



Skin cancer knowledge, awareness, beliefs and preventive behaviors among black and hispanic men and women

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ABSTRACT

Black and Hispanic populations perceive their skin cancer risk to be low and are less likely to use sun protection strategies. We conducted formative research to understand knowledge, awareness, beliefs, and behaviors among these groups. In 2017, eighteen focus groups were conducted with black and Hispanic respondents (18–44 years) in four US cities. Groups were segmented by participant characteristics associated with elevated or lower risk for skin cancer, by race/ethnicity, gender, and age. A professional moderator followed a semi-structured discussion guide, and focus group transcripts were analyzed using conventional content analysis and NVIVO 11 Software. Most participants perceived themselves to be at low skin cancer risk due to their “darker skin tone” and/or “lack of family history.” Skin cancer signs and symptoms were more inconsistently reported by blacks than Hispanics. Few participants reported regular sun protection behaviors. Those who did use sunscreen, wore protective clothing, and had elevated risk based on sun sensitivity or UV exposure. While most participants recalled family discussions (as youth) about sunscreen and sun protection, the understood intent was to warn against “further skin darkening” or to “prevent aging,” not to reduce sun burns or skin cancer risk. Tanning bed use was low across all segments, especially among black respondents. Tailored skin cancer prevention campaigns need to address misperceptions about risks and benefits of skin cancer prevention behaviors among black and Hispanic populations. Families, peer groups, and healthcare providers need to be engaged in the creation of educational interventions and messaging efforts that target these populations.

1. Introduction

Although people of all races and ethnicities can get skin cancer, little has been done to promote skin cancer prevention among non-white populations. Although skin cancer incidence rates are lower among blacks and Hispanics compared to non-Hispanic whites, (U.S. Cancer Statistics Working Group, 2017) research and surveillance efforts have demonstrated that these demographic groups tend to have poorer prognoses and survival rates when they do receive a skin cancer diagnosis (Wu et al., 2011; Rouhani et al., 2008; Kaufman and Alexis, 2017). Furthermore, each year, nearly one in four Hispanic adults and one in ten black adults experience at least one sunburn, illustrating their potential susceptibility to skin damage from the sun. (Holman et al., 2018) While the etiology of skin cancer in blacks and Hispanics

needs further exploration, negative effects of UVR on skin cancer risk among these groups exists (Lozano et al., 2012) and opportunities to engage in prevention behaviors should be leveraged. Poor engagement in sun protection behaviors (Manganello et al., 2016; Pichon et al., 2010a) among those who have traditionally been perceived at low risk for skin cancer due to their ethnic or racial background could be reflective of lower awareness.

In 2014, *The Surgeon General's Call to Action to Prevent Skin Cancer* (US Department of Health and Human Services, 2014) described prevention strategies to protect Americans from overexposure to UVR from the sun and indoor tanning devices. This report also outlined the need to develop effective messages and interventions for specific audiences to increase awareness of skin cancer prevention behaviors without direct mention of specific race or ethnic audiences. There are unique

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Table 1
Focus group segmentation, Skin Cancer Qualitative Assessment Study, 2017.

Total	Chicago	Miami	Atlanta	Los Angeles
	6	4	4	4
Black (8 groups)				
Female (4 groups)				
18–29 (2 groups)				
Elevated risk ^b		1 ^a		
Low risk ^b			1	
30–44 (2 groups)				
Elevated risk ^b			1	
Low risk ^b		1		
Male (4 groups)				
18–29 (2 groups)				
Elevated risk ^b			1	
Low risk ^b	1			
30–44 (2 groups)				
Elevated risk ^b	1			
Low risk ^b			1	
Hispanic (10 groups)				
Female (4 groups)				
18–29 (2 groups)				
Elevated risk ^b				1
Low risk ^b	1			
30–44 (2 groups)				
Elevated risk ^b	1			
Low risk ^b				1
Male (6 groups)				
18–29 (4 groups)				
Elevated risk ^b	1			1
Low risk ^b		1		1
30–44 (2 groups)				
Elevated risk ^b		1		
Low risk ^b	1			

^a Due to recruitment challenges related to finding black women who met inclusion criteria for the elevated risk group, one elevated risk group included women ages 18–44.

^b Participants were classified as having an elevated risk if they had two or more characteristics including: light hair or eye color, an outdoor occupation with sun exposure, self-reported sensitivity to the sun (e.g., sunburn history), or tanning bed use. Low risk classifications were assigned to those who had less than two of the aforementioned characteristics.

opportunities to provide education about skin cancer risk for groups not regularly targeted by skin cancer messages. To inform culturally appropriate messages targeting young adult black and Hispanic populations, we conducted formative research to understand audience 1) knowledge, awareness, beliefs, behaviors (KABB) and perceived risks related to skin cancer; 2) health information seeking behaviors; and 3) exposure to skin cancer messages in digital or traditional media.

2. Methodology

Eighteen focus groups were conducted in English between May 31 and June 27, 2017, with black, non-Hispanic (8 groups) and Hispanic (10 groups) young adult audiences. Market research facilities assisted in participant recruitment (Atlanta Outloud-Atlanta; Focuscope, Inc.-Chicago; Ask Miami-Miami; and Viramontes Marketing Communications, Inc.-Los Angeles). Locations were selected to ensure diverse participant geographic distribution. Audiences were further segmented by: race/ethnicity (Hispanic versus non-Hispanic, black); sex (male versus female), age (18–29 versus 30–44 years), and skin cancer risk profile classification (“elevated” versus “low” risk) (Table 1). Participants were classified as having an elevated risk if they had two or more characteristics including: light hair or eye color, an outdoor occupation with sun exposure, skin’s reaction to 1 h of unprotected sun exposure (sun-sensitivity), (Holman et al., 2018) or tanning bed use.

Inclusion criteria included those who were: born in or lived in the U.S. for ≥10 years (to focus on more acculturated individuals who

likely had riskier sun-related KABB compared to recent US immigrants.); aged 18–44 years; and self-identified as black or Hispanic/Latino. Screening criteria were added (e.g., excluding participants who attended five or more focus groups) to reduce the likelihood of “professional respondents.” To ensure screening criteria adherence, we provided facilities the screening instrument and monitored daily recruiting. Prior to focus groups initiation, participants completed re-screening questionnaires to verify eligibility. To maximize response rate, over-recruitment strategies were employed (recruit 12 to seat 8–10). Chicago male no-show rates were higher and focus group size ranged from 5 to 10 participants.

Trained moderators (matched to participant race/ethnicity) facilitated groups using a semi-structured discussion guide with open-ended questions and targeted probes. Focus groups were 2 h, audio recorded, and observed by note takers and study staff through a two-way mirror. Study staff asked that participants not disclose personal information (e.g. full names, addresses). Participants provided verbal and written informed consent for their audio-recorded and observed participation. Participants received \$75 for their time and study participation.

3. Analysis

Responses were digitally recorded and transcribed. Trained staff reviewed audio files to assess transcripts’ accuracy and completeness. Transcripts were then placed into QSR International’s NVivo 11 software for analysis. Reviewers (JB, ES, AP) trained in qualitative thematic analysis reviewed the data and developed broad codes (themes) based on interview guide questions and demographics of focus groups. Within codes, content were analyzed using constant comparative method and grounded theory approaches. (Glaser and Strauss, 1967) Responses to discussion questions were compared within focus groups and across demographic segments. Themes derived from analysis included: 1) general health information seeking; 2) exposure to skin cancer messages; 3) knowledge and awareness about skin cancer and sun protection; and 4) beliefs, behaviors, and perceived skin cancer risk. Themes were analyzed by sex, race/ethnicity, age, and region.

4. Results

4.1. Sample characteristics

Of 159 participants (73 women; 86 men), 45% (N = 72) were black and 55% (N = 87) were Hispanic/Latino. Hispanic/Latino respondents reported their descent as Mexican (51%, N = 44), Central American (14%, N = 12), Puerto Rican (10%, N = 9), South American (9%, N = 8), Cuban (9%, N = 8), or mixed heritage (7%, N = 6). Most (80%, N = 127) completed at least some college or received an associate’s degree, and about half (53%, N = 85) were ages 18–29.

4.2. Health information seeking

Respondents across groups reported similar health information seeking behaviors. Most used Google and WebMD to answer health questions or learn about symptoms for themselves or family members. Respondents described WebMD as “dependable,” “recognizable,” and a “one-stop-shop” for health information. Additionally, “.org” and “.gov” websites were reportedly “more scholarly” and “trustworthy,” along with personal testimonies and commentaries (e.g., forums, blogs) about health products or topics, by people perceived to be “like themselves.” Blacks uniquely endorsed health insurer websites as trustworthy. Many reported information on general audience websites was not targeted, tailored, or often relevant for blacks. Alternatively, websites like blackdoctor.org reportedly offered culturally relevant health information. Hispanic women reported using a wider variety of sources (e.g., YouTube, Pinterest) compared to blacks and Hispanic men. Hispanic

Table 2
Select quotes by theme, Skin Cancer Qualitative Assessment Study, 2017.

Theme	Supporting Quote	Sex	Race/ethnicity	Age	Location	Risk group
Exposure to skin cancer messaging	(q1) "I see the selfies of the sunburns on Snapchat [laughs]...They just say like, 'I'm paying the price, I got all sunburned,' something like that, show the skin."	M	HIS	18–29	L.A.	L
	(q2) "When I used to work on the beach, same thing, supervisor or the manager would be, 'Hey, you got to put on some sunblock. Let me get you a hat. If we didn't have a hat, he'd go into this gift shop, buy us one all the time, at least for myself.'"	M	HIS	30–44	Miami	E
	(q3) "I went to a Marine Corps boot camp, they always told you about sunblock, sunscreen. They're not on your butt about it, but because mostly they tell you to do because you're going to be in the sun every day, all day long. They pushed it to where you buy it yourself. There's a little store inside the base and you go there whenever they allow you to and you buy it. You buy a bunch so you don't go back."	M	HIS	18–29	Chicago	E
	(q4) "I used [tanning beds] when I was younger because I was a cheerleader... and my legs would be out and some of the white girls were darker than me because they went to the tanning bed, so then I felt like I had to, too."	F	AA	30–44	Atlanta	E
	(q5) "I think like four years ago, so I was 18...At that time, I was into the working out, bodybuilding type of thing, you work out, you tan, whatever... I just didn't like it. It's like one of them things you're just better off being natural."	M	AA	30–44	Chicago	E
	(q6) "I would use the sunscreens, but I sweat a lot and if you sweat a lot it don't really do that much. Most of the time I wear long sleeves when I'm working to keep my skin covered."	M	AA	18–29	Atlanta	E
	(q7) "I just feel like if I put on sunscreen [it is] more for beauty reasons, not for health reasons. If I put on sunscreen it's because I don't want my face to be darker than my body, but not necessarily because of cancer, or skin cancer."	F	AA	18–29	Miami	E
Beliefs and behaviors about sun protection and skin cancer	(q8) "I've never really again been like, 'Oh, I have to cover up or put on sunscreen,' even when I go to the beach. I went out in the country, last week, I see everybody putting on sunscreen, I'm like, 'Oh, it's OK.' I guess, Blacks, we never really needed sunscreen, it is what it is when we go outside. For the most part, that's what it is, just put on some shorts and go"	M	AA	18–29	Atlanta	E
	(q9) "Skin cancer for us isn't widely known in our communities. I know for me, in my family, so it's not hereditary, so I wouldn't have a concern about it. I probably wouldn't have concerns."	M	AA	30–44	Atlanta	L
	(q10) "I really didn't think Blacks would get it. I always thought it would be white people, so that's why I guess I didn't take it serious."	F	AA	18–44	Miami	E
	(q11) "Growing up, nobody really talked about skin cancer at all. [laughs] It's more about, unfortunately, it's more about colorism, more about getting darker. Old people, I remember would say, 'Get out of the sun. Don't get so dark.' I would remember that more so than anybody really caring about skin cancer or caring about my health. I was just more about color, complexion."	M	AA	30–44	Atlanta	L
	(q12) "I don't really think about skin cancer. I don't really think about protecting my skin. I, usually, play sports in the sun. I never thought about it as a kid. I never thought about it as a young adult. For me, I feel like my skin color is what protects me from the sun."	M	AA	30–44	Miami	L
	(q13) "We don't think we can get sunburned and a lot of time we do, we just don't realize we are burned [...] I was out for so long with a tank top and not realizing that I could get burned and peel, and burning until it happened to me. I'm like, 'Wow, we do get burned.' We do need to protect our skin."	F	AA	30–44	Miami	L
	(q14) "I was livid when I found out I was low in vitamin D from my doc. I was mad. I work in the sun eight hours a flipping day. I don't get it."	F	AA	30–44	Miami	L
	(q15) "Just because all the Latino areas that you can think of are very close to the equator. Everything close to the equator, everyone has dark skin and then if you think of people who are from Norway or away from the equator, [they are] super white."	F	HIS	18–29	Chicago	L
	(q16) "Grandpa, great-grandpa, nobody has had any skin cancer. They always worked on the farms. Why would I get it? If I'm not in the sun."	M	HIS	18–29	L.A.	E
	(q17) "I sometimes tan, and I've never looked that up because everybody tells me, 'That's bad, you're going to get cancer.' I'm like, 'I don't want to hear it. I don't want to know, my skin looks beautiful.'"	F	HIS	30–44	Chicago	E

Abbreviations: F = female; M = male; L = low risk; E = elevated risk; L.A. = Los Angeles; AA = black/African American; HIS = Hispanic/Latino.

men and women commented Univision and sources specializing in news and entertainment content for Hispanics were trustworthy.

4.3. Exposure to skin cancer messages

Exposure to skin cancer and sun protection messaging via traditional or digital media sources was infrequent among blacks. In contrast, some Hispanics reported seeing messages about sunburn and sun protection from a variety of sources, including local television news and social media ads and posts (e.g., Facebook, Snapchat; Table 2; q1). Younger respondents (aged 18–29 years) recalled posts about celebrities who had cancerous moles removed. Some Hispanic respondents received messages from employers (e.g., lifeguard agencies, the military) emphasizing the importance of protecting one's skin from the sun (Table 2; q2–q3).

4.4. Skin cancer and sun protection knowledge

While all respondents had heard of skin cancer, knowledge varied by geographic location. Miami and L.A. respondents were more aware of skin cancer terminology, symptoms, and sun protection strategies than those in Atlanta and Chicago. No notable knowledge differences in terminology were found based on race/ethnicity or risk stratification. While “SPF,” “UV,” and “melanoma” were familiar terms to some, others were unsure of their meaning. Respondents in all segments reported “moles/irregular moles” and skin “discoloration” as identifiable symptoms of skin cancer. Blacks uniquely named skin conditions or symptoms related and unrelated to skin cancer (e.g. “rashes,” “flaky skin,” “dry patches,” “blisters,” “bumps”). Hispanics also reported “spots” and “thinning skin” as symptoms.

5. Beliefs, behaviors, perceived risks

5.1. Beliefs and behaviors

5.1.1. Both blacks and hispanics

Most respondents, especially those with “elevated risk,” mentioned sun protection strategies including sunscreen, hats and long-sleeved clothing, seeking shade, or moisturizers with a sun protection factor (SPF). Some “low risk” respondents reported using moisturizers and lotions without SPF (shea butter and coconut oil), could protect skin from the sun and reduce skin cancer risk. Few blacks and Hispanics reported ever using a tanning bed. Prior usage, reported among those at elevated risk, occurred in high school, before prom or with friends (Table 2; q4). Black and Hispanic men who previously indoor-tanned reported being offered tanning packages or promotions with gym memberships (Table 2; q5). Hispanic women who previously used tanning beds reported stopping after noticing signs of skin aging.

5.1.2. Blacks

Among blacks, a quarter ‘always’ or ‘sometimes’ used sun protection, while less than half admitted to ‘rarely/never’ protecting their skin. Elevated risk respondents were more likely to report engaging in sun protection practices than low risk respondents. Those who protected their skin did so to avoid exacerbating existing skin conditions (e.g., vitiligo, melasma, eczema), sunburn-related discomfort, or to stay cooler. Men preferred protective clothing (e.g., long sleeves, pants) over using sunscreen (Table 2; q6). Concern related to sun-exposed skin was linked to beauty norms, rather than skin cancer risk (Table 2; q7). Many protected their skin to prevent further “skin darkening” versus reducing skin cancer risk. For those who did not, engaging in protective behaviors was not top-of mind. This was a common sentiment of those who never had a sunburn or believed race or skin color was enough protection to mitigate the need for sun protection (Table 2; q8).

5.1.3. Hispanics

Hispanics reported protection behavior engagement more often than blacks. However, their usage was inconsistent with less than half of respondents ‘sometimes’ a quarter ‘always’, and a third ‘rarely/never’ engaging in sun protection behaviors. When protection was used, Hispanics used sunscreen with varied SPF concentrations (from 15 to 100+). Hispanic women were more likely than men to protect themselves from sun exposure. Several used moisturizers with SPF, while others “covered up” when outdoors. Women reported behavioral motivation to protect their looks and prevent wrinkles rather than concern about skin cancer risk. Men reported only using sunscreen or covering up after a sunburn; their motivation was to avoid sunburn pain, not skin cancer. This was especially true among men in elevated risk groups with a sunburn history or balding and concerned about their scalp getting sunburned.

5.2. Perceived risk

Most respondents perceived themselves to be at low risk for skin cancer. Some desired to understand more about risk based on age, race/ethnicity, and sex.

5.2.1. Blacks

Most blacks had low perceived risk and viewed health conditions like diabetes and heart disease to be “more relevant” or “threatening” compared to skin cancer. Low perceived risk was associated with: 1) no known family skin cancer history; 2) no knowledge of friends with skin cancer history; 3) limited skin cancer-related conversations with family, friends or co-workers; 4) not being “white”; 5) having darker skin tone or more melanin; 6) no recollection of sunburn; and 7) being encouraged by doctors to increase vitamin D levels through sun exposure.

Most could not recall any family or close friends with a skin cancer history and weren't personally concerned about skin cancer (Table 2:q9). Conversations with friends, co-workers, or family during childhood also did not support or reinforce using sun protection or increase perceived risk. Black participants reported being taught that sunburn was not relevant (Table 2; q10) and few characterized skin cancer as a primary concern. Those recalling admonitions to avoid the sun associated warnings with concerns about skin appearance and not disease avoidance (Table 2; q11). The few who engaged in peer-based conversations either worked outdoors, had ‘white coworkers’ who initiated discussion about moles and skin cancer, or spent time at the beach with friends who used sunscreen.

Many cited the amount of melanin in their skin or their “darker skin color” (Table 2; q12) as being protective and, subsequently, had lower perceived risk. Those who indicated some personal risk were those who had a sunburn history. Compared to younger adults, men and women aged 30–44 years were more likely to recall getting sunburned when in locations with intense sun exposure, but most were unaware they were getting burned and only realized afterward (e.g., peeling skin, pain, “coloring skin”; Table 2; q13).

A few elevated risk respondents in Miami and L.A. (compared to Chicago or Atlanta) recalled conversations with dermatologists about skin care and sun exposure risks. While some elevated risk respondents heeded warnings to protect their skin, most were not influenced by these conversations. Some blacks, conversely, believed they needed more sun exposure to prevent vitamin D deficiency, advice reportedly given by healthcare providers (Table 2; q14).

Most blacks never engaged in indoor tanning and knew little about associated risks. Those with an opinion said risks for blacks would be the same as any other groups (e.g., “exposure to radiation” or “burns”).

5.2.2. Hispanics

Skin cancer was not a perceived personal risk among most Hispanics. There was awareness about personal necessity of sun protection behaviors, often associated with history of sunburn or

premature aging, but overall, skin cancer was not of concern due to their darker skin tone (Table 2; q15). Several respondents in both elevated and low risk groups reported low perceived risk despite finding moles and consulting dermatologists.

Family conversations about sunscreen use, fairly prevalent, were typically with older female family members who encouraged use of sunscreen. Many respondents came from families with a variety of skin tones, which made sun protection important for some, but not others within the same family. Some, particularly in L.A. and Miami, recalled family members or Hispanic acquaintances who had been diagnosed with melanoma. Hispanic men with no family history expressed little concern about sun exposure because they did not spend as much time in the sun as some previous generations of their families, who never developed skin cancer (Table 2; q16). Most Hispanics did not talk to their peers about skin cancer. Many who worked in outdoors jobs were encouraged by supervisors to wear sunscreen or cover up.

Hispanics reported having limited information or experience with indoor tanning. A few women associated indoor tanning with aging; one said she was discouraged to tan after she was handed risk acknowledgement papers to sign before a tanning session. The few participants who tanned regularly were made aware of the health risks, but liked the way that tanning made them look, outweighing any perceived risks (Table 2; q17).

6. Discussion

Health information seeking behaviors were similar among black and Hispanic audiences. Respondents' routine use of web and social media sites for health information seeking behaviors is consistent with research showing that 90% of U.S. blacks and Hispanics aged 18 to 49 years use the internet (Pew Research Center, 2016) and report web and social media sites as a preferred health information seeking behaviors method (Manganello et al., 2016). Respondents reported health information on the internet wasn't always tailored to the needs of diverse racial/ethnic groups (Kelly et al., 2014). Studies show the number and quality of culturally tailored messages are lacking (Kelly et al., 2014). Blacks reported limited exposure to messaging about skin cancer, while some Hispanics recalled seeing messages on sunburn and sun protection. Low overall exposure to messages was expected given that a recent review of public service announcements found that most target young, non-Hispanic, white women and tanners and aren't presented as relevant to other demographic groups (Kelly et al., 2014). This limitation of existing skin cancer messaging is important, as all audience groups placed considerable trust in health messages provided by people they perceived as being "like them."

While low skin cancer prevention knowledge among blacks and Hispanics has been documented (Cheng et al., 2010; Miller et al., 1996; Friedman et al., 1994) our study identified novel differences based on location of participant residence. Miami and L.A. respondents may have increased exposure to skin cancer messaging and therefore may have more general knowledge about skin cancer, as an artifact of living in year-round warmer climates, spending more time outdoors, and regional attitudes toward health consciousness (Bharath and Turner, 2009).

Consistent with previous literature (Eilers et al., 2013; Pichon et al., 2010b) blacks often described skin reactions to extreme sun exposure as "irritation" or "darkening" instead of as "burning" or "tanning." Differences in terminology may reflect differences in skin changes in response to sun damage across different skin types (Pichon et al., 2010b). While respondents identified moles and skin discoloration as signs of symptoms of skin cancer, they did not mention changes in mole diameter or asymmetry. This is consistent with one study showing few blacks and Hispanics knew all ABCDE's of melanoma (Imahiyerobo-Ip et al., 2011).

Black and Hispanic group participants also revealed low engagement in sun protection behaviors. Reported rates of never or rarely

using sun protection were consistent with studies showing poor sunscreen use among Hispanic outdoor workers (Day et al., 2015) despite national surveillance data showing about 76% of US Hispanic adults routinely practice sun-safe behavior (Cancer Trends Progress Report National Cancer Institute, 2017). Among our study participants who used sunscreen, use of different SPF levels was likely due to confusion about how sunscreen works, its safety, the meaning of SPF, intended use, and recommended SPF levels (Osterwalder and Herzog, 2009).

Low reported use of indoor tanning was consistent with findings from national surveillance data (Guy et al., 2017) and in studies among students of African American and Hispanic descent (Trad and Estaville, 2017; Neenan et al., 2012). Few some reported indoor tanning when in high school or as young adult, which is consistent with data showing indoor tanning prevalence peaks in these age groups (Guy et al., 2017). The few men in our study who had previously engaged in indoor tanning associated this behavior with being offered gym/fitness-based tanning promotions.

Consistent with the Health Belief Model Framework (Becker, 1974) reported engagement in sun protection behaviors was dictated by respondents' perceived vulnerability to getting skin cancer, perceived severity of skin cancer, benefits/barriers to engaging in protective behaviors, cues that activated a desire to engage in protective behaviors, and self-efficacy. Low perceived risk or susceptibility to skin cancer was consistent with previous findings showing blacks have lower perceived risk of getting skin cancer than whites (Kesha et al., 2012; Buster et al., 2012; Pichon et al., 2010c; Kundu et al., 2010). Higher melanin production may confer some protection to those with darker skin tones. Black respondents in both elevated and low risk profile groups, more so than Hispanics, associated their race/ethnicity with higher protection from the sun with limited consideration for differences based on variations in skin tones. Misconceptions of immunity to skin cancer and lack of differentiation between race and skin tone reported by respondents is consistent with previous literature (Gupta et al., 2016; Jacobsen et al., 2016). These beliefs may be a function of how messages about skin cancer and associated risk were shared in family discussions during childhood. A perceived need for sun exposure to increase vitamin D levels (based on provider recommendations) may also cause confusion and reduce perceived risk of skin cancer among respondents. Outstanding questions remain regarding optimal levels of vitamin D for overall health, with some evidence suggesting that low vitamin D status is a consequence of rather than a cause of poor health (Autier et al., 2017; Neale et al., 2016). Large scale randomized trials are needed to inform related public health and clinical practice recommendations.

Perceived severity of skin cancer also appeared to affect sun protection behaviors. Our findings showed those who expressed low perceived risk reported infrequent engagement in sun protection behaviors. Lack of perceived severity of skin cancer may be an artifact of several factors including increased known family history of other health conditions like diabetes or heart disease (compared to skin cancer), especially those perceived to have higher mortality rates, and exposure to health information and messaging about other chronic health conditions.

Consistent with published literature (Kesha et al., 2012) more women than men endorsed engaging in protective behaviors such as sunscreen use. While barriers to sunscreen use (e.g., "too greasy," "too laborious to reapply") are reported in the literature and were routinely reported in our study, women often cited the prevention of skin aging as a benefit. This perceived beauty-based benefit could be leveraged in messaging as a motivating factor (Ajzen and Fishbein, 1980). Both men and women reported that protecting skin from "skin darkening" was another benefit of engaging in sun protection behaviors, often a message passed down during family-based communication. These perceived benefits appeared to be related to historical beauty norms associated with "colorism" (Hall, 2017; Wilder and Cain, 2011) rather than concern about health risks. Additionally, respondents noted other benefits

Table 3

Prevention strategies targeting black and Hispanic groups, Skin Cancer Qualitative Assessment Study, 2017.

Strategies
1. Vulnerabilities and risks of sun exposure specific to black and Hispanic men and women
2. Signs and symptoms of adverse skin reactions to extreme exposure
3. SPF levels, sunscreen and appropriate use
4. Using a layered approach to protecting skin
5. Combined benefits to protecting skin including prevention of skin aging and exacerbation of other skin conditions (e.g. eczema).

of sun protection such as preventing the exacerbation of existing skin conditions (vitiligo, melasma, and eczema). Some respondents expressed that these skin conditions may be more pervasive among blacks and Hispanics compared to skin cancer, and care of these conditions may be subsequently prioritized.

6.1. Strengths and limitations

To date, our study is the largest known qualitative assessment comparing KABB among Hispanics and blacks by age and risk status. The study's scale resulted in valuable information from these audience groups. The study also gained feedback from a range of participants, including large numbers of men and diverse Hispanic cultural groups, across multiple geographic regions. This systematic analysis allowed for topline discussion as well as detailed comparisons by demographic characteristics. The definition of "elevated risk" also resulted in a heterogeneous mix of participants: people who used tanning beds either in the present or the past; people who worked outdoors; and people who burned more easily. These participants offered very different perspectives, with different attitudinal orientations. Limitations regarding non-utilization of other phenotypic characteristics and combining modifiable and non-modifiable factors when defining "elevated risk," (e.g. presence of freckles or moles) may exist. While the sample size was larger than average for similar qualitative studies, results were still based on a relatively small sample. Although respondents were from diverse geographic locations across the US, recruitment locations were largely urban.

7. Conclusions

Limited research exists regarding KABB about skin cancer prevention for people of color. Further exploration is needed to understand the intersection of biological, psychosocial, cultural, and healthcare factors and how they influence behaviors and related outcomes among diverse racial/ethnic groups. While general skin cancer prevention messaging exists, tailored and culturally sensitive messaging is limited. Prevention strategies could incorporate tailored messaging, reflective imagery, and education on several topics (Table 3). Engaging families, peer groups, and healthcare providers (e.g., dermatologists, primary care physicians) in educational interventions and messaging efforts is also imperative, as they appear to have influence over skin cancer and prevention beliefs and behaviors.

Conflicts of interest statement

There are no conflicts of interest from any authors. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control, the National Association of Chronic Disease Directors, or Westat, Inc.

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