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A simple intervention to reinforce awareness of tanning bed use and skin cancer in non-medical skin care professionals in Southern California

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Abstract

Background—(i) To assess the baseline knowledge of non-medical skin care professionals (estheticians, cosmetologists, massage therapists) on tanning bed use and its association with melanoma; and (ii) to provide preliminary evidence of the potential impact of a fast and simple educational intervention on tanning beds and melanoma on the awareness of non-medical skin care professionals towards skin cancer prevention.

Methods—A pre-intervention survey was administered to non-medical skin care professional at salons or spas in Southern California to assess baseline knowledge on tanning and skin cancer. This was followed immediately by a 10-minute oral presentation on tanning bed use and its association with melanoma. One month later, a post-intervention survey was distributed to individuals who attended the initial oral presentation.

Results—Significant changes pre- and post-intervention were found in non-medical skin care professionals' answer responses to the following: (i) increased speaking to clients about cancer risk with tanning bed use 42–66% (OR 2.44; 95% CI 1.39, 4.30)]; (ii) decreased personal tanning bed use (23–15% [OR 0.61; 95% CI 0.37, 1.00]); and (iii) decreased belief that tanning beds are an excellent cosmetic tool (29–20% [OR 0.60; 95% CI 0.38, 0.96]).

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Conflicts of interest: None.

Supporting information

Additional supporting information may be found in the online version of this article:

Appendix 1 Pre-interventional survey.

Appendix 2 Post-interventional survey.

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Conclusion—This study provides preliminary evidence that non-medical skin care professionals could be an important source of primary prevention information for reducing the burden of melanoma.

Background

In June 2009, the International Agency for Research on Cancer (IARC), an advisory group for the World Health Organization (WHO), announced that ultraviolet (UV)-emitting tanning devices were proven to be associated with an increased risk of carcinogenesis.¹ Specifically, UV radiation exposure from tanning bed use is associated with cancers of the skin (i.e., melanoma) and eye (i.e., melanoma, particularly of the choroid and ciliary body).¹ In addition, previous studies have demonstrated that the long-term use of tanning beds before age 30 is associated with a 75% increased risk of developing melanoma.^{2–4} According to the Melanoma Research Foundation, melanoma is the most common form of cancer in young adults and, for the last 20 years, melanoma has been the fastest growing cancer in both the United States and worldwide.^{5,6} Hence, dissemination of knowledge regarding preventable causes of melanoma is critical to slowing the incidence of melanoma.

Numerous studies have defined the attitudes and knowledge level of the general public regarding the association of melanoma with frequent and/or prolonged exposure to solar and artificial UV radiation such as tanning bed use. A landmark study by Robinson *et al.*⁷ found that the general public had an increased knowledge of melanoma prevention by limiting tanning exposure between the years of 1988 and 1994. However, it was found in the same study that, since 1994, as social trends evolved and the popularity of tanning increased, there was a concurrent decrease in skin cancer awareness among the general public.⁷ Another study by Lucci *et al.*⁸ examined the knowledge of school-aged teenagers in Texas on melanoma and sun exposure behaviors. These teenagers had an inadequate understanding of melanoma and its risk factors, prevention, and detection.⁸ A third study by Amir *et al.*⁹ of the attitudes and knowledge levels of healthcare workers (excluding physicians) concluded that many workers used tanning beds, and few were aware of the associated increased risk for skin cancer.

Currently, the responsibility of disseminating information on potential health risks of tanning bed usage lies with the medical community. A study by Johnson *et al.*¹⁰ demonstrated that physicians, especially dermatologists, generally recommend against artificial tanning. However, for various reasons, including increasing costs of healthcare, decreased number of trained physicians,¹¹ and management of more acute clinical issues, physicians have limited access to the general public. In contrast, no studies have sought to understand the baseline knowledge of non-medical skin care professionals, who have direct visual exposure to their clients' skin appearance and who frequently interact with individuals who are especially conscious of personal skin care, an important aspect of cosmetic enhancement. For example, cosmetologists and estheticians commonly work in the area of the face, scalp, and neck, while massage therapists tend to work on the back and extremities. Non-medical skin care professionals also have a greater representation in the workforce when compared with medical skin care professionals (nearly 99,900 licensed

physicians in California);¹² consequently, they encounter much more of the general public on a daily basis.

In California, non-medical skin care providers such as cosmetologists and estheticians represent a population of health professionals with access to a large proportion of the general population and engage in direct visual inspection of the skin. According to the California Department of Consumer Affairs, there are over 206,000 cosmetologists and over 23,000 estheticians registered.^{13,14} This would be an ideal population for dermatologists to partner with to increase awareness regarding skin cancer and tanning beds.

This pilot study had two aims: (i) to assess the baseline knowledge of non-medical skin care professionals (i.e., cosmetologists, estheticians, massage therapists) in Southern California on tanning bed use and its association with melanoma; and (ii) to determine the impact of an educational intervention in the form of an oral presentation on the awareness of Southern California non-medical skin care professionals towards preventive care related to tanning bed use and melanoma. This would provide justification for targeting non-medical skin care professionals for more detailed interventions and formally testing their potential impact in influencing their clients' attitudes towards skin care awareness.

Methods

This study was approved by the Institutional Review Board of the University of Southern California, Keck School of Medicine. Schools training individuals to become estheticians, cosmetologists, and massage therapists were selected from the Southern California yellow pages. Each school was contacted via email and phone to be introduced to the study objectives. For schools that expressed interest in participating in the study (nine of 19 contacted), on-site visits were subsequently scheduled. At each visit, pre-intervention surveys were distributed to the students, with a 10-minute oral presentation following completion of the surveys. The pre-intervention survey (Appendix 1) assessed the baseline knowledge of non-medical skin care providers on tanning bed use and melanoma.

Upon completion of the pre-intervention survey, a 10-minute oral presentation with accompanying PowerPoint (Microsoft Corporation, Redmond, WA, USA) slides was delivered with a focus on delineating the association between tanning bed use as a risk factor for developing melanoma, providing a basic understanding of melanoma as a disease, demonstrating the process of a self skin exam, presenting different methods of melanoma prevention, and encouraging students to share their knowledge of tanning beds and melanoma with their clients. At the end of the presentation, educational flyers with the same content as the presentation were distributed to the participants for reference. One month later, a post-intervention survey (Appendix 1) containing the same questions as the pre-intervention survey was administered on-site to only participants who have attended the initial presentation to reassess their knowledge levels of and attitudes towards tanning beds and melanoma as well as their use of the educational information to inform their clients. Participants received the post-intervention survey after verbal confirmation of their previous attendance in the oral presentation; no identifying information was attained. All other

students present at the site but who did not affirm attendance at the initial oral presentation were not distributed post-intervention surveys.

The results of the pre- and post-intervention survey were collected and analyzed for the change in non-medical skin care professionals' knowledge levels of and attitudes towards tanning beds and melanoma. In addition, the impact of the educational presentation was assessed to determine whether these interventions helped to increase students' willingness to educate their clients. All survey participants were anonymous. Permission to administer the survey was obtained from the University of Southern California Institutional Review Board.

Results

A total of 254 pre-intervention surveys (132 cosmetologists, 87 estheticians, 35 massage therapists) and 185 post-intervention surveys (95 cosmetologist, 71 estheticians, 19 massage therapists) were collected from nine different non-medical skin care professional training centers in both the Orange and Los Angeles County areas. The response rate among all surveyed students was 72.8%. A majority (86%) of survey participants had heard of tanning beds. Of those who had heard of tanning beds, a majority (70%) were first exposed to tanning beds between the ages of 10 and 20 years. Few were initially exposed to tanning beds before age 10 (5%) and after age 20 (25%). Many non-medical skin care professionals recognized melanoma as a harmful form of cancer (65%), but few (42%) reached out to educate their clients regarding this topic. Although many had heard of tanning beds, few (21%) had kept up with updates regarding tanning bed safety, such as the one administered by WHO in June 2009.¹

The results are summarized in Table 1. Descriptive statistics, or proportions represented in the Table 1, were calculated in Excel (Microsoft Corporation) after discounting non-responses to the designated question (i.e., not every question was answered by every respondent). Odds ratios of affirmative post-intervention responses compared with affirmative pre-intervention responses and confidence intervals at the 95% confidence level were calculated using the number of affirmative and total responses.¹⁵ Using this simple intervention, statistically significant changes were found in non-medical skin care professionals' answer responses to: (i) increased speaking to clients about cancer risk with tanning bed use (42–66% [OR 2.44; 95% CI 1.39, 4.30]); (ii) decreased personal current tanning bed usage (23–15% [OR 0.61; 95% CI 0.37, 1.00]); and (iii) decreased belief that tanning beds are an excellent cosmetic tool (29–20% [OR 0.60; 95% CI 0.38, 0.96]).

Comment

After delivering the on-site oral presentation, there was a modest decrease in non-medical skin care professionals who responded positively to use of tanning beds, from 23 to 15%. A possible explanation for non-medical skin care professionals' decision to continue using tanning beds may be psychological – the importance of one's appearance.¹⁶ A study of college students' attitudes towards tanning bed use revealed that, though students were generally aware of the adverse effects of UV radiation, many students nevertheless use tanning devices to achieve an improved cosmetic appearance.¹⁷ Similarly, as evident from

the results in this study, non-medical skin care professionals already have a strong knowledge base regarding the risks associated with tanning bed use. Although not many endorse the personal use of tanning beds, those who do and will continually use tanning beds may do so in order to achieve cosmetic results. Furthermore, despite the best efforts of public health programs towards educating the general public, there exists a disparity between individuals' awareness of adverse effects related to tanning and the precautions they take to avoid tanning. Many different studies on tanning salon patrons suggest that the desire for physical attractiveness is a very strong psychological factor that may potentially overcome the power of knowledge and approaches to proper health.^{18–21} Another possibility is that there is a long-running and well-established conflict of information between advertisements from tanning bed companies and research findings from the medical community.^{22,23} Techniques used to increase awareness of risks of smoking could be borrowed to disseminate risks of tanning bed use.

As part of their curriculum in becoming certified, student non-medical skin care professionals are exposed to topics regarding the skin and certain related diseases, including melanoma. Starting in 2002, primary care physicians were encouraged to educate patients about sun safety and recommend periodic full skin examinations, which have contributed to an increase in patients' willingness to change high-risk behavior and embrace preventive skin care as a habit.^{24–26} Although many non-medical skin care professionals in this study have a good understanding of tanning bed use and its association with melanoma, only a little more than half were aware of the relationship between tanning bed use and melanoma of the eye. The prevalence of this disease is thought to be partly attributed to lack of protective goggle use during the indoor tanning process, likely due to an insufficient understanding of UV sensitivity in the eyes as well as in the skin.²⁷ Specifically, the choroid and ciliary body of the eye both contain high concentrations of melanocytes, and prolonged UV exposure may induce carcinogenesis in that cell population.

Even though many non-medical skin care professionals adjusted their attitudes and behavior regarding tanning bed use after the educational intervention, a minority remained unaffected by the educational intervention. This group of non-medical skin care professionals are equally aware of the risks of tanning bed use, but changing their behavior may require time and habituation.²⁸ On further analysis of the subgroup of non-medical skin care professionals endorsing tanning bed use, it was found that most started using tanning beds as adolescents (between the ages of 10 and 20 years). Studies of adolescents' intentions in indoor tanning found that their motivation was not only cosmetic but also because they were not familiar with possible risk factors related to tanning bed use.^{29–31} These factors, in addition to tanning beds commonly being used as a relaxation tool,³² may partly explain these persistent behaviors.

One of the main objectives of the post-intervention survey was to assess the effectiveness of the on-site oral presentation as a form of educational intervention to increase the awareness of tanning beds and its association with melanoma. Even with 89% of non-medical skin care professionals already aware of the association between tanning bed use and melanoma, the intervention further revealed a 7% increase in recognition of melanoma as a harmful disease. This is likely due to the fact that non-medical skin care professionals were familiar with the

term “melanoma” but were unaware of the malignant implications of the disease. In addition, knowledge of tanning beds and its association with skin cancer remained unchanged after the on-site presentation, but knowledge of the association between tanning beds and eye cancers increased by 7%. The impact of the intervention on knowledge of the two cancers can be explained in the context of baseline knowledge. In this population, there was already significant baseline knowledge of the association between tanning beds and skin cancer, as shown in the pre-survey results (89% were aware), which may appear to mask the effects of the educational intervention. However, difficulty in convincing the minority, who may hold strong, non-evidence-based beliefs that tanning beds are not associated with skin cancer, also cannot be completely ruled out.

Aside from improvement in baseline knowledge, several behavioral changes became obvious after the educational intervention. There was an 8% success in deterring non-medical skin care professionals from using tanning beds and most non-medical skin care professionals who routinely referred their clients to use tanning beds have decreased their referral frequency from “every time” to only “occasionally.” This positive change may be due to the power of a direct person-to-person education. In a recent study, email-based interventions on difficult-to-change health behaviors such as habitual indoor tanning were found to be significantly less effective than one-on-one counseling sessions for the same purpose.³³ In fact, the oral presentation, which included pictures, medical updates, and statistics regarding melanoma, appears to have made a significant impact on non-medical skin care professionals counseling their clients; the majority of them reported in the post-survey that they talked to their clients about skin cancer, particularly in the context of tanning beds.

In this study, it was assumed that non-medical skin care professionals’ responses correlated directly with their habit of practice. With this assumption, the study becomes limited by the possibility that certain non-medical skin care professionals may provide the “desired” response, which do not necessarily correlate with their actual practice. In addition, participation by both schools and students was voluntary and may have biased the study in favor of individuals more willing to absorb the contents in the intervention. Another limitation to this study is the lack of information regarding the duration of the effects of educational intervention. The main limitations of this study were three-fold: (i) we were unable to directly link each pre-survey result to a corresponding post-survey result but rather have presented the pre- and post-survey prevalence of responses; (ii) we have no comparison group that did not receive the intervention to serve as a control; and (iii) the time interval between administration of the pre- and post-interventional surveys was relatively short (one month). These are important limitations that cause us to view our results with caution. However, it seems most likely that an overall reduced prevalence of self-reported referral of patients to tanning beds, for example, reflects an improvement in knowledge and attitudes due to the intervention. In other words, the alternative, that non-medical skin care providers changed their overall referral patterns by chance, or unrelated to the intervention, within a one-month period, seems much less likely. The six professionals who changed their response from “frequently” for the statement “I refer clients to tanning beds” may also estimate the approximate percentage of individuals whose opinions on tanning bed use may be effectively influenced by educational efforts. It is possible that the remainder hold fixed

attitudes regarding tanning bed use that is not affected by medical knowledge. While the results of this study provide preliminary evidence that interventions on tanning bed safety and melanoma risk might increase awareness and healthy behavioral practices of non-medical skin care professionals in Southern California, clearly a more detailed follow-up study, including respondent-linked pre- and post-interventional surveys, is required to evaluate the long-term efficacy of such an approach.

Conclusion

Non-medical skin care professionals appear to be a group of healthcare professionals who can assist with population-based skin cancer awareness. Over the last few decades, the medical community has directed significant resources toward basic science and clinical efforts to address the rising incidence of skin cancer. Although significant changes are currently taking place, cooperation with adjunct fields, such as a strong partnership between dermatologists and non-medical skin care professionals, is highly useful and will help these interventions reach their full potential in eliminating excess cancer risk.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Knowledge, attitudes, and practices among non-medical salon and spa professionals. Each cell lists that number of affirmative responses over the total number of responses for that survey statement after discounting non-responses. Significant differences after intervention are in bold type

Survey item	Pre-intervention response (%)	Postintervention response (%)	OR (95% CI)
Knowledge			
Answering positively to item: "Have you heard of tanning beds"	198/230 (86)	185/185 ^a (100)	
Answering "frequently" and "occasionally" to item: "How often are you exposed to information about skin cancer"	206/231 (89)	156/173 (90)	1.11 (0.58, 2.13)
Attitudes			
Answering "agree" to item: "Tanning beds are an excellent cosmetic tool"	69/240 (29)	36/183 (20)	0.60 (0.38, 0.96)
Answering "true" to item: "Tanning beds are not associated with cancer"	42/244 (17)	33/185 (18)	1.04 (0.63, 1.73)
Answering "true" to item: "Tanning beds are associated with cancer"	216/243 (89)	164/185 (89)	0.98 (0.53, 1.79)
Answering "true" to item: "Tanning beds are associated with eye cancer"	147/227 (65)	128/179 (72)	1.37 (0.89, 2.09)
Answering "true" to item: "Melanoma is a harmless form of cancer"	85/240 (35)	52/184 (28)	0.72 (0.47, 1.09)
Practices			
Answering "frequently" to item: "I refer clients to tanning beds" ^b	8/25 (32)	2/16 (13)	0.30 (0.06, 1.67)
Answering positively to item: "I speak to clients about cancer risk with tanning bed use" ^c	51/121 (42)	57/86 (66)	2.44 (1.39, 4.30)
Answering positively to item: "Personal current tanning bed usage"	58/253 (23)	28/183 (15)	0.61 (0.37, 1.00)

^a Post-survey participants have all been exposed to the educational intervention, which included the topic of tanning beds.

^b This statement was presented as a two-part conditional question (Appendix 1, question 3). Respondents were asked whether they refer their clients to tanning beds in the first part (3a). If the answer was "Yes," then they were asked to self-evaluate the frequency of referral as "every time," "frequently," "occasionally," or "never" (3b). The proportion listed is calculated from the number of "frequently" responses out of the sum of "every time," "frequently," or "occasionally" responses.

^c This statement was presented as a two-part conditional question (Appendix 1, question 5). Respondents were asked whether they talked to their clients about skin cancer in the first part (5a). If the answer was "Yes," then they were asked if they ever did in the context of tanning beds (5c). The proportion listed is calculated from the number of "Yes" responses in 5c out of the sum of "Yes" and "No" responses in 5c.