

Attitudes and Behaviors Regarding Sun-Protection Practices Among Minority Groups in a Lower Socioeconomic Community

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Research

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Abstract

Background: Although skin cancer is less common, minorities present with more advanced stages at diagnosis and have worse outcomes. Literature on this disparity is limited.

Objective: To evaluate attitudes influencing sun protective behaviors, skin cancer risk perception, and dermatologist access among an underserved, racially/ethnically diverse community.

Methods: A cross-sectional survey of patients at 5 ethnically diverse student-run, free primary care clinics in Sacramento, California.

Results: 390 surveys were collected with a response rate: 86.4%. Overall, respondents did not use sunscreen, rarely sunburned, were unsure or perceived themselves at low risk for skin cancer and reported limited access to dermatologists. Compared to Whites, Latinos were likely to believe it was not worth getting sunburned to be tan (OR = 24.43, 95% CI: 9.37 to 63.3, P < 0.0001). Whites were more likely than Asians (OR = 3.69, 95% CI: 1.50 to 9.11, P = 0.004) and Latinos (OR = 4.83, 95% CI: 1.83 to 12.8, P = 0.001) to perceive access to dermatology care.

Limitations: Response bias, sampling bias, generalizability

Conclusions: Ethnic groups differ in knowledge of sun protection and self-perceived skin cancer risk. The Latino community showed discrepancies between sun protection knowledge and practices, serving as an interventional target.

Background

Research evaluating underserved and minority communities' attitudes, behaviors, and practices regarding skin care, sun exposure, and sun-protective behaviors is limited.^{[1],[2]} While there are studies assessing these perceptions among White and African American people,^{[3],[4],[5]} few exist for other minority groups and even fewer for low socioeconomic and underserved communities. Existing studies reveal that demographics such as gender, socioeconomic status, and skin type are important predictors of sun protective behaviors.^{[4],[6]} Moreover, other studies suggest that African Americans may undervalue dermatological care due to a self-perceived lower risk of skin cancer.^{[7],[8]} This is notable, for individuals who perceive themselves to be less susceptible to a condition may take fewer preventative actions.^{[9],[10]}^[11] Clearly, it is important to investigate whether this trend holds for other minorities.

While the incidence of skin cancer is much lower in African, Asian, Latin-American, and American-Indian descent,^[12] significant morbidity and mortality is observed in these populations, often related to presenting at more advanced cancer stages than their White counterparts.^{[12],[13]} This may be explained by delays in seeking diagnosis and treatments, suboptimal early-detection practices, and inadequate skin cancer awareness.^{[14],[15]}

Low socioeconomic status (SES) is associated with more advanced stages of skin cancer at presentation and worse outcomes,^[16] which may be a leading contributor to differences in survival among minority populations.^{[7],[15]} Conversely, melanoma incidence is associated with higher SES^[17] in White populations, so differences in sun protective behaviors among SES classes may explain these trends.^{[18],[19]} This study hopes to determine whether these conclusions can be extrapolated to minority communities. In examining beliefs and factors influencing sun protective behaviors and dermatological care among underserved minority groups, we hope to inform how dermatological care might better address the needs of individuals in these populations.

Methods

Study population and Setting

Cross-sectional surveys of adult patients visiting 5 University of California, Davis (UC Davis) student-run health clinics located throughout Sacramento, California, USA between 02/16/2013 and 05/04/2013. These clinics target different ethnic subgroups including Chinese and Vietnamese, South Asian, Hispanic, African American, and Filipino patients. Patients 18 and older were eligible to participate. This study was reviewed and exempted by the UC Davis IRB. Responses were anonymous and no incentives were offered to avoid bias with a low-income, underserved population.

English was not the primary language for most participants, so trained medical interpreters from respective clinics translated the original English survey into Chinese (simplified), Chinese (traditional), Hindi, Spanish, Tagalog, and Vietnamese. The surveys were then reverse-translated back to English to ensure accuracy. Age, gender, annual income, education, and generational status (1st generation defined as born in a country outside the US) were analyzed as potential covariates.

Survey methods

A brief, anonymous, written, cross-sectional survey assessed the use of sunscreen, sun protective knowledge and behaviors, skin care attitudes and beliefs, healthcare utilization, natural and artificial tanning, skin care knowledge, and demographics. The survey consisted of 31 validated^[20] survey items, took 10–30 minutes to complete, and required a 6th grade reading level. Best practices^[20] were followed to limit errors in survey design. Trained, multilingual, and culturally competent undergraduate students working at each respective clinic distributed the self-reported survey and translated responses to English when appropriate.

Responses were categorized using a five-point Likert scale or using yes/no responses. The independent variable was race/ethnicity: African/African American, American Indian/Alaskan Native, Asian/Asian American, East Indian/Pakistani, Latino/Latin American, Middle Eastern, White/Caucasian, Other, or I prefer not to say.

Statistical Analysis

All analyses were performed using SPSS 20.0. Descriptive, frequency, and crosstab analysis were performed with respect to gender and race/ethnicity. Secondary analyses were restricted to crosstab and univariate comparisons in responses regarding sun protective knowledge and behaviors, healthcare utilization, and skin care knowledge between genders and racial/ethnic groups. Pearson's chi-square tests, Fisher's exact tests, Kruskal-Wallis tests, and ordinal and linear logistic regression were two-tailed with a significance level of $\alpha = 0.05$. Ordinal logistic and linear logistic regression analyses assessed the relationship between each outcome, race/ethnicity, and potential covariates including education, household income, generational status, gender and age. The reference category was White. A valid parsimonious regression model was built using stepwise regression. Odds ratios and 95% confidence intervals were then calculated.

Results

A total 390 surveys were collected with a response rate of 86.4%. Of these 390 surveys, 53 were excluded, leaving a total of 337 unique surveys for analysis. Reasons for exclusion included incomplete surveys, having previously completed the survey (per self-report), not being seen at the UC Davis student run clinics that day. Of the 337 participants who completed the survey, 67.7% were female and 32.3% were male (Demographics Table 1). The mean age of the participants was 51.1 years (SD = 12.78) ranging from 18 to 89. 73.9% had at least a high school education, and 20.9% had at least a college education. Education level was comparable between groups. In regard to annual household income, 63.0% reported below \$25,000; 11.0% more than \$25,000, 10.4% did not respond, and 13.9% were unsure. Most (79.1%) were born outside the US, and the sample comprised of 49.3% Asian, 10.7% East Indian/Pakistanis, 28.2% Latino, 5.0% Middle Eastern, and 6.8% White. Most of the population had a darker skin tone; 91.5% type III or higher on the self-reported Fitzpatrick photo-typing scale.

Table 1
Descriptive characteristics of study participants (N = 337)

	Mean	SD	Min	Max
Age (years)	51.09	12.779	18	89
Age (years)	Mean		SD	
Asian/Asian Americans	52.4		12.29	
East Indian/Pakistanis	50.8		14.36	
Latino/Latin Americans	49.5		12.90	
Middle Eastern	42.9		14.5	
White/Caucasian	54.1		10.05	
	N		%	
Gender				
Female	226		67.7	
Male	108		32.3	
Race/Ethnicity				
Asian/Asian American	166		49.3	
East Indian/Pakistani	36		10.7	
Latino/Latin American	95		28.2	
Middle Eastern	17		5.0	
White/Caucasian	23		6.8	
Skin type				
Type I/II	27		8.5	
Type III/IV	132		41.2	
Type V/VI	161		50.3	
Education				
HS Education				
Yes	244		73.9	
No	86		26.1	
College Education				

	Mean	SD	Min	Max
Yes	69		20.9	
No	261		79.1	
Annual household income				
< \$25,000	203		63.0	
\$25,000 - \$49,999	30		9.3	
\$50,000–74,999	3		.9	
\$75,000 - \$100,000	3		.9	
≥ \$100,000	1		.3	
Not sure/I prefer not to say	82		25.5	
Born outside of the U.S.				
Yes	262		79.1	
No	65		20.9	

Sunscreen and sun protection knowledge

With racial/ethnic groups pooled, subjects tended to agree that sunscreen is important to one's health. Despite this, they had little confidence in their knowledge about skin cancer (Fig. 3) and had a mixed consensus about whether sunlight was the most important factor that can cause skin cancer.

Successively, ordinal regression (Table 2) demonstrated that relative to Whites, Latinos were 68% more likely to describe sunscreen as important for health after controlling for gender and age (OR = 0.32, 95% CI: 0.11 to 0.90; P = 0.005). On the other hand, Latinos were 2.5 times less confident in their knowledge about skin cancer (OR = 2.54, 95% CI: 1.10 to 5.91; P = 0.030). Of note, Asians were 70% and Latinos were 79% more likely to believe that sun rays are the most important cause of skin cancer relative to Whites (OR = 0.30, 95% CI: 0.12 to 0.79; P = 0.014 and OR = 0.21, 95% CI: 0.08 to 0.56; P = 0.002 respectively).

Table 2

Ordinal logistic analysis for variables predicting sun protection and skin cancer knowledge. Ethnicity is compared to White/Caucasian group.

Question and Response	Ethnicity (and included covariates)	Odds Ratio	95% CI	p- value
I believe sunscreen is important to my health. Response: disagree	Asian/Asian American	0.38	(0.14, 1.03)	.077
	Eastern Indian/Pakistani	1.93	(0.58, 6.47)	.623
	Latino/Latin American	0.32	(0.11, 0.90)	.005
	Middle Eastern	1.66	(0.42, 6.54)	.740
	White/Caucasian	--	--	--
	Gender	0.47	(0.27, 0.83)	0.023
	Age	1.27	(1.00, 1.61)	0.162
It is worth getting burned to get a tan. Response: disagree	Asian/Asian American	3.22	(1.33, 7.81)	.010
	Eastern Indian/Pakistani	1.83	(0.63, 5.29)	.263
	Latino/Latin American	24.34	(9.37, 63.24)	.000
	Middle Eastern	3.13	(0.86, 11.38)	.084
	White/Caucasian	--	--	--
How confident are you in your knowledge about skin cancer? Response: not confident	Asian/Asian American	1.08	(0.49, 2.38)	.848
	Eastern Indian/Pakistani	2.61	(0.96, 7.04)	.059
	Latino/Latin American	2.54	(1.10, 5.91)	.030
	Middle Eastern	1.05	(0.33, 3.40)	.933
	White/Caucasian	--	--	--

Question and Response	Ethnicity (and included covariates)	Odds Ratio	95% CI	p- value
Do you consider sun rays to be the most important factor that can cause skin cancer? Response: no or not sure	Asian/Asian American	0.30	(0.12, 0.79)	.014
	Eastern Indian/Pakistani	1.35	(0.42, 4.36)	.618
	Latino/Latin American	0.21	(0.08, 0.56)	.002
	Middle Eastern	0.36	(0.10, 1.38)	.137
	White/Caucasian	--	--	--
Are you concerned that you will get skin cancer? Response: no or not sure	Asian/Asian American	0.89	(0.28, 2.81)	.844
	Eastern Indian/Pakistani	1.63	(0.36, 7.30)	.522
	Latino/Latin American	0.23	(0.07, 0.73)	.012
	Middle Eastern	1.58	(0.25, 9.82)	.624
	White/Caucasian	--	--	--
What do you think your chances are of developing skin cancer in the future? Response: lower than average	Asian/Asian American	2.27	(1.00, 5.15)	.050
	Eastern Indian/Pakistani	6.05	(2.01, 18.17)	.001
	Latino/Latin American	1.93	(0.81, 4.60)	.139
	Middle Eastern	2.21	(0.59, 8.33)	.242
	White/Caucasian	--	--	--
	High School Education	0.26	(0.17, 0.64)	< 0.0001
	College Education	0.61	(0.33, 1.01)	0.076
How often do you use sunscreen? Response: rarely or never	Asian/Asian American	1.52	(0.56, 4.15)	.362
	Eastern Indian/Pakistani	8.73	(2.20, 34.63)	.004

Question and Response	Ethnicity (and included covariates)	Odds Ratio	95% CI	p- value
	Latino/Latin American	1.91	(0.68, 5.35)	.428
	Middle Eastern	4.30	(0.98, 19.00)	.131
	White/Caucasian	–	–	–
	Gender	0.46	(0.26, 0.82)	.058
	First Generation	1.83	(0.93, 3.57)	.052
	Age	1.75	(1.36, 2.25)	< 0.0001
Do you know how to find a dermatologist? Response: no or not sure	Asian/Asian American	3.69	(1.50, 9.11)	.004
	Eastern Indian/Pakistani	1.72	(0.58, 5.09)	.310
	Latino/Latin American	4.83	(1.83, 12.78)	.001
	Middle Eastern	1.71	(0.47, 6.24)	.339
	White/Caucasian	–	–	–
	College Education	0.60	(0.33, 1.07)	0.083
How many times did you get sunburned this past year?	Ethnicity	1.11 (linear regression)	(0.96, 1.28)	0.077

Pairwise comparisons revealed that Latinos agreed more often than all other groups that sunscreen is important for one's health. Along this line, they were 24 times more likely to say it is not worth getting sunburned for a tan (OR = 24.43, 95% CI: 9.37 to 63.34; P < 0.0001) (Fig. 2). Similarly, Asians were 3 times more likely to say it is not worth getting sunburned for a tan (OR 3.22, 95% CI: 1.33 to 7.81; P .010) (Table 2).

Self-perceived skin cancer risk

With racial/ethnic groups pooled, there was no statistical significance for whether groups were more or less concerned they would get skin cancer compared to Whites, with the exception of Latinos. Ordinal

regression revealed that Latinos were 77% more likely to report concern for getting skin cancer (OR = 0.23, 95% CI: 0.07 to 0.73; P = 0.012).

Overall, these racial/ethnic groups tended to believe they had a lower than average chance of developing skin cancer in the future relative to Whites. Eastern Indian/Pakistanis and Asians perceived themselves as having a 6 times and 2 times lower than average chance of developing skin cancer in the future relative to Whites, respectively (OR = 6.05, 95% CI = 2.01 to 18.17; P = 0.001, and OR = 2.27, 95% CI = 1.00 to 5.15; P = 0.05, respectively) (Table 2).

Frequency of sunscreen use, sunburn and utilization of dermatologists

With all racial/ethnic groups pooled, our sample tended to rarely, if ever, use sunscreen (Fig. 1), rarely, if ever, get sunburned and seldom go to a dermatologist or know how to find one (Fig. 4). Ordinal regression (Table 1) showed that compared to Whites, Eastern Indian/Pakistanis were more likely to use sunscreen rarely or never after including gender, generational status, and age as covariates (OR = 8.73, 95% CI: 2.20 to 34.63; P = 0.004). However, no significant difference was observed among the racial/ethnic groups in the number of times an individual got sunburned over the past year (P = 0.126).

Ordinal logistic regression analyses (Table 2) indicated Whites were about four times more likely than Asians and Latinos to know how to find a dermatologist (OR = 3.69, 95% CI: 1.50 to 9.11; P = 0.004 (Asians), OR = 4.83, 95% CI: 1.83 to 12.78; P = 0.001 (Latinos)).

Discussion

The primary objective of this study was to assess whether racial/ethnic groups differed in knowledge of skin health and self-perceived risk of skin cancer in a low SES community. With respect to participants' knowledge of sun protection, relative to Whites, Latinos held a stronger belief that sunscreen is important for health, understood that sun rays are the most important cause of skin cancer, and were more likely to say it is not worth getting sunburned to be tan. Nonetheless, they rarely used sunscreen and were less confident in their skin cancer knowledge. This outlines a significant discrepancy between sun protection beliefs and knowledge/behaviors: an important area for future research. Further study is needed to assess if the lack of sunscreen use is related to cost or is beyond knowing the best preventative practices.

In terms of skin cancer risk, Whites did not have the highest self-perceived risk. Latinos tended to be more concerned that they would get skin cancer than Whites. Surprisingly, we also found that more Asian and Eastern Indian/Pakistani respondents perceived a lower than average risk for skin cancers compared to White respondents. This suggests that previous research concluding that African American populations have a lower perceived risk of getting skin cancer may not be generalized to other racial/ethnic groups.^{[8], [15],[18]} Studying each race/ethnicity separately is likely best practice, as other factors such as belief systems, SES, knowledge, and cultural values may come into play. Additionally, evidence for Whites having greater knowledge of skin care and sun protection and increased self-perceived risk of skin cancer

was not clear in our study but it may reflect that our population was entirely restricted to those of a lower SES and therefore harbor different beliefs than the White population at large.

The data generally supported our hypotheses that ethnicities differ in their knowledge of sun protection and self-perceived risk of skin cancer. Trends from other racial/ethnic comparisons^{[3],[14],[15]} supported our hypotheses. These trends are unsurprising, for the majority of the public education efforts have focused on lighter-skinned races and ethnicities.^{[21],[22]} Even if sunscreen awareness is high, deficits in skin care and sun protection knowledge exist. A survey of individuals attending health seminars in New Jersey observed similar results.^[23] Most participants understood the benefits of sunscreen use, but their knowledge of sun protection was incomplete, leading to low compliance. Another interventional study achieved increased knowledge and perceived risk of skin cancer but lacked behavior change in adolescents.^[24] This discrepancy between attitudes, knowledge and behavior may also be prevalent in our study population.

There may be barriers preventing this community from applying their knowledge to behavior. For example, cost may be a barrier to purchasing sunscreen or other sun protective measures.^{[25],[26]} However, only 7.5% of our participants reported price as a major factor in purchasing sunscreen and there may be other factors limiting sunscreen use requiring further study. This could inform future public health initiatives, as one may initially think supplying communities directly with sunscreen or funds to purchase sun protection items may improve adherence; however, our data and others^[27] point to other factors at play.

Low sunburn frequency may also discourage sunscreen use. For instance, children with darker pigmentation may receive less parental encouragement to use sun protection compared to their fairer counterparts.^{[28],[29]} Our sample had low skin sensitivity to UV radiation (91.5% type III or higher), so sunscreen use may be rare.^{[28],[30],[31]} More simply, sunscreen is often seen as unnecessary without sunburns and with low perceived risk of skin cancer (optimistic bias).^{[9],[10]} Nevertheless, our findings indicate a need to better understand why there is a discrepancy between knowledge and behavior in this population.

Most participants reported that they did not go to a dermatologist or know how to find one, especially in Asian and Latino groups. Considering the changing demographics of the US and the quickly growing minority populations^[32], issues with minority access to dermatology among those with lower SES must be addressed, as individuals with darker skin are less likely to be aware of skin cancer and sun exposure risks and early detection strategies.^{[33],[34],[35],[36],[37]} These disparities may explain decreased survival rates observed among minorities due to more advanced stages at presentation. Increasing awareness through culturally appropriate health education to promote prevention, screening, early diagnosis, and treatment is key.^{[8],[38],[39],[40]}

To improve validity, data collection occurred during the spring to account for seasonal biases, which is known to influence self-reported sun protection behaviors.^[41] Survey administration aimed for cultural competence with translators who addressed literacy and clarification needs. Aligning research staff to sample population is known to improve participation rates.^[42] Subsequently, we achieved a response rate of 86.4%.

There were several limitations. While diverse, the overall sample size was limited, especially in the African/African American and Native American populations. This was attributed to the closure of the clinic targeting Sacramento's African American community during survey administration. A larger sample size could improve the significance of observed trends. Additionally, this cross-sectional data cannot establish temporality between skin care beliefs and behaviors. This self-reported data is also susceptible to social desirability bias.^{[43],[44]} Finally, only a minority of participants were White and were from a lower SES; qualifying for free primary care. We utilized the White population as our reference group, but it is possible that our sample has a different view on health risks compared to other surveys utilizing White populations with higher SES. Nevertheless, our surveys were analyzed as a comparison, and our comparisons are valid when restricted to a lower SES population. Therefore, this study may not be generalizable to the greater US population, especially those in areas with less sunlight or without free clinics or among those of higher SES.

Lastly, the assumption that race correlates with self-reported skin type may be invalid for some participants. This is because race correlates poorly with self-reported skin phototype and objective measures.^{[45],[46]} The Fitzpatrick scale likely also has limited applications for skin of color, as it was originally developed for light-skinned populations.^{[45],[46]}

The data presented identified several key aspects of skin care knowledge and behavior with potential targets of future improvement. Markedly, the Latino population reported the lowest confidence in skin cancer knowledge, had the greatest concern for skin cancer risk, yet had low sunscreen use. Therefore, the Latino community may be a motivated population for change. A similar study examining sun protection behaviors among patients utilizing a free clinic came to the same conclusion.^[47] Another comparable study identified lower income Spanish-speaking patients as an ideal population for promoting skin protection awareness.^[48]

Conclusion

There are well-identified discrepancies between racial and ethnic groups surrounding sun protection, skin cancer knowledge and dermatology care that warrant intervention. We hope the results presented will aid healthcare professionals and policy makers to increase access to healthcare that is sensitive to patients' backgrounds to improve patient outcomes.^[49] This is especially important in dermatology, as dermatological care has traditionally focused on lighter-skinned and higher SES populations.^{[1],[2],[50]}

Abbreviations

1. SES: Socioeconomic status
2. OR: Odds ratio
3. UC Davis: University of California, Davis

Declarations

Ethics approval and consent to participate:

IRB approval status: Reviewed and exempted by the University of California, Davis IRB; approval #364883-1. Verbal informed consent to participate was taken at time of survey administration. No identifiable information was collected from participants.

Consent for publication:

verbal consent attained at time of survey administration, all data is anonymous

Availability of data and materials:

The dataset supporting the conclusions of this article is included within the article's additional files.

Competing interests:

The authors declare that they have no competing interests. This research has not previously been presented in any other form.

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Authors' contributions:

AN participated in study design, data collection and manuscript writing, JF performed statistical analysis, TE wrote the majority of the manuscript and oversaw and executed revisions and manuscript submission, AA and JL assisted with survey administration, RD and EM assisted with study design and data analysis and manuscript refinement. RS oversaw study design and publication All authors reviewed the manuscript and approved its final form.

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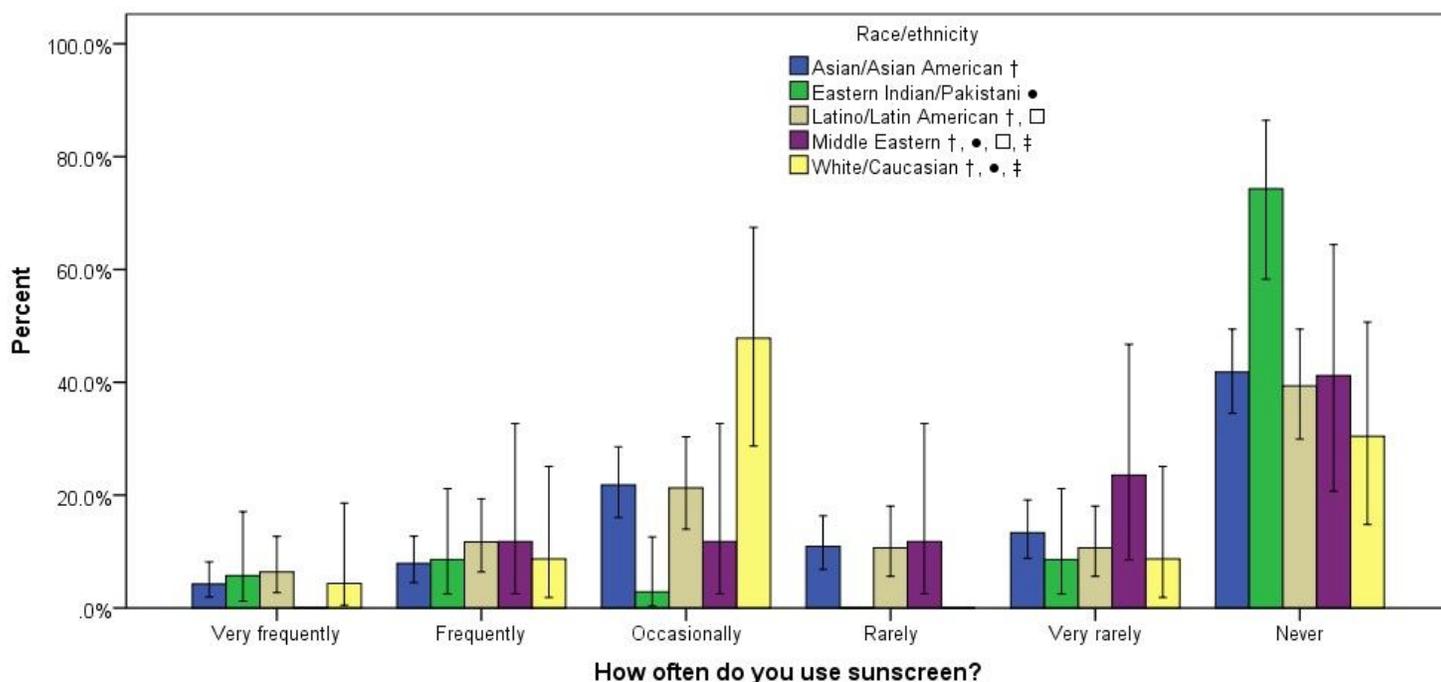
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Figures



Racial/Ethnic groups that share a symbol are not significantly different at $\alpha = 0.05$.
 Error bars: 95% Confidence interval.

Figure 1

Percent of racial/ethnic group with respect to their frequency of sunscreen use.

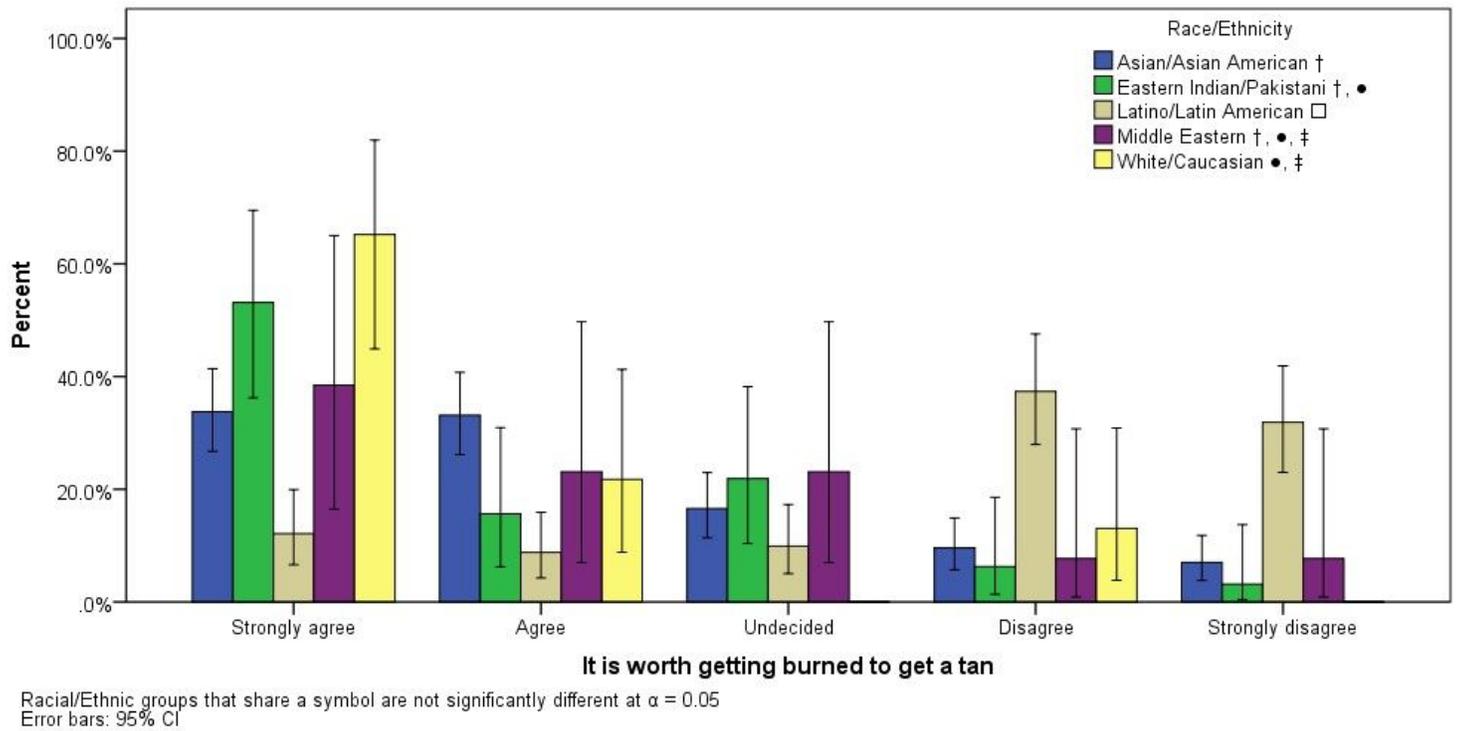


Figure 2

Percent of racial/ethnic group that believes it is worth getting a sunburn to get a tan.

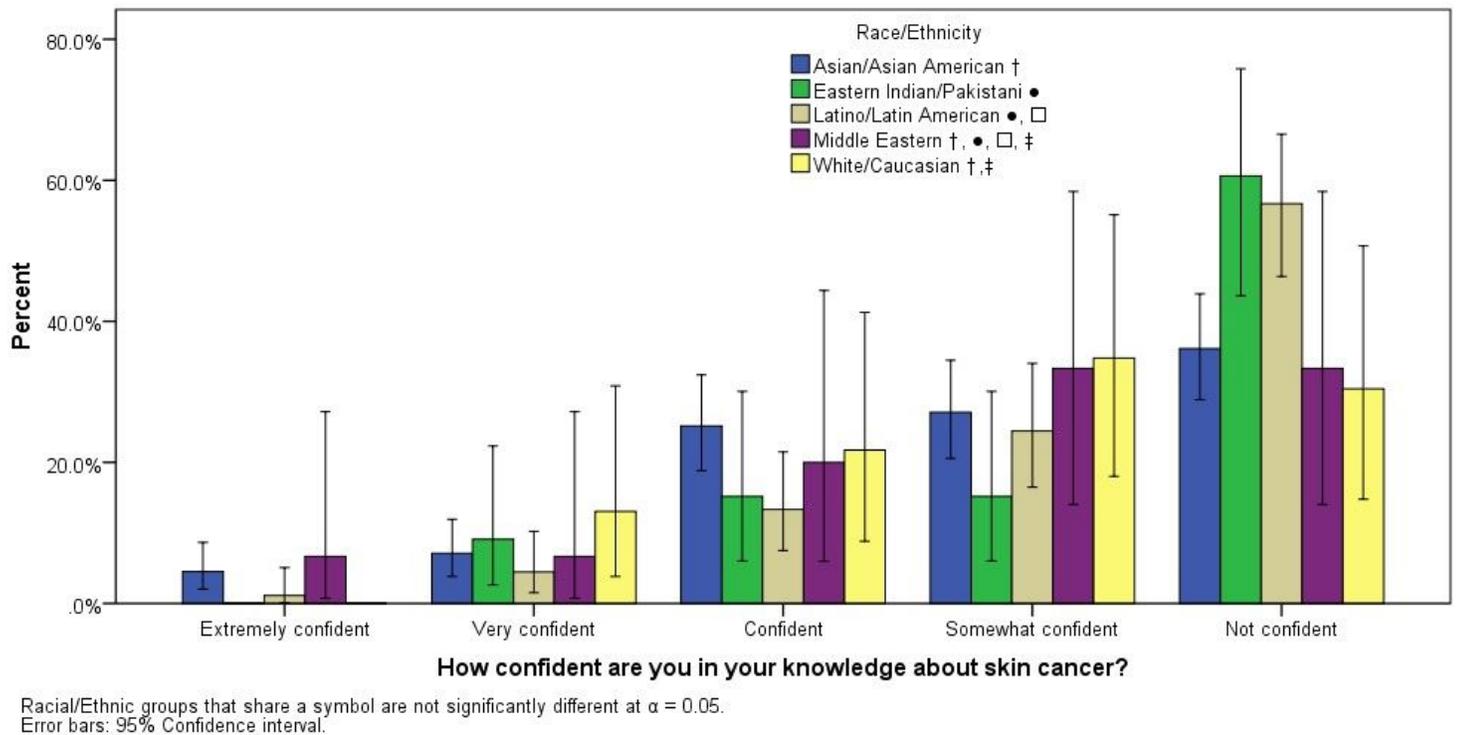
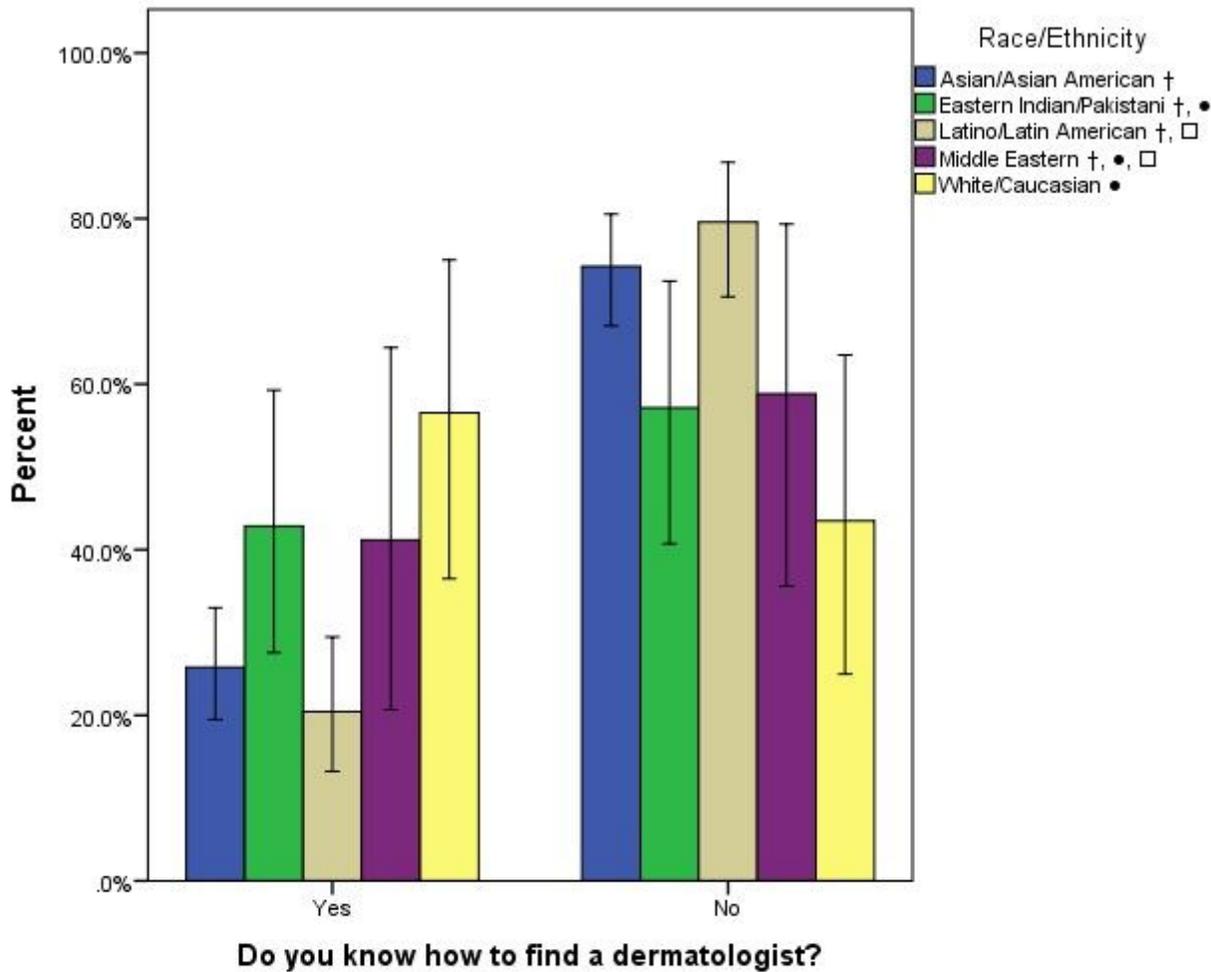


Figure 3

Percent of racial/ethnic group with respect to their confidence in their knowledge about skin cancer.



Racial/Ethnic groups that share a symbol are not significantly different at $\alpha = 0.05...$

Figure 4

Percent of racial/ethnic group that know how to find a dermatologist

Supplementary Files

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