

# Melanoma and medical education: student's perceptions of skin cancer screening in three medical schools

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## ABSTRACT

**Background:** This study evaluated how the level of medical education affected confidence of counseling on skin health, performing skin examinations, and the likelihood of using those skills in future screenings. **Material and Methods:** An online survey was distributed to students at three midwest medical schools that assessed sun protection behaviors, and the student's perception of education and comfort on the complete skin examination and counseling on skin health. **Results:** 51.6% (n=243) indicated they were in the last two years of medical school and were considered advanced students, compared to less advanced students in the first two years. Advanced students were significantly more comfortable in performing a complete skin examination and counseling patients on skin health when compared to less advanced students ( $p < 0.001$ ). However, they were also statistically less likely to indicate they would provide skin screening on future patients when compared to less advanced students ( $p < 0.001$ ). Only 29.5% (n = 139) and 60.7% (n = 286) of students indicated they had been educated on performing a complete skin examination and counseling on skin health, respectively. **Conclusions:** Although advanced students were more likely to report education and comfortability in skin cancer screening they were not as likely to indicate they would practice these skills in the future compared to less advanced students. Also, only a small number of students perceived themselves to be educated in these aspects.

**Key words:** Skin health; Melanoma; Complete skin examination; Medical education; Primary care

## INTRODUCTION

Although melanoma is the third most common form of skin cancer behind basal cell carcinoma and squamous cell carcinoma, it is the deadliest [1-4]. Over 63,000 people are diagnosed annually and nearly 9,000 people die from this affliction yearly [4,5]. In 2016, the estimations of melanoma incidences and mortalities were 76,360 and 10,130, respectively [1]. It is one of the most common cancers among young adults and is currently the fifth most common

cancer in males and sixth in females [4,6,7]. Overall, melanoma is most prevalent among caucasians, older adults, and males, although, in individuals below 50 years of age, it is more frequent in females [2,4,8]. Although the five-year survival rate has been improving over the past two decades, at about 90%, this rate varies among different stages of disease. For example, over 90% of patients with local disease survive the five years compared to less than 20% of patients surviving with metastatic disease [4,7,9]. These variations demonstrate the significance of early

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detection and prevention and how these aspects can reduce the progression of melanoma.

The outcome of melanoma, a potentially fatal disease, is dependent on early diagnosis. When detected by a physician, that physician is almost always a primary care physician (PCP) rather than a specialist [3,10,11]. It has been found that most patients with newly diagnosed melanoma have visited their PCP at least once the year prior to their diagnosis [6,10,12,13]. Even so, only 20% of these patients report receiving a skin cancer examination, indicating that this diagnosis could have been detected sooner [10,12]. Also, the majority of Americans do not go to the dermatologist regularly, so without finding high-risk lesions themselves or via PCP, these patients would not be able to have the early detection that is crucial with a melanoma diagnosis [6,9]. Of melanomas found by physicians, over 75% are detected by PCPs [13]. Therefore, PCPs are important targets for skin cancer prevention practices and education. They are important for early detection as well because melanoma lesions diagnosed at later stages are associated with a greater risk of death. However, evidence is lacking regarding the best way to conduct early detection in order to reduce melanoma mortality and is a controversial subject currently [4].

At this point, there is conflicting information between medical organizations regarding prevention recommendations and skin cancer screening and little research has been done to delve into the obstacles against the CSE. Whereas some organizations recommend screening of all adults, others suggest screening high-risk adults only, and others do not promote screening at all. There is also not much research in the area of early detection or which modality works best. These inconsistencies and the minimal amount of research in this area prompted the authors to further investigate. We studied medical school education as this is where future medical professionals would typically get their first exposure to dermatological education. The survey examined aspects on whether the level of medical education influenced the student's perception of their desire to tan, their own sun protective practices, comfort-level and amount of education on counseling in skin health risk factors and performing the complete skin examination, as well as the likelihood to use these skills on future patients. The purpose of this study is to analyze and discuss how the comfort level of a physician can influence the performance and use of sun safety screening and education. This emphasizes the need for PCPs to widen their scope of practice into

the dermatological field, especially with early detection of skin cancer.

## MATERIAL AND METHODS

The survey had to be developed and the questions determined before it was emailed to approximately 1,200 medical students at the University of Kansas School of Medicine, University of Missouri—Kansas City School of Medicine, and Kansas City University. The survey had two primary sections and included a total of 22 questions administered to all medical students at the three medical schools via email. The survey consisted of 22 questions divided into demographics, personal attributes/behaviors, and curriculum sections. The demographics section assessed the student's gender, age, skin type, personal history of skin cancer, and year of medical education. The personal attributes/behaviors section assessed student's own sun protection behaviors, and view of complete skin examination (CSE) and counseling patients about skin cancer risk factors. When discussing counseling throughout this paper, please note that it is referring to counseling patients on risk factors and prevention of skin cancer. Curriculum assessed the student's perception of education, comfort, and level of importance on the CSE and counseling on skin cancer risk factors. This survey was administered to all medical students at three medical schools via email.

The University of Missouri-Kansas City hosted REDCap electronic data capture tool – a secure, web-based application designed to support data capture for research studies, providing an interface for validated data entry, audit trails for tracking data manipulation, and automated export procedures and procedures. Also used was a Stata statistical software package (SE version 9.2; Stata Corp., College Station, Texas) for all analyses. These modalities were used to compare medical students in medical school years 3 or 4, considered advanced students to students that indicated medical school years 1 or 2, considered less advanced students. The University of Kansas Institutional Review Board (IRB), University of Missouri-Kansas City IRB, and Kansas City University IRB approved this study and an IRB approval exemption was obtained from each school.

The chi-square test generated descriptive statistics and correlations performed evaluated direction and magnitude of any significant associations found

between survey items. We conducted sequential and systematic stratified univariate and multivariate logistic and multinomial regression analyses, as appropriate, to assess for significance, confounding and effect modification on selected items utilized as outcome variables. The final regression models used all variables found to be statistically significant or to be associated with confounding/interaction. Regression modeling determined odds ratios (OR) and 95% confidence intervals (CI) and all tests for significance were two-tailed with an a priori level of 0.05 ( $p \leq 0.05$ ).

## RESULTS

A total of 1,200 students were surveyed with a response rate of 39.25% ( $n=471$ ). The survey responses were reviewed for completeness and blank surveys ( $n=2$ ) were not included in the final study population or descriptive statistics. Of the responders, 51.6% ( $n=243$ ) of students indicated they were advanced students, compared to 48.2% ( $n=227$ ) that indicated they were less advanced students. Female (54.8% ( $n=258$ )) Male (44.6% ( $n=210$ )) The indications of age groups were as follows: 17-21 years 6.4% ( $n=30$ ), 22-26 years 68.6% ( $n=323$ ), 27-31 years 19.5% ( $n=92$ ), 32-36 years 3% ( $n=14$ ), 37-41 years 0.8% ( $n=4$ ), and  $\geq 42$  years 1.1% ( $n=5$ ). Skin types based on the Fitzpatrick scale are as follows: Type 1 (white, very fair) 6.4% ( $n=30$ ), Type 2 (white, fair) 23.4% ( $n=110$ ), Type 3 (beige, very common) 46.3% ( $n=218$ ), Type 4 (beige, with brown tint) 18.5% ( $n=87$ ), Type 5 (dark brown, very rarely burn) 4.9% ( $n=23$ ), and Type 6 (black, never burn) 0.6% ( $n=3$ ).

92.6% ( $n=436$ ) have utilized sun protection in the past year compared to 6.8% ( $n=32$ ) who did not. 56.5% ( $n=266$ ) spent time in sun with intent to tan in past year compared to 43.1% ( $n=203$ ) who did not. 10.4% ( $n=49$ ) utilized a tanning booth in past year compared to 88.7% ( $n=418$ ) who did not. 19.5% ( $n=92$ ) utilized artificial tanning products compared to 79.8% ( $n=376$ ) who did not. 36.3% ( $n=171$ ) believed that their medical education changed their desire to tan compared to 39.5% ( $n=186$ ) who did not, and 23.8% ( $n=112$ ) who indicated that this was not applicable due to no desire to tan. 5.1% ( $n=24$ ) indicated personal history of skin cancer whether suspected or confirmed compared to 94.9% ( $n=447$ ) who did not. 25.5% ( $n=120$ ) indicated they had a first-degree relative history of skin cancer compared to 74.3% ( $n=350$ ) who did not.

Advanced students were statistically more likely to report more sun protective practices ( $p = 0.008$ ,  $r = 0.169$ ) and to indicate that medical education has changed their desire for tanned skin ( $p < 0.001$ ,  $r = 0.181$ ) when compared to less advanced students. Advanced medical students were also significantly more comfortable in performing a CSE and counseling patients on skin health, or skin cancer screening, when compared to less advanced students ( $p < 0.001$  for both variables) ( $r = 0.229$  for CSE) ( $r = 0.218$  for counseling). Although, advanced students were statistically less likely to indicate that they were very likely or somewhat likely to perform skin cancer screening on future patients when compared to less advanced students ( $p < 0.001$ ,  $r = 0.289$  for CSE) ( $p < 0.001$ ,  $r = 0.252$  for counseling).

However, regarding performing a CSE and counseling patients about risk factors of skin cancer, only 29.5% ( $n = 139$ ) and 60.7% ( $n = 286$ ) of medical students, respectively, indicated that at their level of education had been educated on these topics. Only 33.1% ( $n=156$ ) of respondents indicated that to this point in their medical training they feel comfortable in performing a CSE and 73.7% ( $n=347$ ) indicated they felt comfortable in counseling patients. The majority of respondents, 80.9% ( $n=381$ ) indicated that they believed it was very important or somewhat important for patients to receive an annual CSE. This is compared to 14.6% ( $n=69$ ) that felt it was neither important nor unimportant, 4.5% ( $n=21$ ) that indicated somewhat unimportant and 0.0% ( $n=0$ ) to indicate very unimportant for patients to receive an annual CSE. The majority of respondents, 67.7% ( $n=319$ ), indicated very likely or somewhat likely to perform an annual CSE on their future patients, compared to 16.6% ( $n=78$ ) indicated neither likely nor unlikely, 15.7% ( $n=74$ ) indicated somewhat unlikely or very unlikely to perform annual CSE on their future patients. The majority of respondents, 98.5% ( $n=646$ ) indicated that they believed it was very important or somewhat important for patients to be counseled on risk factors for and prevention of skin cancer. While, 0.8% ( $n=4$ ) indicated neither important nor unimportant and 0.0% ( $n=0$ ) indicated somewhat unimportant or very unimportant for patients to receive counseling on risk factors for and prevention of skin cancer. The majority of respondents, 88.9% ( $n=419$ ) indicated they were very likely or somewhat likely to counsel their future patients on the risk factors, 6.2% ( $n=29$ ) indicated neither likely nor unlikely and 4.8% ( $n=23$ ) indicated

somewhat unlikely or very unlikely to counsel their further patients.

Respondents who indicated that they had been educated on performance of CSE were significantly more likely to indicate that they felt the CSE was the responsibility of a patient's PCP ( $p=0.029$ ,  $r=0.122$ ). These respondents that indicated they were educated on performance of CSE were also significantly more likely to indicate they felt it was very important or somewhat important for patients to receive an annual CSE ( $p=0.040$ ,  $r=-0.115$ ). They were also significantly more likely to indicate that it was very important or somewhat important to counsel patients ( $p=0.040$ ,  $r=-0.110$ ). Also, these respondents had a statistically significantly higher number of total sun protection practices ( $p=0.003$ ,  $r=0.182$ ) and that they were educated on how to counsel ( $p<0.001$ ,  $r=0.370$ ). It was significantly more likely for those that had indicated being educated on counseling patients to also indicate they were likely to perform a CSE on their future patients ( $p=0.001$ ,  $r=0.190$ ).

## DISCUSSION

Melanoma is the deadliest form of skin cancer and skin cancer is among the fifth and sixth leading causes of death in men and women, respectively [4,6,7]. Although not proven through randomized clinical trials at this point, early detection has been associated with a better mortality and increased survival rate [8,14,15]. There are inconsistencies with the guidelines on early detection and how to approach skin health screening in general, especially primary practice [5,14,15]. Therefore, more research is needed in this area to determine the best way to conduct early detection and screening [5].

The survey showed that although advanced medical students were statistically more likely to indicate that they felt educated on and comfortable with skin cancer screening, they were not as likely to indicate that they would practice these in the future when compared to less advanced medical students. Although, only a small number of advanced medical students perceived themselves to be educated at their point in training on both of these aspects of skin health. This could suggest a number of things, namely that students do not perceive their experiences accurately. It could also suggest that the students personally would not plan to carry out these practices in the future due to

a specialty that are planning on pursuing since there was no option on the survey for future specialty. Or this could suggest that students do not see a need for dermatology in primary care. Advanced students were more likely to indicate higher number of sun protection practices and that their medical school education had changed their desire for tanned skin. This could suggest that education on risk factors of skin cancer and general dermatological education has an effect on sun protection practices.

There were some limitations in our study such as, we did not ask students their future specialty. This would confound results if students were planning on a future specialty that would not encompass skin health counseling or CSE. We also did not ask students their opinions on ways to improve the dermatological education within their respective schools. Although this was not a necessity, it would have been useful and relevant data. There were also only three schools surveyed and all confined to the Midwest and a metropolitan area. Further research is needed to be able to generalize our data to a national scale.

Early detection for skin cancer is a controversial topic with no clear guidelines and more research is needed in this area to determine best modality for early detection [4,5]. Therefore, this area was of interest. We looked into medical schools to investigate the beginning of dermatological education and grasp the perceptions of future physicians. We recommend further research in the education of medical students on the importance of early detection and on the role of the primary care physician in dermatology. Another recommendation is investigation into the best deliverance methods of dermatology education in medical schools. Some suggestions from the authors include incorporating use of live patients, grand round approach and minimal rotational experience in dermatology in addition to the basic science lectures. Ulman, Binder and Borges proposed similar modifications to curriculum after administration of a dermatology quiz to medical students [11]. Further investigations in the curriculum would help ensure that new physicians would be able to identify new cases of skin cancer.

## CONCLUSION

Students' own perceptions of their education regarding skin cancer screening indicated that they were lacking in certain areas. Although, the majority of students

reported that they were less likely to utilize skin cancer screening in their future practice. This possibly suggests the need for medical school curriculums to increase training and practicing of the clinical skills needed in order to recognize early stages of skin cancer as well as increased ability to counsel patients on the risk factors of skin cancer. This could include curriculum reform in medical schools regarding dermatology education. It could also mean educating students regarding the importance of dermatology in primary practice. However, it is difficult to know whether students reported specific answers due to future desired specialties. Even so, future investigation is needed in this area to determine if this is needed and the mode of education that would most benefit students.

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