

Skin Cancer Awareness and Behavior Risk Assessment in Hispanics

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ABSTRACT

Objective: To examine skin cancer awareness and behaviors in Hispanic patients attending skin cancer screening clinics in Puerto Rico. To compare those patients who had lesions clinically suspicious of skin cancer or pre-malignant conditions with those who did not have suspicious lesions. The growing incidence of skin cancer in Hispanics and the year long high ultraviolet radiation exposure in Puerto Rico make the findings of this study pertinent.

DESIGN: Cross-sectional study.

SETTING: Two free skin cancer screening clinics held separately (five months apart) at malls in the cities of Ponce and San Juan, Puerto Rico.

MAIN VARIABLES MEASURED: Questionnaire data was collected regarding demographics and knowledge, attitudes, and behaviors for skin cancer.

RESULTS: Out of the 276 screened, 16% had a clinically suspected precancerous lesion and 7% a suspected cancerous lesion; 74% reported never checking their moles and 80% reported minimal weekly sun exposure and beach days. Only 18% of the participants reported using daily sunscreen. The most common reason as to why they don't use sunscreen was that they don't think about it. The majority answered correctly to knowledge questions regarding childhood exposure to sun, using sunscreen on cloudy days, sun reflectors, and the importance of having both ultraviolet radiation A (UVA) and UVB coverage and using protective clothing. However, only 16% knew that the sun protective factor (SPF) 30 is not double SPF 15. Only 3.4% of participants believed that there was no serious complication of skin

cancer. Having a suspected clinical diagnosis of a precancerous or cancerous lesion at these skin cancer screenings was less likely in women (OR = 0.50; 95% CI: 0.10, 0.90), and less likely in participants that reported to use sunscreen everywhere including lips and ears (OR = 0.20; 95% CI: 0.03, 0.80). A suspected clinical diagnosis of a precancerous or cancerous lesion was more likely in participants reporting their skin color as white or white with freckles (OR = 5.30; 95% CI: 2.20, 12.80). The prevalence rate of a preliminary diagnosis of cancer or pre-cancer was 49% among white men who do not use complete sun protection, whereas the prevalence rate was 0% among non-white women who use complete sun protection.

CONCLUSION: There was a fairly high prevalence of clinically suspicious lesions (24%), which is consistent with the notion that we are dealing with the most common cancer in this population. Important elements of knowledge and behavior were strongly associated with skin precancerous lesions. The deficiency in sun-protective behaviors and the presence of good attitudes regarding skin cancer reflects a need for education in a population with high exposure.

INTRODUCTION

Skin cancer is the most common of all cancers.¹ The World Health Organization (WHO) estimates that as many as 60,000 people a year

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worldwide die from too much sun exposure, mostly from skin cancer. Of these deaths, 48,000 are from melanoma, and 12,000 are from other skin cancers. About 90 percent of these cancers are caused by ultraviolet light from the sun.² The most preventable risk factor for skin cancer is unprotected ultraviolet (UV) exposure. UV exposure in childhood and intense intermittent UV exposures are the major environmental risk factors for melanoma and basal cell carcinoma (BCC), and cumulative UV exposure is the major preventable risk factor for squamous cell carcinoma (SCC).³

The epidemiological trends of melanoma in Puerto Rico from 1978 to 1991, showed an increase age-adjusted incidence rate of 6.3 times in males and 3.0 times in females. The male age-adjusted incidence rate was 0.7 per 100,000 in 1978 and 4.4 in 1991, whereas in females it increased from 0.7 to 2.1 per 100,000.⁴ In 1983-1987, the average annual age-adjusted incidence rates in the United States per 100,000 were 10.8 for white males and 8.8 for white females.⁵

The current decrease in the planet's ozone layer has been associated with higher levels of UV radiation. In areas of the world where the ozone layer is exhausted, people are exposed to higher UV levels and they have higher incidence of non-melanoma skin cancer (NMSC).⁶ Skin cancer develops more frequently in zones close to the equator, in outdoor workers, in sun-exposed body areas, and in people with light-colored skin.⁷ Puerto Rico's geographic location (latitude 18.6 N) has a normally elevated UV index. The UV index is a number linearly related to the intensity of UV radiation reaching the earth at the sun's highest point in the day, which typically occurs during the four-hour period surrounding solar noon. According to the SunWise Program of the U.S. Environmental Protection Agency, the UV Index of Puerto Rico in 2007 revealed 57 days of the year in high (index of 6-7), 93 days in very high (8-10), and 205 days in extreme index (>11). The UV Index ranged from 7.0 - 13.5 in 2007. Throughout 2007 and through August of 2008, when compared to 58 cities in the United States, Puerto Rico's UV index was the highest.⁸

The objective of the Ponce School of Medicine Skin Cancer Screening Clinics in Puerto Rico was to provide medical attention to those patients having dermatological concerns with no health insurance or those who would otherwise not visit a dermatologist. With this free public screening clinic, we opted to reinforce sun protection behavior and change attitudes toward sun exposure in a purely Hispanic population. The results of the Sun Smart study demonstrate that both increases in knowledge and awareness of the limitations of sunscreen and the use of appropriate sun-protective behaviors are needed to reduce the incidence of skin cancer.¹⁰ Reducing death and morbidity from

skin cancer is possible through education and successful behavioral intervention that influences modifiable risk factors associated to sun exposure. Furthermore, the incidence of melanoma and non-cutaneous cancer increases following NMSC. Thus preventing NMSC can decrease the morbidity and mortality from other cancers.¹¹

Only one third of Americans practice sun-protective behaviors, and their practices vary greatly, depending on age, socioeconomic status, sex, and their ability to tan and burn. Previous studies have shown that Hispanic patients do not consider themselves to be at risk for the development of skin cancer and that they have decreased tendency to burn.⁹

There is scant data describing the behavior of a purely Hispanic population in an area of the world with one of the highest UV indices year round. Consequently, the purpose of this study was to assess specific skin cancer behaviors, attitudes, and common misconceptions, in order to help increase skin cancer awareness in an at risk community.

METHODS

In this cross-sectional study, we hosted two skin cancer screening clinics, one in Ponce and the other in San Juan, located in the southern and northern areas of Puerto Rico, respectively. The screening clinic in Ponce was conducted in a shopping mall in November of 2007; the one in San Juan was in another mall in March of 2008. All the subjects who participated in these clinics were Hispanic Puerto Ricans, and they were all included in the study.

The participants were recruited in Ponce using flyers posted throughout the city and having people explain the event to passing shoppers at the mall. In San Juan, participants were notified with an announcement in the most read newspaper in Puerto Rico. The flyer and newspaper announcement mentioned a free-of-charge skin examination by a dermatologist in order to find skin cancer and that the event was hosted by the American Academy of Dermatology (AAD) and Ponce School of Medicine (PSM) Dermatology and Pathology Interest Group.

The medical students of PSM administered two questionnaires. The first one, consisting of 20 questions was prepared by the medical students and was approved by PSM Institutional Review Board (IRB). The second questionnaire was a standard one provided by the AAD for skin cancer screenings. The questionnaire prepared by the medical students included: demographic questions (age, sex, eye color, perceived skin color); questions related to skin cancer risk factors (work sun exposure, family history, beach days per year, weekly

hours of sun exposure); sun protection behaviors (when and where sunscreen is used); knowledge about ways to protect oneself from the sun (SPF value, using clothing versus sunscreen, sun reflectors, UVA and UVB coverage); and attitudes toward skin cancer.

After filling out the questionnaires, the participants received a free skin examination looking for lesions suspicious of malignancy or pre-malignant conditions. If a suspicious lesion was seen, biopsies or the appropriate treatment was recommended and discussed. After the consultation, patients were given one-on-one education by the medical students according to their individual need. The need was assessed by the questionnaire and the participants' specific questions. Prior to the event, every medical student volunteer received training about what to teach and how to effectively teach. Some specific examples of the education given include: how to put on sunscreen, how to buy sunscreen (which combination of ingredients to look for), understanding the meaning of SPF, understanding the UV Index of Puerto Rico, understanding the different types of skin cancer and their associated consequences, how and when to do skin self examinations, and the long term effects of tanning beds in those who desired such information.

All the data collected from the questionnaires were analyzed with SPSS® 16.0 (SPSS Chicago 2008). The statistical analysis was used to describe the profile of the participants, and to compare individuals who had suspected precancerous or cancerous lesions with participants without suspicious lesions. Descriptive analysis was carried out by using frequency distributions, counts, and percentages. Means, medians, and standard deviations were calculated for continuous variables.¹² For comparison purposes, crude analysis included cross tabulations to assess the differences between cases and non-cases regarding potential factors included in the study. Odds ratios were estimated as measures of association with their respective 95% confidence intervals. Mantel-Haenszel stratified analysis was used to explore confounding and interaction effects before performing multivariate analysis.¹³ Multiple logistic regression analysis was used to estimate the adjusted odds ratios measuring individual contribution of several exposure factors associated with suspected cancer or precancerous lesions, adjusting for all confounders simultaneously.¹⁴

RESULTS

We had a total of 276 participants at the skin cancer screenings that filled out questionnaires. Of the 276 participants, 167 (61%) were female and 107 (54.9%) were male. The mean age was 55 years old, with a range of 5-89. Table 1 summarizes the results of all the

demographic variables. It was remarkable that 62% of participants described their skin type as white or white with freckles.

Figures 1-4 show the frequency distributions of responses to questions related to sun exposure behavior. Figure 2 reveals that the majority report minimal sun exposure during the week. Figure 3 shows the number of beach days per year reported by participants. The mean was 7.8 days and the mode was 0 days; the median was 2 days, with a large range of 0 - 270 days/year. Figure 4 reveals that only 18% of participants use sunscreen daily.

Figure 1
Question: "How often do you check the moles on your skin?"

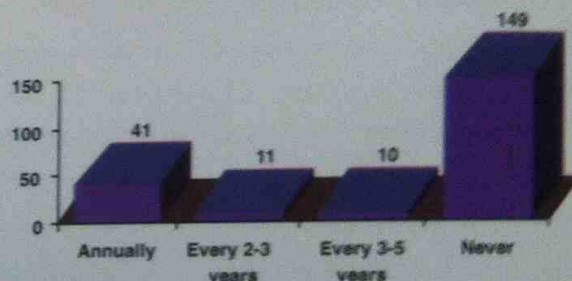


Figure 2
Question: "How many hours per week are you exposed to the sun?"

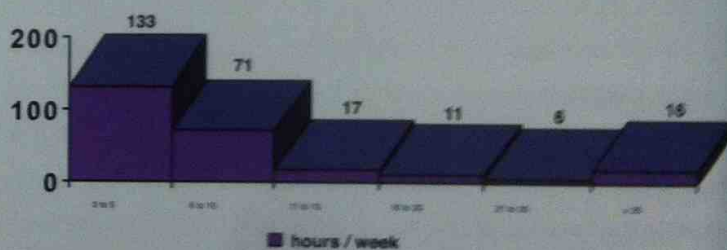


Figure 5
"It is more important for me to protect my skin for cosmetic reasons than for health reasons?"

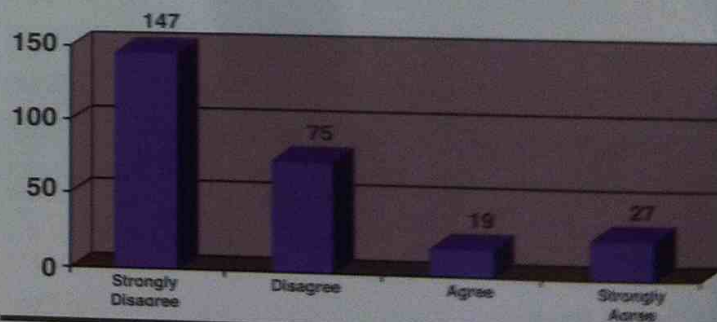


Figure 3
Question: "How many days to you go to the beach each year?"

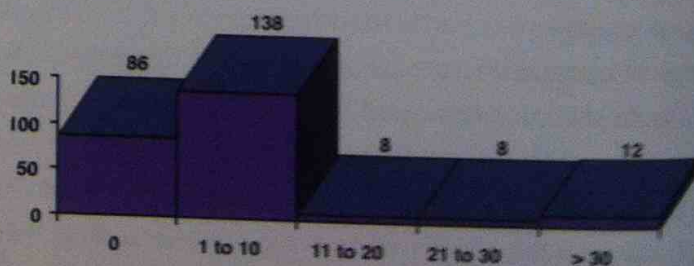


Figure 4
Question: "When do you use sunscreen?"

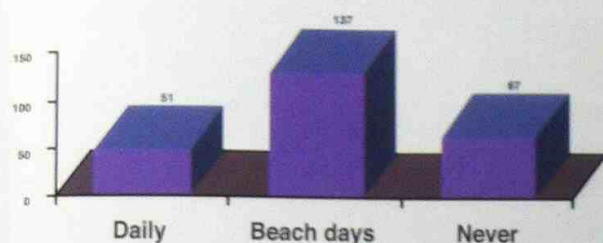


Table 1. Basic Demographics and Skin Sensitivity

Age: mean, Range	54.9, 5-89	n (%)
Age group:		
	5-20	15 (5.7)
	21-45	57 (21.5)
	46-65	111 (41.9)
	>65	82 (30.9)
Eye Color:		
	Brown	206 (81.4)
	Green	23 (9.1)
	Hazel	15 (5.9)
	Blue	8 (3.2)
	Black	1 (0.4)
Hair Color:		
	Brown	97 (50.8)
	Black	82 (42.9)
	Blonde	9 (4.7)
	Grey	2 (1.0)
	Red	1 (0.5)
Skin Color:		
	White	119 (43.3)
	White with freckles	51 (18.5)
	Tan	81 (29.5)
	Dark	24 (8.7)
Skin Type (AAD questionnaire): N (%)		
	Always burn, never tan (1)	30 (11.5)
	Always burn, tan minimally (2)	47 (17.9)
	Sometimes burn, tan gradually (3)	40 (15.3)
	Burn minimally, tan well (4)	57 (21.8)
	Rarely burn, tan well (5)	63 (24.0)
	Never burn, always tan well (6)	25 (9.5)

Table 2. Frequency of response as to reasons why participants that attended skin cancer screenings do not use sunscreen

I don't think about it	121 (46.5%)
I don't have sunscreen	89 (34.2%)
I don't burn	26 (10.0%)
I want to tan	20 (7.7%)
Sunscreen makes my skin greasy	19 (7.3%)

Table 2 summarizes the frequency of responses to the question: "When you do not use sunscreen, what are your reasons?" The most common reason for not using sunscreen among the participants was that they do not think about it.

Table 3 summarizes the results of responses to questions that have to do with knowledge about practical ways to protect oneself from the sun.

Figure 5 shows the frequency distribution of responses to the participant's level of agreement with the statement: "It is more

Answers to questions concerning sun protection	Correct No. (%)	Incorrect No. (%)	Don't know No. (%)
Which of the following reflects the sun?			
• Snow (correct = yes)	72 (27.4%)	191 (72.6%)	N/A
• Sand (correct = yes)	161 (61.2%)	102 (38.8%)	N/A
• Water (correct = yes)	205 (77.9%)	58 (22.1%)	N/A
• Cement (correct = yes)	150 (57.0%)	113 (43.0%)	N/A
• Lawn (correct = no)	203 (77.2%)	60 (22.8%)	N/A
Exposition to the sun in childhood is NOT related to skin cancer as an adult (correct = false)	174 (63.3%)	46 (16.7%)	55 (20.0%)
It is important to use sunscreen on sunny days and NOT on cloudy days (correct = false)	167 (60.7%)	81 (29.5%)	27 (9.8%)
In a sunscreen, it is important to look at coverage of both UVA and UVB before the verification of SPF (correct = true)	177 (64.4%)	10 (3.6%)	88 (32.0%)
SPF 30 is double the strength of SPF 15 (correct = false)	44 (15.9%)	139 (50.4%)	93 (33.7%)

important for me to protect my skin for cosmetic reasons than for health reasons".

When patients were asked about what they believed was the most serious consequence of skin cancer, 180 (67.2%) answered death. After death, 51 (19%) answered scarring and 28 (10.4%) answered facial deformity. Only 9 (3.4%) participants believed that there was no serious complication of skin cancer.

Among the participants in the study, 45 (16%) had clinically suspicious precancerous lesions on examination at the skin cancer screening. Lesions suspicious of skin cancer were present in 20 (7%) participants. In summation, of participants who presented to the skin cancer screenings, 24% had lesions clinically suspicious of cancer or precancerous conditions according to the dermatologist or dermatology residents' perspective. The clinical suspicion is non-diagnostic and requires biopsy to be conclusively diagnostic.

Table 4 shows the results of estimates of association (odds ratios) between several variables and the presence of suspected skin cancer or pre-cancerous lesion. These variables include demographics, behaviors, knowledge and attitudes. Crude Odds Ratios (OR's) were estimated with cross tabulations. Preliminary effects of confounding and interaction were explored using Mantel-Haenszel stratified analysis. Variables that were likely to be affected by confounding were analyzed using a Multivariate Logistic Regression Model, using the presence of skin cancer or pre-cancerous lesions as the dependent variable.

Table 4. Association between different variables and the presence or suspected skin cancer or pre-cancerous lesions

Exposure Independent Variable	Suspected cancer or pre-cancer No. (Row %)	No suspicious lesions No. (Row %)	Crude OR (95% IC)	Adjusted OR (95% IC)	P-value
AGE					
46 and older	56 (29.0%)	137 (71.0 %)	4.4	2.1	0.200
5 - 45	6 (8.5%)	65 (91.5 %)	(1.8-10.8 %)	(0.8-6.0 %)	
GENDER					
Female	33 (19.8%)	134 (80.2%)	0.6	0.5	0.025
Male	31 (29.2%)	75 (70.8 %)	(0.3-1.0 %)	(0.1-0.9 %)	
EYE COLOR					
Brown	18 (24.3%)	56 (75.7 %)	0.3	0.5	0.080
Hazel, blue, green	11 (47.8%)	12 (52.2 %)	(0.2-0.7 %)	(0.2-1.1 %)	
SELF REPORTED SKIN TYPE					
White or white w/freckles	56 (32.9%)	114 (67.1 %)	5.2	5.3	0.0002
Tan or dark skin	9 (8.7%)	95 (91.3 %)	(2.4-11.0 %)	(2.2-12.8)	
WORK IN THE SUN					
Yes	14 (37.8%)	23 (62.2 %)	2.3	1.9	0.207
No	48 (21.0%)	181 (79.0 %)	(1.1-4.8 %)	(0.7-4.8 %)	
WHERE ON BODY DO YOU USE SUNSCREEN					
Everywhere including ears and lips	18 (24.3%)	56 (75.7 %)	0.3	0.5	0.080
Face only, exposed area, or never use	11 (47.8%)	12 (52.2 %)	(0.2-0.7 %)	(0.2-1.1 %)	
BEACH DAYS					
0-1	35 (31.8%)	75 (68.2 %)	2.3	1.8	0.102
2 or more	24 (17.0%)	117 (83.0 %)	(1.3-4.1 %)	(0.9-3.5 %)	
WEEKLY SUN HOURS					
0-5	50 (24.6%)	153 (74.5 %)	0.9	1.0	0.9437
More than 5	13 (26.5%)	36 (73.5 %)	(0.4-1.8 %)	(0.4-2.2 %)	
FAMILY HISTORY OF SKIN CANCER					
Yes	17 (26.2%)	48 (73.8 %)	1.2	1.4	0.450
No	47 (22.6%)	161 (77.4 %)	(0.6-2.3 %)	(0.6-3.0 %)	
PROTECT SKIN FOR COSMETIC REASONS RATHER THAN FOR HEALTH REASONS					
Agree	9 (19.6%)	37 (80.4 %)	0.3	0.5	0.756
Disagree	53 (24.0%)	168 (76.0 %)	(0.2-0.7 %)	(0.2-1.1 %)	
NOT WORRIED ABOUT SKIN CANCER BECAUSE IT CAN BE DETECTED AND TREATED EASILY					
Agree	20 (27.4%)	53 (72.6 %)	1.4	1.3	0.549
Disagree	42 (21.5%)	153 (78.5 %)	(0.7-2.5 %)	(0.6-2.7 %)	
WORRIED ABOUT SKIN CANCER BECAUSE I LIVE IN AN ISLAND OF THE CARIBBEAN					
Agree	54 (24.0%)	171 (76.0 %)	0.7	0.7	0.393
Disagree	8 (18.6%)	35 (81.4 %)	(0.3-1.7 %)	(0.2-1.7 %)	
WEARING HATS AND PROTECTIVE CLOTHING IS MORE IMPORTANT THAN SUNSCREEN					
Incorrect (False) or don't know	44 (21.7%)	159 (78.3 %)	0.7	1.1	0.741
Correct (True)	20 (28.2%)	51 (71.8 %)	(0.4-1.3 %)	(0.5-2.6 %)	
SPF 30 IS DOUBLE SPF 15					
Incorrect (False) or don't know	52 (22.6%)	178 (77.4 %)	0.8	0.7	0.370
Correct (True)	12 (27.3%)	32 (72.7 %)	(1.0-3.1 %)	(0.3-1.6 %)	
CHILDHOOD SUNBURNS DO NOT AFFECT ADULT RISK OF SKIN CANCER					
Incorrect (False) or don't know	30 (30.0%)	70 (70.0 %)	1.8	1.0	0.951
Correct (True)	34 (19.5%)	140 (80.5 %)	(1.0-3.1 %)	(0.5-2.1 %)	

* Adjusted by age, gender, complete sun protection, skin color, number of beach days, and other confounders as needed.

Statistically significant protective associations included female gender (OR = 0.50; 95% CI: 0.10, 0.90) and using sunscreen everywhere, including ears and lips (OR = 0.20; 95% CI: 0.030, 0.80). A statistically significant risk factor was self-reported white skin or white with freckles (OR = 5.30; 95% CI: 2.20, 12.80). The prevalence rates of the preliminary diagnosis of pre-cancer or cancer was found to be 49% (24/49) in the white men who do not use complete sun protection and 0% (0/7) in non-white women who report to use complete sun protection.

The factors that showed a tendency toward being protective included: brown eyes, being worried about skin cancer due to the fact that they live in the Caribbean, and answering incorrectly or not knowing the value of SPF. However, none of these factors were statistically significant. Risk factors for finding a suspicious lesion at the skin cancer screenings that did not reach statistical significance included the following: age >45, working in the sun, only using sunscreen on the face (in comparison to those who don't use it at all or use it everywhere), going to beach never or once a year, having a positive family history for skin cancer, not being worried about skin cancer because of the early detection and easy treatment, and not knowing that clothing and hats are more effective than sunscreen.

DISCUSSION

There have been extensive efforts in the United States by various organizations to promote sun protection behaviors in order to prevent melanomas and other skin cancers. At least two surveys all over the United States have assessed sun protection behavior, risk factors, and attitudes.^{15,16} White audiences have benefited from skin cancer prevention messages and targeted campaigns, as they have at least 10 times the risk of developing melanoma than ethnic minorities. Awareness of known skin cancer risk factors is high in the white population, but low in the ethnic population. However, minorities are more likely to have skin cancer diagnosed at an advanced stage and to have lower survival rates, as they are less knowledgeable of sun damage, sun protection behavior and skin cancer risk factors.^{17,18} Most studies in Puerto Rico have focused on the incidence and prevalence of melanoma and the UV dose affecting non-melanoma skin cancer in Puerto Rico.^{3,4} Unfortunately, there has been little effort to promote sun protection behaviors in Puerto Rico and no systematic effort to assess trends in sun protection behavior, knowledge and attitudes.

The Hispanic population that attended our skin cancer screening clinics mostly consider themselves to be white (61.8%). This is sub-

jective and could be accounted for by cultural perspectives of race or the ambiguous definition of what it means to be white in Puerto Rico. This could also be explained by a selection bias, provided white Hispanics may be more likely to be concerned about their skin and thus will be more likely to attend a skin cancer screening.

There have been studies revealing that white Hispanics perceive themselves to be at lower risk for skin cancer, to have less knowledge, and to be less likely to have been educated about skin self examinations than their white non-Hispanic peers.¹⁵ This is consistent with our findings. Our study revealed that the majority (74%) of participants report never checking their moles and seldom or never using sunscreen (only 18% used daily sunscreen). We expected that those who attended a skin cancer screening would be more concerned about their skin and would have reported different such behaviors. It was also surprising to see that those who attended the screenings report to rarely go to the beach and to get minimal or no sun exposure during the week. We are highly suspicious that this self-reported perspective of weekly hours of sun exposure may be underestimated. This reveals a possible need of orientation about the actual UV exposure for normal daily activities. Another region of the world with very high ambient levels of UV radiation is Australia. It has the highest rate of skin cancer in the world. However, unlike Puerto Rico, they have extensive population based education campaigns that have shown a general improvement in sun-protective behaviors.¹⁹ Therefore, these two geographic locations near the equator differ predominately in sun protective behaviors due to the impact of educational programs.

For other questions concerning attitude, the majority answered in a way that reflects a concern for skin cancer. The majority of participants disagreed with the statement that they protect themselves only for cosmetic reasons and the majority answered that death and scars were what they considered the most serious complications of skin cancer. Similar findings are present in studies among young people in the United States. Young people in general hold positive attitudes toward sun protection (believe protecting the skin is a way to stay healthy and prevent skin cancer) yet they still show preference or interest in tanning.¹⁶ Our study reveals incongruence between the participants' behaviors and attitudes; the participants care about the health of their skin and understand the seriousness of skin cancer, yet the majority does not check their moles nor use daily sunscreen. This is important because the attitudes and interests of many are reflected in their sun protection behaviors and how easily behaviors can be changed. This population in Puerto Rico was concerned for

the health of their skin, but may be limited by lack of knowledge or lack of interest in sun protection behaviors.

Most of the knowledge items were answered correctly by the majority of participants. An exception to this was that only 16% of participants knew that SPF 30 is not double SPF 15. Also, less than one third of participants answered correctly that the snow reflects the sun. The latter is not surprising considering this population is not exposed to the snow. A previous study concerning knowledge in high school students of Miami, Florida, has shown that the white-Hispanics were less knowledgeable about skin cancer than non-Hispanic whites.¹⁵ There may have been a limitation of our assessment of knowledge in the San Juan screening clinic due to the fact that we offered a skin cancer presentation five times throughout the day. There were a few moments when too many people were waiting and walked past the entrance to watch the presentation before filling out the questionnaires. Thus, we cannot assess the true knowledge of the participants due to the uncertainty of how many overheard the presentation prior to having their knowledge assessed. On the other hand, this may reflect an educated group of participants who were indeed knowledgeable.

The only variable that demonstrated a statistically significant positive association with suspected cancer or precancerous lesions was a reported white or white with freckles skin color (OR 5.30). Variables that had statistically significant protective effects for suspected cancer or pre-cancer was using sunscreen everywhere, including the lips and ears (OR 0.20) and female gender (OR = 0.50).

There was a trend for age older than 45 years (OR 5.0) and working in the sun (OR 2.3) to be positively associated with clinically suspected suspicious lesions at skin cancer screenings, but the odds ratios did not reach statistical significance after adjustments.

A few limitations of the study should be noted. The survey was administered in two shopping malls, Plaza Las Americas and Plaza del Caribe, with a limited sample size. The characteristics of people who go to shopping malls may not be representative of the whole population. The majority (73%) were older than 46 years old. An older population may reflect more wisdom of the consequences of sun exposure. Another limitation may be the confusion with understanding some of questions due to differences in the level of education. We did not assess the socioeconomic status of the population examined. Thus the socioeconomic status and level of education and the association with the respective sun protection behavior should be assessed in the future.

Socioeconomic status has been shown to be a strong predictor of survival among cancer patients, as people of higher economic status are more likely to visit a dermatologist and have their tumors excised.²⁰ Future skin cancer screenings should be targeted at the lower socioeconomic class in order to address the population with lower survival rates.

In the future, we should aim to assess the sun protection behaviors after having done multiple skin cancer screenings with sun protection campaigning, to see if the intervention has an effect in increased sun protection behaviors and decreased skin cancer incidence. Studies done in the United States among adolescents to assess the impact of widespread sun protection campaigns, have found a moderate increase in use of sunscreen but yet no adequate implementation of the regular use of other recommended sun protection practices.¹⁶ We are optimistic that the participants at these large scale screening and educational events were impacted by the concern from the dermatologists and medical students for their skin's health. We hope to see improved trends in sun protection behaviors, and a congruency a congruency with attitudes and practices.

In addition, future studies to assess self perceived risk, sun protection behaviors, and knowledge, should be focused on a younger population in order to truly prevent UV induced skin damage.²¹ While children and teenagers are not at a greater risk of getting skin cancer than adults, skin cancer is occurring in young people, especially those who get consistent amounts of sun exposure. Skin cancer screenings are excellent for early detection; not necessarily primary prevention.

In conclusion, the Hispanic population attending skin cancer clinics appear to have a need for education about skin cancer. The reported minimal sun exposure yet living a latitude near the equator reveals some desensitization to the high amounts of sun exposure. The majority of the population was concerned about skin cancer yet did not practice sun protective behaviors. There was a fairly high prevalence of clinically suspicious lesions (23%), which is consistent with the notion that we are dealing with the most common cancer in our population and in the United States. With such a high UV index all year long in a population of all skin types, there is a strong rationale for recommending skin cancer educational campaigns targeting the Hispanic population living in Puerto Rico, especially the white men who do not practice sun protective behaviors.

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