

Prevalence and Correlates of Sun-Protection Behaviors Among African Americans

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Background: Data suggest that the prevalence of sun-protection behaviors is low (44%) among African Americans; the samples in such studies, however, tended to be small or nonrepresentative.

Purpose: This article aims to examine the prevalence and correlates of sun-protection behaviors among a large, random, statewide sample of African-American adults living in California to ascertain behavioral patterns and highlight directions for targeted interventions.

Methods: From September 2006 through May 2008, an anonymous health survey collected data on sunscreen, sunglasses, and wide-brim hat use among a random sample of 2187 African-American adults, and assessed demographic, regional, skin type, and other potential correlates of these behaviors. The analysis was conducted in 2009.

Results: Only 31% engaged in at least one sun-protection behavior; of the three behaviors, sunscreen use was the least prevalent, with 63% never using sunscreen. Multivariate logistic regressions revealed that gender, SES, and skin type were significant predictors of sun-protection behaviors.

Conclusions: Tailored interventions to increase sun-protection behaviors among African Americans (men in particular) are needed.

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Introduction

The incidence of melanoma is more than ten times higher in whites than in African Americans, but the 5-year survival rate for African Americans (78%) is significantly lower than that of whites (92%); hence, skin cancer is one of many African-American-white cancer disparities that need to be reduced or eliminated.¹ Possible reasons for skin cancer disparities may be that African Americans are more likely to present with an advanced stage of disease and have a poorer prognosis.²⁻⁶ Further, there may be genetic differences in tumor presentation.⁷ Other factors might include suboptimal early-detection practices, inadequate

knowledge about and awareness of skin cancer, low perceptions of skin cancer risk, heightened fear of a cancer diagnosis, and living in a community with low educational attainment.⁸⁻¹²

Exposure to solar ultraviolet radiation (UVR) is a well-established primary risk factor for nonmelanoma skin cancer and melanoma in whites.¹³⁻¹⁵ There is an association between UVR and basal cell carcinoma in African Americans; that is, 89% of these tumors develop on sun-exposed skin.¹⁶⁻¹⁹ In contrast, squamous cell carcinoma and melanoma typically present on unexposed skin in African Americans.^{6,16,17,20-22} Only a few studies have examined the association between UVR exposure and melanoma among African Americans and whites. One²³ found that UV index and latitude were related to melanoma incidence in African-American men, but another²⁴ found this association only for white men and women. Irrespective of the strength of the relationship between UVR exposure and skin cancer among African Americans versus whites, reducing UVR exposure (to potentially reduce skin cancer risk) among all Americans is an objective of *Healthy People 2010*.^{25,26} Specifically, the *Healthy People 2010* objective is to increase the percent-

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age of people who engage in at least one sun-protective behavior, including sun avoidance, wearing protective clothing (e.g., sunglasses and wide-brim hat), and using sunscreen with a sun-protection factor (SPF) of at least 15 during midday sun exposure.^{25–27} These behaviors are efficacious in reducing UVR exposure.^{28–30}

Six studies^{8,31–35} have examined such behaviors among African Americans, with three^{31,32,34} of these involving non-clinical participants. Unfortunately, the African-American samples in these studies were small and/or nonrepresentative, and hence findings from the studies are tentative. Thus, the purpose of this study was to acquire basic data on sun-protection behaviors among African Americans by assessing those behaviors in a random, statewide sample to inform cancer-prevention interventions.

Methods

Participants

A random, statewide sample (N=2187) of African-American adult residents of California aged 18–95 years (mean age=43.5 years) participated; 93% had a high-school education or higher, and 57.7% were women. Characteristics of the sample are

shown in Table 1.

Method

Community-based sampling methods were used.^{36–40} Community-based sampling is a three-stage, random-probability household-sampling procedure often used in population studies^{36,37,39,40} of African Americans and Latinos to ensure inclusion of segregated, phoneless, and cell-phone-only minorities. In Stage 1, census data were used to identify the seven California counties in which the majority (85%) of California African Americans reside; these seven counties were selected, and African Americans were sampled from those with probability proportional to their representation. For example, 42% of all California African Americans reside in Los Angeles County, 6% in San Diego County, and 12% in San Bernardino County; hence, 42% and 6% of the sample came from Los Angeles and San Diego counties, respectively, such that the sample was representative of the California African-American population.

In Stage 2, a total of 513 census tracts with low and high levels of segregation within those seven counties were selected; this process ensured inclusion of the segregated African Americans who are usually under-represented in nationwide household and telephone health surveillance studies,³⁷ and thus ensured a more diverse and representative study sample.³⁷ Segregation was defined as the percentage of African-American residents (20%–50%=low-segregated/integrated, 60%–92%=segregated). Next, equal numbers of census tracts with high and low segregation levels were randomly selected from this set of 513, and 100–120 people

Table 1. Characteristics of San Diego State University–California Black Health Network Study participants (n=2187)

	n (%)
Gender	
Female	1178 (57.7)
Male	862 (42.3)
Education	
<High school	151 (7.2)
High school graduate/GED	604 (28.6)
Some college	919 (43.5)
College graduate	294 (13.9)
Master's degree	109 (5.2)
Doctorate and similar degree	34 (1.6)
Income (\$)	
<5,000	262 (13.6)
5,000–10,999	175 (9.1)
11,000–16,999	162 (8.4)
17,000–25,999	197 (10.2)
26,000–49,999	436 (22.6)
50,000–75,999	348 (18.1)
76,000–99,999	167 (8.7)
≥100,000	180 (9.3)
Region	
Northern California (San Francisco, Oakland, and Sacramento counties)	648 (29.6)
Southern California (San Bernardino, Riverside, Los Angeles, and San Diego counties)	1539 (70.4)
Skin type	
Type I/II	105 (5.1)
Type III/IV	745 (35.9)
None of the above	1228 (59.1)
Sunscreen	
Never	1307 (62.7)
Sometimes	369 (17.7)
Half the time	132 (6.3)
Often	140 (6.7)
Always	137 (6.6)
Sunglasses	
Never	514 (24.7)
Sometimes	549 (26.4)

(continued on next page)

Table 1. (continued)

	n (%)
Half the time	206 (9.9)
Often	304 (14.6)
Always	508 (24.4)
Wide-brim hat	
Never	813 (39.1)
Sometimes	644 (31.0)
Half the time	194 (9.3)
Often	225 (10.8)
Always	203 (9.8)

GED, graduate equivalency diploma

were acquired from each census tract. Block groups within census tracts were randomly selected, and all households were sampled until the census-tract sample size ($n=100-120$) was reached. Only one self-identified African-American adult resident of each household participated. If more than one adult wished to participate, one adult was randomly selected by using a modified version of the Kish procedure;⁴¹ that is, the person whose birthday was closest to the day of sampling was selected.

This study was a partnership between San Diego State University (SDSU) and the California Black Health Network (CBHN), a respected, African-American community organization that, since the 1970s, has been conducting statewide, health promotion programs for African Americans living in California. The CBHN cosponsored the study and hired African-American surveyors who were familiar with, or residents of, the communities to collect the data in that community. These surveyors were trained in the survey procedures to standardize their behavior and were supervised and monitored by SDSU and CBHN staff. Surveyors distributed the brief, anonymous California Black Health Network Survey door-to-door on weekends from September 2006 through May 2008 in the census tracts, and they reimbursed participants \$10 in cash for completing it. The CBHN Health survey was designed to examine the influence of residential segregation and sociocultural factors in smoking prevalence among African-American adults in California. The survey included 91 items assessing tobacco use, physical activity, mental health, racial discrimination, neighborhood safety, sun protection, and demographic characteristics. The survey refusal rate was 1%. The study had the approval of the IRB of SDSU.

Materials and Measures

The brief, anonymous, written health survey included basic questions on sun-protection behaviors, skin type, and demographics (e.g., gender, age, income, education). The survey took

15 minutes to complete and had a seventh-grade reading level. To examine three sun-protection behaviors, participants were asked: *During the summer months, how often do you do the following when you are out in the sun for more than 15 minutes?* This was followed by questions about using sunscreen with an SPF of 15 or higher, wearing sunglasses, and wearing a hat with a surrounding brim of at least 2.5 inches. Response options for each question were Likert-type scales that ranged from *never* to *always*. These sun-protection behavior items have been used and validated in an RCT with U.S. Postal Service (USPS) letter carriers.^{42,43} To assess skin type, a modified version of the well-known Fitzpatrick skin-type measure^{44,45} was used. Participants were asked: *Which of the following best describes your skin's usual reaction to your first exposure to summer sun, without sunscreen, for one-half hour at midday?* The five response categories were (1) *always burn, unable to tan* (Type I); (2) *usually burn, then can tan if I work at it* (Type II); (3) *sometimes mild burn, then tan easily* (Type III); (4) *rarely burn, tan easily* (Type IV); and (5) *none of the above describes me*. The modification of the measure consisted of simply adding the last (*none of the above*) category to the scale for this study. The analysis was conducted in 2009.

Results

Prevalence and Correlates of Sun-Protection Behaviors

Prevalence of sun-protection behaviors is shown in Table 1. About 31% ($n=667$) of the sample reported always engaging in at least one sun-protection behavior. Each sun-protection behavior outcome was analyzed separately. The five response categories were collapsed into these three: *never*, *sometimes/half of the time/often*, and *always* for the regression analyses. Multivariate multinomial logistic regression analyses were used to explore relationships between each sun-protection behavior and potential correlates.

Multivariate analyses are shown in Table 2. As shown, African-American women were about three to six times more likely than African-American men to use sunscreen; on the whole, the odds of sunscreen use increased with income and education and were unrelated to age and geographic region. Participants who did not classify their skin type into the Fitzpatrick categories (i.e., who selected *none of the above*) were significantly less likely to use sunscreen, whereas those with Type I/II skin were significantly more likely than those with Type III/IV skin to use sunscreen.

Women were more likely than men to wear sunglasses; for the most part, the odds of wearing sunglasses increased with income and education and were unrelated to age and geographic region. Those who did not classify

Table 2. Multivariate multinomial logistic regression predicting use of sunscreen, sunglasses, and wide-brim hat^a; ORs (95% CIs)

	Sunscreen				Sunglasses				Wide-brim hat			
	Sometimes		Always		Sometimes		Always		Sometimes		Always	
Predictors												
Gender												
Female	2.75 (2.13, 3.55)	p=0.001	6.60 (3.70, 11.77)	0.001	1.66 (1.29, 2.15)	0.001	3.48 (2.53, 4.80)	0.001	0.55 (0.43, 0.69)	0.001	0.23 (0.15, 0.35)	0.001
Male	ref		ref		ref		ref		ref		ref	
Education												
≤High school	0.62 (0.43, 0.89)	0.01	0.31 (0.15, 0.63)	0.001	0.67 (0.45, 1.01)	0.05	0.72 (0.45, 1.17)	n.s.	0.53 (0.38, 0.75)	0.001	0.65 (0.36, 1.18)	n.s.
Some college	0.65 (0.47, 0.90)	0.01	0.42 (0.24, 0.71)	0.001	0.97 (0.66, 1.42)	n.s.	1.10 (0.72, 1.70)	n.s.	0.96 (0.70, 1.30)	n.s.	1.05 (0.62, 1.79)	n.s.
≥College graduate	ref		ref		ref		ref		ref		ref	
Income (\$)												
0–25,999	0.33 (0.23, 0.48)	0.001	0.20 (0.10, 0.39)	0.001	0.63 (0.41, 0.96)	0.032	0.37 (0.23, 0.60)	0.001	0.94 (0.67, 1.33)	n.s.	1.00 (0.55, 1.84)	n.s.
26,000–49,999	0.55 (0.37, 0.80)	0.002	0.12 (0.05, 0.27)	0.001	0.80 (0.51, 1.26)	n.s.	0.58 (0.35, 0.97)	0.036	0.79 (0.55, 1.13)	n.s.	0.86 (0.46, 1.60)	n.s.
50,000–75,999	0.67 (0.45, 0.98)	0.04	0.43 (0.23, 0.78)	0.006	0.69 (0.44, 1.09)	n.s.	0.53 (0.32, 0.87)	0.013	1.03 (0.71, 1.49)	n.s.	1.15 (0.62, 2.14)	n.s.
≥76,000	ref		ref		ref		ref		ref		ref	
Age												
	0.99 (0.99, 1.00)	n.s.	1.01 (0.99, 1.02)	n.s.	1.00 (0.99, 1.01)	n.s.	1.03 (1.02, 1.04)	0.001	1.01 (1.00, 1.02)	0.003	1.04 (1.03, 1.06)	0.001
Skin type												
None of these	0.30 (0.24, 0.39)	0.001	0.38 (0.24, 0.61)	0.001	0.57 (0.43, 0.75)	0.001	0.56 (0.40, 0.78)	0.001	0.65 (0.51, 0.82)	0.001	1.03 (0.66, 1.59)	n.s.
Type I/II	1.43 (0.82, 2.50)	n.s.	2.86 (1.22, 6.70)	0.02	0.81 (0.44, 1.52)	n.s.	0.59 (0.26, 1.32)	n.s.	0.94 (0.55, 1.60)	n.s.	1.64 (0.64, 4.21)	n.s.
Type III/IV	ref		ref		ref		ref		ref		ref	
Region												
Southern California	0.85 (0.65, 1.10)	n.s.	1.35 (0.78, 2.35)	n.s.	1.04 (0.79, 1.37)	n.s.	1.09 (0.78, 1.53)	n.s.	1.12 (0.88, 1.43)	n.s.	0.90 (0.59, 1.39)	n.s.
Northern California	ref		ref		ref		ref		ref		ref	

Note: Boldface indicates significance.

^aReference group is *never wear*
n.s., not significant

their skin type into the Fitzpatrick categories (i.e., who chose *none of the above*) were significantly less likely than Type III/IV participants to use sunglasses.

Women were 45% less likely than men to wear a wide-brim hat. Wide-brim hat use was basically unrelated to income, education, and geographic region, but it was associated with age, with hat use increasing slightly but significantly as age increased. Those who did not classify their skin type into the Fitzpatrick categories (i.e., those selecting *none of the above*) were significantly less likely than Type III/IV participants to use a wide-brim hat.

Discussion

This study confirms prior findings of low levels of sun-protection behaviors among African Americans relative to current recommendations.^{1,25,26} The results also reveal significant predictors of sun-protection behaviors among African Americans and highlight areas for tailored interventions.

Low prevalence of sunscreen use among this sample is comparable to national statistics for African Americans found in studies from 1992 and 1998.^{31,34} These findings may be attributed to African Americans' having a lower incidence of skin cancer⁴⁶ and thus being less motivated by fear of skin cancer. Moreover, darker skin offers some protection from solar UVR for African Americans.⁴⁷ However, there is considerable heterogeneity in African-American skin.

Our finding that gender, education, and income are significant predictors of sunscreen use among African Americans is consistent with data on other ethnic groups.^{31,32,34,35} One possible explanation for gender differences is that many facial cosmetics for women contain SPF. The education and income differences for sunscreen use likewise match the data for the general U.S. population and for outdoor workers.^{31,32,34} Differences in SES might reflect sun-safety knowledge and ability to afford sunscreen. The consistency in findings across studies of different ethnic groups suggests the need for interventions targeting African-American men and low-SES African Americans in particular to promote sunscreen use.

There was greater variability in whether people wore sunglasses than in whether they wore sunscreen or wide-brim hats among this sample. In one study,³² 44.1% of African-American USPS letter carriers reported always wearing sunglasses during workdays. This estimate is more than 19 percentage points higher than the current findings. These differences may be attributable to letter carriers working in the sun daily, for longer periods of time, and to their need to be able to read in direct sunlight while delivering mail.

In the current study, women were significantly more likely to wear sunglasses than men. This was the case among female letter carriers also who were 1.78 times more likely to wear sunglasses than male letter carriers.³² Few studies have assessed other predictors of sunglasses use among the general population. Low-income African Americans in the present study were the least likely to report wearing sunglasses. Another study⁴⁸ also found the lowest-SES group to be the least likely to wear sunglasses compared to the highest-SES group in a community sample of Australians. Differences by gender may be related to notions of attractiveness, whereas differences by SES may be related to the affordability of sunglasses and knowledge regarding the benefits of wearing them.

Less than 10% of these participants reported always wearing a wide-brim hat. This finding is consistent with previous studies.³² For example, only 30% of African-American USPS letter carriers report always wearing a wide-brim hat during their workdays.³² Predictors of wide-brim hat use in this sample included gender and age, with men and older people more likely to wear wide-brim hats. These findings are consistent with data on letter carriers; female letter carriers are half as likely as men to report always wearing a wide-brim hat.^{32,49} These gender differences might reflect gender-related norms about hat wearing and gender-related concerns about maintaining hairstyle by avoiding hats. The age differences found are consistent with data for the general U.S. population, in which wearing protective clothing (including hats) increases with age.³⁴

Skin type was a significant predictor of all three sun-protection behaviors. Sun-sensitive African Americans were significantly more likely to use sunscreen (as in prior studies³²); in addition, African Americans who could not classify their skin type were significantly less likely to engage in any of the three sun-protection behaviors. The latter finding highlights the need for studies of the utility and validity of the Fitzpatrick categories of skin type for African Americans, and underscores the need for data on the sun-safety behaviors of African Americans who find none of the categories applicable.

Strengths and Limitations

The present study is the first to collect data on sun-protection behaviors from a large, community-based sample representative of African Americans. The co-sponsorship by an African-American health organization and use of mostly African-American surveyors resulted in a 1% refusal rate and the inclusion of low-SES and segregated African Americans who rarely participate in surveillance studies.³⁷ Their inclusion increases the generalizability of these findings and may in part explain why

the prevalence of meeting sun-protection goals found here (31%) was lower than that (44%) found in prior studies.²⁵ Moreover, for the skin type measure, the response option *none of the above describes me* was added; consequently, the 59% of the sample who selected this option were included in the analyses rather than excluded because of missing data on this variable.

Despite these strengths, the study has limitations. Participants were asked to recall their sun-protection behaviors during the summer months, and their recall might be inaccurate. Likewise, there may be seasonal biases in recall, with those sampled during the summer months providing more accurate reports than those sampled in the winter. To keep the survey brief, cultural and psychosocial correlates of sun-protection behaviors were not examined. Further, qualitative data from respondents who did not endorse the Fitzpatrick skin types were not obtained. Given the size, diversity, and randomness of the sample, however, the findings have several implications for African-American health.

Research and Practice Implications

Research gaps on the efficacy of skin cancer prevention among minorities have been identified in a recent review; only three community-based interventions included African Americans.^{50,51} Some may debate the relevance of skin cancer prevention among African Americans given the low incidence in this population.^{46,52} However, these studies are important because of the low survival^{5,16,21,53} and high mortality^{6,16,21} rates among African Americans who develop skin cancers (relative to whites). Culturally tailored early-detection skin cancer prevention programs may need to be created to prevent delayed presentation of atypical melanomas; such programs are likely to be successful if they follow well-known guidelines for tailoring cancer prevention for African Americans^{54,55} and are modeled on prior successful efforts.^{56–58} Efforts to increase skin cancer awareness among African Americans and healthcare providers are warranted. Very few African Americans are aware that African Americans can get skin cancer.³⁵ Further, healthcare providers may not discuss early detection or perform clinical skin examinations with African-American patients.^{10,59} There is a misconception among African Americans that having darker skin provides protection against the damaging effects of UVR. Although this is partially true, African-American skin varies from individual to individual.^{45,47} There is evidence that African Americans experience sunburn, and a proportion of those who had a sunburn experience repeated sunburns.⁶⁰ It is plausible that skin cancer prevention may reduce overexposure to UVR and reduce sunburns among sun-sensitive African Americans.

African-American broadcast media have tried to minimize misconceptions of skin cancer risk for African Americans by providing messages to emphasize the importance of early detection and to promote sun-protection behaviors. Public health institutions should consider collaborating with broadcast media to evaluate the effectiveness of such media campaigns. Evaluations should include a comprehensive list of primary prevention and secondary prevention outcome variables and should measure these independently. Finally, policy changes within mainstream broadcasting are recommended so as to include skin cancer prevention awareness and so that early-detection campaigns reach all ethnic/racial groups.

Interventions would benefit from data on the cultural correlates of sun-protection behaviors among African Americans. There are no data on the role of acculturation⁶¹ or of cultural beliefs such as skin-color perception in sun-protection behaviors among African Americans. Because these cultural factors have been demonstrated to contribute significantly to a variety of cancer-related behaviors among African Americans,^{61–63} they may also contribute to sun-protection behaviors. Likewise, little is known about African-Americans' beliefs, attitudes, and knowledge about sun protection or skin cancer. Assessing these potential psycho-social factors and probable cultural factors could highlight barriers to sun-protection behaviors and inform interventions.

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