

## BRIEF ARTICLES

## Weight Gain Over Time in Hidradenitis Suppurativa Patients: Trends and Implications

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### ABSTRACT

**Background:** Hidradenitis suppurativa (HS) is often seen in overweight and obese patients. However, little is documented about weight gain over time in HS patients.

**Methods:** From August 2009 to March 2018, all patients in the UCLA HS clinic were asked at initial examination about their weight gain since high school.

**Results:** A cohort of 143 HS patients were found to have a significant mean BMI increase of 4.7 (25.5 to 30.2,  $p < 0.0001$ ) from high school until time of presentation (approximately a 15 year interval). Of the patients with  $\geq 10$  point BMI increase, 85.2% were women. 59.6% of women were normal weight in high school with an average BMI of 24.8 (SD 6.41, range 14-50) and 78.7% were overweight or obese at time of HS clinic intake. Hispanic HS patients were found to have more weight gain than other ethnic groups, ( $p = 0.09$ ) which may be clinically significant.

**Conclusions:** Although many HS patients were normal weight or mildly overweight in high school, most become obese in early adulthood. Since obesity is thought to increase HS severity, weight management should be stressed in HS patients early on before weight gain occurs.

### INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic inflammatory skin disorder with a significant

comorbidity burden. Obesity is a modifiable risk factor that is strongly associated with HS. Recent evidence suggests that HS patients are 17.3 times more likely to be obese than healthy controls.<sup>1,2</sup> Furthermore,

March 2020 Volume 4 Issue 2

HS patients are 2.22 times more likely than controls to develop metabolic syndrome (MetS), which includes obesity, hypertension, hyperlipidemia, and diabetes.<sup>3</sup> Thus, HS patients are at high risk for adverse cardiovascular (CV) outcomes. Compared to matched controls, HS patients have an increased risk for MI (OR 1.57; 95%CI 1.14-2.17), ischemic stroke (OR 1.33; 95%CI 1.01-1.76), and CV-associated death (1.95; 95%CI 1.42-2.67).<sup>4</sup>

There is little literature on weight gain over time in HS patients, and even more sparse evidence on which sub-populations are at increased risk for weight gain. The aim of this study is to examine the body mass index (BMI) change over time in a cohort of HS patients.

## METHODS

A retrospective chart review was conducted on 143 sequential HS patients who were seen at the UCLA HS Specialty Clinic from 2009 to 2018. Patient demographics, medical history related to HS, weight in high school and weight and height at initial presentation were abstracted. The BMI was calculated by weight in kilograms divided by height in meters squared. A paired t-test and McNemar's test were used to compare BMI in high school and BMI at initial presentation. Paired t-tests were used for all subgroup analyses. All analyses were performed in R (V3.5.1 Vienna, AU) and p-values < 0.05 were considered to be statistically significant.

## RESULTS

Patient characteristics are reported in Table I. 43% of the patients reported having HS symptoms by age 18 and the average duration from high school to presentation at

HS clinic was 14.8 years. The mean BMI in high school was 25.5 (SD6.69, range 14-54) and the mean BMI at the time of presentation to HS Clinic was 30.2 (SD7.59, range 19-60). This increase in BMI was significant ( $p < 0.0001$ ). Furthermore, a significantly higher proportion of patients reported a weight and height that would qualify them for being obese ( $BMI \geq 30$ ) at time of presentation compared to high school (46% vs. 19%,  $p < 0.0001$ ).

59.6% of women were normal weight in high school with an average BMI of 24.8 (SD6.41, range 14-50); however, 78.7% were overweight or obese at the time of HS clinic intake. Women tended to gain more weight than men, though not statistically significant. Family history of HS and race do not appear to significantly influence weight gain, although Hispanics (78.2% Mexican) tended to have higher BMI gain than that in other ethnic groups. (Table II).

18.9% of the patients ( $n=27$ ) had a  $\geq 10$  point BMI increase, most commonly Hispanic (22.2%) and White (22.2%), followed by Bi or Multi Racial (14.9%) and Black (11.1%) patients. Among them, 85.2% were women and 74.1% did not have a family history of HS (Figure 1).

## DISCUSSION

A large number of patients in this cohort reported significant weight gain between high school and presentation to HS specialty clinic. In high school, patients were mildly overweight (mean BMI 25.5) and approximately 1 in 5 were obese ( $BMI \geq 30$ ). At the time of presentation, the mean BMI increased to 30.2 and the percentage with obesity more than doubled (2.4x) with nearly 1 in 2 patients being obese. Given the

**Table I.** Patient variables.

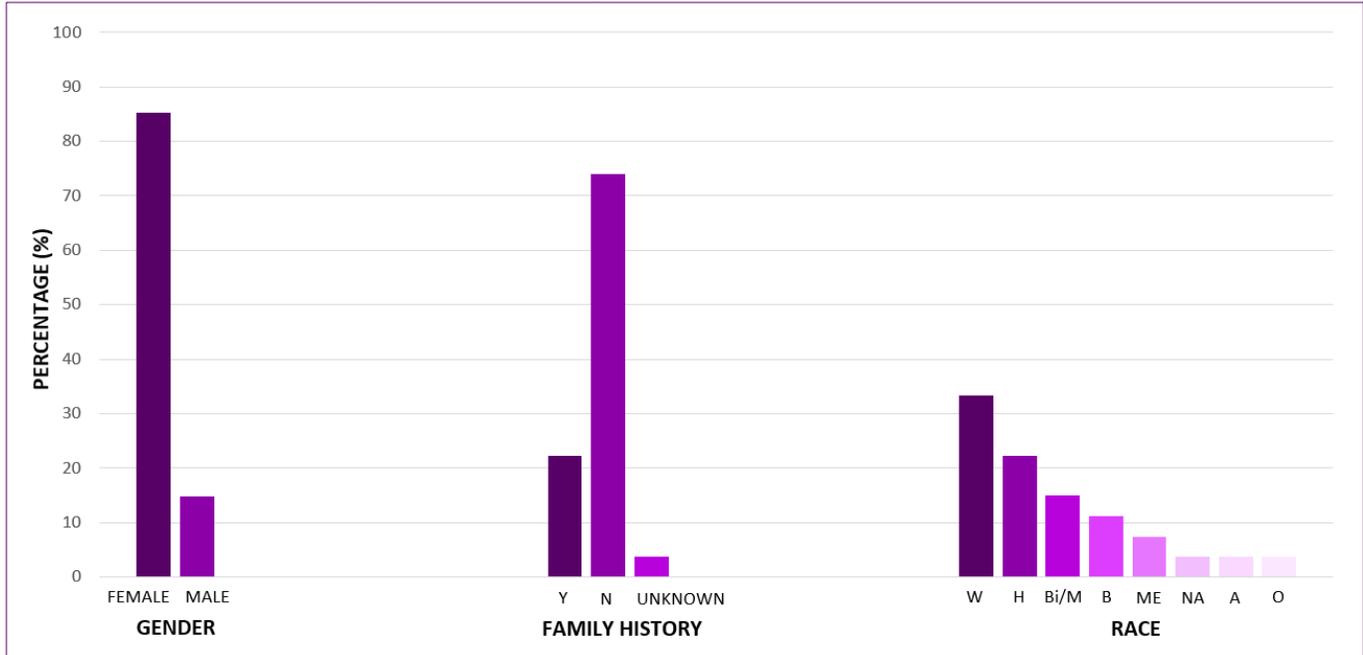
<b>Total Patient Number</b>	<b>143</b>
<b>Gender, n (%)</b>	
Female	94 (65.7%)
Male	49 (34.3%)
Presentation age to UCLA HS Clinic, mean (range)	32.8 (15-65)
Onset age of HS, mean (range)*	22.1 (6-63.5)
BMI in high school, mean (range)	25.5 (14-54)
BMI at presentation, mean (range)	30.2 (19-60)
<b>Race/Ethnicity, n (%)**</b>	
White	41 (28.7%)
Hispanic	23 (16.1%)
Black	19 (13.3%)
Middle Eastern	12 (8.4%)
Non-Indian Asian	10 (7%)
Indian Asian	6 (4.2%)
Native American	1 (0.7%)
Bi- or Multi-Racial	25 (17.5%)
<b>Family History, n (%)***</b>	
Yes	39 (27.3%)
No	98 (68.5%)

\*Unknown for 5 patients; \*\*Unknown for 4 patients; \*\*\*Unknown for 6 patients

**Table II.** BMI changes within patient subgroups.

	<b>High School BMI, mean</b>	<b>Current BMI, mean</b>	<b>P value</b>
<b>Gender</b>			
Males, n = 49	27.0	30.6	p=0.20
Females, n = 94	24.8	30.0	p=0.20
<b>Family History of HS</b>			
Yes, n = 39	26.9	30.8	p=0.45
No, n = 98	25.2	30.1	p=0.45
<b>Race/Ethnicity</b>			
White, n = 41	25.2	29.0	
Black, n = 19	26.8	32.2	p=0.41
Hispanic, n = 23	29.9	36.7	p=0.09
Middle Eastern, n = 12	22.6	26.5	p=0.82
Native American, n = 1	17	28	--
Asian, n = 10	24.5	28.7	p=0.94
South Asian, n = 6	25.3	28.3	p=0.65
Bi or Multi-Racial, n = 25	24.3	28.2	p=0.93

**Figure 1.** Characteristics of 27 patients with  $\geq 10$  kg/m<sup>2</sup> increase in BMI



Key: Y=Yes, N=No, W=White, H=Hispanic, Bi/M=Bi/Multicultural, NA=Native American, A=Asian, O=Other

negative impact of weight gain on HS disease course and its cardiovascular comorbidities, identifying at-risk patients and initiating weight reduction strategies early is important.

The effects of obesity in HS are both metabolic and physical. Metabolic activity in adipose tissue produces a subacute inflammatory state, secreting increased levels of IL-1, IL-6, TNF $\alpha$ , C-reactive protein.<sup>5</sup> Persistent and heightened release of these pro-inflammatory cytokines may increase keratinocyte proliferation, contributing to follicular occlusion observed in HS.<sup>5</sup> In patients with a high BMI, increased friction in intertriginous areas causes increased moisture, retention of hair follicle material, epidermal hyperplasia, and follicular rupture further contributing to HS development.<sup>1</sup>

Previous studies have shown a significant correlation between increased BMI and HS severity as measured by Hurley Score.<sup>6</sup>

Normal weight patients with subsequent weight gain report increased HS severity.<sup>7</sup> Several case reports have demonstrated symptom improvement and even disease remission in HS patients who achieved large weight reduction following bariatric surgery.<sup>8,9</sup>

Overall, obesity is the most frequently observed component of the MetS.<sup>10</sup> A 2015 study found that HS was significantly associated with each individual component of MetS, including obesity (OR 1.71; 95%CI 1.53-1.91), diabetes (OR 1.41; 95%CI 1.19-1.66), hyperlipidemia (OR 1.14; 95%CI 1.02-1.28), and hypertension (OR 1.19; 95%CI 1.03-1.38) when compared to controls.<sup>11</sup> Progressive weight gain is noted in adulthood in the general U.S. population, with mean BMI trending from 27.6 in the second decade to 29.4 in the third decade for women and 27.2 in the second decade and 28.9 in the third decade for men.<sup>12</sup> However, weight gain deserves special attention in HS patients

March 2020 Volume 4 Issue 2

since obesity has serious consequences for HS patients compared to non-HS patients with regard to disease severity and risk of cardiovascular disease.

The reported progression from mildly overweight BMI in high school to obese BMI in mid adulthood in this study suggests that HS patients may benefit from early weight management. Hispanic patients especially tended to have large weight gain and women comprised the majority of individuals with  $\geq 10$  point BMI increase, which may represent particularly high-risk groups of HS patients, highlighting the importance of targeting these groups.

Limitations of this study include its confinement to a single academic center cohort and the small sample size. In addition, inaccurate estimation of high school weight and height and weight at presentation is also possible.

## CONCLUSION

While obesity is highly associated with HS, our study found that most patients were normal weight or only mildly overweight in adolescence. Identifying HS patients who are potentially at great risk of weight gain, such as women and Hispanics, before they become obese is crucial for early intervention.

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