hispanics, blacks, and Asians are more likely to present with late-stage melanoma (regardless of subtype) at the time of diagnosis.[3–4, 11]

Screening for ALM is just one of many indications for SSE and FBSE, but in ethnic minority populations this may represent an opportunity for improvement in mortality and disparities in melanoma outcomes. Although our study did not find a significant difference in the frequency of acral exams between white and ethnic minority patients when their skin is examined, the overall disparity in skin examination experiences implies fewer opportunities for melanoma discovery, including ALM, in ethnic patients compared to white patients. It has been well reported that ALM predominantly affects ethnic minorities, and that these patients have a worse prognosis.[2–9] Earlier diagnosis of ALM is important because the prognosis of metastatic ALM is poor, with a median survival of stage IV ALM

as low as 12 months.[12] Lee et al. found greater delays in diagnosis among Asian patients with ALM[13], and other studies have demonstrated thicker lesions at diagnosis in ethnic minorities.[4,9]

FBSE by a HCP may serve to be an effective method for secondary prevention of melanoma. Studies have shown that FBSE by HCPs lead to thinner melanomas at time of diagnosis.[14–16] In a recent study from Germany, a FBSE screening program resulted in greater melanoma detection and improved mortality compared to a cohort population and the same population without intervention.[17–18] Aitken et al. also found increases in melanoma detection in patients enrolled in FBSE programs in Australia.[19] Despite this evidence, the United States Preventive Services Task Force (USPSTF) in 2009 concluded that there was insufficient evidence to recommend skin cancer screening by SSE or FBSE.[20] However, much of the evidence supporting skin exams for skin cancer screening has come to light after the USPSTF recommendation in 2009, and this may have implications for future policy recommendations.[21]

The reasons behind different reported rates of skin inspection between whites and ethnic minorities are not entirely known, but increased awareness of melanoma, including ALM, for both patients and HCPs may be important in addressing the current disparity. In this study, ethnic minority patients reported performing SSE less frequently than white patients; however, no differences were found in reported rates of self-inspection of the hands and feet between the groups. Increases in SSE practices for ethnic minority populations, including having knowledge of signs of melanoma and bringing suspicious lesions to the attention of a HCP, could be effective for improving discovery of melanoma. Skin cancer awareness is a focus of current efforts to increase knowledge and rates of skin examination among populations at risk for delayed diagnosis. Kundu et al administered knowledge-based interventions for melanoma awareness and found improvements in knowledge and screening for melanoma among ethnic minority populations.[22] The Randomized Skin Awareness Trial in Australia, targeting men 50 years or older, found gains in SSE rates after distribution of intervention materials. Although this trial explored the relative efficacy of video versus written materials, they found that either type of intervention was beneficial in improving self examination behaviors.[23] The specificity of SSE is high (83% to 97%), but sensitivity is low, ranging from 25% to 93%.[24] Some studies have observed that SSE reduced the risk of melanoma itself and of advanced stage disease among melanoma patients.[25–27]

Skin cancer awareness interventions generally focus on patient education, but increased awareness of ALM among HCPs is also important. Although we did not find statistically significant differences between acral exams in whites and ethnic minorities, we did find that the frequency of patient-reported foot exams for both whites and ethnic minorities lagged behind FBSE, suggesting patients may not be getting their feet examined during their FBSE. Acral sites may not be routinely inspected by HCPs, possibly due to the infrequency of ALM and the additional time and inconvenience required of asking patients to remove their shoes and socks. Indeed, studies show that time is a commonly reported barrier to HCP screening for skin cancer.[28–29] Further research regarding the etiology of barriers to examination of acral surfaces by HCPs and the efficacy of interventions for increasing ALM screening among HCPs will also need to be assessed. Previous assessments of educational

interventions to increase skin cancer screening among HCPs have ranged from observing no significant benefits to modest improvements in skin cancer awareness and detection.[30–33] More effective screening for ALM and skin cancer in general will need to be a goal of future endeavors.

There are some important limitations to this study that should be addressed. The survey relied on patient recall for data regarding frequencies of skin examinations and of hand and foot inspection and is therefore subject to inaccuracy and recall bias. A personal or family history of skin cancer may influence patient recall of skin examination, but melanoma survivors have been observed to perform SSE at rates comparable to the general population.[28] White and ethnic minority patients from this study differed in their personal and family/friend histories of skin cancer, but this was controlled for during multivariate statistical analysis. Similarly, a history of dysplastic nevi may influence patient recall of skin examination, but this data was not gathered in our survey. Although information regarding age, gender, education, and skin cancer history were gathered, the socioeconomic status and access to healthcare for participants was not surveyed. Such factors could be important in assessing healthcare for ethnic minority populations; however, these data were not collected due to possible inaccuracies in reporting and patient concerns about confidentiality. The survey questions were objectively written to avoid leading language, but the setting and design of our study may contribute to response and sampling bias. Furthermore, this study was the initial use of this survey, so the survey did not undergo rigorous pilot and validation studies prior to use. Therefore there may be undetected misclassification bias due to inherent differences in survey interpretation or differences in health literacy. For example, our survey asked about inspection of hands, fingers, feet, and toes, without specifically asking about palms, soles, or nails; this may have lead to subject misinterpretation and omission of palms, soles, or nails from their recollection of hand and foot inspection. However, we have no reason to believe one study group would differentially interpret the study questions from another. Additionally, the skin examinations referred to within the survey were not specified as limited to screening for ALM. As skin examinations are fundamentally used to screen for many pathologies including ALM, this most closely mirrors cancer screening in practice today. Furthermore, this study was conducted at one academic center in one region of the United States, and thus these findings may not be generalizable to other patient populations. Reported rates of FBSE in this study were higher than national rates,[10] but results of this study are consistent with national data suggesting that rates of FBSE are lower in ethnic minorities. Finally, since our study was based on self-reported surveys, we chose to analyze our data using odds ratios rather than relative risk. This, however, can represent an overestimation of results in high prevalence scenarios, but since odds ratios are a traditional method of data analysis in these types of studies we elected to report our data in this way.

Despite these limitations, this study provides some evidence that ethnic minority patients undergo skin examinations less frequently, which possibly contributes to delays in ALM diagnosis and more advanced disease in ethnic minority patients. These findings merit further study and may provide a springboard for much needed educational efforts tailored at minority groups, where skin examinations, not just of acral surfaces but of the entire skin, may lead to earlier melanoma diagnoses and improved morbidity and mortality.

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Abbreviations

ALM	acral lentiginous melanoma
FBSE	full body skin examination
HCP	healthcare provider
SSE	self-skin examination

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Capsule summary

- Ethnic minority patients are disproportionately afflicted by acral lentiginous melanoma (ALM) and more advanced melanomas compared to white patients.
- Ethnic minority patients report less frequent skin exams, but not acral skin exams, than whites.
- Less frequent skin exams may underlie delays in melanoma diagnoses (including ALM) in ethnic minority patients.

Table 1

Ethnic identities of study participants and the population of West Los Angeles*.

Ethnic Identities	Study Participants *n* (%)	West Los Angeles
White/Caucasian	778 (74.8%)	65.4%
Asian/Pacific Islander	105 (10.1%)	13.0%
Hispanic/Latino	72 (6.9%)	15.7%
Black/African American	52 (5.0%)	5.8%
Other	33 (3.2%)	0.1%

* "Key Indicators of Health by Service Planning Area" Los Angeles Department of Public Health. March 2013.

Table 2

Demographics of White and Ethnic Minority participants.

	White (N=777)	Ethnic Minority (N=263)	P-values
Gender			
Male	343 (44.1%)	95 (36.0%)	p=0.3
Female	434 (55.9%)	168 (63.6%)	
Age			
• Mean	54.8 years	43.6 years	p<0.01
• Median	56 years	40 years	
• Range	18 to over 89 years	18 to over 89 years	
Education (% completing college)	579/775 (74.7%)	176/262 (67.1%)	p=0.02
Positive history of skin cancer	312/757 (41.2%)	9/260 (3.5%)	p<0.01
Family/friend history of skin cancer	413/777 (57.4%)	39/262 (16.5%)	p<0.01
Skin type:			
• Always burn, never tan	83/772 (10.8%)	13/260 (5.0%)	p<0.01
• Usually burn, rarely tan	142/772 (18.4%)	12/260 (4.6%)	
• Sometimes burn, sometimes tan	397/772 (51.4%)	102/260 (39.2%)	
• Rarely burn, usually tan	122/772 (15.8%)	95/260 (36.5%)	
• Never burn, always tan	28/772 (3.6%)	38/260 (14.6%)	

Table 3

Experiences with skin examinations.

	White *n* (%)	Ethnic Minority *n* (%)	Univariate Logistic Regression (unadjusted)		Multivariate Logistic Regression (controlled for age, gender, education level, personal skin cancer history, and family/friend skin cancer history)	
			OR (95% CI)	p-value	OR (95% CI)	p-value
Patients who have performed SSE	663/774 (85.7%)	166/260 (63.8%)	3.38 (2.45, 4.67)	p<0.01	2.05 (1.38, 3.07)	p<0.01
Rates of hand inspection during SSE	520/616 (84.4%)	138/164 (84.1%)	1.02 (0.64, 1.64)	p=0.9	0.91 (0.51, 1.62)	p=0.7
Rates of foot inspection during SSE	397/606 (65.5%)	111/165 (67.3%)	0.92 (0.64, 1.33)	p=0.6	1.04 (0.66, 1.64)	p=0.87
Patients who have had FBSE by a HCP	597/770 (77.5%)	102/262 (38.9%)	5.41 (4.01, 7.31)	p<0.01	2.89 (2.01, 4.17)	p<0.01
Rates of hand inspection during FBSE from a HCP						
• At the most recent FBSE	504/551 (91.5%)	85/107 (79.4%)	2.78 (1.59, 4.84)	p<0.01	2.20 (1.10, 4.41)	p=0.02
• At any previous FBSE	475/535 (88.8%)	74/101 (73.3%)	2.89 (1.72, 4.84)	p<0.01	1.84 (0.96, 3.52)	p=0.06
Rates of foot inspection during FBSE from a HCP						
• At the most recent FBSE	421/544 (77.4%)	67/105 (63.8%)	1.94 (1.24, 3.03)	p<0.01	1.70 (0.97, 2.98)	p=0.59
• At any previous FBSE	409/523 (78.2%)	65/101 (64.4%)	1.99 (1.26, 3.14)	p<0.01	1.69 (0.95, 3.00)	p=0.07

Table 4

Frequencies of skin examination

	White *n* (%)	Ethnic Minority *n* (%)	P-value (based on Wilcoxon test)
Frequency of SSE			
• Daily	96/774 (12.4%)	17/260 (6.5%)	p<0.01
• Weekly	143/774 (18.5%)	24/260 (9.2%)	
• Monthly	219/774 (28.3%)	42/260 (16.2%)	
• Yearly	104/774 (13.4%)	38/260 (14.6%)	
• Less than yearly	101/774 (13.0%)	45/260 (17.3%)	
• Never	111/774 (14.3%)	94/260 (36.2%)	
Frequency of FBSE by a HCP			
• More than yearly	140/770 (18.2%)	11/262 (4.2%)	p<0.01
• Yearly	252/770 (32.7%)	40/262 (15.3%)	
• Less than yearly	205/770 (26.6%)	51/262 (19.5%)	
• Never	173/770 (22.5%)	160/262 (61.1%)	