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Intentional outdoor tanning in the United States: Results from the 2015 *Summer ConsumerStyles* survey

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Abstract

There is limited literature about adults in the United States who usually or always spend time outdoors for the purpose of developing a tan, defined as intentional outdoor tanning. Using data from the 2015 *Summer ConsumerStyles*, an online cross-sectional survey weighted to the US adult population (n=4,127), we performed unadjusted and adjusted multivariable logistic regressions to examine the associations between demographic characteristics, behaviors, and belief factors related to skin cancer risk and intentional outdoor tanning. Nearly 10% of the study population intentionally tanned outdoors. Outdoor tanning was more prevalent among women (11.4%), non-Hispanic white individuals (11.5%), those aged 18–29 years (14.1%), those without a high school diploma (12.7%), and those in the northeast United States (13.2%). The adjusted odds of outdoor tanning were significantly higher among women than men (adjusted odds ratio [AOR] 1.51, 95% confidence interval [CI] 1.12–2.04); those with a history of indoor tanning or recent sunburn than those without (AOR 2.61, CI 1.94–3.51; AOR 1.96, CI 1.46–2.63, respectively); those who agreed they looked better with a tan than those who did not (AOR 6.69, CI 3.62–12.35); and those who did not try to protect their skin from the sun when outdoors than those who did (AOR 2.17, CI 1.56–3.04). Adults who engaged in other risky behaviors that expose a person to ultraviolet (UV) radiation were more likely to tan outdoors, further increasing their risk of skin cancer. These findings may guide potential interventions to reduce UV exposure from outdoor tanning.

Keywords

Skin cancer; Sunbathing; Ultraviolet rays; Outdoor tanning; Sun exposure

1. Introduction

Skin cancer is the most common cancer in the United States, and overexposure to ultraviolet (UV) radiation from the sun is a major, and preventable, risk factor (U. S. Department of Health Human and Services, 2014). A previous study reported that 71% of adults use some type of sun protection (shade, protective clothing, or sunscreen with SPF15+), while only

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Conflict of interest statement

The authors have no conflicts of interest to disclose.

one-third use sunscreen (National Cancer Institute. National Institutes of Health. U.S. Department of Health and Human Services, 2017). More than one-third of adults (37%) get sunburned each year, including half under age 30 (Holman et al., 2014). Sunbathing or spending time outdoors for the purpose of developing a tan is a potentially dangerous source of UV exposure and to our knowledge, there is limited research from national surveys on this topic in the United States.

A pooled analysis of 10 studies published from 1992 to 2009 found that about one-third of adolescents and adults were engaged in sunbathing (Dennis et al., 2009). A recent Austrian study found that almost half of adults (47%) sunbathed >5 times a year (Haluza et al., 2016). Among studies of American college students, outdoor tanning prevalence was as high as 70% overall and 87% among women (Poorsattar and Hornung, 2007; Cafri et al., 2009). Perceptions of appearance have been cited as a motivation for sunbathing in some studies (Cafri et al., 2009; Gillen and Markey, 2012) but not in others (Day et al., 2013; Heckman et al., 2009). Greater peer sunbathing norms and perceived benefits of tanning have also been associated with outdoor tanning (Jackson and Aiken, 2000; Dunn, 2014).

To help guide efforts to reduce UV exposure, we used data from an online cross-sectional survey to describe the characteristics of US adults who usually or always spend time outdoors for the purpose of developing a tan, defined as intentional outdoor tanning.

2. Methods

We analyzed data from the 2015 summer wave of Porter Novelli's[1] *ConsumerStyles* database (Porter Novelli Public Services, 2015). The *ConsumerStyles* database is built each year from a series of web-based surveys given to members of GfK's KnowledgePanel®[2] to gather information including health behaviors and beliefs of the adult US population. In June 2015, *Summer ConsumerStyles* questionnaire was emailed to 6172 adults aged 18 years or older, who previously completed the 2015 spring wave of the *ConsumerStyles* survey. 4127 surveys were returned resulting in a response rate of 67%. The median completion time was approximately 22 min. Respondents were not required to answer any of the questions and could exit the survey at any time. Upon completion, respondents received reward points (approximately $5) and were entered in a monthly sweepstakes. The data were weighted to match the US Current Population Survey proportions for sex, age, household income, race/ethnicity, household size, education level, census region, metro status, and internet access availability before joining the survey. The Centers for Disease Control and Prevention (CDC) purchased a license to use the data from Porter Novelli post-collection. Analysis of this data was exempt from institutional review board approval because CDC did not engaged in human research and personal identifiers were not included in the data file. Additional information about the study sample can be found in a previous study using the 2015 *Summer ConsumerStyles* data (Holman et al., 2017).

[1]Porter Novelli Public Services is a public relations firm with offices at 1615 L Street NW, Suite 1150, Washington, D.C. 20036.
[2]GfK's KnowledgePanel® is representative of the entire U.S. population (Porter Novelli Public Services, 2015). Members from all 50 states are recruited using probability-based sampling by address and include respondents regardless of whether or not they have landline phones or Internet access. If needed, households are provided with a laptop computer and access to the Internet. The panel is continuously replenished and maintains approximately 50,000 panelists. http://www.gfk.com/en-us/products-a-z/us/knowledgepanel-united-states/.

To measure intentional outdoor tanning, respondents were asked, *When spending time outdoors, how often do you try to get some sun for the purpose of developing a tan?* With 5 response options: *always, usually, sometimes, rarely*, and *never*. The analytic sample included 4115 adults, excluding those who refused (n=12). Because the category *always* comprised a small percentage of respondents, we combined *usually* and *always* into one category and defined it as the outcome of this study.

Respondents were asked about ever indoor tanning: *Have you EVER used an indoor tanning device, such as a sunlamp, sunbed, or tanning booth?* (National Center for Health Statistics, Centers for Disease Control and Prevention, 2015), and recent history of sunburn: *During the past 12 months, how many times have you had a sunburn?* (National Center for Health Statistics, Centers for Disease Control and Prevention, 2015). We categorized individuals as having no recent history of sunburns or having one or more sunburns.

Beliefs about sun protection and skin cancer risk were measured by indicating level of agreement with the following statements: *I think I look better with a tan* (Cokkinides et al., 2006); *I am concerned that my current sun exposure will cause wrinkles in the future*; and, *I try to protect my skin from the sun when spending time outdoors* with 5 response options: *strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree*, or *strongly agree*. For the multivariable analyses, we collapsed response options into three categories: *strongly or somewhat agree, neither agree nor disagree*, and *strongly or somewhat disagree*.

To assess skin sensitivity to the sun, individuals were asked: *After several months of not being in the sun very much, if you went out in the sun for an hour without sunscreen, a hat, or protective clothing, which one of these best describes what would happen to your skin?* (National Center for Health Statistics, Centers for Disease Control and Prevention, 2015). Individuals chose from the following: *Get a severe sunburn with blisters*; *Have a moderate sunburn with peeling; Burn mildly with some or no tanning; Turn darker without sunburn;* or *Nothing would happen to my skin*. Other demographic characteristics of interest included sex, age, education, race/ethnicity, and US census region (www.census.gov/geo/reference/gtc/gtc_census_divreg.html).

We analyzed the data with SAS-callable SUDAAN (RTI International, Research Triangle Park, NC). We conducted unadjusted and adjusted multivariable logistic regressions to examine the associations between demographic characteristics and behavioral and belief responses about sun protection and skin cancer risk with intentional outdoor tanning. We presented descriptive statistics, unadjusted and adjusted odds ratios, confidence intervals, and assessed significant findings with Wald F statistics. To avoid multiple testing, we compared the average of subcategories with similar estimates to the reference group using linear contrasts (e.g., age and region).

3. Results

The majority of the study population was female (51.7%), aged 45 years or older (53.4%), non-Hispanic white (65.6%), and had some college or a bachelor's degree or higher

education (58.1%) (data not shown). The largest proportion of individuals lived in the South US (37.0%) and 36.9% had a recent history of sunburn with a median of 2 burns.

The weighted percentages of intentional outdoor tanning among US adults are presented in Table 1. 9.5% of adults were intentionally seeking a tan outdoors and women had a higher percentage than men (11.4% vs 7.5%). Intentional outdoor tanning was most frequent among adults aged 18–29 (14.1%) and non-Hispanic whites (11.5%).

The unadjusted and adjusted odds ratios of adults who engaged in intentional outdoor tanning are presented in Table 2. Generally, a similar pattern was observed between the unadjusted and adjusted results with a few exceptions. Notably, in the unadjusted model, non-Hispanic blacks and other or multiple races (OR [unadjusted odds ratio] 0.36, 95% confidence interval [CI] 0.22–0.58) and Hispanics (OR 0.61, CI 0.39– 0.95) were significantly less likely to tan outdoors than non-Hispanic whites, but race/ethnicity was not significant in the adjusted model.

In the adjusted model, the odds of intentional outdoor tanning were higher among women than men (AOR [adjusted odds ratio] 1.51, CI 1.12–2.04) and decreased significantly with some college or higher education ($P < 0.001$). Compared with all older age categories averaged, adults aged 18–29 years were more likely to intentionally tan outdoors ($P=0.004$). Similarly, outdoor tanning was significantly higher among individuals from the Northeast than the average of other regions ($P = 0.001$).

The odds of intentional outdoor tanning among adults who had ever indoor tanned were more than twice the odds of those who had not (AOR 2.61, CI 1.94–3.51). Higher odds were also found among adults with a recent history of sunburn than among those without (AOR 1.96, CI 1.46–2.63). Adults who believed they look better with a tan were almost seven times more likely to intentionally tan outdoors than those who did not (AOR = 6.69, CI 3.62–12.35). Those who did not try to protect their skin from the sun were more than twice as likely to intentionally tan outdoors as those who did try to protect their skin (AOR 2.17, CI 1.56–3.04).

4. Discussion

Overall, 9.5% of adults engaged in intentional outdoor tanning. Adults who intentionally tanned outdoors believed they look better with a tan, did not try to protect their skin from the sun when outdoors, had a recent history of sunburn, and ever engaged in indoor tanning. Outdoor tanning was more prevalent among females and decreased with older age and education level.

The strong association between the belief of looking better with a tan and intentionally tanning outdoors supports the theory that perceptions about appearance and the desire for tanned skin are related to outdoor tanning (Cafri et al., 2009). Past studies suggest that preference for a darker tan is the primary motivator for tanning, outweighing the perceived risk of harms from UV exposure (Bränström et al., 2010).

Our study found that adults who did not use skin protective measures when spending time outdoors in the sun were more likely to intentionally tan outdoors. Outdoor tanning was also more common among those with a history of indoor tanning or those who had recent sunburns. These findings are generally consistent with other studies in the literature. A study of Austrian adults found a significant association between sunbathing (>5 times a year) and sunburn and indoor tanning, although there was no association found with level of sun protection habits (Haluza et al., 2016). An Australian study of college women found that tan avoiders had significantly lower levels sunburn and sun-protective behaviors compared to women who tanned outdoors (Day et al., 2013).

Compared to the Austrian and Australian studies showing an association between outdoor tanning and darker skin types (Haluza et al., 2016; Day et al., 2013), our findings indicate that adults with a higher skin sensitivity to the sun, who are more vulnerable to sunburn and skin cancer (Fitzpatrick, 1988), were just as likely to engage in intentional outdoor tanning as those who have skin that is less sensitive. Researchers have shown that indoor tanners tend to have fairer skin types associated with an increased sensitivity to the sun (Day et al., 2016). Given their increased risk of skin cancer, individuals with greater skin sensitivity need to be made aware of the importance of avoiding excess sun exposure from outdoor tanning.

We observed a higher prevalence of intentional outdoor tanning in the Northeast region of the US than other regions. This finding is not consistent with the regional distribution of indoor tanning, which has been shown to be more prevalent in the Midwest (Guy et al., 2015). It is possible that variations in climate and latitude influence UV levels, which may have an effect on regional differences in outdoor tanning.

Limitations to this study include the cross-sectional nature of the survey and reliance on self-reported data, which might be subject to bias. The response rate of 67% was subject to non-response bias and some estimates were limited by small sample size. However, weighting the data to the US population might have mitigated the bias. Also, to the extent that persons agreeing to participate in recurring surveys as part of a panel may have different characteristics than persons who do not agree to belong to such panels, our results may be subject to selection bias. Our measures on intentional outdoor tanning, concern that sun exposure will cause wrinkles, and trying to protect one's skin from the sun, had not been validated in previous research, although trying to protect one's skin from the sun performed well in cognitive testing (unpublished). Questions assessing intentional outdoor tanning and trying to protect one's skin from the sun did not specify a time period, potentially introducing different interpretations by respondents.

Individuals who intentionally tan outdoors engaged in other behaviors or beliefs that increase exposure to UV rays, further increasing their risk of skin cancer. This points to the need for comprehensive interventions, systems, and environmental change strategies aimed at changing perceptions about tanning, as well as reducing intentional outdoor tanning.

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Table 1

Weighted percentages of intentional outdoor tanning among US adults, *Summer ConsumerStyles* 2015.

	Total	Never (n = 1812)	Rarely (n = 1060)	Sometimes (n = 862)	Usually/always (n = 381)
	n	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Total	4115	46.1 (44.3–47.9)	24.6 (23.1–26.2)	19.8 (18.4–21.2)	9.5 (8.5–10.6)
Sex					
Male	1907	49.3 (46.6–51.9)	25.4 (23.2–27.8)	17.8 (15.9–19.9)	7.5 (6.2–8.9)
Female	2208	43.1 (40.7–45.6)	23.9 (21.9–26.0)	21.6 (19.7–23.6)	11.4 (9.9–13.2)
Age (year) (mean = 50)					
18–29	543	38.2 (33.8–42.8)	23.9 (20.2–28.0)	23.8 (20.1–27.8)	14.1[a](11.2–17.8)
30–44	919	43.2 (39.4–47.0)	25.0 (21.9–28.5)	22.5 (19.5–25.7)	9.3[a](7.5–11.6)
45–59	1374	46.6 (43.5–49.7)	25.5 (23.0–28.2)	18.9 (16.8–21.3)	9.0 (7.4–10.9)
60–86	1279	54.5 (51.5–57.5)	23.9 (21.5–26.6)	14.9 (13.0–17.1)	6.6[a](5.2–8.3)
Race/ethnicity					
Non-Hispanic white	3074	38.4 (36.5–40.4)	27.1 (25.4–29.0)	22.9 (21.3–24.7)	11.5 (10.2–13.0)
Non-Hispanic black; other & multiple races	598	70.2 (65.7–74.4)	17.0[a](13.7–21.0)	8.3[a](5.9–11.5)	4.4[a](2.8–7.0)
Hispanic	443	48.6 (43.3–53.9)	23.4 (19.3–28.0)	20.7[a](16.8–25.2)	7.3[a](4.9–10.8)
Education					
<High school	290	57.6 (51.1–63.8)	18.2[a](13.8–23.6)	11.5[a](8.0–16.4)	12.7[a](8.9–17.9)
High school	1230	47.8 (44.7–51.0)	22.4 (20.0–25.1)	18.4 (16.1–21.0)	11.3 (9.3–13.6)
Some college	1253	44.4 (41.2–47.6)	24.5 (21.8–27.4)	22.6 (20.0–25.4)	8.5 (7.0–10.4)
Bachelors or higher	1342	41.3 (38.2–44.4)	29.6 (26.8–32.5)	21.7 (19.3–24.4)	7.4 (6.0–9.1)
US region					
Northeast	723	36.6 (32.6–40.7)	27. 3 (23.7–31.3)	22.9 (19.6–26.5)	13.2[a](10.6–16.4)
Midwest	1048	38.2 (34.8–41.7)	27.1 (24.2–30.2)	22.9 (20.0–26.0)	11.8 (9.6–14.5)
South	1445	53.1 (50.1–56.1)	21.3 (19.0–23.9)	17.3 (15.2–19.6)	8.3 (6.8–10.1)
West	899	49.7 (45.8–53.5)	25.4 (22.2–28.9)	18.4 (15.7–21.6)	6.5[a](4.7–8.8)
Skin sensitivity to the sun					
Severe burn with blisters	199	64.0 (55.6–71.7)	20.4[a](14.4–28.0)	10.1[a](5.9–16.8)	5.4[a](2.6–11.0)

	Total	Never (n = 1812)	Rarely (n = 1060)	Sometimes (n = 862)	Usually/always (n = 381)
	n	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Moderate sunburn with peeling	906	38.5 (34.9–42.2)	31.7 (28.2–35.3)	19.2 (16.4–22.3)	10.7[a](8.4–13.5)
Burn mildly with some or no tanning	1410	36.8 (33.9–39.8)	28.6 (25.9–31.4)	25.1 (22.6–27.8)	9.6 (7.9–11.6)
Turn darker without sunburn or nothing	1577	54.7 (51.8–57.6)	18.7 (16.6–21.0)	17.1 (15.1–19.3)	9.5 (8.0–11.3)
Ever indoor tanned					
Yes	982	19.5 (16.8–22.5)	26.4 (23.5–29.6)	32.2 (28.9–35.7)	21.9 (18.9–25.1)
No	3111	53.1 (51.0–55.2)	24.2 (22.5–26.0)	16.4 (14.9–17.9)	6.3 (5.4–7.5)
Recent history of sunburn					
Yes (≥1 sunburn in last 12 months)	1523	29.5 (26.8–32.1)	29.4 (26.7–32.1)	26.1 (23.6–28.7)	15.1 (13.0–17.4)
No (0 sunburns in last 12 months)	2557	56.1 (53.8–58.3)	21.8 (20.0–23.7)	15.9 (14.3–17.6)	6.3 (5.3–7.5)
I think I look better with a tan					
Strongly or somewhat disagree	986	74.3 (71.0–77.4)	18.9 (16.2–22.0)	4.6[a](3.3–6.3)	2.2[a](1.3–3.6)
Neither agree nor disagree	1427	53.3 (50.3–56.3)	26.7 (24.2–29.4)	15.9 (13.7–18.3)	4.1[a](3.0–5.4)
Strongly or somewhat agree	1690	21.2 (18.9–23.6)	26.6 (24.2–29.1)	33.1 (30.5–35.7)	19.2 (17.0–21.6)
I am concerned that my current sun exposure will cause future wrinkles					
Strongly or somewhat disagree	1292	53.4 (50.2–56.6)	22.2 (19.7–24.8)	15.2 (13.0–17.6)	9.3 (7.6–11.3)
Neither agree nor disagree	1340	44.3 (41.2–47.4)	25.0 (22.4–27.8)	21.7 (19.2–24.3)	9.1 (7.3–11.2)
Strongly or somewhat agree	1474	41.1 (38.2–44.1)	26.6 (24.0–29.3)	22.1 (19.8–24.6)	10.2 (8.6–12.2)
I try to protect my skin from the sun when spending time outdoors					
Strongly or somewhat disagree	678	43.5 (39.2–47.9)	20.6 (17.4–24.3)	19.4 (16.3–23.0)	16.5 (13.6–19.9)
Neither agree nor disagree	803	45.9 (41.9–50.0)	21.1 (18.1–24.5)	22.4 (19.2–26.0)	10.5[a](8.3–13.3)
Strongly or somewhat agree	2620	46.7 (44.5–49.0)	26.9 (25.0–29.0)	19.1 (17.4–20.8)	7.3 (6.1–8.6)

Percentages are weighted to the study population.
Sample size for some variables may not add to 4115 because of missing information.
Each row totals 100%.

[a]Interpret with caution because of small sample size (n < 100).

Table 2

Unadjusted and adjusted odds ratios of US adults who intentionally tan outdoors, *Summer ConsumerStyles* 2015 (n = 4115).

	n	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)	Wald F *P*-value
Sex				0.007
Male	1907	Ref	Ref	
Female	2208	1.60 (1.24–2.06)	1.51 (1.12–2.04)	
Age (year)				0.035
18–29	543	Ref	Ref	
30–44	919	0.62 (0.43–0.90)	0.64 (0.43–0.96)	
45–59	1374	0.60 (0.42–0.85)	0.64 (0.45–0.93)	
60–86	1279	0.43 (0.30–0.62)	0.58 (0.39–0.87)	
Race/ethnicity				0.781
Non-Hispanic white	3074	Ref	Ref	
Non-Hispanic black; other & multiple races	598	0.36 (0.22–0.58)	0.82 (0.45–1.49)	
Hispanic	443	0.61 (0.39–0.95)	1.03 (0.63–1.68)	
Education				<0.001
<High school	290	Ref	Ref	
High school	1230	0.87 (0.55 1.38)	0.75 (0.46–1.22)	
Some college	1253	0.64 (0.40–1.01)	0.48 (0.29–0.79)	
Bachelors or higher	1342	0.55 (0.34–0.87)	0.37 (0.22–0.63)	
US region				0.008
Northeast	723	Ref	Ref	
Midwest	1048	0.88 (0.63–1.24)	0.62 (0.43–0.90)	
South	1445	0.59 (0.42–0.83)	0.61 (0.43–0.87)	
West	899	0.45 (0.30–0.69)	0.51 (0.32–0.80)	
Skin sensitivity to the sun				0.214
Severe burn with blisters	199	Ref	Ref	
Moderate sunburn with peeling	906	2.08 (0.92–4.68)	1.18 (0.48–2.89)	
Burn mildly with some or no tanning	1410	1.84 (0.83–4.08)	0.98 (0.40–2.35)	
Turn darker without sunburn or nothing	1577	1.83 (0.83–4.04)	1.39 (0.56–3.44)	
Ever indoor tanned				<0.001
Yes	982	4.14 (3.21–5.34)	2.61 (1.94–3.51)	
No	3111	Ref	Ref	
Recent history of sunburn				<0.001
Yes (≥1 sunburn in last 12 months)	1523	2.65 (2.06–3.42)	1.96 (1.46–2.63)	
No (0 sunburns in last 12 months)	2557	Ref	Ref	
I think I look better with a tan				<0.001
Strongly or somewhat disagree	986	Ref	Ref	
Neither agree nor disagree	1427	1.90 (1.04–3.47)	1.55 (0.81–2.95)	
Strongly or somewhat agree	1690	10.66 (6.16–18.42)	6.69 (3.62–12.35)	

	n	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)	Wald F *P*-value
I am concerned that my current sun exposure will cause future wrinkles				0.302
Strongly or somewhat disagree	1292	Ref	Ref	
Neither agree nor disagree	1340	0.98 (0.71–1.35)	1.15 (0.81–1.64)	
Strongly or somewhat agree	1474	1.12 (0.83–1.50)	0.87 (0.62–1.21)	
I try to protect my skin from the sun when spending time outdoors				<0.001
Strongly or somewhat disagree	678	2.51 (1.87–3.37)	2.17 (1.56–3.04)	
Neither agree nor disagree	803	1.50 (1.08–2.06)	1.75 (1.21–2.52)	
Strongly or somewhat agree	2620	Ref	Ref	

Multivariable analysis included all displayed factors and was based on the weighted population of the study.