Social Determinants of Racial and Ethnic Disparities in Cutaneous Melanoma Outcomes

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Background: This article sought to elucidate how aspects of poverty and culture may contribute to race- and ethnicity-based disparities in cutaneous melanoma outcomes. Methods: We identified published studies addressing the social determinants of melanoma. Selected review articles included US-based studies comprised of patients representing adults, children, and adolescents. Results: African Americans and Hispanics diagnosed with cutaneous melanoma are more likely to present with more advanced stages of disease at diagnosis and have higher rates of mortality than their nonminority counterparts. These disparities may be a consequence of economic, social, and cultural barriers such as low income, public forms of health insurance, lower levels of education, lower levels of melanoma awareness and knowledge, and lower rates of participation in melanoma screening. No studies in the literature examined the potential impact of social injustice, English proficiency, immigrant status, and health literacy. Conclusions: Substantial gaps exist in our knowledge of the pathways linking social determinants and race- and ethnicity-based disparities in melanoma. More studies are warranted to inform the development of effective interventions aimed at narrowing inequities and improving cutaneous melanoma outcomes among minority populations.

Introduction

Cutaneous melanoma is a significant public health concern. In 2013, 76,690 incident cases and 9,480 deaths occurred from cutaneous melanoma in the United States alone.¹ The poor prognosis and limited treatment options of advanced-stage disease make early detection and diagnosis critical. Although the incidence of cutaneous melanoma is greatest in Caucasians,² most studies have shown that racial and ethnic minorities diagnosed with cutaneous melanoma are more likely to experience worse cutaneous melanoma outcomes.²⁻⁷ Surveillance, Epidemiology, and End Results data reveal that Hispanics, African Americans, American Indians, and Asians diagnosed with cutaneous melanoma are more likely to present with advanced (regional and metastatic) cutaneous melanoma than Caucasians.³⁻⁵ Moreover, while the proportions of local stage or in situ cutaneous melanomas have increased among Caucasians, an opposing trend has been observed among Hispanic men living in California who present with thicker primary tumors at diagnosis.⁴ Evidence also suggests variability in the quality of care received by minority patients with cutaneous melanoma. A Surveillance, Epidemiology, and End Results–based study found that blacks were less likely than Caucasians to receive surgical treatment for melanoma,¹³ and those who underwent surgery experienced shorter survival time than other races.¹³ After accounting for demographical and clinical characteristics, minorities have an approximate two- to three-fold greater risk of melanoma-specific mortality than their nonminority counterparts.¹⁴ In African Americans, differences in mortality rates persist even after stage at diagnosis is considered.² Although biological factors may account for some of these differences (cutaneous melanomas in minorities tend to occur at unusual anatomical sites and may be of more aggressive histological subtypes), the underlying mechanisms of these disparities remain unclear.²

Theoretical Framework

Freeman's health disparities cancer model provides a framework for organizing racial and ethnic dis-
The model is based on the premise that social setting contributes to disease outcome and considers 3 major variables, ie, poverty, culture, and social justice, and posits an important connection between the social determinants of health and health inequities. Numerous studies have helped to further elucidate this connection to determine how individual health outcomes are shaped by individual motivation and higher-level social and structural forces (ie, social determinants of health). The model developed by Freeman and Chu suggests that many of the factors related to the successful acquisition of cancer prevention, control, and treatment are shaped and influenced by socially determined elements, including cultural and economic factors, social support networks, the physical and social environment, access to health care services, and social and health policies.

As such, based on this theoretical framework and the literature, this review summarizes how aspects of social determinants, including poverty and culture, contribute to race- and ethnicity-based disparities in the prevention, early detection, diagnosis incidence, treatment, and mortality rates of cancer. Given the paucity of literature linking race-based disparities in cutaneous melanoma to social justice, this article will focus on the domains of poverty and culture.

**Methods**
The medical literature was searched to identify all published studies that addressed social determinants of cutaneous melanoma within the United States using such search terms as melanoma, minorities, health disparities, social determinants, socioeconomic status, education, income, race, ethnicity, insurance, public insurance, Medicaid, Medicare, African Americans, Hispanics, Asians, Pacific Islanders, sunscreen, sun protection, skin examinations, poverty, cancer disparities, literacy, US acculturation, melanoma awareness, melanoma knowledge, and immigrants. References within selected articles were also reviewed to identify additional pertinent publications. Due to the relative paucity of studies that included minorities with cutaneous melanoma, articles addressing the aspects of social determinants in non-Hispanic whites were also reviewed to provide context.

**Barriers Related to Poverty**
Measures of socioeconomic status, such as level of educational attainment, occupation, income, poverty level, health insurance status, and place of residence, are key determinants for preventive skin screenings, cutaneous melanoma incidence, stage at diagnosis, and melanoma mortality rates. Regardless of the economic measure employed, the preponderance of studies demonstrates a direct correlation of the incidence of cutaneous melanoma with measures of high socioeconomic status. Conversely, lower socioeconomic status is associated with the development of thicker primary tumors, more advanced stages of disease at the time of diagnosis, and increased mortality rates.
In their examination of cutaneous melanoma survival rates among beneficiaries of Medicare, Reyes-Ortiz et al\textsuperscript{34} found that patients residing in low-income regions had lower 5-year, melanoma-specific survival rates than those living in high-income areas. The researchers found that the interactions between race, ethnicity, socioeconomic status, and cutaneous melanoma survival rates were greatest among minorities, with non-Caucasians earning less than $30,000 having the highest percentages of advanced-stage melanoma and thicker tumors.\textsuperscript{35}

Treatment for melanoma also varied by socioeconomic status. Medicare enrollees living in poor areas were less likely to receive chemotherapy than their Medicare counterparts living in wealthier regions.\textsuperscript{32}

Education

The association between education and health is well established.\textsuperscript{34,35} Education and knowledge may help individuals recognize the signs and symptoms that necessitate prompt medical care and navigate through the health care system.\textsuperscript{36} Geller et al\textsuperscript{31} found that patients with cutaneous melanoma who were less educated presented with more advanced-stage disease and had greater mortality rates. Reductions in mortality rates for cutaneous melanoma between 1993 and 1997 compared with 2003 and 2007 were confined to the most highly educated individuals (≥ 13 years of education), while patients with fewer years of education experienced increases in mortality rates during that same time period.\textsuperscript{31}

Buster et al\textsuperscript{37} found that people who were less educated, elderly, or black were more likely to perceive themselves as being at low risk for developing skin cancer and were less inclined to receive skin examinations. In their survey of more than 500 patients who survived cutaneous melanoma, Pollitt et al\textsuperscript{4} found that lower levels of education were associated with decreased perception and knowledge of risk for cutaneous melanoma. They also found that physicians were less likely to counsel survivors of melanoma who had only achieved a high school education compared with their college graduate counterparts on skin cancer risks and the importance of regular self- and physician-performed skin examinations, thus demonstrating the impact of educational status on patient–physician communication.\textsuperscript{5}

Health Insurance

Health insurance status also influences cutaneous melanoma outcomes.\textsuperscript{14,29,38} Kirsner et al\textsuperscript{39} found that patients covered by Medicare health maintenance organizations (HMOs) were diagnosed in the earlier stages of cutaneous melanoma and experienced longer survival times than age-matched controls enrolled in Medicare fee-for-service programs. Similarly, Medicare HMO enrollees who were Hispanic were less likely to be diagnosed with advanced-stage melanoma than patients using fee-for-service programs.\textsuperscript{40}

Although Hispanics using fee-for-service programs were more likely to have an advanced-stage cutaneous melanoma at diagnosis than non-Hispanic whites using fee-for-service programs, no significant difference was seen in stage at diagnosis or median survival rates among non-Hispanic whites and Hispanics enrolled in HMOs.\textsuperscript{40} These disparities may be explained in part by the “HMO effect.” For example, patients enrolled in HMOs are seen by their primary care physicians more often than those using a fee-for-service program; therefore, they are more likely to use preventative services such as skin cancer screenings.\textsuperscript{39}

The duration of Medicaid enrollment inversely correlates with cutaneous melanoma stage at the time of diagnosis.\textsuperscript{29} One study found that newly enrolled patients were 13 times more likely to be diagnosed with late-stage melanoma, whereas intermittently enrolled patients were twice as likely to have late-stage cutaneous melanoma as those not on Medicaid.\textsuperscript{29} Medicaid beneficiaries continuously enrolled for more than 1 year were just as likely to be diagnosed with late-stage disease as those not enrolled in Medicaid.\textsuperscript{29} A second study showed that Medicaid beneficiaries enrolled at least 3 months prior to diagnosis experienced more favorable survival outcomes than those who enrolled upon or after receiving a diagnosis of cancer.\textsuperscript{41} Together, these findings support the importance of continuous access to preventive services in improving mortality rates for melanoma and suggest that Medicaid services may be sufficient for continuously enrolled beneficiaries.

Despite the benefits of continuous enrollment, patients on Medicaid experience less favorable outcomes than their non-Medicaid counterparts.\textsuperscript{41} Possible explanations include (1) the receipt of late or inadequate treatment, (2) Medicaid beneficiaries commonly consisting of disadvantaged populations with numerous physical comorbidities, psychiatric...
comorbidities, or both, which may contribute to their poor prognosis, and (3) additional barriers, including lack of transportation and psychosocial support, that may preclude the receipt of adequate treatment or continuous care. Although minority populations represent approximately one-third of the US population, they account for more than one-half of people covered by Medicaid.

Health insurance status also affects the diagnostic staging evaluation of cutaneous melanoma. In one study, patients on Medicare and Medicaid were less likely than privately insured patients to undergo sentinel lymph node biopsy for cutaneous melanoma, indicating that publicly insured individuals may be understaged and possibly inadequately treated.

### Barriers Related to Culture

Because culture can either amplify or reduce the expected negative effects of poverty, an understanding of the cultural contributors to cutaneous melanoma inequities is essential. Risk factors for melanoma, such as sun exposure behavior and the aesthetic benefits of a tanned appearance, can be rooted in cultural tendencies and preferences.

### Risk Behaviors

Compared with Caucasians, minority populations typically engage in fewer types of behavior that increase risk for skin cancer. Specifically, minority populations have a lower prevalence of sunburn, indoor tanning use, and sunscreen consumption, and are more likely to seek shade than Caucasians. Female sex, education, income, and age are associated with sunscreen use in blacks and Hispanics.

### Acculturation

Acculturation, the process by which immigrants adopt the language, attitudes, behaviors, and norms of their host country, has been associated with behavioral changes in relation to skin cancer risk among Hispanics. US cultural norms favor sunscreen use and sun tanning more than Hispanic cultural norms. Acculturation among Hispanics has been linked to higher perceived benefits of exposure to ultraviolet radiation, less worry about skin damage, higher rates of sunbathing, and an increased risk of sunburns. Of note, a subgroup analysis of Mexicans and Puerto Ricans revealed that differences in sun protection behaviors varied by country of origin, exemplifying the limitations of aggregating heterogeneous populations.

### Perception of Skin Cancer Risk

In general, the medical literature as it pertains to cancer has shown that a patient's lack of perceived risk of cancer is a barrier to risk reduction and that perceived risk of cancer is a positive predictor of preventative behaviors. Blacks and Hispanics perceive themselves to be at very low risk for developing skin cancer. A study by Pichon et al observed no difference in sunscreen use among blacks who reported they perceived a high risk of skin cancer versus those who perceived no risk of skin cancer. These findings are in contrast to the medical literature on cancer, which shows a positive correlation between perceived cancer risks and preventative behaviors.

A study by Buster et al found that blacks placed less emphasis on the importance of regular skin examinations as a method for early detection of skin cancer than whites. Both blacks and Hispanics believed that they could do little to reduce their risk of skin cancer, primarily because too many recommendations exist about preventing skin cancer to know which ones to follow.

### Awareness and Knowledge

Temoshok et al found that both a low level of knowledge about cutaneous melanoma prior to diagnosis and a poor understanding of melanoma treatment were associated with greater tumor thickness. Compared with non-Hispanic whites, both Hispanics and blacks appear to be less knowledgeable about melanoma. Blacks and Hispanics also believe that they would be less likely to seek medical care if they have a suspicious skin lesion. Even when comparing Hispanics and non-Hispanic whites with similar access to health care, Hispanics continued to demonstrate lower levels of melanoma awareness. Among middle school students, knowledge emerged as the strongest sun safety predictor for Hispanics. Knowledge-based interventions have been shown to increase monthly self-skin examinations in minority populations. However, the evidence is not sufficient to determine how and if knowledge gaps contribute to race- and ethnic-based disparities in melanoma outcomes.

Individuals are more likely to perform skin self-examinations if they have a high level of knowledge and awareness about melanoma, and patients practicing skin self-examinations can potentially decrease cutaneous melanoma mortality rates by 63%. Several studies have reported that the rates of skin self-examinations among minority populations and physician-assisted skin examinations are significantly lower than those of non-Hispanic whites. Among Hispanics, factors associated with higher rates of skin self-examinations and physician-assisted skin examinations include greater US acculturation, older age, an increased number of melanoma risk factors, physician recommendations, fewer skin self-examination barriers, country of origin, tanning indoors, a higher level of knowledge about skin cancer, a high level of perceived skin cancer severity, a low worry of skin
cancer, and added physician-assisted skin examination benefits. The primary reasons Hispanics cited for not performing skin self-examinations were lack of awareness regarding the necessity of skin self-examinations and lack of knowledge about how to conduct such an examination. The primary reasons Hispanics provided for not receiving physician-assisted skin examinations were inadequate amount of time with the physician and not knowing to ask or how to ask for a physician-assisted skin examination.

**Language Fluency**

Low English proficiency has been linked to having less access to care, receiving lower quality care, and having poor health outcomes. Although numerous studies have found detrimental associations between

| Table. — Select US Studies Addressing Social Determinants Across the Cancer Care Continuum for Racial and Ethnic Minorities |
|---|---|---|---|---|
| Domain | Primary Prevention | Secondary Prevention | Diagnosis and Incidence | Treatment | Survival and Mortality |
| Poverty | | | | | |
| Race and ethnicity | | | Cormier | | Cormier |
| | | | Hu | | |
| | | | Pollitt | | |
| | | | Rouhani | | |
| | | | Bergfelt | | |
| | | | Black | | |
| | | | Clairwood | | |
| | | | Rouhani | | |
| | | | Wu | | |
| Education | Buster | Singh | Pollitt | | |
| | | | Wich | | |
| | | | Singh | | |
| Income | Buster | Singh | Pollitt | | |
| | | | Wich | | |
| | | | Singh | | |
| Access to health care | | Coups | | Reyes-Ortiz |
| | | | 73 | |
| | | | Coups | | |
| | | | 74 | |
| Insurance status | | Halpern | | Wich |
| | | | 38 | |
| | | | Pollitt | | |
| | | | 79 | |
| | | | Halpern | | |
| | | | 38 | |
| | | | Rouhani | | |
| | | | 95 | |
| Culture | | | | | |
| Race and ethnicity | Coups | Buller | Halil | Santmyire |
| | 46 | 47 | 48 | 49 |
| US acculturation | Andreeva | Coups | Coups | Heckman | Hay | Andreeva |
| | 52 | 53 | 54 | 55 | 43 | 48 |
| Melanoma awareness and knowledge | Ma | Piptone | Imahiyerobo-Ip | Kundu | Temoshok | Arnold | Imahiyerobo-Ip |
| | 60 | 61 | 71 | 59 | 62 | 70 | 71 |
| Perceived risk of melanoma | Pichon | Pichon | Ma | Piptone | | | | | Kundo | 59 |

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limited English proficiency and health outcomes, we were unable to find any studies that investigated the role of English proficiency on outcomes among patients with cutaneous melanoma.

**Gaps in Knowledge**

No studies have explored the potential impact of social justice, English proficiency, health beliefs, health literacy, disability, immigrant status, or housing status despite the fact that these variables have been shown to contribute to ethnic and racial disparities in many other malignancies. We were also unable to identify studies addressing the post-treatment quality of life among minority patients with cutaneous melanoma. Much remains unknown about cutaneous melanoma in other US minority groups, including Asians, Pacific Islanders, American Indians, and Native Alaskans. The Table illustrates our current knowledge on this topic organized along the cancer continuum.

**Conclusions**

Hispanics and African Americans diagnosed with cutaneous melanoma typically present at diagnosis during the advanced stages of disease and experience high mortality rates. The literature on the social determinants of cutaneous melanoma outcomes in minorities is limited. In addition, decreased access to dermatological care is associated with poor melanoma outcomes; however, how this impacts outcomes among minority populations is unclear. Poverty and insurance status are key contributors of socioeconomic status-based disparities in patients with cutaneous melanoma. Barriers related to poverty also disproportionately burden minorities who are more likely to be impoverished and publicly insured. Hispanics and blacks possess lower self-perceived risk for melanoma than their counterparts, and they have less awareness and knowledge about melanoma. They are also less likely to participate in melanoma prevention and screening. Furthermore, the increasing US acculturation among Hispanics is associated with increased skin cancer risk behaviors.

This review also exposes the paucity of literature addressing the social determinants of inequities in outcomes among patients with cutaneous melanoma. Although the low incidence and prevalence rates of cutaneous melanoma among Hispanics and blacks contribute to the sparseness of studies on this topic, many of the barriers discussed are potentially modifiable; therefore, they are important to understand. Additional studies are needed to unravel the cultural, economic, and biological complexities that contribute to the observed inequities in outcomes among patients with cutaneous melanoma. This information may be valuable for the development of effective interventions in the future as well as developing cancer prevention measures and cancer control strategies targeting these specific populations.

**References**


