

Medical Student Melanoma Detection Rates in White and African American Skin using Moulage and Standardized Patients

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Introduction

Published medical literature has established an ethnic disparity in melanoma stage at time of diagnosis, which has been attributed in part to earlier detection in whites as compared to African Americans[1-6]. Lack of physician knowledge about the clinical presentations of melanoma in African Americans, particularly acral lentiginous melanoma (ALM), in addition to misperceptions that melanomas only occur in sun-exposed areas and that dark-skinned individuals are not at risk may contribute to the reported diagnostic delay[3,6]. A consequence of the rarity of melanomas in African Americans (1 per 100,000 as compared to 21.6 per 100,000 in whites) is that medical students have few opportunities to see melanomas in African Americans during short dermatology clerkships, and medical educators have limited opportunities to train and assess medical student melanoma diagnostic skills in this population. Our group has previously used standardized patients (SPs) and moulage to evaluate medical student melanoma detection skills[7]. In this study, we build upon our prior work and use SPs and moulage to assess fourth-year medical student melanoma detection rates in different skin types among physicians early in their training.

Material and Methods

This study was approved by the University of Illinois at Chicago (UIC) Institutional Review Board. All fourth-year UIC medical students undergo a competency in clinical skills assessment as part of the curriculum using SPs. Only professional actors are used as SPs by the UIC Graham Clinical Performance Center and they are trained to portray a scripted patient presentation reliably and accurately during multiple encounters. The method of using SPs and moulages in simulated scenarios to assess melanoma detection rates in the current study has been

previously published by our group[7]. As before, we utilized a wrist pain case with a melanoma moulage painted on the second digit of the SP's hand where it would be easily visible during an examination of the hands (Fig.1). Four non-Hispanic white (referred to as white) actors and 4 African American actors presented our case after a board-certified dermatologist (CH) reviewed the moulage for realism.

During the SP training sessions, a dermatologist (CH) helped coach the SPs on how to answer questions about the clinical history and symptoms of the simulated melanoma. The SP was instructed not to mention the lesion unless the student noticed the moulage. It is only if the student mentions the simulated lesion that the SP would answer specific questions posed by the student. The SPs were to provide the following information if asked by the student: the lesion was noticed approximately 6-8 months prior, the lesion has been growing in size; the patient grew up in Florida with heavy sun exposure, had no prior history of skin cancer, experienced no symptoms of pain or bleeding, and noticed no other changes in any other nevi.

The melanoma moulage case was featured as part of the 12-station Objective Structured Clinical Examination (OSCE) that fourth-year students are required to take. We assessed a total of 357 fourth-year medical students. Students were instructed that everything they observed during the encounter should be considered as part of the patient's presenting clinical findings. Each student had 15 minutes to conduct a focused history and physical examination and 10 minutes to document pertinent history, physical examination findings, differential diagnosis, and work-up plans. Student encounters were video-recorded.

Following the encounter, SPs completed a checklist regarding the history, physical examination, and follow-up recommendations (Table 1). Student clinical notes, SP checklists, and video recordings were all reviewed by two authors (CH and PS) to determine whether the student noticed the melanoma moulage, obtained relevant history, performed a screening physical examination, and correctly counseled the patient

regarding further management.

Results

A total of 357 fourth-year medical students participated in our study. White SPs were assessed by 174 students, while African American SPs were assessed by 183 students. Study results are shown in Table 2. Of the 174 students assessing white SPs, 47 noticed the moulage, but only 34 correctly counseled the SP that the lesions required a biopsy or a dermatologist assessment. Among the 13 students who did not recommend either biopsy or follow-up, several were observed to tell the SP that the lesion was benign or not to worry about the lesion. The 34 students who correctly counseled the patient were used to calculate the detection rate among white SPs (19.5%). Of the 182 students assessing African American SPs, 41 noticed the moulage, and 29 correctly asked the patient to undergo a biopsy or follow-up with dermatology. The detection rate for African American SPs was 15.9%. The total detection rate for all SPs in this study was 17.6%.

Discussion

We previously reported the utility of using the melanoma moulage/SP simulation technique to evaluate melanoma

detection by medical students in non-Hispanic whites[7]. In this study, we wish to prove that this technique can be utilized to assess medical student melanoma detection rates in different skin types including skin of color. Simulated melanomas are an important method to add to our armamentarium to assess physician detection skills in academic centers. Since melanomas are rare among African Americans[4], accruing a sufficient number of African American melanoma patients in a prospective manner can be challenging. We sought to find an alternative method to assess medical student melanoma detection rates in whites and African Americans given the melanoma disparity and lingering question regarding potential physician diagnostic delays contributing to poor outcomes in African Americans.

Four previous studies[7-10] have investigated medical student melanoma detection rates using SPs and moulage (Table 3). One of the studies [9] assessed the performance of opportunistic screening in whites and African Americans. Robinson et al. [9] found that 9 of 58 (16%) medical students noticed moulages placed on SPs who presented with dermatologic complaints, with no significant difference in detection due to patient race. Our study design differed in that students assessed SPs during a one-on-one consultation, and SPs presented with chief complaints

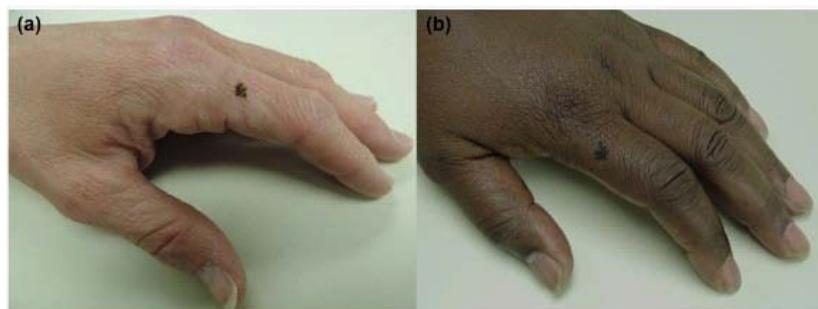


Figure 1: Melanoma moulage applied to the second digit of a white standardized patient's hand (a) and an African American standardized patient's hand (b).

Table 1: Melanoma SP Checklist. The following components of the melanoma SP checklist were assessed by SPs immediately after the encounter.

Melanoma SP checklist
The examinee noticed the melanoma moulage
History
The examinee asked me if I have noticed any changes in the lesion
The examinee asked me if I have experienced any symptoms related to the lesion
The examinee asked me if I have a family history of skin cancer
The examinee asked me if I ever had a previous diagnosis of skin cancer
The examinee asked me about previous sunburns
The examinee asked me about sunscreen use
The examinee asked if I had noticed changes in any other moles
The examinee asked if I performed regular self skin examinations
Physical Examination
The examinee noticed the moulage on my hand during the physical examination portion of the encounter
The examinee examined my feet
The examinee palpated for axillary lymphadenopathy (must be performed bilaterally)
Assessment/Plan
The examinee recommended further follow-up with a dermatologist and/or biopsy

unrelated to dermatology in order to remove the cue to perform a visual inspection of the skin.

Surprisingly, our study found that medical student detection rates were low in both groups and did not differ significantly between whites (19.5%) and African Americans (15.9%). Thus this study continues to document low rates of detection for opportunistic detection irrespective of skin color by medical students early in their medical education[7-10]. The issue of the potential cause of melanoma disparity has been the subject of much discussion. Biological, environmental, and even physician factors have all been implicated. This study demonstrates a simulated technique that can be used to study physician skills at detecting a rare but important cancer. Unlike many cancer detection programs that assess student skills using photographs, our simulated scenario more closely approximates an actual physician-patient encounter and draws medical educators closer to assessing physician behavior and skills in a real world clinical encounter. Moreover, this study begins the process of assessing detection rates between two different skin types and found that physician detection rates were low in both groups with no statistically significant difference.

Our study underscores the fact that much work remains to be done in regards to melanoma education in medical school. In addition to continuing to build on visual melanoma recognition, dermatology curricula need to cover the differences in risk factors and clinical presentations of melanoma in different skin types[11]. For instance, the greatest melanoma risk factors in whites include periods of high intermittent sun exposure and/or large cumulative doses of UV radiation from chronic sun exposure, family or personal history of melanoma and/or non-melanoma skin cancers, large number of common benign nevi, atypical nevi, and history of blistering sunburns[11,12]. Risk factors for African Americans, however, include burn scars, radiation therapy, trauma, albinism, and immunosuppression[12]. Even though less of a significant factor in the development of melanoma in African Americans, UV radiation may still play a role in African American skin[12]. In our study, none of the medical

students who had noticed the moulage on African American SPs had inquired about prior sunburn history and only 1 student had asked about sunscreen use. Therefore, it is necessary to educate students not to overlook sun exposure history and sun protection practices even when evaluating African Americans. The importance of examining acral and mucosal regions in African Americans should also be taught as our study found that only 1 medical student evaluating an African American SP had inspected the patient's feet after detecting the moulage on the hand[12].

One limitation of our study was that students assessed either a white or African American SP, which did not allow us to directly evaluate a particular student's skill for both skin types. Other limitations include testing only students attending one medical school and time constraints since this occurred in the context of an OSCE, which may affect the number of students who decide to perform skin examinations and focus only on the wrist pain complaint.

Reports have suggested that secondary prevention efforts, such as skin cancer screenings, are suboptimal in patients of color, with African Americans being screened less frequently than whites[13-20]. One cited reason for the disparity in skin cancer screening is low physician confidence levels in surveillance skills in African Americans[21] and lack of physician education in the risk factors and presentations of skin cancer within this population[3]. Our study highlights the need to continue to develop a more comprehensive melanoma education program even at the medical student level. We demonstrate the potential use of SPs and moulage as an educational tool to reduce educators' dependence on the presentation of melanoma in the outpatient setting at a time when students or residents are present in order to teach or assess their skills. Furthermore, this study begins to hint at educational targets for curricular improvement so that properly trained medical students will graduate with the skills and confidence to provide melanoma screenings for patients of any skin color.

Table 2: Results.

Elements of history, physical examination, and management plan	Number of students (Black SPs) N = 183	Number of students (White SPs) N = 174
Noticed nevus	41 (22%)	47 (27%)
Asked if there were any changes in nevus	38 (21%)	37 (21%)
Asked if patient had any symptoms	31 (17%)	26 (15%)
Asked if patient had a family history of skin cancer	3 (2%)	7 (4%)
Asked if patient had personal history of skin cancer	1 (0.5%)	2 (1%)
Asked about sunburn history	0 (0%)	7 (4%)
Asked about sunscreen use	1 (0.5%)	2 (1%)
Asked if patient had noticed changes in any other moles	7 (4%)	8 (5%)
Asked if patient regularly performed self skin examinations	1 (0.5%)	0 (0%)
Examined feet	1 (0.5%)	0 (0%)
Palpated for axillary lymphadenopathy	1 (0.5%)	0 (0%)
Recommended further follow-up	29 (16%)	34 (20%)
Included carpal tunnel on the differential diagnosis	181 (99%)	174 (100%)
Included melanoma on the differential diagnosis	26 (14%)	25 (14%)
Noticed nevus while performing the physical examination	31 (17%)	34 (20%)

Table 3: Summary of previous studies utilizing Standardized Patients (SPs) and moulage to assess medical student melanoma detection rates.

Study	Detection rate(no counseling) provided	Detection rate(with counseling provided)	Ethnic differences in detection rate	Pre-assessment education	Assessment technique	SP chief complaint
Robinson et al. (1996) [8]	1/285 (0.35%)	0/285 (0%)	N/A	Skin cancer lecture → written exam + photographs	<ul style="list-style-type: none"> • SP +moulage • M2 clinical skills examination 	Non-dermatologic
Robinson et al. (2010) [9]	9/58 (15.5%)	N/A	No significant difference	Skin cancer lecture	<ul style="list-style-type: none"> • SP +moulage • M2 voluntary dermatology experience 	Dermatologic
Goulart et al. (2012) [10]	37/59 (63%)	25/59 (42%)	N/A	Skin cancer lecture Pre-/post-lecture written exam + photographs	<ul style="list-style-type: none"> • SP +moulage • M2 clinical skills practice sessions 	Non-dermatologic
Hernandez et al. (2013) [7]	56/190 (29%)	43/190 (22.6%)	N/A	Skin cancer lecture	<ul style="list-style-type: none"> • SP +moulage • M4 clinical skills examination 	Non-dermatologic
Current study	88/357 (24.6%)	63/357 (17.6%)	No significant difference	Skin cancer lecture	<ul style="list-style-type: none"> • SP +moulage • M4 clinical skills examination 	Non-dermatologic

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