CUTANEOUS MALIGNANT MELANOMA AMONG WHITE HISPANICS AND NON-HISPANICS IN THE UNITED STATES

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Aim: To explore whether disparities exist in melanoma incidence and prognosis between White Hispanics and White non-Hispanics.

Methods: Analyses were based on 42,770 patients with malignant melanoma in the United States, 2004 through 2006.

Results: Hispanics were significantly less likely to be diagnosed with superficial spreading melanoma or Hutchinson's melanotic freckle, but significantly more likely to be diagnosed with nodular melanoma or acral lentiginous melanoma. Hispanics were also significantly less likely to have multiple primary cancers and less likely to receive surgical treatment. Among those diagnosed during the study period, 12.4% (n=142) of Hispanic patients and 8.5% (n=3,235) of non-Hispanic patients died sometime during these years. Approximately 7.3% of Hispanic patients and 4.8% of non-Hispanic patients died specifically from melanoma. Later stage at diagnosis was the primary explanation for the difference in death from melanoma between Hispanic and non-Hispanic Whites.

Conclusions: Hispanic melanoma patients experience significantly poorer prognostic findings at diagnosis. The disparity in melanoma stage, tumor depth, and ulcerated tumors at diagnosis emphasizes the need for greater secondary prevention efforts among this group. (*Ethn Dis.*2010;353–358)

Key Words: Disparity, Epidemiology, Ethnicity, Melanoma, Prognostic Indicators, SEER

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INTRODUCTION

Malignant melanoma of the skin is a cancer of the melanocytes, which are the pigment producing cells that protect against ultraviolet radiation.[1] In the United States, approximately 5% of new malignant cases of cancer in males and 4% of new cancer cases in females involve cutaneous melanoma.[2] There has been a long-term increase in melanoma-related incidence in many countries for both sexes.[3–5] In a large study conducted in Florida, melanoma incidence rates significantly increased by 3.0% ($P<.001$) per year among White non-Hispanic males, 3.6% ($P<.001$) among White non-Hispanic females, and 3.4% ($P=.01$) for White Hispanic females.[5] There was also an increase of 0.9% for White Hispanic males, albeit not statistically significant. This study also showed that White Hispanics had significantly more advanced melanoma at diagnosis. Little change was found in the proportion of distant-staged melanoma over the time of their study, 1990 through 2004.

Although it is well-documented that Blacks with malignant melanoma tend to be diagnosed at a later stage and have poorer outcomes, less is known about disparities among Hispanics. This may be explained, at least in part, because the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute did not classify data according to Hispanic origin until recent years. For the years 2000 through 2006, melanoma incidence rates significantly increased by 2.6% ($P=.02$) for White non-Hispanic males and 2.8% ($P=.02$) for White non-Hispanic females.[6] However, there was no significant change in trend for White Hispanic males or females (−0.7% annual change, $P=.75$, 1.0% annual change, $P=.70$).

The purpose of our study was to explore whether ethnic disparities exist in melanoma incidence and prognostic indicators in the United States.

MATERIALS AND METHODS

Melanoma patient data were obtained from medical records at hospitals and other facilities by population-based cancer registries in the SEER program of the National Cancer Institute.[6] The SEER program was established in response to the National Cancer Act of 1971 that mandated public health surveillance of cancer in the United States for use in prevention, diagnosis, and treatment of cancer. The SEER Program began collecting data on cancer cases on January 1, 1973, with seven registries included (Connecticut, Iowa, New Mexico, Utah, Hawaii, and the metropolitan areas of Detroit and San Francisco-Oakland). In the following two years the metropolitan area of Atlanta and the 13-county Seattle-Puget Sound area were added. In 1992, the SEER Program was expanded to increase coverage of minority populations to include 10 primarily Black rural counties in Georgia, the Alaskan Native population, Los Angeles County, and four counties in the San Jose-Monterey area south of San Francisco. In 2001, the SEER Program further expanded coverage to include Kentucky and the remaining counties in California (Greater California); in addition, New Jersey and Louisiana became participants.[7] These areas cover 26% of the US population (23% of African Americans, 40% of Hispanics, 42% of American Indians and Alaska Natives, and 59% of the Asian/Pacific Islander population).[8]

The tumor registries participating in the SEER Program routinely abstract records of all cancer patients in hospitals, clinics, nursing homes, and other health service units that provide diagnostic or treatment services; from private pathology laboratories and radiotherapy units; and from death certificates. Data collected by the tumor registries include patient demographics, tumor characteristics, morphology, diagnostic information, extent of disease, first course of treatment, and active patient follow-up of vital status including cause of death. Cancers are coded according to the International Classification of Disease for Oncology Second Edition (ICD-O-2).[9] For our study, data were obtained from an original dataset of 43,103 White patients with malignant melanoma, diagnosed during the years 2004 through 2006. Ninety-eight patients were excluded because they were children aged <15 years; 107 patients were excluded because they were diagnosed by autopsy or death certificate only; and, an additional 128 patients were excluded because their diagnosis was not microscopically confirmed. This left 42,770 patients for analysis. Patients were classified as White Spanish-Hispanic-Latino (n= 1,286; 3%), hereafter called Hispanic, and White non-Hispanic (n=41,484; 97%).

Stage classification was according to the American Joint Committee on Cancer (AJCC) *Cancer Staging Manual*, 6th ed., which provides a heavily revised staging system for melanoma of the skin. Anatomic site was classified according to ICDO-2 site coding: C44.0 (lip); C44.1 (eyelid); C44.2 (ear); C44.3 (face excluding eyelid); C44.4 (scalp and neck excluding ear); C44.5 (trunk); C44.6 (upper limb and shoulder); C44.7 (lower limb and hip); C44.8 (overlapping site); C44.9 (site not specified). Thickness of melanomas at diagnosis was recorded as the depth in millimeters of the lesion. Histologic type classification was based on ICDO-2 histology code: superficial spreading melanoma (SMM): 8743; nodular melanoma (NM): 8721; acral lentiginous melanoma (ALM): 8744; and Hutchinson's melanotic freckle (HMF): 8742. The remainder of histologic types comprised those recorded simply as 'malignant melanoma' (MM): 8720, and those recorded as 'other or not specified' (8722-8741, 8745-8790). Number of cancer primaries was dichotomized into only one cancer primary vs otherwise. The presence of ulceration was also presented. Other variables included in the study were age and marital status at diagnosis, sex, and surgery status.

Data were also obtained from the SEER Survival System (SEER*Stat).[6] Rates were expressed per 100,000 person-years by age group or age adjusted using the 2000 US standard population. Trend lines were fit to the data using polynomial regression. Frequency distributions for selected variables were compared between White Hispanics and White non-Hispanics and assessed using the chi-square test for independence. Adjusted odds ratios were derived using multiple logistic regression models. Tests of significance and confidence intervals were based on the 0.05 level. Analyses were performed using the Statistical Analysis System, Release 9.2 (SAS Institute Inc., Cary, NC, USA, 2007).

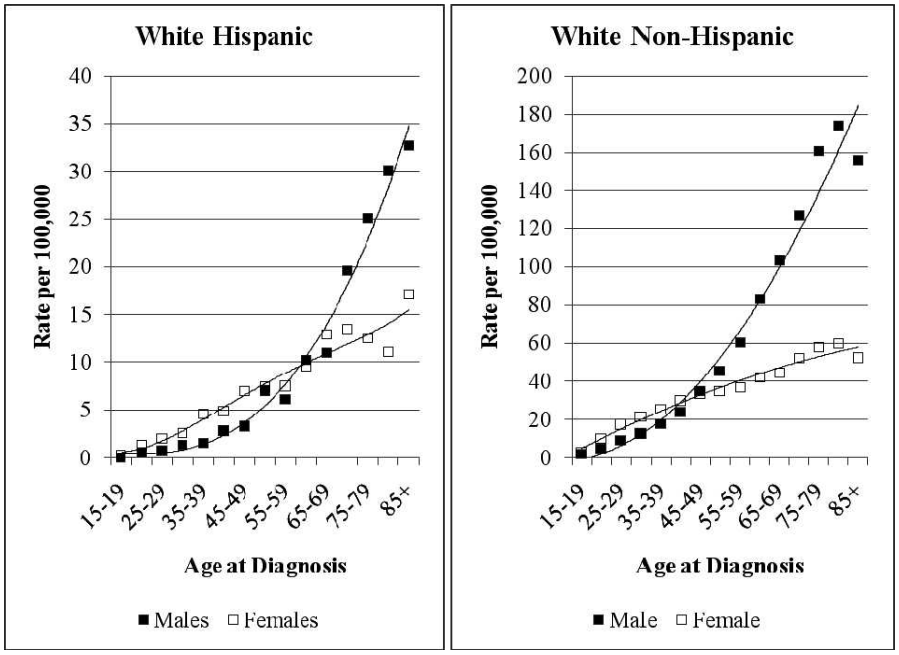

Fig 1. Incidence of malignant melanoma in Whites according to age and ethnicity, SEER 2004–2006.

RESULTS

In the years 2004 through 2006, the age-adjusted incidence rates of malignant melanoma among White Hispanics were 5.9 for males and 5.8 for females. Rates for White non-Hispanics were 7.4 times greater for males and 5.0 times greater for females (ie, 43.7, 28.9). Incidence rates of malignant melanoma among Whites are presented according to age at diagnosis and Hispanic status in Figure 1. Incidence rates are higher for females compared with males through ages 55–59 for White Hispanics and ages 40–44 for White non-Hispanics, and are greater for males thereafter.

The distribution of age, sex, and marital status is presented according to

Table 1. Distribution of age, sex, and marital status in White patients with melanoma according to Hispanic status

	White Hispanic		White non-Hispanic		Chi-square
	n	%	*n*	%	*P* value
Age (years)					
15–19	97	8	1,841	4	<.001
30–34	190	15	3,347	8	
40–44	264	20	6,584	16	
50–54	247	19	8,431	20	
60–64	196	15	7,831	19	
70+	292	23	13,450	33	
Sex					
Male	549	43	24,024	58	<.001
Female	747	57	17,460	42	
Marital Status					
Married (including cohabitating)	698	54	22,689	55	<.001
Separated, divorced, widowed	187	15	5,287	13	
Single (never married)	216	17	4,959	12	
Unknown	185	14	8,549	20	

Hispanic: Spanish-Hispanic-Latino.
Source: SEER, 2004–2006.

ethnicity in Table 1. White Hispanic melanoma patients had a significantly younger age distribution than White non-Hispanic patients. They were also significantly more likely to be female, single, and never married.

White Hispanics had a significantly later stage at diagnosis, greater tumor depth, and a greater likelihood of an ulcerated tumor (Table 2). Compared with malignant melanoma, Hispanics were significantly less likely to be diagnosed with superficial spreading melanoma, or Hutchinson's melanotic freckle, but significantly more likely to be diagnosed with nodular melanoma or acral lentiginous melanoma. Hispanics were significantly less likely to have their melanoma on the scalp and neck, trunk, or upper limb and shoulder, but more likely to not have the site of their cutaneous melanoma specified. In addition, Hispanics were significantly less likely to have multiple primary cancers and less likely to receive surgical treatment.

The percentage of those diagnosed with melanoma who died during the study period was 12.4 (n=142) for White Hispanics and 8.5 (n=3,235) for White Non-Hispanics. Percentages of melanoma patients specifically dying from melanoma were 7.3 (n=88) for White Hispanics and 4.8 (n=1,882) for White Non-Hispanics. The odds of dying during the study period among melanoma patients diagnosed during that same time period is presented according to Hispanic status in Table 3. After adjusting for age, sex, and marital status, Hispanic patients have a significantly greater chance of dying from any cause or dying from melanoma compared to White non-Hispanic patients. After adjusting for stage at diagnosis, a significantly greater risk of death remains from any cause for Hispanics, but there is no significant difference in death specifically from melanoma between Hispanics and non-Hispanics.

DISCUSSION

This study explores whether incidence and prognostic disparities exist between White Hispanic and White non-Hispanic cutaneous melanoma patients. Although we found age-adjusted rates of malignant melanoma in White non-Hispanics compared with White Hispanics to be 7.4 times greater for males and 5.0 times greater for females, significant disparities in prognostic indicators exist.

For both White Hispanic and non-Hispanic patients, incidence rates across the age span were initially greater for women. This is not a new observation as shown in two studies in the early 1980s.[10,11] The authors suggest that the low incidence rates of melanoma enables a hormone-dependent variant of melanoma. However, studies have failed to find any conclusive evidence of a link between reproduction and melanoma.[12] Age at menarche and age at menopause have also failed to show an association with melanoma risk.[13] In addition, none of the six studies involving hormonal factors reviewed by Evans and colleagues found exogenous hormonal exposure, other than oral contraceptives, to significantly predict melanoma risk.[14] Further studies on the use of contraceptives showed that long-term use of oral contraceptives significantly increased melanoma risk.[15,16]

More recent research has also explored this topic. A study on differing phenotypes in women and the effect of that phenotype on melanoma incidence found that women with a certain GG phenotype were more likely to develop melanoma at a younger age than the other two phenotypes (TG and TT).[17] This is important because estrogen signaling may be involved in the GG phenotype, indicating that perhaps hormonal factors contribute to melanoma development. In another study, male and female mice showed differences in skin responses to ultra violet (UV) radiation.[18] Male mice had less inflammation than female mice, but higher oxidative DNA damage due to lower antioxidant activity. Difference in skin reaction to UV radiation is important because the skin synthesizes sex hormones. Differing skin reactions may indicate that the sex hormones synthesized in the skin impact melanoma formation.

Table 2. Odds of having selected prognostic factors: White Hispanic vs White non-Hispanic

	White Hispanic		White non-Hispanic		Chi-square *P* value	Odds Ratio[a]	95% CI*
	n	%	*n*	%			
Stage							
IA	442	34	18,391	44	<.001	1	—
IB	220	17	7,417	18		1.25	1.06–1.48
IIA	66	5	2,209	5		1.39	1.06–1.81
IIB	49	4	1,463	4		1.64	1.21–2.22
IIC	29	2	625	2		2.43	1.64–3.86
IIIA	32	3	671	2		1.81	1.25–2.61
IIIB	48	4	870	2		2.41	1.77–3.28
IIIC	28	2	499	1		2.51	1.69–3.73
IIINOS	13	1	234	1		2.32	1.31–4.10
IV	91	7	1,448	3		2.96	2.33–3.75
Unknown	268	21	7,657	18		1.55	1.33–1.81
Tumor Depth							
< 0.75 mm	555	43	22,574	54	<.001	1	—
0.75–1.49 mm	238	19	7,539	18		1.25	1.07–1.46
1.50–2.49 mm	128	10	3,223	8		1.68	1.38–2.05
2.50–3.99 mm	70	5	2,024	5		1.57	1.22–2.03
> 3.99 mm	295	23	6,124	15		2.15	1.85–2.49
Ulcerated							
No	913	71	32,604	79	<.001	1	—
Yes	198	15	4,577	11		1.7	1.45–1.99
Unknown	175	14	4,303	10		1.5	1.27–1.77
Histology							
Malignant melanoma	682	53	21,362	51	<.001	1	—
Superficial spreading melanoma	325	25	12,113	29		0.79	0.69–0.91
Nodular melanoma	113	9	2,761	7		1.36	1.11–1.67
Acral lentiginous melanoma	66	5	309	1		6.88	5.19–9.11
Hutchinson's melanotic freckle	32	3	2,559	6		0.53	0.37–0.77
Other	68	5	2,380	6		0.93	0.72–1.20
Site of skin							
Face/eyelid/lip/ear (C440–C443)	187	15	5,476	13	<.001	1	—
Scalp and neck (C444)	63	5	3,133	8		0.56	0.42–0.75
Trunk (C445)	325	25	13,656	33		0.57	0.47–0.69
Upper limb and shoulder (C446)	260	20	10,434	25		0.6	0.49–0.73
Lower limb and hip (C447)	368	29	7,286	18		1	0.83–1.21
Skin, NOS (C448–C449)	83	6	1,499	3		1.37	1.05–1.79
Primary							
Single only	1,073	83	11,519	72	<.001	1	—
Multiple	213	17	29,965	28		0.63	0.54–0.73
Surgery							
No	111	9	2,175	5	< 0.001	1	—
Yes	1,171	91	39,245	95		0.54	0.44–0.66
Unknown	4	0	64	0		1.27	0.45–3.58

Hispanic: Spanish-Hispanic-Latino.
Source: SEER, 2004–2006.
* Adjusting for age and marital status at diagnosis and sex.

White Hispanics presented with significantly later stage disease at diagnosis, greater tumor depth, and a greater likelihood of an ulcerated tumor. The long-term clinical course of patients with melanoma indicates that tumor thickness is one of the primary prognostic indicators for survival.[19] A recent study has shown disparities for different ethnicities in relation to the stage of melanoma at the time of diagnosis.[5] In particular, Blacks and Hispanics tend to be diagnosed at a later stage of disease than Whites and, consequently, have poorer survival.

Histological type is a factor related to prognosis. Rate of invasion and site of the lesion influence how quickly

Table 3. Odds of dying among melanoma patients according to Hispanic status

		Death from any cause		Death from melanoma	
	Adjusting for	OR	95% CI	OR	95% CI
Hispanic vs non-Hispanic	Nothing	1.47	1.23–1.75	1.55	1.24–1.93
	Age	1.87	1.56–2.25	1.78	1.43–2.23
	Age, Sex	1.94	1.62–2.34	1.87	1.49–2.33
	Age, Sex, Marital Status	1.85	1.53–2.22	1.74	1.39–2.18
	Age, Sex, Marital Status, and Stage	1.32	1.06–1.63	1.03	0.78–1.35

Hispanic: Spanish-Hispanic-Latino.
Source: SEER, 2004–2006.

melanomas can be diagnosed, and thus the prognosis. For example, superficial spreading melanoma is easy to diagnose early because changes in size, shape, and color are readily noticeable.[20] As such, the 10-year survival rate is approximately 95% in the United States.[21] Hutchinson's melanotic freckle also has a good prognosis of nearly 100% survival rate through 10 years because of its very slow progression. On the other hand, nodular melanoma grows rapidly and the majority of the lesion is underneath the skin surface. Its 10-year survival rate is less than 65%. Acral lentiginous melanoma is most often found on the soles of the feet or the toe, and is often unrecognized and undiagnosed. Its survival rate is also less than 65%. In our study, White Hispanics were more likely to be diagnosed with the two more lethal melanomas: nodular and acral lentiginous melanoma. Similar results have been found in other studies.[22,23] Therefore, sun exposure is not a likely etiologic agent for these two forms of melanoma; this may be the reason why Hispanics, Blacks, and Asians all have higher incidence of acral melanoma as their darker skin serves as a protective agent against the development of superficial melanoma.[23]

In our study, the location of melanoma on the body differed according to ethnicity. Hispanics were significantly less likely to have melanoma on the scalp and neck, trunk, or upper limb and shoulder. This is consistent with another study in which Hispanic men were more likely to have had melanoma develop on the lower extremities than were non-Hispanic White men.[23] However, the study did not find a significant difference in the location of melanoma on the lower extremities between Hispanic and non-Hispanic women.

Hispanics were significantly less likely to have multiple cancer primaries. Hispanics in general have lower incidence rates for all cancers combined and for the most common types of cancer than whites, with the exception of certain cancers associated with infection (eg, uterine cervix, liver, and stomach).[24] In addition, they were significantly less likely to receive surgical treatment. A significant amount of research has been conducted on healthcare disparities between Hispanics and White non-Hispanics in the United States. Several factors contribute to inadequate health care in the Hispanic population, including lack of health insurance, lower income, and cultural/language barriers. Lack of health insurance is a significant deterrent to health care, and specifically to preventive health care. Even Hispanics who have health insurance are less likely to receive preventive health care because of high deductibles and co-payments. Cultural/language barriers are exacerbated by a lack of bilingual health professionals in many areas and the cost of professional interpreters.[25] All of these factors may contribute to our finding that Hispanics with melanoma are less likely to receive surgical treatment, and a lack of adequate preventive health care means that melanomas have progressed further by the time of diagnosis. The expense of surgery, especially among the uninsured, is another deterrent.

The odds of dying from any cause during the study period among melanoma patients diagnosed during that same time period was significantly greater for Hispanics, after adjusting for age, sex, marital status, and stage at diagnosis. However, once stage was adjusted for, we found no significant difference between Hispanics and non-Hispanics in their odds of dying specifically from melanoma.

Strengths and weaknesses of the SEER data deserve some mention. SEER incorporates several quality assurance measures, identifies nearly all diagnosed cases in its catchment areas, and has a very high level of follow-up for vital status. Specific criteria adhered to by SEER regarding formatting and defining case information is described elsewhere.[26,27] SEER provides a large number of cases with detailed information on patient demographics, tumor characteristics, morphology, diagnostic information, and extent of disease. This allowed us to consider several important factors in the analyses. Further, the SEER registries cover 26% of the US population, with both urban and rural geographic areas represented. Hence, the results have a high level of generalizability. Unfortunately, SEER does not collect data on comorbid diseases for conditions other than cancer, which may have added to our study.

CONCLUSION

White Hispanic melanoma patients, compared with White non-Hispanic patients, experienced significantly poorer prognostic findings at the time of diagnosis. However, when stage was adjusted for, we no longer found a significant difference in death specifically from melanoma between both groups. From this result, we propose that if melanoma is identified for White Hispanics at the same stage as for White non-Hispanics, their survival rates will be similar. This disparity is likely a result of cultural differences, language barriers, inadequate insurance, or other socioeconomic factors. Further, White Hispanics are more likely to be diagnosed with the more lethal types of melanoma (nodular and acral lentiginous melanoma). Thus, sun exposure may not be a primary risk factor for these two forms of the disease; the fact that Hispanics, Blacks, and Asians all have higher incidence of acral melanoma supports this conclusion. Location of melanomas was also found to differ by race. White Hispanics were less likely than White non-Hispanics to have melanoma on the scalp and neck, trunk, or upper limb and shoulder, and had a more frequent occurrence of melanoma on the lower extremities. As a result, skin examinations should be adapted to account for differences in location and tumor type in certain ethnicities to help doctors identify melanoma in patients at an earlier stage. The disparity in melanoma stage, tumor depth, and ulceration emphasizes the need for greater screening efforts among this minority group.

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Design concept of study: Merrill, Pace, Elison
Acquisition of data: Merrill
Manuscript draft: Merrill, Pace, Elison
Statistical expertise: Merrill, Pace
Acquisition of funding: Merrill
Administrative: Merrill
Supervision: Merrill