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Racial and socioeconomic differences in acral lentiginous melanoma outcomes: A Surveillance, Epidemiology, and End Results analysis

Neel S. Raval, BS, MPHS[a,b,c], **Wesley T. Hodges, BS, MPHS**[b], **Pearl O. Ugwu-Dike, BS**[a], **Fellipe Godoy, MD**[b], **George Ansstas, MD**[d], **Lynn A. Cornelius, MD**[c], **Amy C. Musiek, MD**[c], **Maryam M. Asgari, MD, MPH**[a], **Yevgeniy R. Semenov, MD, MA**[a]

[a]Department of Dermatology, Massachusetts General Hospital, Boston, Massachusetts;

[b]Division of Public Health Sciences, Washington University School of Medicine, St. Louis, Missouri.

[c]Division of Dermatology, Washington University School of Medicine, St. Louis, Missouri.

[d]Division of Oncology, Washington University School of Medicine, St. Louis, Missouri.

To the Editor: Acral lentiginous melanoma (ALM), a subtype of melanoma that forms on the palms or soles or beneath the nails, is the most common type of melanoma in patients with skin of color (SOC).[1] Although nonacral cutaneous melanoma survival is associated with certain demographic and socioeconomic variables,[2] less is known about the epidemiology and risk factors of ALM. Notwithstanding, an association between lower socioeconomic status (SES) (ie, manual labor occupations) and the incidence of ALM has been reported.[3] However, US-based studies investigating the impact of race and SES on ALM outcomes are lacking. As such, our goal was to examine mortality trends among racial and ethnic minorities with ALM while accounting for SES.

We analyzed the Surveillance, Epidemiology, and End Results 18 Registry for patients with ALM (ICD-O-3 8744/3) from 2000 to 2016. Study variables included age at diagnosis, SES tertile (Supplementary Methods, available via Mendeley at http://doi.org/10.17632/dn9k77txbv.1),[4] race, sex, location, extent of disease (localized or extensive), surgical treatment (definitive or not), insurance status, vital status (living or dead), and survival months. We calculated the annual percentage changes in ALM incidence by race from 2000 to 2016 using JoinPoint software. Next, we constructed a multivariate model of the hazard of ALM-specific mortality using a competing risk approach, adjusting for significant variables (type III $P < .15$) and subsequently stratifying by variables not satisfying the proportional-hazards assumption. An SOC group, defined as Hispanic, Asian/Pacific Islander, or non-Hispanic Black, was created to appropriately power the competing risk model. Causes of death not attributable to ALM were censored (Supplementary Methods). Cases with

Correspondence to: Yevgeniy R. Semenov, MD, MA, Department of Dermatology, Massachusetts General Hospital, Harvard Medical School, 40 Blossom Street, Bartlett Hall 6R, Room 626, Boston, MA 02114, ysemenov@mgh.harvard.edu.

Conflicts of interest

None disclosed.

incomplete data were excluded. Insurance status was excluded from the primary analysis due to a high unknown rate but was included in a sensitivity analysis. Analyses were performed using SAS Studio.

We identified 2676 ALM cases across 4 racial/ethnic cohorts (Table I). The annual incidence of ALM increased by 1.7% (95% CI 0.6% to 2.7%) during the study period, driven primarily by an increasing incidence among non-Hispanic White (2.1% annually, 95% CI 1.0% to 3.2%), while rates remained flat across all other ethnicities (Supplementary Fig 1, A to E, available via Mendeley at http://doi.org/10.17632/dn9k77txbv.1). Cause-specific mortality modeling stratified by the extent of disease at diagnosis revealed significantly higher hazard ratios of ALM-specific mortality for populations with SOC (hazard ratio 1.39, 95% CI 1.13 to 1.71) than for non-Hispanic Whites (Table II). Male sex, older age, and lower SES were significantly associated with an elevated risk of mortality ($P < .05$). Specifically, patients in SES tertile 1 were at a significantly higher risk of mortality than those in tertile 3 (ie, wealthiest) (Table II). In a sensitivity analysis including insurance classification, mortality hazard ratios remained significant for all previously significant covariates (Supplementary Table I, available via Mendeley at http://doi.org/10.17632/dn9k77txbv.1).

Our study provides novel populatione–level data about the impacts of race and SES on ALM-specific mortality. Patients with SOC with ALM have greater risks of ALM-specific death, even after adjusting for several important confounders. Disparities in health care literacy, medical mistrust, and biased recruitment to immunotherapy trials may influence this finding.[5] Unfortunately, we did not have access to detailed medication information for this cohort and could not meaningfully incorporate insurance data into our primary model. Future ALM studies should investigate pathogenesis, institutionally driven health care disparities, and health inequity mitigation strategies.

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Table I.

Baseline characteristics

Characteristic	Non-Hispanic White (n = 1882)	Hispanic (n = 380)	Asian or Pacific Islander (n = 195)	Non-Hispanic Black (n = 219)	*P* value*
Age at diagnosis, mean (SD)	65.5 (16.0)	62.2 (15.9)	66.1 (15.6)	66.2 (15.5)	.007
Sex, n (%)					.099
Male	898 (47.7)	175 (46.0)	99 (50.8)	87 (39.7)	
Female	984 (52.3)	205 (54.0)	96 (49.2)	132 (60.3)	
SES tertile, n (%)					<.001
1 (lowest)	174 (9.3)	107 (28.2)	16 (8.2)	96 (43.8)	
2	318 (16.9)	91 (24.0)	33 (16.9)	42 (19.2)	
3 (highest)	528 (28.0)	44 (11.6)	78 (40.0)	16 (7.3)	
Location, n (%)					<.001
Upper extremity	367 (19.5)	53 (14.0)	36 (18.5)	29 (13.2)	
Lower extremity	1432 (76.1)	321 (84.5)	158 (81.0)	187 (85.4)	
Other	83 (4.4)	6 (1.6)	1 (0.5)	3 (1.4)	
Extent of disease at diagnosis, n (%)					.003
Localized	1350 (71.7)	240 (63.2)	126 (64.6)	154 (70.3)	
Extensive	532 (28.3)	140 (36.8)	69 (35.4)	65 (29.7)	
Definitive surgical treatment, n (%)					<.001
Yes	1721 (91.5)	324 (85.3)	174 (89.2)	190 (86.8)	
No	161 (8.6)	56 (14.7)	21 (10.8)	29 (13.2)	
Insurance status, n (%)					<.001
Uninsured	21 (1.1)	17 (4.5)	5 (2.6)	1 (0.5)	
Non-Medicaid Insured	1038 (55.2)	164 (43.2)	104 (53.3)	106 (48.4)	
Medicaid Insured	58 (3.1)	72 (19.0)	25 (12.8)	23 (10.5)	
Unknown	765 (40.1)	127 (33.4)	61 (31.3)	89 (40.6)	

Analysis of variance was used to compare continuous variables; χ^2 test was used for categorical. *SES*, Socioeconomic status.

*P values < .05 were considered significant.

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Table II.

Acral lentiginous melanoma cause-specific hazards model (n = 2676)*

Parameter	Hazard ratio	95% CI	*P* value†
Age at diagnosis	1.02	(1.01–1.03)	<.001
Sex			<.001
Male	1.59	(1.32–1.93)	
Female	1	Ref	
SES tertile			
1 (lowest)	1.29	(1.01–1.64)	.040
2	1.15	(0.92–1.44)	.222
3 (highest)	1	Ref	
Race/ethnicity classification			.002
SOC	1.39	(1.13–1.71)	
NHW	1	Ref	
Definitive surgical treatment			.009
No	1.50	(1.11–2.03)	
Yes	1	Ref	

Analysis of variance was used to compare continuous variables; χ^2 test was used for categorical.

NHW, Non-Hispanic White; *SES*, socioeconomic status; *SOC*, skin of color (includes Asian or Pacific Islander, non-Hispanic Black, and Hispanic).

*Model adjusted for age at diagnosis, sex, race/ethnicity classification, SES tertile, and surgical treatment and stratified by extend of disease.

†*P* values < .05 were considered significant.