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Authors

Lofgreen, Seth
Lehrer, Michael
Bennett, Paige
et al.

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Original

Integrating *The Integrated Skin Exam* film into medical education

Seth Lofgreen¹ PharmD, Michael Lehrer² BS, Paige Bennett¹ BA, Amit Garg³ MD, Cory A Dunnick⁴ MD

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¹University of Colorado School of Medicine, Aurora, CO

²Creighton University School of Medicine, Omaha, CO

³Department of Dermatology, Hofstra North Shore-LIJ School of Medicine, Hempstead, NY

⁴Department of Dermatology, University of Colorado School of Medicine, Aurora, CO

Correspondence:

Seth Lofgreen
Email: seth.lofgreen@ucdenver.edu

Abstract

Background

The mortality rate for melanoma continues to rise and the greatest improvement in melanoma survival is attributable to early detection with skin cancer screening exams. However, physicians feel that limited training in the examination of skin and limited clinical time both serve as barriers to adequately assess high-risk lesions.

Objective

To test the use of *The Integrated Skin Exam* film as an instructional tool to teach the examination of skin in a live classroom setting, outside of the purview of the original formal study.

Methods

Identical cross-sectional surveys were administered pre- and post-film to a class of first-year medical students at the time of viewing *The Integrated Skin Exam* film. Results were compared to the initial assessment of this film as a teaching tool in a research setting.

Results

Of the maximum 182 possible surveys administered, we collected 148 pre-surveys and 142 post-surveys (81.3% and 78.0% response rates, respectively). After viewing the film, students showed improvement in identification of high-risk demographic groups (79.3% vs 58.9%, $p < 0.001$) and high-risk anatomic sites in both women (91.9% vs 59.6%, $p < 0.001$) and men (92% vs 62.1%, $p < 0.001$). Students demonstrated increased confidence in the skin cancer examination (SCE) (52.2% vs 6.9%, $p < 0.001$) and a greater proportion (74.4% vs 48.3%, $p < 0.001$) of students believed less than 3 minutes was required to integrate a skin cancer exam (SCE) into the routine examination.

Conclusions

The Integrated Skin Exam film is a valuable training tool as proven by increased knowledge of, and improved attitudes about the SCE after viewing the film. In addition, there was a striking similarity in outcomes when using this film in a live classroom environment compared to the original study setting.

Keywords: Integrated skin exam; skin cancer; melanoma screening; undergraduate medical education

Introduction

In 1988, surgeon Neville Davis wrote that melanoma “writes its message in the skin for all of us to see.” However, even now, almost 30 years later, we find that melanoma mortality rates continue to rise [1]. In fact, the Centers for Disease Control estimates that melanoma skin cancer causes the premature demise of more than 9,000 people each year; each of these people lose an average of 20 years of life expectancy [2, 3]. The greatest survival improvement stems from earlier detection, but primary care physicians experience little training in detecting melanoma [4]. Some estimate that the totality of medical school dermatology instruction, on average, constitutes less than ten hours of training in detection of melanoma [5]. This leads to a proficiency deficit in identifying potentially dangerous lesions by the majority of non-dermatologists although more melanomas are diagnosed by non-dermatologists than dermatologists [4, 6, 7, 8]. However, it has been proposed that even small changes in medical school dermatology curricula could increase confidence and competence in identifying melanoma, while also increasing the integration of skin cancer examination (SCE) into clinical practice [9].

Recognizing this deficit, the Integrated Skin Exam Consortium created and tested a video (<https://www.youtube.com/watch?v=blBaYZvG7f8>) teaching the integrated skin examination (ISE) [10]. The purpose of the ISE is to identify high-risk patients and document those anatomic areas where a skin examination performed in conjunction with the routine physical exam might prove helpful. By routinely checking the skin as a part of the physical examination, physicians can identify those potentially dangerous skin lesions which may otherwise go unnoticed.

Methods

Surveys were administered to first-year medical students at the University of Colorado School of Medicine during their regular preclinical dermatology instruction. The video was viewed in small groups of 12-24 students with a dermatology resident preceptor. One survey was administered before watching the video and another identical survey administered after. Pre- and post-film surveys from the same student were not paired, but rather, improvement was assessed in the class as a whole.

Statistical Analysis

Survey responses were recorded; frequencies and proportions of responses to each question were calculated. Not all students responded to the pre- and post- intervention survey and data were not paired. Owing to the unpaired data, we used a Chi-squared test to evaluate questions with binary outcomes (identification of high risk groups, anatomic sites, increase in confidence, and time for exam < 3 mins, Microsoft Excel). Students' confidence was transformed to binary data such that students indicating they “agreed” or “strongly agreed” regarding confidence levels were grouped versus those students who responded “disagree” or “strongly disagree.” A similar approach was taken to analyze time to perform the ISE; students believing the exam would take less than three minutes were grouped against those believing it would take longer than three minutes. Responses to questions regarding increase in confidence levels and time for exam were also analyzed as continuous data using a two-tailed unpaired Student's t-test (Microsoft Excel).

Results

Of the maximum 182 possible surveys administered, we collected 148 pre-surveys (81.3% response rate) and 142 post-surveys (78.0% response rate). Of these, one pre- and one post-film survey were disallowed as the student submitted one sheet of paper with one set of answers and labeled it as both the pre- and post-film survey. In addition, four other post-film surveys were disallowed because the students marked that they had not viewed the film. Therefore, these surveys would not allow us to measure the effect size of the intervention. In total, 147 pre-film surveys and 137 post-film unpaired surveys were analyzed.

Before watching the film, 6.9% of students agreed or strongly agreed that they felt confident in examining the skin for skin cancer. However, after the film 52.2% ($p < 0.001$) responded in the same manner. In addition, the students who strongly disagreed with

feeling confident in examining the skin for skin cancer dropped from 55.5% to 13.4% ($p < 0.001$). In identifying men over the age of 50 as being at the highest risk for lethal melanoma, students improved from 58.9% to 79.3% ($p < 0.001$). Regarding questions requiring students to identify sites where they are most likely to incidentally find melanomas, students improved from 59.6% to 91.9% ($p < 0.001$) correctly identifying the back in men, and from 62.1% to 92.0% ($p < 0.001$) correctly identifying the leg in women. Also, students who thought that integrating a SCE into a routine physical examination would take less than three additional minutes increased from 48.3% to 74.5% ($p < 0.001$). Finally, the number of students somewhat or very likely to integrate an SCE into their patients' routine physical examination improved from 80.7% to 97.8% ($p < 0.001$). All pertinent studies were compared to data published in the original ISE paper (Table 1).

Table 1. Comparison of CU data to ISE Consortium data

	CU			ISE Consortium	
	Pre-	Post-	p-value	Pre-	Post-
ABCDE Criteria	95.2%	97.8%	0.24	91.2%	98.4%
High-Risk Demographics	58.9%	79.3%	<0.001	42.9%	61.0%
Female Site	59.6%	91.9%	<0.001	46.5%	88.6%
Male Site	62.1%	92.0%	<0.001	34.8%	92.1%
Length of ISE < 3 min	48.3%	74.4%	<0.001	41.9%	70.4%
Confidence	6.9%	52.2%	<0.001	16.4%	66.9%

Discussion

Barriers to skin cancer screening include limited time, training, and expertise as well as lack of significant findings on most skin examinations and lack of reimbursement [4, 6, 8, 11]. In order to combat the increasing incidence of melanoma we must identify ways of minimizing modifiable barriers [1]. In Germany, a single state (Schleswig-Holstein) instituted a population-wide screening program that decreased melanoma mortality by 40%, while melanoma mortality in Denmark and the rest of Germany remained stable during the same period [1, 12, 15]. In contrast, the United States Preventative Services Task Force gives an “I”-rating (insufficient evidence) regarding population-based skin cancer screening [1, 12]. Although widespread formal skin cancer screening may not be currently feasible, integrated versions of the SCE, especially for high-risk anatomic sites in high-risk individuals, seem appropriate to obtain some of the proven decrease in mortality shown by early detection.

The ISE overcomes barriers to performing a skin examination by integrating the skin exam components into the flow of a routine examination. It also reduces the perceived time required to perform a skin exam, which is important in a healthcare system in which providers realize no financial incentive for performing this service [13]. The ISE film represents a unique method of increasing training and expertise in relatively nominal dermatology curricula [5, 14]. Students showed increases in confidence in performing the SCE and in identifying high-risk demographics and high-risk anatomic sites for finding incidental melanomas. Perhaps most importantly, the film improved students' perceptions of the duration of a brief, focused skin exam and increased students' likelihood of actually integrating this skill into clinical practice.

In the author's opinion, the film employs many useful tactics to catch the viewers' attention and improve retention. It starts with patients' stories of how they found their melanomas (e.g. self-discovery, eye doctor, primary care physician). The film then continues to an instruction session of a medical student physical exam in which the physician educator emphasizes the role of inspection in the physical exam, and multi-tasking by looking for melanoma at the same time as examining the body part of interest. The film excels by illustrating the concepts that it is reinforcing. For instance, showing a student inspecting for melanoma while performing a pulmonary exam on a man or while performing a lower extremity musculoskeletal exam on a female (to reinforce high-risk anatomic sites by gender) [4, 7, 8]. It then illustrates normal appearance and abnormal appearance using the ABCDEs for skin lesions, but does so in the context of a student investigating her own skin lesion. Particularly impactful was an illustration of a student discovering a large melanoma on a patient who had previously been examined by other physicians and students who never examined the back of a patient. Finally, the film uses subtle humor and several “common” characters to whom the viewers might relate—the mildly hypochondriacal student, the seemingly uninterested attending physician, and the slightly grumpy patient who finds it unreasonable to know the appearance of the skin on his back. The techniques employed facilitate the creation of an impactful film that improved student knowledge and attitudes about the ISE.

Our study was limited by a few different factors. First, video streaming difficulties in some of the classrooms playing this film may have diminished the observed effectiveness of the film. Second, since all students were not instructed to create paired pre- and post-film surveys, we were unable to obtain paired data. However....

Conclusions

The ISE film is a proven teaching tool useful in medical school dermatology curricula. It serves as an efficient method of providing practical instruction to future physicians who have inadequate time, training, and expertise in identifying high-risk lesions. Students showed an objective increase in comprehension of high-risk anatomic sites and patient demographics. They also gained confidence in the SCE, perceived that it requires only minimal time commitment, and were more likely to incorporate this exam into their clinical practice. These results were similar to a previous study and show that this film is applicable to a wider variety of students and in a different setting.

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List of Abbreviations

ISE=integrated skin exam

PRIOR PRESENTATIONS

This information was presented in poster form at the Colorado Dermatological Society 2015 Annual Meeting.

SUPPLEMENTAL CONTENT

1. *The Integrated Skin Exam* film can be found at <https://www.youtube.com/watch?v=blBaYZvG7f8>

2. Pre-film and post-film surveys:

PRE-FILM QUESTIONNAIRE

1. Please estimate the number of times you have been instructed to perform a skin cancer examination?
 - A. No times
 - B. 1-3 times
 - C. 4-9 times
 - D. 10+ times

2. Please estimate the number of adult patients for whom you have observed a physician perform a skin cancer examination?
 - A. No patients
 - B. 1-3 patients
 - C. 4-9 patients
 - D. 10+ patients

3. Please estimate the number of adult patients for whom you have performed a skin examination for skin cancer?
 - A. No patients
 - B. 1-3 patients
 - C. 4-9 patients
 - D. 10+ patients

4. Please rate your level of agreement with the following statement.
“I feel confident examining the skin for skin cancer.”
 - A. Strongly disagree
 - B. Disagree
 - C. Agree
 - D. Strongly agree

5. Please rate your current skill level for examining the skin for skin cancer.
 - A. Not at all skilled
 - B. Slightly skilled
 - C. Moderately skilled
 - D. Very skilled

6. Which of the following features is part of the “ABCDE” criteria of melanoma?
 - A. Agmination
 - B. Border irregularity
 - C. Convexity
 - D. Diameter greater than 4mm
 - E. Elipsoidal shape

7. Which of the following demographic groups is at greatest risk for lethal melanoma?
 - A. Men under the age of 50
 - B. Men over the age of 50
 - C. Women under the age of 50
 - D. Women over the age of 50

8. A focused physical examination for which of the following complaints would most likely lead to the incidental detection of a melanoma in a 22-year-old white female?
- A. Diarrhea
 - B. Dyspareunia
 - C. Headache
 - D. Galactorrhea
 - E. Leg pain
9. During routine examination of which of the following organ systems would a physician be most likely to find a skin lesion suspicious for melanoma in a 60-year-old white male?
- A. Cardiac
 - B. Gastrointestinal
 - C. Genitourinary
 - D. Neurologic
 - E. Pulmonary
10. A 34-year-old male patient shows you a mole on his shoulder that he feels has enlarged over the last 4 months. He also states that the mole recently bled while towel-drying after a shower. You suspect the lesion represents a melanoma based on ABCDE criteria. Which of the following represents the next course of action: (Please mark all that apply)
- A. Biopsy of the lesion
 - B. Follow-up with the patient in 4-6 weeks for repeat examination of the lesion
 - C. Perform a complete skin examination
 - D. Refer to have the lesion to be excised
 - E. Treat the lesion with a topical antibiotic and a bandaid to facilitate wound healing
11. How much additional time do you feel is required to integrate a skin cancer examination into the routine physical examination performed by a primary care physician?
- A. No additional time
 - B. Less than 3 minutes
 - C. 3 – 5 minutes
 - D. 5-10 minutes
 - E. Greater than 10 minutes
12. How likely is it that you will integrate a skin cancer exam during your patients' routine physical examinations?
- A. Very likely
 - B. Somewhat likely
 - C. Unlikely
 - D. Only if the patient has a concern about his or her skin
-

POST FILM QUESTIONNAIRE

1. Please estimate the number of times you have been instructed to perform a skin cancer examination?
- A. No times
 - B. 1-3 times
 - C. 4-9 times
 - D. 10+ times
2. Please estimate the number of adult patients for whom you have observed a physician perform a skin cancer examination?
- A. No patients
 - B. 1-3 patients
 - C. 4-9 patients
 - D. 10+ patients

3. Please estimate the number of adult patients for whom you have performed a skin examination for skin cancer?
- A. No patients
 - B. 1-3 patients
 - C. 4-9 patients
 - D. 10+ patients
4. Please rate your level of agreement with the following statement.
“I feel confident examining the skin for skin cancer.”
- A. Strongly disagree
 - B. Disagree
 - C. Agree
 - D. Strongly agree
5. Please rate your current skill level for examining the skin for skin cancer.
- A. Not at all skilled
 - B. Slightly skilled
 - C. Moderately skilled
 - D. Very skilled
6. Which of the following features is part of the “ABCDE” criteria of melanoma?
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9. During routine examination of which of the following organ systems would a physician be most likely to find a skin lesion suspicious for melanoma in a 60-year-old white male?
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 - B. Gastrointestinal
 - C. Genitourinary
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11. How much additional time do you feel is required to integrate a skin cancer examination into the routine physical examination performed by a primary care physician?

- A. No additional time
- B. Less than 3 minutes
- C. 3 – 5 minutes
- D. 5-10 minutes
- E. Greater than 10 minutes

12. How likely is it that you will integrate a skin cancer exam during your patients' routine physical examinations?

- A. Very likely
- B. Somewhat likely
- C. Unlikely
- D. Only if the patient has a concern about his or her skin

13. Have you viewed the film titled "the Integrated Skin Exam"?

- A. Yes
- B. No