

Photoaging and Photoprotection in United States Hispanic Population

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ABSTRACT

Photoaging is a complex and chronic process that induces structural and functional changes in sun-exposed skin, including coarse wrinkles, laxity, dyschromia, telangiectasias, and potential precancerous lesions. Pigmented skin presents different structure and physiology that contribute to distinctive photoaging process. The skin of color population is reported to “age better” than their Caucasian counterparts in general, with fewer wrinkles and better skin texture. However, pigmentary disorders and sun-exposure related dyschromia are highly prevalent in skin of color. Hispanics are the fastest growing population in the U.S. and represents a heterogeneous group of people with different skin tones and Fitzpatrick phototypes. They demonstrate large diversity and heterogeneity in skin physiology, pigmentary disorders, and photoaging-related skin color shifting. Specific concerns around hyperpigmentation, skin tone evenness, and texture or roughness are very common among Hispanics, demanding targeted medical and cosmeceutical solutions. Customized daily routines including sufficient photo-protection are essential to address such needs. This mini review identifies some of the specific skin concerns of Hispanics in America and emphasizes the needs for long-term sunscreen use and education.

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INTRODUCTION

Ultraviolet (UV) irradiation of the skin leads to acute inflammatory reactions such as erythema, sunburn, and chronic reactions, including premature skin aging and skin tumors. Photoaging is a complex and chronic process that induces structural and functional changes in sun-exposed skin, including coarse wrinkles, laxity, dyschromia, telangiectasias, and potential precancerous lesions. UV irradiation (both UVB and UVA) is a potent generator of oxidative stress in the skin, increasing the cellular levels of reactive oxygen species, which damages lipids, proteins, and nucleic acids in both epidermal and dermal cells, and contributes to the sunburn reaction as well as photo carcinogenesis and photoaging.¹

All skin types do not react to UV irradiation in the same way. Pigmented skin (Fitzpatrick skin type III-IV) presents different structure and physiology that contribute to distinctive photoaging process. The increased amount of melanin in pigmented skin provides some protection from photodamage and photoaging among skin or color populations and lowers the risk of skin cancer. Skin of color subjects generally have fewer visible signs of aging (deep wrinkles, fine lines, rough surface texture, and sun spots). However, darker skin tones are more sensitive to UV, visible light, and infrared-induced skin pigmentation. Their skin is more susceptible to certain skin conditions including post-inflammatory hyperpigmentation (may occur after injury, burn, cut, etc.), melasma, pityriasis alba (round, light patches covered with fine scales), dry or “ashy” skin, dermatosis papulosa nigra, and at greater risk of keloid development.² The incidence of skin cancer among U.S. Hispanics has also increased 1.3 % annually from 1992 to 2008.

The Hispanic population is projected to be among the fastest growing population in the United States. They are projected to increase from 55 million in 2014 to 119 million in 2060, an increase of 115% and by 2060, 29% of the U.S. is projected to be Hispanic-- more than one-quarter of the total population.³ Hispanic-Americans come from a wide range of geographical areas, which may differ in their specific cultural, ethnic, and national characteristics. The Hispanic group in the U.S. includes people with Puerto Rican, Dominican, Cuban, Venezuelan, Mexican, or other Latin American origins or mixed populations. This diversity may contribute to a wide range of skin complexions with different hues and undertones that make proper clinical skin assessment for photoaging or pathological conditions more complex.⁴

Clinical and Instrumental Assessment of Skin Color

When performing clinical evaluation of skin complexion or color shift under physiological or pathological conditions, multiple methodologies have been adopted to help define and track the progression. Traditional Fitzpatrick assessment of skin phototypes is important for understanding the photo-reactivity of skin, however, it does not correlate well with skin tone, especially when color shifts occur due to photo aging or diseased conditions. Vissher et al demonstrated the use of individual typology angle (ITA) values determined from L* and b* values, where 6 groups of skin pigmentation were classified: ITA greater than 55 (very light tone), 41 to 55 (light tone), 28 to 41 (intermediate tone), 10 to 28 (tan), -30 to 10 (brown), and less than -30 (dark tone).⁵ The ITA values and categories correlated well with skin melanin content based on mexameter measure-

FIGURE 1. Aging pattern over 15 months in a Hispanic female.

ment. De Rigal et al assessed the skin color of females globally, with an instrumental approach using the "chromosphere[®]" spectroscopy imaging system to capture skin color variation in details. This together with interviews led to the establishment of a color assessment chart of 66 shades that enabled clinicians and consumers to match skin tone and color variation precisely. In this manner, they were able to establish a veritable geography of consumer skin tone analysis in multiple ethnicities. Based on objective elements, this mapping makes it possible to adapt cosmeceutical products to the expectations of different consumers, and evaluate the effectiveness of skin care products that target radiance or uneven skin tone in different ethnic groups.

Due to the heterogeneity of Hispanic American population and the wide range of skin tones,^{5,6} a combination strategy is required to define and evaluate color and pigmentation related concerns in this population. It is recommended that clinical researchers adopt a combination strategy using Fitzpatrick phototype, ITA values, and skin color charts,⁵ to accurately represent the clinical manifestation of facial pigmentation and skin tone variation. By using such analysis in combination with self-assessment questionnaires, diversity of skin tone and color shift with photoaging in Hispanic group can be quantitated effectively.^{5,6}

Pigmentation Changes Associated With Photoaging in Hispanics

During the photoaging process, it was reported that major concerns of Hispanic females were "yellow tone" and "dullness" of their skin. Other concerns include acne/breakouts, uneven skin tone, pigmentation spots and marks, undereye dark circles, and scarring. As with all other skin types, the ideal skin for Hispanic females is one that looks uniform in color, consistent and clear, without any blotchiness, marks, patches, dark circles, or age spots. Despite the concerns on the quality of their skin, the data from measurement of skin tone of Hispanic women showed a fairly good evenness among younger population.⁴ A significant darkening of skin with age as well as skin heterogeneity was also observed for all 4 different skin types (Caucasian,

Chinese, Hispanic, and Black), suggesting the damaging effects of photoaging.⁶ Figure 1 illustrates the aging progression of a 40-year-old Hispanic female subject of skin type IV over a period of 15 months in Los Angeles area. The baseline picture taken during the winter month demonstrates fairer complexion with more uniform skin texture. The figure at 10 months and 15 months demonstrates increasing pigmentation, redness, unevenness of skin color, and beginning of the appearance of dark shades and patches.

Sun Protection in Hispanics

The majority of the U.S. Hispanic population resides in areas with high UV index, and sun seeking behaviour is very common. However, the vast majority of Hispanics do not meet sun protection recommendations.⁷ Regardless of national origin, being born in the U.S. or based on the amount of time spent living in the U.S., Hispanics do not uniformly engaged in sun protection behaviors on a regular basis, and thus there is a need to raise awareness of skin cancer risks, preventive measures, and benefits of sunscreen and sun protection among Hispanics in general.⁸

The sun protection behaviors recommended to reduce skin cancer risk and premature aging are sunscreen use, shade seeking, and use of sun protective clothing that minimizes skin exposure to the sun. Many Hispanics do not engage in these behaviors on a routine basis.^{8,9} Data from several studies indicate that a number of sociodemographic factors are associated with Hispanic individuals' engagement in sun protection behaviors.^{8,9} For example, Hispanic adults report that they engage in sun protection more by staying in the shade (53.7%) than use of sunscreen (32.3%) or wearing sun protective clothes (18.1%). Not surprisingly, 36.7% of the subjects indicated that they never use sunscreen. With age, those aged 65 and over appear to have stronger preference for staying in the shade and use of protective clothing than younger Hispanics. However, those aged 65 and over tend to use sunscreen less than younger Hispanics. Education and language also plays a role in the preferred sun protection measures with college educated Hispanics and those that speak mostly or only English having a higher usage rate of sunscreen than those with some high school education and mostly or only Spanish speakers; inversely, those with some high school education or those who mostly or only speak Spanish report using shade more frequently than those with college education or those who mostly or only speak English.¹⁰ In a separate study, facial use of sunscreen was higher in Hispanic women (36.3%) than Hispanic men (16.0%) and while the women's use of sunscreen in other photo-exposed areas is lower than on the face (25.7%), it is still higher than in males (11.9%).¹¹

Other life style factors such as pollution, dietary influences, stress, and lack of sleep can also influence the skin quality of Hispanic subjects. All these factors point to a need for better

education on intervention approaches that can be incorporated into programs to promote sun protection and life style behaviors among Hispanic adults. This will require intervening at multiple levels of the healthcare system, including educating a wide array of healthcare providers about skin cancer prevention among Hispanics, facilitating identification of Hispanics at increased risk for skin cancer, and delivering appropriate prevention messages in the media and public health forums.^{8,9} In a recent study, long term benefit (1-year) of a broad range (SPF 30 and PPD 20 for UVB and UVA protection) sunscreen cream on skin was observed among US Hispanic females. The results positively demonstrated statistically significant improvement in overall skin quality and hyperpigmentation (Grimes et al, manuscript submitted). Such studies can help educate and stress the importance of daily use of high-quality sunscreen to Hispanic patients and skin of color patients in general.

According to the American Academy of Dermatology, skin cancer in skin of color population is on the rise, and often result in high mortality rate, possibly due to diagnosis at a later stage. Taken together, sun protection should be made a higher priority for skin of color population including Hispanics who currently do not adopt proper sun protection routines.

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