SKIN

RESEARCH LETTER

The Prevalence of Secondhand Smoke Exposure in Hidradenitis Suppurativa: A Cross-Sectional Survey Study

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ABSTRACT

Introduction: Hidradenitis Suppurativa (HS) is a chronic inflammatory disease of the skin highly associated with firsthand smoking. Secondhand smoke, defined as the inhalation of smoke from burning a tobacco product or smoke that is exhaled by smokers, and its relationship to HS has not been assessed. This study aims to determine the prevalence of secondhand smoke exposure in the HS population.
Methods: In this cross-sectional study (N=136), surveys were both administered in a dermatology clinic and emailed to patients with HS, verruca vulgaris (VV), and atopic dermatitis (AD). Control groups were selected based on secondhand smoke associations: AD has a known association, whereas VV does not.
Results: The survey response rate was 67.3% (N=136). We found that more than half of HS patients (58.73%) were exposed to secondhand smoke within the last 12 months, whereas 38.30% and 30.77% in the AD and VV groups were exposed, respectively (p=0.0209). However, our data did not identify a significant correlation between secondhand smoke and HS disease severity.
Conclusion: Our study is the first to assess the prevalence of secondhand smoke exposure in the HS population. Although we observed a statistically significant increased prevalence of secondhand smoke in HS patients, we could not establish how it may affect severity of disease. Our study highlights an area for further investigation evaluating the relationship between passive tobacco exposure and inflammatory skin disease.

Hidradenitis Suppurativa (HS) is a chronic inflammatory disease of the skin associated with several risk factors, including genetic susceptibility, obesity, and firsthand smoking.[1,2] Firsthand smoke is the smoke inhaled directly by the person using tobacco products, including cigarettes, cigars, pipes, hookahs, and vaping devices.[3] While firsthand smoking is highly prevalent in patients with HS[4], secondhand smoke, defined as the inhalation of smoke from burning a tobacco product or smoke that is exhaled by smokers,[5] and its relationship to HS has not been assessed. This study aims to determine the prevalence of secondhand smoke exposure among a sample of HS patients.

This is a cross-sectional study, and data collection occurred from December 1, 2021, to May 31, 2022. A survey was distributed to patients at the University of Alabama at Birmingham general and pediatric dermatology clinics who were diagnosed with

HS, atopic dermatitis (AD), or verruca vulgaris (VV) by a dermatologist and who were aged 14+. Additionally, surveys were also emailed to participants based on retrospective diagnosis. Control groups were selected based on secondhand smoke associations: AD has a known association, whereas VV does not. In terms of definitions, HS severity (mild, moderate, or severe) was self-reported by participants based on descriptions provided in the survey, and active secondhand smoke exposure was defined as the inhalation of smoke from a tobacco product exhaled by another person within the last 12 months. Statistical analyses were performed using JMP Pro 16 at α=0.05 significance level.

The survey response rate was 67.3% (N=136). Most HS patients (53.97%) reported having moderate HS defined as having 'recurrent abscesses and nodules with tracts or scarring' (**Table 1**). There was no significant difference between smoking status (i.e., never smoker, past smoker) among the three skin condition groups (p=0.1813). Additionally, 51.5% of the total sample reported one or more household members being smokers during their childhood, with no significant differences between skin condition groups (p=0.2448).

More HS patients reported experiencing active secondhand smoke exposure (defined as tobacco exposure within the last 12 months) than those with AD and VV (p=0.0209, **Table 1**). Although HS patients more likely reported secondhand smoke exposure than other groups, there was no difference in self-reported HS disease severity among those with secondhand smoke exposure and those without (p=0.2419).

Table 1. Survey data by skin condition (N=136)

In summary, our study found that a majority of HS patients (58.7%) were exposed to secondhand smoke. Compared to patients with AD and VV, HS patients had significantly higher rates of secondhand smoke exposure; however, there was no significant correlation between secondhand smoke and HS disease severity.

Research illustrates that tobacco smoke promotes proinflammatory cytokines and various inflammatory pathways in HS lesions that contribute to disease progression.[1] Based on the knowledge of how smoking tobacco affects chronic inflammatory skin diseases such as AD and HS, it is possible that significant secondhand smoke exposure can act similarly. While data on the effects of passive smoke exposure on HS is currently limited, our results identify the increased prevalence of secondhand smoke in HS.

While smoking cessation can lead to improved outcomes[4], more research is needed to evaluate whether complete smoke avoidance would be effective and reasonable for HS patients. This is an essential consideration in the pediatric population, who have little to no control over the smoke exposure they receive in the household.

This single-center study was limited by a small sample size and significant differences between groups which impacted the ability to compare and draw conclusions about secondhand smoke exposure. Additionally, several variables that may influence secondhand smoke prevalence, including race, socioeconomic factors, and age,[6] were not accounted for and may have confounded the results. According to the Centers for Disease Control and Prevention, secondhand smoke exposure is more

Characteristic	HS (n=63) N (%)	AD (n=47) N (%)	VV (n=26) N (%)	P-value
Age (years)				
Mean ± SD	36 ± 10.67	47 ± 19.67	45 ± 17.87	0.0007
Med, Min-Max	36, 15-66	48, 17-90	43, 18-84	
Sex Assigned at Birth				
Female	55 (87.30)	34 (72.34)	15 (57.69)	0.0083
Male	8 (12.70)	13 (27.66)	11 (42.31)	
Race/Ethnicity				
Black	43 (68.25)	16 (34.04)	--	<0.0001
White	17 (26.98)	27 (57.45)	23 (88.46)	
Hispanic/Latino	1 (1.59)	1 (2.13)	--	
Asian	1 (1.59)	2 (4.25)	1 (3.85)	
Biracial/Multiracial	1 (1.59)	1 (2.13)	2 (7.69)	
Self- Reported HS Severity				
Mild	6 (9.52)			
Moderate	34 (53.97)			
Severe	23 (36.51)			
Frequency of HS Flares				
≥ 3 times a month or never completely clear	22 (34.92)			
1-2 times a month	15 (23.81)			
Every couple of months	18 (28.57)			
2-3 times a year	7 (11.11)			
Once every year or every couple of years	1 (1.59)			
Smoking Status				
Never Smoker	41 (65.08)	34 (72.34)	18 (69.23)	0.1813
Past Smoker	9 (14.29)	8 (17.02)	7 (26.92)	

Current Smoker	13 (20.63)	5 (10.64)	1 (3.85)	
Childhood Secondhand Smoke Exposure				
Yes, 1 or more people in my house were smokers	34 (53.97)	25 (53.19)	11 (42.31)	0.2448
Yes, many people around me smoked (but the people in my household did not smoke	15 (23.81)	9 (19.15)	3 (11.54)	
No, I had little to no second-hand smoke exposure as a child	14 (22.22)	13 (27.66)	12 (46.15)	
Secondhand Smoke Exposure in Last 12 Months				
Yes	37 (58.73)	18 (38.30)	8 (30.77)	0.0209
No	26 (41.27)	29 (61.70)	18 (69.23)	
Frequency of Secondhand Smoke Exposure*				
A couple of times a month	14 (38.89)	10 (55.56)	4 (50.00)	--
1-2 times per week	1 (2.78)	2 (11.11)	--	
Every couple of days	3 (8.33)	2 (11.11)	1 (12.50)	
1-2 times per day	2 (5.56)	2 (11.11)	2 (25.00)	
Every couple of hours	16 (44.44)	2 (11.11)	1 (12.50)	

*Frequency of secondhand smoke exposure was only evaluated in participants who reported active secondhand smoke exposure. Thus, for HS n=36 (missing n=1), for AD n=18, and for VV n=8.
HS= hidradenitis suppurativa, AD= atopic dermatitis, VV= verruca vulgaris

common among children ages 3-11 years, non-Hispanic Black Americans, and those living below the poverty level.[6] Despite these limitations, our findings suggest that secondhand smoke exposure is more prevalent in HS patients than in those with atopic dermatitis or verruca vulgaris. While we cannot conclude if secondhand smoke is truly increased in HS patients regardless of race or other potential confounders, this raises the question if screening for secondhand smoke exposure in the HS population would have clinical value. Further research is needed to assess if an association exists between HS and secondhand smoking.

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