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Health insurance relationship to sun protection practices and beliefs

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Abstract

Purpose: Lower socioeconomic status is associated with decreased sun protection practices. This survey study investigated practices and beliefs surrounding sun protection based on health insurance.

Methods: 401 surveys were administered May to June 2019 at two dermatology clinics in Sacramento, California. 384 surveys by private insurance, Medi-Cal (California's Medicaid), and Medicare coverage were analyzed.

Results: Patients with Medi-Cal are twice as likely to rarely or never use sunscreen (OR=2.37; 95% CI 1.45-3.87; P<0.001) compared to those with private insurance. Patients with Medi-Cal or Medicare are less likely to use sunscreen (P<0.001), protective clothing (P=0.025), and sun avoidance (P=0.028). Medi-Cal patients more often used tanning beds (OR=4.90; 95% CI 1.30-18.50; P=0.019). Over half of patients with Medi-Cal agreed it is worth getting burned for a tan (54.6%, OR=2.54; 95% CI 1.41-4.62; P=0.0021). There were no significant differences in opinion that sunscreen is a hassle to apply or expensive. Groups did not differ significantly in ethnicities or skin type.

Conclusion: Those with Medi-Cal are less likely to use all forms of sun protection and more likely to value tanning. Negative opinions of sunscreen and perceived knowledge and concern for skin cancer were similar, pointing to additional factors influencing these disparities.

Introduction

Skin cancer is a growing problem in the developed world even though it is largely preventable by avoiding exposure to UV radiation [1]. The continued practice of sun protective behaviors is essential to decreasing one's skin cancer risk, but adherence to recommendations is often low [2,3]. The literature suggests that fewer than half of people in developed countries practice these recommendations and that adherence rates are even lower in people of low socioeconomic status (SES), [1-3]. In addition, underserved communities often lack access to dermatologic care and lower SES is associated with worse skin cancer outcomes [2].

Significant positive associations between SES and sun-protective behaviors have been found for some, but not all protective methods. Even so, sunscreen use uniformly appears to be higher among high-SES individuals [2]. In addition, a large literature review outlined a positive association between sun protection behavior and education level, but found a mixed consensus on the positive association between SES and sun protection [3]. Additional studies are needed to clarify these relationships.

To our knowledge, no studies to date compare sunscreen use and perceptions from an insurance-based approach. These findings could present specific targets for patient education and skin protection interventions for state and national providers. Skin cancer prevention is economical for all parties involved and large-scale efforts stemming from third party payers could have major impacts.

Keywords: behavior, health insurance, socioeconomic status, sun protection

Understanding the perceptions of sunscreen and other sun protective measures is an important step in skin cancer prevention. A review of the literature indicates that sunscreen is seen as expensive, messy, and time consuming to apply. Sunscreen is also perceived as a potential irritant or allergen [4]. Studies conclude that people generally see their risk of developing skin cancer as low, decreasing the likelihood of practicing sun protection [4]. Investigating these perspectives in a dermatology clinic-based Medi-Cal (California equivalent of Medicaid in other states) population can identify interventional targets.

Methods

The survey was reviewed and exempted by the University of California, Davis Institutional Review Board. Participants were recruited from the University of California, Davis Dermatology Clinic, as well as the Pacific Skin Institute. The inclusion criteria included English-speaking adults aged 18 years or older who agreed to take the survey.

Survey

Participation of subjects who met inclusion and exclusion criteria was anonymous and voluntary and subjects were not compensated for their time. The survey was deployed through Survey Monkey and consisted of 25 questions assessing sun protection habits and beliefs and demographics including current health insurance.

Statistical analysis

Chi-squared and Fisher exact tests compared survey responses using the program R. A P value <0.05 was considered significant. Subjects were divided into those with private health insurance, Medi-Cal, and Medicare. Data analysis by ethnicity compared "White" and "Non-White." Patients were only allowed to choose one ethnicity, and those who marked "Other" were excluded from analysis.

Results

We collected 401 completed, anonymous surveys between May 22, 2019 and June 18, 2019 at the Pacific Dermatology office and the University of

California Davis Dermatology offices in Sacramento, California. We analyzed 384 surveys comparing responses based on private insurance versus Medi-Cal coverage and Medicare coverage. We also performed analysis comparing ethnicity with White versus all other ethnicities.

Survey participants ranged from age 18 to 87 with an average age of 52.2. As a whole, 58.1% (233/401) were female, 41.4% (166/401) were male and 0.5% identified as non-binary (2/401). The majority of participants were born in the United States (84.04%) and grew up only or mostly in the U.S. (84.04%). The largest represented ethnicity was White (62.84%) followed by Hispanic or Latinx (12.97%) and Asian or Asian American (8.98%). Over half of subjects had not attained a bachelor's degree (56.37%) and of those who responded, most had an annual income below \$75,000 (63.1%).

Demographics

With regard to education, the majority of subjects with private insurance attained a bachelor's degree or greater (56.45%), ([Table 1](#)). In the Medi-Cal insurance group, the majority attained no more than some college credit without a degree (57.92%). The majority of those with Medicare had attained no more than some college credit or an associate degree (58.44%).

Analysis of differences in ethnicities (Medi-Cal versus non) revealed no significant difference ($P=0.98$), although White comprised the largest proportion in those with Medicare (77.9%), followed by Medi-Cal (66%), and lastly private insurance (57%). The largest proportion of Latinx was in the private insurance group (15.6%) followed by Medicare (9.1%), with the smallest proportion in the Medi-Cal group (8.3%).

Sun protection behaviors

Our results indicate that patients with private health insurance are more likely to use sunscreen frequently or very frequently (61.8%), whereas patients with Medi-Cal are twice as likely to report rarely or never using sunscreen (OR=2.37; 95% CI 1.45-3.87; $P=0.0005$), ([Table 2](#)). Additionally, patients with Medi-Cal or Medicare are less likely to protect themselves from the sun with sunscreen (Medi-Cal OR=0.55; 95% CI 0.33-0.92; $P=0.024$), (Medicare

OR=0.37; 95% CI 0.21-0.66; P<0.001), protective clothing (Medi-Cal OR=0.56; 95% CI 0.35-0.90; P=0.017), (Medicare OR=0.56; 95% CI 0.32-0.97; P=0.034), and sun avoidance (Medi-Cal OR=0.53; 95% CI 0.33-0.85; P=0.0078), (Medicare OR=0.76; 95% CI 0.44-1.29; P=0.30) than patients with private health insurance (Table 2).

Skin cancer perceptions and risk

Our analysis did not reveal a significant difference in patient’s concern for developing skin cancer, perceived knowledge about skin cancer or perceived chances of developing skin cancer in the future based on insurance group. Even so, the greatest proportion of patients who viewed themselves as having a lower-than-average chance of developing skin cancer was in the private insurance group (30.6%; P=0.16, $\chi^2=6.6133$, df=4). This proportion was only 23.1% in the Medi-Cal group and 16.89% in the Medicare group. The proportion who believed they had a below average or average chance of developing skin cancer was similar throughout groups (63.0% for private insurance, 63.6% for Medi-Cal and 63.6% for Medicare; P=0.16, $\chi^2=7.63$, df=6). The rest were either unsure or believed they had a higher-than-average chance. This suggests that

perceived risk of developing skin cancer may not be the greatest contributor to the likelihood that these populations use sunscreen and other sun protection methods.

Whether or not these groups considered sun rays as the most important factor that causes skin cancer was not significantly different. Most participants did not get sunburned in the past year, but this differed based on insurance group. Most patients in the Medicare group had no sunburn (63.6%), about half (55.4%) of those with private insurance had no sunburn, and less than half (44.6%) of Medi-Cal patients had no sunburn (P=0.15).

Sunscreen opinions

The most important factors when selecting a sunscreen for all groups were SPF number and ingredients. Additionally, no significant difference was seen between groups’ opinions that putting on sunscreen is a hassle (P=0.20, $\chi^2=5.95$, df=4) or that it is expensive (P=0.80, $\chi^2=1.6$, df=4). Nonetheless, 13% of patients with Medicare reported that they could not afford sunscreen, making them four times less likely than those with private insurance to afford this sun protective measure (OR=0.25; 95% CI 0.13-0.50;

Table 2. Univariate analysis comparing insurance coverage to survey responses.

Response	Health insurance Yes response (Percent)		
	Medi-Cal	Medicare	Private
Rarely or never use sunscreen.	53 (43.8)	31 (40.2)	46 (24.7)
OR (CI)	2.37 (1.45-3.87)	2.05 (1.17-3.61)	1 [Reference]
Use sun protective clothing	69 (57.0)	44 (57.1)	131 (70.4)
OR (CI)	0.56 (0.35-0.90)	0.56 (0.32-0.97)	1 [Reference]
Avoid sun or seek shade	43 (35.5)	34 (44.2)	95 (51.1)
OR (CI)	0.53 (0.33-0.85)	0.76 (0.44-1.29)	1 [Reference]
I can afford sunscreen	94 (77.7)	54 (70.1)	168 (90.3)
OR (CI)	0.37 (0.20-0.71)	0.25 (0.13-0.50)	1 [Reference]
It is worth getting burned for a tan	32 (26.4)	9 (11.7)	23 (12.4)
OR (CI)	2.54 (1.41-4.62)	0.94 (0.41-2.13)	1 [Reference]
Use an ultra-violet tanning bed	9 (7.44)	1 (1.30)	3 (1.61)
OR (CI)	4.90 (1.30-18.50)	0.80 (0.082-7.83)	1 [Reference]

P=0.0001), (**Table 2**). Together, our data point to multiple factors influencing the use of sun protection.

Tanning

Compared to patients with private health insurance, those with Medi-Cal were nearly five times as likely to use ultraviolet tanning beds (OR=4.90; 95% CI 1.30-18.50; P=0.019), (**Table 2**). In addition, patients with Medi-Cal are more than twice as likely to agree it is worth getting burned to get a tan (OR=2.54; 95% CI 1.41-4.62; P=0.002). Medicare patients were least likely to tan using any method (P=0.0094, $\chi^2=9.3375$, df=2) and were least likely to agree that it is worth getting burned to get a tan (88% reported “no”; OR=0.94; 95% CI 0.41-2.13; P=0.88). It appears that patients with Medi-Cal insurance value tanning more than other groups.

Ethnicity analysis

We also analyzed responses based on ethnicity. When it comes to sun protection and skin cancer beliefs, White patients are twice as concerned as non-White patients that they will develop skin cancer (OR=2.11; 95% CI 1.38-3.23; P<0.001). Whites described an average or higher than average perceived risk of skin cancer five times more often than non-Whites (OR=5.63; 95% CI 3.56-8.89; P<0.001). In contrast, non-Whites were significantly less confident in their knowledge about skin cancer (OR=0.43; 95% CI 0.31-0.73; P<0.001). Interestingly, non-Whites are three times as likely to agree it is worth getting burned for a tan (OR=3.17; 95% CI 1.34-7.55; P=0.0089). It appears that White patients have a greater perceived understanding of skin cancer and a greater risk for it.

Discussion

Our data points to differences in sun protection practices among insurance groups that go beyond negative opinions of sunscreen, ethnicity, and perceived risk of skin cancer. Those with Medi-Cal are more likely to be of lower socioeconomic status, practice fewer sun protection measures, and tan more often, highlighting areas for intervention. Based on 2018 data, in Sacramento county, 29.9% of those with insurance are covered with Medi-Cal and

an estimated 22.7% are covered with Medicare [5]. Medicaid insures over 72 million individuals annually and its expenditures are predicted to grow, so understanding this population and its risks to preventable illness is important [6].

Sun protection and socioeconomic status

The insurance groups differed in SES and sun protection behaviors. Those with Medi-Cal reported the greatest behavioral gaps in preventing excessive sun exposure; however, there were no significant differences in confidence in skin cancer knowledge or self-perceived risk. Overall, lower SES is correlated with reduced preventative care [7]. At least half of this association with regard to skin cancer is believed to be mediated by individuals' knowledge and perceptions of sun protection [2,7]. Our results indicate that those in the lower SES Medi-Cal group perceive sun protection as a lower priority irrespective of knowledge or sun burn frequency.

Barriers to sunscreen use

A systematic review by Garside, et al. reveals that most people view their susceptibility to skin cancer as low and barriers to applying sunscreen include perceptions of it being expensive, messy, or time consuming to apply [4]. In our study, we did not see a significant difference in belief that sunscreen was a hassle to apply and within groups, responses were evenly spread (agree, neither agree nor disagree, disagree). Compared to those with private insurance, participants with Medi-Cal and Medicare were three and four times less likely to report being able to afford sunscreen, respectively. This could be related to the majority of those with Medicare having a fixed income or none at all. Over half of those with Medi-Cal reported an income below the federal poverty line for a four-person household [8].

Skin cancer and ethnicity

It is known that there are differences in incidence and presentation of melanomas among ethnic groups [3,10,11]. A study based in Sacramento used the California Cancer Registry compared melanoma cases among Hispanic, Asian, and Black people to non-Hispanic White cases. Those in the Hispanic, Asian, and Black groups were far more likely to be diagnosed with melanoma that had metastasized to a distant site and was at a later stage than their White

counterparts [9]. These groups were also more likely than non-Hispanic Whites to be diagnosed with acral lentiginous melanoma, which is associated with the worst prognosis of cutaneous melanomas, likely due to later stage at time of presentation and greater tumor thickness [10,11]. Though acral lentiginous melanoma is not associated with sun exposure, these groups may have higher incidence of later stage melanoma related to lower skin cancer awareness [11].

Our participants that were non-White described a lower perceived risk for developing skin cancer (OR=0.178; 95% CI 0.11-0.28; P<0.001) and less confidence in their knowledge of skin cancer (OR=0.43; 95% CI 0.31-0.73; P<0.001). A low-risk perception by patient and clinicians and suboptimal access to care is known to play a part in delayed diagnosis and treatment of skin cancer in minority groups [12,13].

Limitations

Limitations include the self-reported nature of the data at risk for response biases: recall and social desirability [14,15]. Confounding variables in comparison groups such as age, gender, educational status, and family history of skin cancer may also impact this study. A review of two national surveys and case studies from three states used data from 1994-2009 indicating that over a third of Americans are sunburned in the past year and that females and older adults practice sun protection more often [15]. This was consistent with our results and point to age

and gender as potential sources of differential sun protection practices among groups. These results give insight on dermatology patients in Sacramento, and extrapolation may be limited for other geographic areas. However, our results are supportive of further evaluation of the role of insurance status in sun protective behavior trends.

Conclusion

Health insurance is associated with a difference in sun protection behaviors including the use of sunscreen and tanning. Those with Medi-Cal are less likely to use all forms of sun protection, more likely to agree it is worth getting burned to get a tan, and rarely or never use sunscreen. Comparing groups with Medi-Cal, private insurance and Medicare did not reveal significant differences in opinions that sunscreen is a hassle to apply or that it is expensive. Concern for skin cancer and perceived knowledge of skin cancer did not differ significantly, pointing to additional factors influencing the differences in sun protection practices among insurance groups. Interventions focusing on cognitive factors may be the best initial approach [16]. Current evidence suggests behavioral counselling for skin cancer prevention should emphasize multiple methods of sun protection [17].

Potential conflicts of interest

The authors declare no conflicts of interest.

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Table 1. Demographics based on health insurance.

Demographic	Health insurance		
	Medi-Cal Individuals (Percent) N=121	Medicare Individuals (Percent) N=77	Private Individuals (Percent) N=186
Mean age	43 years	78 years	55 years
Female	77 (63.6)	37 (48.0)	109 (58.6)
Male	43 (35.5)	40 (52.0)	76 (40.9)
Other	1 (0.83)	0 (0)	1 (0.54)
Ethnicity			
African or African American	10 (8.3)	4 (5.2)	8 (4.8)
American Indian or Alaska Native	1 (0.83)	0 (0)	1 (0.54)
Asian or Asian American	11 (9.1)	1 (1.3)	23 (12.4)
East Indian or Pakistani	9 (7.4)	0 (0)	7 (3.8)
Hispanic or Latino	10 (8.3)	7 (9.1)	29 (15.6)
Middle Eastern	4 (3.3)	1 (1.3)	1 (0.54)
Native Hawaiian or other Pacific Islander	0 (0)	0 (0)	3 (1.6)
White or Caucasian	80 (66.1)	60 (77.9)	106 (57.0)
Other	3 (2.5)	4 (5.2)	7 (3.8)
Speak a language other than English at home			
No	87 (71.9)	68 (88.3)	141 (75.8)
Yes	34 (28.1)	9 (11.7)	45 (24.2)
Highest level of education			
Elementary or Middle school	3 (2.5)	2 (0.03)	1 (0.5)
High school or equivalent (GED)	24 (19.8)	13 (16.9)	22 (11.8)
Some college credit (but no degree)	43 (35.5)	21 (27.3)	33 (17.7)
Vocational school	17 (14.0)	9 (11.7)	23 (12.4)
Bachelor's degree	27 (22.3)	22 (28.6)	57 (30.6)
Master's degree	6 (5.0)	3 (3.9)	35 (18.8)
Doctoral degree	1 (0.83)	4 (5.2)	12 (6.5)
Other	0 (0)	3 (3.9)	2 (1.1)
Household income			
Under \$25,000	61 (50.4)	19 (24.7)	5 (2.7)
\$25,000-49,000	29 (24.0)	12 (15.6)	29 (15.6)
\$50,000-74,999	13 (10.7)	10 (13.0)	34 (18.3)
\$75,000-100,000	2 (1.7)	10 (13.0)	34 (18.3)
Over \$100,000	2 (1.7)	16 (20.8)	57 (30.6)
Prefer not to say	7 (5.8)	6 (7.8)	19 (10.2)
Not sure	7 (5.8)	4 (5.2)	8 (4.3)