

# Racial Disparities in Hidradenitis Suppurativa–Related Pain: A Cross-sectional Analysis

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## PRACTICE POINTS

- Racial disparities exist in the management of hidradenitis suppurativa (HS)–related pain.
- Black/African American patients with HS are 4 times more likely to experience very severe pain than patients of other races or ethnicities.
- Lower income levels, higher HS disease severity, and a history of prescription pain medication use are all independent risk factors for very severe pain in patients with HS.

Racial disparities in pain management for chronic diseases persist in the United States. However, no research exists assessing racial disparities in related pain. This study aimed to identify racial differences in hidradenitis suppurativa (HS)–related pain scores. Additionally, we characterized patient satisfaction with pain management. Further research is needed to evaluate if systemic or health care provider biases contribute to racial differences in HS-related pain management.

*Cutis.* 2023;111:E25–E30.

**H**idradenitis suppurativa (HS), a chronic inflammatory disease that is characterized by tender inflamed nodules of the skin and subcutaneous tissue, disproportionately affects postpubertal females as well as Black/African American individuals. The nodules can rupture, form sinus tracts, and scar.<sup>1</sup> Hidradenitis

suppurativa has been associated with cardiovascular disease, type 2 diabetes mellitus, polycystic ovary syndrome, depression, suicide, and substance use disorders. Because of the symptom burden and associated conditions, HS can be a painful and distressing disease that substantially impairs the quality of life for individuals with this condition.<sup>2</sup>

Pain is a commonly reported symptom in HS that often goes untreated. Furthermore, HS-related pain is complex due to the involvement of different pain types that require various treatment modalities.<sup>3</sup> According to Savage et al,<sup>4</sup> recognizing whether HS-related pain is acute, chronic, neuropathic, or nociceptive is vital in establishing a framework for an effective pain management scheme. Currently, such established multimodal pain management strategies in dermatology do not exist. In 2021, dermatology-specific pain management strategies proposed the use of a multimodal regimen to address the multifaceted nature of HS-related pain.<sup>4</sup> However, these strategies failed to recognize the systemic racial and ethnic biases in the US health care system that undermine pain management care for minority groups.<sup>5,6</sup> One approach to combatting racial disparities in pain management is determining average pain levels across racial groups.<sup>7</sup> This study sought to compare HS-related pain scores by racial groups. Furthermore, we assessed differences in perception of patients' respective pain management regimens by race. We hypothesized that the average HS-related pain intensities and pain management would differ between self-reported racial groups.

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## Methods

This cross-sectional study took place over 5 months (August through December 2021). A survey was emailed to 2198 adult patients with HS in the University of Alabama Health System. The survey consisted of demographic and general questions about a patient's HS. Pain scores were captured using the numeric rating scale (NRS), a measurement tool for pain intensity on a scale from 0 to 10.<sup>8</sup> Age at diagnosis, gender, education level, household income, total body areas affected by HS, disease severity (categorized as mild, moderate, and severe), comorbidities including mood disorders, tobacco use, and HS and HS-related pain medication regimens also were collected. Additionally, participants were asked about their level of agreement with the following statements: "I am satisfied with how my pain related to HS is being managed by my doctors" and "My pain related to HS is under control." The level of agreement was measured using a 5-point Likert scale, with responses ranging from strongly disagree to strongly agree. All data included in the analysis were self-reported. The study received institutional review board approval for the University of Alabama at Birmingham.

**Statistical Analysis**—Descriptive statistics were used to assess statistical differences in patient characteristics of Black/African American participants compared to other participants, including White, Asian, and Hispanic/Latino participants. Thirteen participants were excluded from the final analysis: 2 participants were missing data, and 11 biracial participants were excluded due to overlapping White and Black/African American races that may have confounded the analysis. Categorical variables were reported as frequencies and percentages, and  $\chi^2$  and Fisher exact tests, when necessary, were used to test for statistically significant differences. Continuous variables were summarized with means and standard deviations, and a *t* test was used for statistically significant differences.

Logistic regression was performed to assess the relationship between race and pain after adjusting for confounding variables such as obesity, current tobacco use, self-reported HS severity, and the presence of comorbidities. A total of 204 patient records were included in the analysis, of which 70 (34.3%) had a pain score of 8 or higher, which indicates very severe pain intensity levels on the NRS,<sup>8</sup> and were selected as a cut point based on the distribution of responses. For this cross-sectional cohort, our approach was to compare characteristics of those classified with a top score of 8 or higher (*n*=70) vs a top score of 0 to 7 (*n*=134) (cases vs noncases). Statistical analyses were performed using JMP Pro 16 (JMP Statistical Discovery LLC) at an  $\alpha$ =.05 significance level; logistic regression was performed using SPSS Statistics (IBM). For the logistic regression, we grouped patient race into 2 categories: Black/African American and Other, which included White, Asian, and Hispanic/Latino participants.

Crude and adjusted multivariable logistic regression analyses were used to calculate prevalence odds ratios with 95% confidence intervals. Covariate inclusion in the multivariable logistic regression was based on a priori hypothesis/knowledge and was meant to estimate the independent effect of race after adjustment for income, HS severity, and history of prescription pain medication use. Other variables, including tobacco use, obesity, mood disorders, and current HS treatments, were all individually tested in the multivariate analysis and did not significantly impact the odds ratio for high pain. Statistical adjustment slightly decreased (19%) the magnitude between crude and adjusted prevalence odds ratios for the association between Black/African American race and high pain score.

## Results

**Survey Demographics**—The final analysis included 204 survey respondents. Most respondents were Black/African American (58.82%), and nearly all were female (89.71%) (Table 1). The mean age (SD) of respondents was 37.37 (11.29) years (range, 19-70 years). Many respondents reported having completed some college (36.27%) or receiving a bachelor's degree (19.12%). Of patients who were not Black/African American, 10.71% had higher than a master's degree, whereas no Black/African American patients held a degree higher than a master's (*P*=.0052). Additionally, more Black/African American respondents (35.83%) reported an annual household income level of less than \$25,000 compared with respondents who were not Black/African American (19.05%, *P*=.0001). Most respondents rated the severity of their HS as moderate or severe (46.57% and 41.67%, respectively), and there was no significant difference in reported severity of HS between racial groups (*P*=.5395).

**Pain Scores**—As documented in the Methods, respondents were asked to rate their HS-related pain intensity from 0 to 10 using the NRS. The average pain score (SD)—the level of pain intensity over the prior month—was 6.39 (2.56) (range, 0-10). The mean pain score (SD) at the time of the survey was 3.61 (2.98) (range, 0-10) (Table 1). These data revealed that Black/African American patients had a significantly higher average pain score (SD) than patients with HS who were not Black/African American (7.08 [2.49] and 5.40 [2.35], respectively; *P*<.0001). After adjustment with multivariable logistical regression, Black/African American patients had 4-fold increased odds for very severe levels of pain (score of  $\geq 8$ ) compared with patients who were not Black/African American.

**Pain Management**—Although pain scores were higher for Black/African American patients with HS, there was no significant difference in the perception of pain control between racial groups (*P*=.0761). Additionally, we found low income (adjusted prevalence odds ratio [POR], 0.22; 95% CI, 0.05-0.91), a history of prescription pain medication use (adjusted POR, 2.25; 95% CI, 1.13-4.51), and HS severity (adjusted POR, 4.40; 95% CI, 1.11-17.36) all to

**TABLE 1. Study Sample Characteristics by Race**

Characteristic	Black/African American (n=120)	Other <sup>a</sup> (n=84)	P value	Total (N=204)
Mean age at diagnosis (SD), y	36.64 (11.74)	38.42 (10.86)	.2746	37.37 (11.29)
Gender, n (%)				
Female	112 (93.33)	71 (84.52)	.0793	183 (89.71)
Male	8 (6.67)	12 (14.29)		20 (9.80)
Nonbinary/third gender	0 (0.00)	1 (1.19)		1 (0.49)
Education level, n (%)				
Some high school/GED	5 (4.17)	5 (5.95)	.0052	10 (4.90)
Completed high school	17 (14.17)	9 (10.71)		26 (12.75)
Trade school	2 (1.67)	0 (0.00)		2 (0.98)
Some college	46 (38.33)	28 (33.33)		74 (36.27)
Associate's degree	18 (15.00)	10 (11.90)		28 (13.73)
Bachelor's degree	24 (20.00)	15 (17.86)		39 (19.12)
Master's degree	8 (6.67)	8 (9.52)		16 (7.84)
Higher than master's degree	0 (0.00)	9 (10.71)		9 (4.41)
Annual household income, n (%)				
<\$25,000	43 (35.83)	16 (19.05)	.0001	59 (28.92)
\$25,001–\$50,000	45 (37.50)	19 (22.62)		64 (31.37)
\$50,001–\$100,000	21 (17.50)	29 (34.52)		50 (24.51)
\$100,001–\$200,000	8 (6.67)	18 (21.43)		26 (12.75)
>\$200,000	3 (2.50)	2 (2.38)		5 (2.45)
Self-reported HS severity, n (%)				
Mild	12 (10.00)	12 (14.29)	.5395	24 (11.76)
Moderate	55 (45.83)	40 (47.62)		95 (46.57)
Severe	53 (44.17)	32 (38.10)		85 (41.67)
Average pain score, <sup>b</sup> mean (SD)	7.08 (2.49)	5.40 (2.35)	<.0001	6.39 (2.56)
Pain score at time of survey, mean (SD)	3.99 (3.18)	3.07 (2.59)	.0242	3.61 (2.98)
History of prescription pain medication use				
Yes	50 (41.67)	21 (25.00)	.0129	71 (34.80)
No	70 (58.33)	63 (75.00)		133 (65.20)

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TABLE 1. (continued)

Characteristic	Black/African American (n=120)	Other <sup>a</sup> (n=84)	P value	Total (N=204)
Current pain medication use				
Yes	30 (25.00)	11 (13.10)	.0331	41 (20.10)
No	90 (75.00)	73 (86.91)		163 (79.90)

Abbreviations: GED, General Education Development; HS, hidradenitis suppurativa.

<sup>a</sup>Other: White, Asian, and Hispanic/Latino race and ethnicities.

<sup>b</sup>The level of pain intensity over the prior month.

be independent risk factors contributing to higher pain scores in patients with HS (Table 2). Lastly, we noted current or reported history of pain medication use was significantly correlated with higher pain scores ( $P=.0280$  and  $P=.0213$ , respectively).

**Satisfaction With Pain Management**—The level of satisfaction with physician management of HS-related pain was significantly different between Black/African American patients and those who were not Black/African American ( $P=.0129$ ). Of those who identified as Black/African American, 26.7% ( $n=32$ ) strongly disagreed with the statement, “I am satisfied with how my pain related to HS is being managed by my doctors,” whereas only 15.5% ( $n=13$ ) of patients who were not Black/African American strongly disagreed.

**Comment**

There is no cure for HS, and a large focus of treatment is pain management. Because racial disparities in the treatment of chronic pain will affect those with HS, we conducted a cross-sectional analysis of pain and pain management among HS patients. We found that Black/African American patients with HS have higher average pain scores than those who are not Black/African American and were 4 times more likely to experience very severe pain. Prior studies have established that patients with HS often report higher pain levels than patients with other chronic inflammatory skin conditions,<sup>7,8</sup> and our study identified racial disparities in HS-related pain management.

Measuring pain is challenging because of its multi-dimensional and subjective nature, making it essential to consider underlying causes and patients’ emotional responses to pain.<sup>9</sup> By adjusting for confounding factors that may influence pain, such as mood disorders, disease severity, comorbidities, and medication use, we were able to gain better insight into fundamental differences in average pain intensity levels among racial groups and assess what factors may be contributing to a patient’s pain perception. Our study determined that lower income

levels, higher HS disease severity, and a history of prescription pain medication use were all independent risk factors for high pain. Of note, obesity, tobacco use, and mood disorders such as anxiety and depression did not significantly differ between racial groups or increase the odds of high pain between racial groups identified.

With low income being an independent risk factor for high pain, we must consider the social determinants of health and how they may influence the pain experience in HS. We speculate that low income may be associated with other social determinants of health for the patients assessed in this study, such as lack of social and community support or limited health care access that contribute to worse health outcomes.<sup>10,11</sup> In addition, low income contributes to limited access to medical care or treatments<sup>12</sup>; without access to effective HS management, lower-income patients may be at risk for higher disease severity and thus higher pain levels. However, economic stability is only a part of the whole picture; therefore, assessing the other social determinants of health in patients with HS may lead to better health outcomes and quality of life.

Another identified risk factor for high pain was a reported history of prescription pain medication use. This finding suggests that patients with moderate to severe pain likely have required stronger analgesic medications in the past. We further speculate that high pain levels in patients who have received prescription pain medications indicate either undertreatment, mistreatment, or recalcitrant pain. More research is needed to assess the relationship between HS-related pain intensity, analgesic medications, and providers who manage HS-related pain.

We also found that Black/African American patients with HS had a significantly higher dissatisfaction with their physician’s management of their pain, which could be attributable to several factors, including biological differences in medication metabolism (in which the patient has medication-resistant HS), undertreatment of pain, and/or poor doctor-patient relations. These reasons coincide

**TABLE 2. Results From Multivariable Logistic Regression for the Association Between Select Patient Characteristics and High Pain Score (N=204)<sup>a</sup>**

Characteristic	Crude POR (95% CI)	Adjusted POR (95% CI) <sup>b</sup>
Black/African American race	4.94 (2.48-9.86)	4.00 (1.84-8.71)
Annual household income		
<\$25,000	Ref	Ref
\$25,001–\$50,000	0.66 (0.32-1.35)	0.92 (0.41-2.06)
\$50,001–\$100,000	0.27 (0.12-0.63)	0.52 (0.20-1.35)
>\$100,000	0.10 (0.03-0.38)	0.22 (0.05-0.91)
Self-reported HS severity		
Mild	Ref	Ref
Moderate	2.24 (0.61-8.18)	1.36 (0.34-5.40)
Severe	7.51 (2.08-27.07)	4.40 (1.11-17.36)
History of prescription pain medication use	2.48 (1.36-4.52)	2.25 (1.13-4.51)

Abbreviations: HS, hidradenitis suppurativa; POR, prevalence odds ratio; Ref, reference group.

<sup>a</sup>For the logistic regression, we grouped race into 2 categories: Black/African American and Other. A total of 204 patient records were included in the analysis, of which 70 (34.3%) had a pain score of 8 or higher. A score of 8 or higher indicates very severe pain intensity levels according to the numeric rating scale<sup>9</sup> and was selected as a cut point based on the distribution of responses. For this cross-sectional cohort, our approach was to compare characteristics of those classified with a top score of  $\geq 8$  (n=70) vs a top score of 0 to 7 (n=134)—cases vs noncases.

<sup>b</sup>Covariate inclusion in the multivariable logistic regression was based on a priori hypothesis/knowledge and was meant to estimate the independent effect of race after adjustment for income, HS severity, and history of prescription pain medication use. Statistical adjustment slightly decreased (19%) the magnitude between crude and adjusted PORs for the association between Black/African American race and high pain score. After adjustment, Black/African American patients had 4-fold increased odds for high pain compared with patients classified as Other.

with other diseases where health disparities are found.<sup>13-15</sup> Recognizing these factors will be key to dismantling the disparities in HS that are noted within this study.

The limitations of this work include the cross-sectional study design and its inability to evaluate causal factors of high pain levels across racial groups, the NRS lack of insight on pain chronicity or pain experience,<sup>7</sup> the lack of provider or institution perspectives, and self-reported data. Additionally, only patients with email access were included, which may have excluded vulnerable populations with more pain associated with their HS.

Our findings highlight an area for further investigation to assess why these racial differences exist in HS-related pain. The results also emphasize the need for research evaluating whether systemic or health care provider biases contribute to racial differences in HS-related pain management.

**Acknowledgment**—Dr. Weir was supported by the Predoctoral Clinical/Translational Research Program (TL1), a National Institutes of Health Ruth L. Kirschstein National Research Service Award (NRSA), through the

University of Alabama at Birmingham (UAB) Center for Clinical and Translational Science (CCTS).

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