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Tanning behavior among young frequent tanners is related to attitudes and not lack of knowledge about the dangers

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Abstract

Objective—To examine the importance of tanning among students in relation to attitudes and knowledge regarding skin cancer prevention.

Design—A cross-sectional survey.

Setting—College students at a major Midwestern university

Methods—Students were recruited to complete a self-administered questionnaire that included information on sun-sensitivity, knowledge and tanning attitudes and behaviors. Survey sampling statistical techniques that account for clustering among the 163 students recruited were used.

Results—We found a high level of skin cancer prevention knowledge; however knowledge was not related to a reduction in the importance of tanning. In many cases, higher levels of knowledge corresponded to a greater emphasis on the importance of tanning. Sunscreen use was low among this population. Those who placed an importance on tanning more often checked that they believed that “sunless tanning creams are safer than the sun”.

Conclusions—This population’s belief that they look healthier and feel better with a tan strongly influences the desire to tan. Therefore, future cancer information campaigns or other prevention efforts should directly address the desire to tan by encouraging the use of sunless tanning products as an alternative method of tanning.

Keywords

Knowledge; Attitudes; Cancer Prevention; Tanning; Ultraviolet Rays

INTRODUCTION

Ultraviolet (UV) radiation has been related to both non-melanoma and melanoma skin cancer. Non-melanoma skin cancer rates are very high and melanoma rates are increasing. Australian migration studies have provided evidence that sun exposure at an early age or long-term exposure may be of particular importance to melanoma development [1]. Early UV exposure is of concern with the expanding popularity of tanning beds and salons. Current evidence suggests an increase in melanoma risk among tanning bed users [2], presumable by increasing the overall amount of UV radiation received by individuals. Rates may continue to increase as younger populations expose more of their bodies to such units that can provide many times the exposure level of similar time spent in the sun depending on how recently the tanning bulbs were changed and the time of day and latitude of the sun exposure.

Cancer information campaigns with the goal of skin cancer prevention typically focus on increasing knowledge regarding the harmful effects of ultraviolet radiation (UVR). Previous studies of the knowledge and attitudes towards melanoma suggest that behavioral change interventions should focus on young people because they have the highest desire to tan intentionally and also the easiest access to sun [3, 4].

The Sunbed Association's (TSA) Code of Practice is based on European standard guidance that states children under age 16 should not use sunbeds [5]. Canadian researchers are also looking at more detailed guidelines. Of the 50 states in the United States (US), 28 have restricted access to tanning salons for minors [6]. Some states restrict access below specific ages (ranging from 14–18); others require permission of a parent or guardian. Additional states have a combination of these two types of restrictions. Prior to 2008, 7 of the 12 Midwestern states had tanning salon laws that restricted use by minors, including Illinois, Indiana, Michigan, Minnesota, North Dakota, Ohio and Wisconsin [6].

The purpose of this study was to examine how the knowledge of the dangers of UVR and tanning attitudes relate to the perceived importance of tanning among frequent tanners. Thus, we have targeted college students, age 18–23, who were expected to have high tanning rates. More specifically, we targeted sorority and fraternity students, because members of this group typically have higher disposable income than other college students, and they may be subject to greater influence from their peers to tan.

METHODS

Study Population

Students from eight social organizations for college women (sororities) and men (fraternities) with 10 or more members were recruited at a Midwestern university in the US during the spring semester. Subjects were asked to complete a self-administered questionnaire that included information on sun-sensitivity, tanning attitudes and behaviors, sunburns, and family history of skin cancer. Of the 165 participants, two were excluded: one completed a questionnaire with random answers and extreme inconsistencies (identified based on the skip patterns); another was non-Caucasian and had a low baseline inherent risk of skin cancer. One additional student who did not respond to the question on the importance of tanning was excluded from these analyses. Thus, our final sample consisted of 162 students.

Our survey included host factors such as gender, age, year in college, skin color, hair color, eye color, tendency to sunburn, and inability to tan. Knowledge questions included true-false items and items on a five-point likert scale (from strongly agree to strongly disagree). Additionally, we solicited information on attitudes related to motives for using different tanning methods.

Statistical Analysis

Descriptive statistics were used to examine the sample characteristics. Survey sampling statistical techniques were used with a finite population correction [7, 8]. Sampling weights were computed from the selection probabilities at each stage [8]. The Taylor expansion method was used to estimate the standard errors of the estimators for the means [7, 9]. The variance estimates also accounted for the clustering of the students associated with the same sorority or fraternity house, since students in these social organizations tend to have many similar characteristics. Differences in frequency distributions were based on a Wald log-linear F-test. All analyses were conducted within SAS version 9.1.2 [10], and involved PROC SURVEYFREQ and PROC SURVEYLOGISTIC [7].

RESULTS

Our analyses examined 162 eligible participants who ranged in age from 18–23 years. The study population was predominantly female (73%) and white (99%). Self-reported skin color of the upper inner arm had 51 percent reporting that they are fair skinned, 46 percent reporting medium skin color and only 3 percent reporting dark skin.

Artificial UVR tanning

This population was specifically chosen as one with high UVR exposure due to intentional tanning. This was verified by both the attitudes towards tanning and artificial UVR tanning behavior. Among those surveyed, 84 percent on average (77% of males and 89% of females) felt that having a tan is very or somewhat important (Table 1). Among males (fraternity students), 58 percent had ever used a “sunlamp, tanning lamp or sunbed” compared to 99 percent of female (sorority) students. Fifty-two percent of males and 94 percent females reported doing so in the past year. Among females, 96 percent reported more than 10 artificial UVR tanning sessions in their lifetime, whereas only 39 percent of males surveyed reported more than 10 sessions (Table 1).

Sun Sensitivity

Self-reported skin color was not related to perceived importance of tanning. Responses for tendency to sunburn minimally increase from no burn to a mild burn to severe sunburn. A significant increase was seen among participants who reported sunburns that turned to a tan (OR= 5.5; 95% confidence interval of 2.3–13.2). Thus, participants who put importance on tanning were more likely to report sunburns that turned to tans.

Knowledge about skin cancer prevention

Believing that a tan is very or somewhat important was related to correct, rather than reduced, knowledge about cancer prevention. Participants, who understood that sunburning to get a tan is harmful, or that sunlamps are not safer than the sun, were more likely to report that tanning is important (Table 2). The belief that sunless tanning creams are safer than the sun was also high among those who feel that a tan is important (Table 2). Accurate knowledge on other items regarding sun exposure was also related to an increased importance of tanning. Thus, knowledge did not correlate with a decreased importance of tanning. While many participants had good knowledge about skin cancer prevention, they were likely to continue to sunbathe or use tanning beds in spite of their knowledge.

Tanning attitudes

Reporting that a tan was important was related to feeling better, feeling more attractive or looking healthier with a tan (Table 3). Those who felt that it is important to have a tan reported tanning because it makes them feel better (OR=7.5) rather than because of what their friends thought. The personal preference for a tan was more related to items focused on feeling attractive (OR=5.5) and looking healthy (OR=2.2) than was the desire to feel thinner or to cover up skin problems. When comparing responses of those who agreed on specific attitudes to those who disagreed or were neutral in each case, we found that the attitudes that corresponded best to the feeling that tanning is important included feeling: better with a tan, that a tan is attractive, that lack of a tan is unattractive, that tanned skin looks healthier than untanned skin, and that their friends and the media support the idea that a tan is attractive (Table 3).

These tanning attitudes may also be reflected in the low level of sunscreen use. Overall, only 12 percent reported using sunscreen, with the highest use among those reporting their skin

color as “dark” (36%) and the lowest for those self-reporting to be “fair” skinned (8%). The low use of sunscreen among “fair”-skinned students is indeed troubling.

Reasons for using specific methods of tanning

While we did not specifically ask if subjects “had ever sunbathed”, most students gave evidence of “ever sunbathing” in stating their preference for sunbathing in comparison of other tanning methods. Therefore, when looking at reasons for sunbathing we included all participants in the analyses, whereas analyses of reasons for using artificial UVR or sunless tanning creams were restricted to participants who had ever used that product. We examined reasons for artificial UVR use by asking participants to check all reasons that apply. Similar information regarding use of sunless tanning creams was also assessed. Table 4 describes the frequency of various reasons for tanning. Feeling better with a tan was the most frequently cited reason for tanning and specifically for using either artificial UVR or sunless tanning creams. Perceptions that friends feel a tan is attractive was high overall, but not frequently given as a reason for use of artificial UVR or sunless tanning creams. While artificial UVR users rarely (8%) cited the need to reduce their sunbathing as a reason for using artificial UVR, about one-third (32%) of sunless tanning cream users stated using the creams to reduce both sun exposure (sunbathing) and artificial UVR exposure. Additionally, sunless tanning cream use was preferred among users because they believed sunless tanning creams were safer than the sun or artificial UVR (Table 4). Sunbathing was preferred by many because it is cheap (45%) and convenient (44%).

DISCUSSION

Our participants clearly had knowledge about the dangers of sun exposure and artificial UVR tanning, yet they still had a strong desire to tan and tanned frequently. Research shows merely providing knowledge does not change behavior. We found those who felt a tan was important had higher knowledge about the harmful effects of sunlamps and the harmful effects of sunburning to get a tan. Other studies have likewise shown that, while knowledge is important, it is not sufficient to change behavior [11]. Several studies have reported that although teens know that sun exposure is harmful to the skin, they continue to sunbathe and use artificial UVR tanning beds [12–15]. We also found this among our participants. One survey indicated that, in spite of 78 percent of teens knowing that sun exposure damages the skin, as many as 66 percent nevertheless opted to tan because they believed that they look healthier with a tan [13]. Other studies have revealed that some allow themselves to tan simply because they find covering up in the sun to be “a hassle” [16]. Thus, behavioral interventions on sun protection may need to focus on changing attitudes regarding the perceived healthiness and attractiveness of having a tan and focusing less on increasing knowledge of skin cancer.

The social desirability of tanned skin has led to a tremendous growth in tanning salon use and in the domestic use of tanning lamps. Exposure to sun and artificial UVR may be modified if the public is aware of the potential danger. However, among frequent tanners with a strong desire to tan, this will be difficult. Because younger populations already have knowledge of the dangers of UVR exposure but consider a tan socially desirable, they may need to ultimately be convinced that looking tan is not healthier for change to occur. Among the participants of our study, the desire to tan appears to be based on looking and feeling good. A few other studies have also reported that social desirability to tan is important [12, 17]. Indeed, positive attitudes towards tanning and sun exposure are good predictors of increased sun exposure and sunburns [18, 19]. The importance of tanning may also affect sun-protection behaviors. Some research shows that sun-sensitive adolescents are more likely to participate in sun-protective behavior [20], but this was not seen in our study. Our population of frequent tanners showed the lowest sunscreen use (6%) among “fair” skinned

participants. Perhaps being among frequent tanners puts so much pressure on sun-sensitive women in the sororities that they resort to not using sunscreen. Changing such attitudes should be targeted in cancer prevention efforts. While changing such attitudes may be difficult, behavior change theories may provide a beginning. Changing subjective norms regarding tanned skin may provide a positive reinforcement for young people, especially if these norms are reflected in behavior among celebrities or models. Promoting alternative methods of tanning as normative might also encourage positive behavior.

Several factors need to be considered before choosing behavior change theories that might apply to interventions aimed at reducing sunbathing and artificial UVR exposure among frequent tanners. Given that knowledge of the harmful effects of UVR is high in this population but it is not related to their behavior may affect the model choice. Attitudes towards tanning as well as perceived norms of friends and norms expressed in the media do appear to be associated with behavior. Changing subjective norms regarding tanned skin may provide a positive reinforcement for young people, especially if these norms are reflected in behavior among celebrities or models. Promoting alternative methods of tanning as normative might also encourage positive behavior.

Future skin cancer prevention campaigns should target high risk populations, such as college students, whose members may already have knowledge regarding the dangers of UVR exposure. This creates an important challenge: finding behavior change modalities that incorporate this population's desire to tan. Since knowledge does not appear to change tanning behavior, safer methods of tanning should be considered. Currently, the use of sunless tanning products appears to be the safest method of prevention, since the other possibilities, such as sunscreen use are correlated with increased UVR exposure in some populations [21]. Finding ways to alter attitudes and beliefs may be particularly important since reducing sunbathing may be difficult because it is inexpensive and often used for relaxation. Highlighting the safer alternative of using sunless tanning products to achieve reduced UVR exposure effect might be effective in shifting tanning practices among those who are relatively well-informed about the dangers of UVR. Our data suggest that about one-third of sunless tanning cream users do so to reduce their UVR exposure and about half state using these creams because they are "safer than lying in the sun or under tanning lamps." Over half of artificial UVR users stating that they use tanning beds before going in the sun. Therefore, campaigns may encourage sunless tanning cream use along with applying and re-applying sunscreen (with greater than 15 SPF) as an alternative to using tanning beds prior to scheduled outdoor sun exposure.

Some studies have shown that tanning behavior can be modified. In Tennessee, college-age females reduced their use of artificial UV tanning when educated on the its damaging effects [22]. In Australia, campaigns in the 80's and 90's were developed in response to public awareness that skin cancer was a community and national issue [23]. While these campaigns showed promise [23], recent studies in this area indicate sun protection practices among adolescents are declining significantly over time [24]. Campaigns must continue to be maintained at a high level in order to sustain the effect of sun protection in new cohorts each year.

Although other student populations may not have as high a tanning behavior, these sorority women in particular exhibit high-risk behavior with respect to UVR exposure. The unique study population surveyed here represents a group of college students, soon to be young working adults, at high risk of damage from UVR. This attitude may continue to be reflected in their participation in sunbathing and artificial UVR tanning. Some of their tanning behaviors may naturally be reduced as they move into the work force, but they will retain the damage already received, and this will put them at increased risk of skin cancer as they

age. Of concern is recent data from Australia indicating the percentage of adults expressing positive attitudes towards tanning shows an upward trend in recent years [24]. If college students continue to place high importance on tanning as their access to sunbathing decreases when they enter the work force, they may increase their artificial UVR exposure; thus increasing their cumulative UVR exposure and risk of skin cancer.

Conclusions

Skin cancer prevention is an important public health issue. Since early exposure is important in the development of melanoma and early attitudes may contribute to continued tanning behavior, changing behavior among college students is important. This is especially true given their strong desire to tan. Studies of specific methods for changing such behavior are needed. If health promotion campaigns can successfully increase sun protection and cessation of tanning salon use by changing attitudes towards having a tan, then they may have an impact on the incidence of melanoma or other non-melanoma skin cancers.

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Abbreviations

UVR	ultraviolet radiation
OR	odds ratio
CI	confidence interval

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Table 1

Tanning habits among sorority and fraternity students, stratified by gender and based on a cross-sectional survey.

	Males %	Females %	P-value*
Importance of having a tan			
Very important	8.2	6.5	
Somewhat important	68.8	83.0	
Not important at all	23.1	10.5	
Important to avoid getting a tan	0.0	0.0	0.0691
If you like to have a tan, what method do you prefer to obtain a tan? (assuming all options were available to you, e.g., during the summer)			
Tanning bed / sun lamp	4.4	12.4	
Tanning lotion / spray on tan	2.3	5.2	
Sunbathing	86.9	66.9	
No preference	6.5	15.4	0.02
Ever using sunlamp, tanning lamp or sunbed in order to get a tan (artificial UVR tanning)			
Yes	58.3	99.3	
No	41.7	0.7	<0.01
Use in the past year			
0 times	47.9	5.6	
1–5 times	15.3	11.5	
6–10 times	18.4	15.2	
11–15 times	9.2	15.8	
16–20 times	3.1	14.4	
>20 times	6.1	37.4	<0.01
Lifetime Use			
0 times	41.7	0.7	
1–5 times	9.2	1.4	
6–10 times	10.3	1.5	
11–20 times	8.1	4.1	
20–50 times	21.5	37.6	
>50 times	9.2	54.7	<0.01

*P-value based on a two-sided Wald log-linear F-test

Table 2

Knowledge items as predictors of the perceived importance of tanning (n=162)*

Knowledge Items:	%	Crude OR
Sunlamps are safer than the sun (false statement)		
True	13.6%	reference
False	86.4%	2.7 (1.0–7.2)
Sunburning to get a tan is not harmful (false statement)		
True	4.8%	reference
False	95.2%	3.9 (1.7–9.1)
Sunless tanning creams are safer than the sun (true statement)		
False	14.2%	reference
True	85.8%	2.6 (1.6–4.1)
The strength of the sun's rays is increased at the top of mountains (true statement)		
False	25.7%	reference
True	74.3%	2.4 (1.7–3.4)
Moles are unrelated to sun exposure (false statement)		
True	6.7%	reference
False	93.3%	3.8 (1.0–14.8)
Sunlamps can be dangerous (true statement)		
Disagree or are neutral	7.6%	reference
Agree	92.4%	1.5 (0.4–6.1)
Ultraviolet lamps can cause some skin damage (true statement)		
Disagree or are neutral	6.3%	reference
Agree	93.7%	1.8 (0.4–8.1)

*Tanning considered to be "very" or "somewhat important" compared to "not important".

Table 3

Attitudes regarding tanning and sun exposure as predictors of the perceived importance of tanning (n=162) *

Tanning Attitudes:	Subjects reporting attitudes	Crude OR†
I like a tan because (check all that apply)		
I think a tan makes me look thinner	23.3%	1.9 (0.3–10.9)
I just feel more attractive with a tan	66.7%	5.5 (3.0–9.8)
I think a tan makes me look healthier	55.4%	2.2 (1.0–4.4)
I think a tan makes my skin problems less noticeable *	29.4%	0.7 (0.3–1.7)
I use sunlamps, tanning lamps or sunbeds (check all that apply)		
…because I feel better with a tan	68.1%	7.5 (3.4–16.7)
…because my friends think I look better with a tan	6.8%	1.8 (0.3–11.3)
…before I know I am going to be in the sun	48.9%	2.2 (0.7–6.5)
…so that I can spend more time in the sun	11.4%	1.8 (0.7–4.9)
…so I don't need to sunbathe as often	6.8%	0.8 (0.2–3.1)
I feel better with a tan		
Disagree or are neutral	10.6%	reference
Agree	89.4%	4.6 (2.8–7.4)
I feel a tan is attractive		
Disagree or are neutral	9.0%	reference
Agree	91.0%	15.9 (9.8–25.7)
I feel unattractive when I don't have a suntan		
Disagree or are neutral	59.7%	reference
Agree	40.3%	5.7 (1.6–20.6)
Tanned skin looks more healthy than untanned skin		
Disagree or are neutral	34.7%	reference
Agree	65.3%	3.1 (1.7–5.6)
My friends feel a tan is attractive		
Neither or disagree	18.6%	reference
Agree	81.4%	4.7 (2.0–10.8)
The media suggests that a tan is attractive.		
Disagree or are neutral	14.4%	reference
Agree	85.6%	3.3 (1.5–7.3)

* Tanning is "very" or "somewhat important" compared to "not important".

† Reference group is those not reporting the behavior unless otherwise specified.

Table 4

Reasons for using specific tanning methods: sunbathing, tanning bed/salon use, and sunless tanning cream use.

Tanning attitudes among:	sunbathers (n=162)*	tanning bed users (n=137)**	sunless tanning cream users (n=54)
I feel better with a tan	87.6%	77.4%	44.4%
My friends feel a tan is attractive	79.6%	7.3%	7.4%
Before I know I am going to be in the sun		54.7%	3.7%
So that I can spend more time in the sun		14.6%	1.9%
It is a more efficient way to get a tan	15.4%	27.7%	9.3%
I can get a deeper tan than I can with other methods	28.4%	6.6%	3.7%
I think it is relaxing	72.2%	35.0%	
I think it is safer than			
…lying in a tanning bed or under a tanning lamp	18.5%		
… lying in the sun		1.5%	
… lying in the sun or under a tanning lamp			50.0%

*We included all participants since our data provided evidence that all participants except 3–7 males had sunbathed and prefer to sunbathe.

**Tanning bed use defines as “sunlamp, tanning lamp or sunbed users”.