Skin cancer and photoprotection in people of color: A review and recommendations for physicians and the public

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Skin cancer is less prevalent in people of color than in the white population. However, when skin cancer occurs in non-whites, it often presents at a more advanced stage, and thus the prognosis is worse compared with white patients. The increased morbidity and mortality associated with skin cancer in patients of color compared with white patients may be because of the lack of awareness, diagnoses at a more advanced stage, and socioeconomic factors such as access to care barriers. Physician promotion of skin cancer prevention strategies for all patients, regardless of ethnic background and socioeconomic status, can lead to timely diagnosis and treatment. Public education campaigns should be expanded to target communities of color to promote self-skin examination and stress importance of photoprotection, avoidance of tanning bed use, and early skin cancer detection and treatment. These measures should result in reduction or earlier detection of cutaneous malignancies in all communities. Furthermore, promotion of photoprotection practices may reduce other adverse effects of ultraviolet exposure including photoaging and ultraviolet-related disorders of pigmentation. (J Am Acad Dermatol 2014;70:748-62.)

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DEFINITIONS

Whites: Non-Hispanic individuals of European descent

Blacks: Non-Hispanic individuals of African descent

Hispanics: Individuals who trace their origin or descent to Mexico, Puerto Rico, Cuba, Spanish-speaking Central and South American countries, Spanish-speaking island nations of the Caribbean, and other Spanish cultures. Origin can be considered as the heritage, nationality group, lineage, or country of the person or the person's parents or ancestors before their arrival in the United States. People who

Abbreviations used:

BCC:	basal cell carcinoma
DFSP:	dermatofibrosarcoma protuberans
MED:	minimal erythema dose
MF:	mycosis fungoides
MM:	malignant melanoma
NMSC:	nonmelanoma skin cancer
POC:	people of color
SCC:	squamous cell carcinoma
SEER:	Surveillance, Epidemiology, and End Results
SPF:	sun-protection factor
UV:	ultraviolet

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identify their origin as Hispanic or Latino may be of any race. This definition of Hispanic fully excludes the Portuguese, Brazilians, or anyone from any other country that speaks Portuguese.[1]

Asians: Individuals having origins in any of the original peoples of East Asia, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.[1]

INTRODUCTION

Malignant melanoma (MM) and nonmelanoma skin cancer (NMSC) account for 40% of all neoplasms in whites, making it the most common malignancy in the United States.[2] Skin cancer is most common in whites and in people living in equatorial latitudes.[3] The incidence of both MM and NMSC remains significantly lower in people of color (POC) when compared with whites as they are seen in about 5% of Hispanics, 4% of Asians, and 2% of blacks.[4,5] Even so, multiple reports have demonstrated heightened morbidity and mortality in minority populations,[6-8] raising public health concerns in these groups. Although there are data detailing incidence of skin cancer in POC, these data are limited. In addition to skin cancer, factors such as photoaging, pigmentary disorders induced or exacerbated by ultraviolet (UV) exposure, and sunburn must be considered in POC. It is estimated that black, Hispanic, and Asian Americans will comprise approximately 50% of the US population by the year 2050.[4] These evolving demographics, elevated rates of skin cancer morbidity and mortality in POC, and limited clinical data on additional adverse effects of UV exposure in this population mandate that physicians develop familiarity with the concept of optimized photoprotection for POC. An understanding of the varying clinical presentations of UV-related skin cancers in POC, in addition to relevant topics in photoaging and UV-related disorders of pigmentation, is necessary for adequate management of photoprotection in POC.

BIOLOGICAL BASIS OF SKIN CARCINOGENESIS AND PHOTOAGING IN POC

Few studies have been performed to thoroughly evaluate biological differences between differing ethnic skin types. Skin color is primarily determined by the presence of melanin. Jimbow et al[9] reported that dark skin has larger melanocytes that produce more melanin and melanosomes are distributed individually in keratinocytes rather than in aggregates. The rarity of cutaneous malignancy in populations of darker complexions is secondary to photoprotection from a higher amount of epidermal melanin, which filters at least twice as much UV radiation as the epidermis of whites.[10] In an in vitro study performed by Kaidbey et al,[11] the amount of UV radiation reaching the papillary dermis of whites was greater than that of blacks by approximately 5-fold. The authors proposed that larger and more melanized melanosomes observed in POC absorbed more energy than the melanosomes in white skin, which were smaller, less dense, and lightly melanized. Furthermore, the authors estimated that the epidermis of blacks has an intrinsic sun-protection factor (SPF) of 13.4, whereas light skin has an SPF of 3.3.[11] Therefore, exposure to UV radiation plays a lesser role in heightening the risk for skin cancer in populations of darker complexions.

Damage to DNA secondary to UV radiation is a major factor in cutaneous photocarcinogenesis and photoaging. However, the correlation of ethnicity and degree of sensitivity to UV rays has not been elucidated. Tadokoro et al[12] performed a study evaluating the correlations between melanin content and degree of UVA- and UVB-induced DNA damage in normal-appearing skin of various ethnic groups. DNA damage was found to be most severe in qualitatively light skin. Baseline skin pigmentation and extent of DNA damage were inversely related, as individuals of darker skin tones were able to repair UVA-/UVB-induced DNA damage more rapidly than subjects with fair skin. Even low exposure to UVA/UVB radiation induced some appreciable DNA damage in all skin types, dispelling the myth that those with very dark skin are completely immune to UVA-/UVB-induced DNA damage.[12]

Indeed, NMSC and MM do occur in POC, despite the low relative risk.[13] Because of the limited research on skin cancer in POC, there are few resources providing insight on evaluating darkly pigmented lesions in POC. Frequently atypical presentations, together with constitutive dark pigmentation, pose diagnostic challenges in the identification of characteristics such as variation in color within the lesions. Furthermore, certain skin cancers that are pigmented in POC may not be pigmented in whites (such as basal cell carcinoma, which is more likely to be pigmented in darker skin types); therefore, a high index of suspicion in POC is necessary in making the diagnosis.[5]

BASAL CELL CARCINOMA

Basal cell carcinoma (BCC) is the most prevalent skin cancer found in whites, Asians, and Hispanics.[14] Hispanics are more likely to be given a diagnosis of multiple BCC rather than a single squamous cell