

Defining the Need for Dermatologic Surgery Global Health in an Afro-Caribbean Country

Nicole Ufkes, BS,* Audrey A. Jacobsen, MD, MPH,*† Doris J. Joseph, MD,‡ Calum N.L. Macpherson, PhD, DIC,§ Satish Bidaisee, DVM, PHD, EdD,|| Maryjane deGuzman, MD,# and John Strasswimmer, MD, PhD*¶**

BACKGROUND Dermatologic surgery services are largely absent in Africa and in Afro-Caribbean countries. In the USA, studies of people of African ancestry have demonstrated health care gaps, but there are no data for Africa nor a Afro-Caribbean country. Dermatology surgery has been largely absent from global health because there are few data to demonstrate the need. We sought to determine skin cancer tumor types, and local knowledge and perception in an Afro-Caribbean country.

OBJECTIVE We sought to determine whether there exist knowledge gaps and whether a dermatology surgery medical missions program would improve the health of Afro-Caribbean people.

METHODS First, we conducted a survey of knowledge and behaviors related to skin cancer. Second, we analyzed the number and types of tumors treated during a multi-year surgical dermatology project.

RESULTS In the survey, 62% did not know what melanoma was. Eighty-one percent did not think skin cancer is preventable. Of 163 surgical specimens, 64 were malignancies with 91% related to UV exposure.

CONCLUSION There is a need for a skin cancer treatment and education program in a country of mostly African-ancestry people.

The prevalence and incidence of skin cancer in African countries and in those populated primarily by people of the African ancestry, including much of the Caribbean, is unknown. Moreover, local knowledge, attitudes, and perceptions (KAPs) of skin cancer risk in these countries is also unknown. Over the past decades, the incidence of melanoma and non-melanoma skin cancers has been increasing worldwide.¹ Although extensively studied in nations with large Caucasian populations, such as the United States, Europe, and Australia, patterns of sun-protective

behaviors, self-skin checks, and physician skin exams are understudied in the rest of the world, particularly in areas with predominantly darker-skinned populations.² Although skin cancer is less common in these populations, a higher proportion of acral lentiginous (AL) type melanomas are diagnosed in African Americans, with greater morbidity and mortality and diagnosed at a more advanced stage.³⁻⁶ Specifically, African Americans present with deeper tumors than Caucasians, exhibit higher rates of regional and distant spreading, and are more likely to present with metastatic disease, ulcerated lesions, and positive lymph node involvement.⁴ Furthermore, studies indicate that skin cancer rates do correlate with increasing levels of ultraviolet radiation (UVR) exposure in this group.⁷⁻⁹ This evidence highlights the need for targeted and culturally appropriate primary, secondary, and tertiary skin cancer prevention efforts in countries populated by people of African ancestry.

We performed a multicomponent study to investigate both the skin cancer burden and current knowledge, risk perceptions, and preventative behaviors held by a predominantly dark-skinned population living in a middle-income country.

In collaboration with Dermatology Medical Missions (DMMs), a nonprofit organization that provides free dermatology surgery services and related support to improve global dermatology health equity, we identified the country of Grenada, a southeastern Caribbean nation with a population of 108,000 as our target population.¹⁰ Melanoma has been identified as one of the 4 most frequent cancer diagnoses in the pathology records of St George's Hospital, the main hospital in Grenada.¹¹ However,

*From the *Dermatology Medical Missions, Delray Beach, Florida; †Department of Dermatology, University of Minnesota School of Medicine, Minneapolis, Minnesota; ‡Ministry of Health, St Georges, Grenada; §School of Graduate Studies, St. George's University, Windward Islands Research and Education Foundation, St. George's, Grenada; ||Department of Public Health and Preventative Medicine, St. George's University, Windward Islands Research and Education Foundation, St. George's, Grenada; ¶Dermatology Associates of the Palm Beaches, Delray Beach, Florida; #Dermatology Associates of the Palm Beaches, Delray Beach, Florida; **College of Medicine and College of Sciences, Florida Atlantic University, Boca Raton, Florida*

Funding for this project was provided in part by a "Skin Care for Developing Countries" grant from the American Academy of Dermatology to A. Jacobsen and by a "Dermatologist from the Heart" award from the Fondation La Roche-Posay USA to J. Strasswimmer and grants from the Safe Sun Foundation of Boca Raton, FL.

The authors have indicated no significant interest with commercial supporters. Address correspondence and reprint requests to: John Strasswimmer, MD, PhD, 2605 West Atlantic Avenue Suite 204, Delray Beach, FL 33445, or e-mail: strasswimmer@gmail.com

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.dermatologicsurgery.org).

<http://dx.doi.org/10.1097/DSS.0000000000002684>

insufficient data exists regarding cancer incidence and mortality in Grenada because it does not have a functioning cancer registry.¹² Since 2014, DMM has collaborated with the Grenada Ministry of Health to build a dermatology surgery program in collaboration with Grenadian dermatologists. Early in this partnership, the need for dermatologic surgery care in Grenada was apparent.

The objectives of this study were to quantify the relative types of cutaneous tumors in patients treated by the DMM and Ministry of Health partnership and also to assess current skin cancer knowledge, attitudes, and practices (KAPs) concerning skin cancer in Grenada. Results will help identify key skin cancer prevention and education needs in Grenada and to guide other countries with populations comprised of dark skin tones, including those in Caribbean and in the African continent. This is an underrepresented demographic in skin cancer research.

Methods

This research was approved by the Institutional Review Board of the Windward Islands Research and Educational Foundation (WINDREF). The study consists of 2 parts: a retrospective review of pathology specimens, and a survey to assess current skin cancer knowledge, risk perception, and preventative behaviors in Grenadian citizens. Patients were identified and referred by local dermatologists from the Grenada Ministry of Health System for further evaluation by DMM. Foreigners residing for work or leisure were not eligible for participation. Biopsies or excisions were performed as needed and specimens were reviewed by a board-certified dermatopathologist in the United States. A retrospective chart review was then performed on all pathology specimens obtained during these medical missions.

Separately, from June to August 2016, we administered a 22-question cross-sectional Knowledge, Attitude, and Practices (KAPs) survey to Grenadian adults enrolled in “Sports for Health,” a community-based exercise program instituted by the Westward Islands Research and Education Foundation (WINDREF). The goal of “Sports for Health” is to reduce the public health burden associated with chronic disease by raising awareness and educating the community on ways to lead a healthy lifestyle.¹³ The survey population consisted of English-speaking Grenadian adult citizens enrolled at 5 community exercise sites. Of the 6 parishes across the nation, 4 were represented.

Questionnaire items were adapted from previously validated surveys.^{14,15} Frequency of sun-protective behaviors and skin cancer risk perception were measured and summed on a 5-level Likert-type scale, with responses ranging from “never” to “always” or “very unlikely” to “very likely,” respectively. We used a color bar tool for skin type self-identification that has been validated for non-Caucasian skin tones in addition to traditional Fitzpatrick skin types.¹⁶ Data were analyzed using Excel. The WINDREF Institutional Review Board approved this study.

Results

We completed 5 dermatology surgery exchanges from 2015 to 2018, operating on 105 patients and obtaining 163 pathology specimens. A total of 64 cutaneous malignancies were identified. Squamous cell carcinoma was the most common malignancy (53.1%, $n = 34$ of 64) followed by basal cell carcinoma (35.9%, $n = 23$), cutaneous hematopoietic malignancies (7.8%, $n = 5$ representing CTCL and HTLV-1 disease), invasive melanoma (1.6%, $n = 1$), and DFSP (1.6%, $n = 1$). The remaining cases were pre-malignant or benign proliferative disorders (33.1%, $n = 54$ of 163), inflammatory dermatoses (24.5%, $n = 40$), or infectious disease (3.1%, $n = 5$; including one with lepromatous leprosy). Most cases of keratinocyte and melanocytic malignancies were likely related to UVR exposure because they were predominantly located on chronically or intermittently sun-exposed areas of the head and neck, trunk, and upper extremities.

Next, we surveyed 137 Grenadian adults enrolled in “Sports for Health”. The mean age (SD) of participants was 46.3 years (SD = 7.3), with 25.5% ($n = 35$) male and 74.5% ($n = 102$) female respondents. More than half (72.1%, $n = 98$) of the participants self-identified as Afro-Caribbean, followed by Indo-Caribbean (18.4%, $n = 25$). Demographics are listed in **Supplemental Digital Content 1** (Table S1, <http://links.lww.com/DSS/A472>).

Survey participants assessed their skin tone using a validated 6-point color scale.¹⁵ More than half of the participants (65.0%, $n = 89$) identified as a dark skin tone (Type 5 and 6), whereas 30.7% ($n = 42$) identified as medium skin tone (Type 3 or 4), and 3.65% ($n = 5$) identified as a light tone (Type 1 or 2). Interestingly, although most participants identified as having “dark” skin tones, 58.4% ($n = 80$) of participants described their skin’s reaction to the sun as “always burns, never tans” or “burns, then tans” using the Fitzpatrick skin type method.

Skin Cancer Knowledge and Attitudes

More than half of participants (61.3%, $n = 84$) did not know what melanoma is. Nearly 2 thirds (64.2%, $n = 88$) were unable to identify the warning signs of melanoma. Less than a quarter of participants (23.4%, $n = 32$) correctly identified that “melanoma can occur in places where skin is not exposed to the sun, like the bottoms of the feet and toenails.” Moreover, only 38.7% ($n = 53$) recognized that dark-skinned people can develop skin cancer. Participant responses are listed in **Supplemental Digital Content 2** (See Table S2, <http://links.lww.com/DSS/A473>). Most participants “strongly agreed” or “agreed” (81.0%, $n = 111$) that there is no way to prevent skin cancer.

Sun-Protective Practices

Participants were asked to rate their use of various sun-protective methods when outside for more than 1 hour on a warm sunny day. Most (89.1%, $n = 122$) participants reported never or rarely wearing sunscreen. Use of sun-protective clothing, such as long-sleeved shirts or hats, was

also limited, with zero participants “always” wearing clothing that covers most of the body, and only 7 (5.12%) “always” wearing a hat. The most common sun-protective behavior was staying in the shade, with 70.1% ($n = 96$) “often” or “always” seeking shade, followed by sunglasses (48.9%, $n = 67$). Results are listed Table 1.

Almost all the participants (91.2%, $n = 126$) had never asked a dermatologist or general practitioner about a suspicious spot on their skin or skin cancer. In addition, 60.1% ($n = 83$) had never examined their skin for signs of skin cancer.

Discussion

In this two-part study, we identified the skin cancer types along with current skin cancer knowledge and preventive behaviors in a predominantly dark skin-toned population living in a low-income country. Although most of Grenada’s population is of African-ancestry with dark skin tones, skin cancers are present and pose a significant public health problem. Most malignancies identified were likely related to UVR exposure (90.6%, $n = 58$ of 64). These results highlight the need for culturally appropriate skin cancer education and surgical interventions in low-to-middle-income countries, including those with predominantly dark-skinned populations. Significantly, although most participants had self-reported dark skin tones (5 or 6), a small proportion had Fitzpatrick skin prototypes of a lighter number. This reinforces the need to emphasize skin phototype, not simply skin pigment, in assessing skin cancer risks. This is particularly important in the Caribbean, because many people are of mixed ethnicity.

Our survey results indicate the misbelief that dark skin cannot get skin cancer is widespread. A high proportion (37.2%, $n = 51$) of participants believed dark or black skin offered complete protection from skin cancer, whereas another 23.4% were unsure ($n = 32$). This number is higher in comparison to our previously published study of participants of predominantly Hispanic ethnicity in the United States, where approximately 20% believed that people with dark skin cannot get skin cancer.¹⁷

Most participants were unfamiliar with melanoma (61.3%, $n = 84$), and only 34.3% ($N = 47$) could correctly

identify a warning sign. Furthermore, less than a quarter of participants (23.4%, $n = 32$) recognized that melanoma can occur on the palms, soles, and toenails, which are common locations for AL melanoma. Acral lentiginous melanoma has been identified as the most common melanoma subtype in African Americans.^{4,5,17} Because AL melanoma is associated with delayed diagnosis and more advanced stage at presentation, education with a focus on atypical locations should be incorporated for Grenadians and similar at-risk populations.^{4,17,18}

Sun-protective practices in Grenada also appear limited based on our data. Seeking shade is the most common sun-protective practice (70.1%, $n = 96$), followed by use of sunglasses (49.1%, $n = 67$). Sunscreen is the least common method used. These findings suggest participants have not received adequate education regarding the consequences of excessive UV exposure and protective behaviors to prevent skin cancer. Increased education regarding the risks, presentations, and prevention of melanoma and skin cancers among the Grenadian population may provide an opportunity for better prevention, screening, and early detection.^{19,20}

Our present study expands on the recent findings by Gupta and colleagues whereby BCC in African Americans are anatomically located primarily on UV-exposed areas²¹ We confirmed this finding and add to the discussion by the identification of squamous cell carcinoma at the primary tumor type. Previously, we identified the skin cancer tumor types in a free medical clinic in Florida which primarily serves migrant workers.²³ This supports the needs for more creative uses of education for minority patients, such as the demonstration of an online melanoma education program aimed at the Hispanic population.²⁴

Limitations

Review of pathologic specimens was limited to patients treated by DMM, and thus may not be representative of the whole population. Moreover, skin cancer patients did not have skin pigment type reported. The surveys assessed a sample population involved in a program dedicated to improving community health, and thus could be considered more “health conscious” than the general Grenadian

TABLE 1. Sun-Protective Behaviors

Sun-Protective Behavior*	Participant Responses, n (%)				
	Never	Rarely	Sometimes	Often	Always
Sunscreen	111 (81.6)	11 (8.03)	7 (5.12)	6 (4.38)	1 (0.73)
Clothing	7 (5.12)	50 (36.5)	52 (38.0)	25 (18.2)	0 (0)
Hat	27 (19.7)	38 (27.7)	31 (22.6)	31 (22.6)	7 (5.12)
Sunglasses	39 (28.5)	9 (6.57)	20 (14.6)	45 (32.8)	22 (16.1)
Shade	2 (1.46)	12 (8.76)	24 (17.5)	89 (65.0)	7 (5.12)

* Participants were asked “When you are outside for more than 1 hour on a warm sunny day how often do you (use sunscreen, wear clothing that covers most of your body, wear a hat, wear sunglasses, stay in the shade)?”

population. However, because the program has no affiliation with dermatologists, the survey results were not biased by responses from participants already familiar with dermatology clinics. In addition, most participants were women (74.5%, $n = 102$), so responses may not reflect the KAPs of Grenadian men. Finally, the KAP survey has not been validated for use with this specific demographic group.

Conclusion

Skin cancer is a significant public health problem in Grenada. Our results identify key skin cancer prevention, education, and treatment objectives that should be addressed in Grenada. Before the multi-year exchange between DMM and the Grenada Ministry of Health, nearly all skin cancer excision procedures were performed in the general hospital using a full operating room. We demonstrated the safety and efficiency of performing surgical dermatology procedures in an outpatient clinic (Grande Anse Medical Center). Moreover, we conducted the first survey of skin cancer knowledge in African ancestry people outside of the United States. We anticipate that similar countries in the Caribbean and in Africa may benefit from such an approach.

Our findings challenge the common opinion that skin cancer in countries of predominantly African people of color should not be a priority. Disparities in morbidity and mortality indicate the need for more studies to identify culturally appropriate primary, secondary, and tertiary interventions in similar populations. Other populations that would likely benefit from similar investigations include other low-to-middle income countries, those with predominantly non-Caucasian populations, and those with high incidences of Albinism.²⁵ Defining tumor burden, dispelling common skin cancer myths, and raising awareness amongst patients and primary health care providers may lead to earlier interventions and better clinical outcomes.

Acknowledgments

This project was possible thanks to the multi-year collaboration with Doris Joseph, MD, Dermatologist, Ministry of Health, Grenada. Expert dermatopathology services were donated by Mary Jane DeGuzman, MD. The Permanent Secretary of the Ministry of Health of Grenada provided essential logistical Global Health Equity collaboration.

References

1. Kozma B, Eide MJ. Photocarcinogenesis: an epidemiologic perspective on ultraviolet light and skin cancer. *Dermatol Clin* 2014;32:301–13, viii.
2. Padovese V, Franco G, Valenzano M, Pecoraro L, et al. Skin cancer risk assessment in dark skinned immigrants: the role of social determinants and ethnicity. *Ethn Health* 2018;23:649–58.
3. Bradford PT. Skin cancer in skin of color. *Dermatol Nurs*. 2009;21:170–7, 206; quiz 178.
4. Mahendraraj K, Sidhu K, Lau CS, McRoy GJ, et al. Malignant melanoma in African-Americans: a population-based clinical outcomes study involving 1106 African-American patients from the surveillance, epidemiology, and end result (SEER) database (1988-2011). *Medicine (Baltimore)* 2017;96:e6258.
5. Cormier JN, Xing Y, Ding M, Lee JE, et al. Ethnic differences among patients with cutaneous melanoma. *Arch Intern Med* 2006;166:1907–14.
6. Gloster HM Jr, Neal K. Skin cancer in skin of color. *J Am Acad Dermatol* 2006;55:741–60; quiz 761-744.
7. Hu S, Ma F, Collado-Mesa F, Kirsner RS. UV radiation, latitude, and melanoma in US Hispanics and blacks. *Arch Dermatol* 2004;140:819–24.
8. Pennello G, Devesa S, Gail M. Association of surface ultraviolet B radiation levels with melanoma and nonmelanoma skin cancer in United States blacks. *Cancer Epidemiol Biomarkers Prev* 2000;9:291–7.
9. Cestari T, Buster K. Photoprotection in specific populations: children and people of color. *J Am Acad Dermatol* 2017;76:S110–s121.
10. Affairs UNDoEaS. *World Statistics Pocketbook 2018 Edition*. New York, NY: United Nations; 2018.
11. Asulin Y, McCann TJ, McCarty CW, Hage RW, et al. Cancer incidence and mortality in Grenada 1990-2000. *West Indian Med J* 2004;53:368–73.
12. Cattin LM, Pinheiro PS, Callahan KE, Hage R. Twenty-first century cancer patterns in small island nations: Grenada and the English-speaking Caribbean. *Cancer Causes Control* 2017;28:1241–9.
13. Bidaisee S, Macpherson C. Evaluation of the Grenada sports for health program. *Biomed J Sci Tech Res* 2018; 6: 5420–3.
14. Robinson JK, Fisher SG, Turrisi RJ. Predictors of skin self-examination performance. *Cancer* 2002;95:135–46.
15. Ho BK, Robinson JK. Color bar tool for skin type self-identification: a cross-sectional study. *J Am Acad Dermatol* 2015;73:312–3.e311.
16. Jacobsen AA, Galvan A, Lachapelle CC, Wohl CB, et al. Defining the need for skin cancer prevention education in uninsured, minority, and immigrant communities. *JAMA Dermatol* 2016;152:1342–7.
17. Bradford PT, Goldstein AM, McMaster ML, Tucker MA. Acral lentiginous melanoma: incidence and survival patterns in the United States, 1986-2005. *Arch Dermatol* 2009;145:427–34.
18. Franke W, Neumann NJ, Ruzicka T, Schulte KW. Plantar malignant melanoma—a challenge for early recognition. *Melanoma Res* 2000; 10:571–6.
19. Agbai ON, Buster K, Sanchez M, Freud A, et al. Skin cancer and photoprotection in people of color: a review and recommendations for physicians and the public. *J Am Acad Dermatol* 2014;70:748–62.
20. Buster KJ, You Z, Fouad M, Elmets C. Skin cancer risk perceptions: a comparison across ethnicity, age, education, gender, and income. *J Am Acad Dermatol* 2012;66:771–9.
21. Gupta R, Gordon S, Council M, Laurin MD, et al. Clinical characteristics of basal cell carcinoma in African Americans: a 10-year retrospective review at a single Academic institution. *Dermatol Surg* 2019;45:660–5.
22. Jacobsen A, Schwarz J, Nousari C, Strasswimmer J. Dermatologic surgery needs in low-income, uninsured, and minority communities. *Dermatol Surg* 2017;43:302–4.
23. Roman C, Guan X, Barnholtz-Sloan J, Xu J, et al. A trial online educational melanoma program aimed at the hispanic population improves knowledge and behaviors. *Dermatol Surg* 2016;42:672–6.
24. Hong ES, Zeeb H, Repacholi MH. Albinism in Africa as a public health issue. *BMC Public Health* 2006;6:212.