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## Original Research

# Evaluation of the Psychosocial Burden of Hidradenitis Suppurativa and Relevant Factors: A Prospective Single-Center Study

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### Abstract

**Objectives:** Hidradenitis suppurativa (HS) is a chronic inflammatory skin disorder in which patients with HS experience profound deterioration in their overall well-being, psychological state and quality of life. This study aimed to evaluate the psychological impact of HS and examined its associations with relevant factors, including sociodemographic and disease-related characteristics.

**Methods:** A prospective, single-center study was conducted involving 80 patients with HS. The demographic and clinical characteristics of patients were recorded. Depression Anxiety Stress Scale-21 (DASS-21), Dermatology Life Quality Index (DLQI), and General Health Questionnaire-12 (GHQ-12) were used to assess the psychosocial impact of HS.

**Results:** A significant proportion of patients with HS had severe and extremely severe scores in depression, anxiety and stress, with 48.75%, 52.5%, and 48.75% of patients, respectively. Sixty percent of the patients exhibited high psychological disorders while 53.8% experienced severe impairment in their quality of life (QoL). Sociodemographic and clinical factors were evaluated for associations with the scales used in this study. DASS-21 Anxiety (DASS-21A) was significantly positively correlated with lower education levels and higher body mass index (BMI) ( $p<0.05$ ). There were no significant correlations between the Hurley stages and the other three scales, except for the DASS-21 Stress (DASS-21S) subscale. Patients with a family history had higher DASS-21A, DASS-21 Depression (DASS-21D), DASS-21S, and GHQ-12 (both Likert and traditional scoring) scores compared to those without a family history ( $p<0.05$ ). Additionally, a positive family history significantly predicted higher scores on DASS-21A, DASS-21D, and DASS-21S ( $p=0.002$ ;  $p=0.019$ ;  $p=0.022$ , respectively).

**Conclusion:** Our findings confirm that a significant proportion of patients with HS had high or extremely high levels on all three scales assessing the psychological burden of HS. Patients were negatively affected psychologically at each Hurley stage. Family history proved to be a strong predictive factor contributing to impaired psychosocial status among individuals with HS. Thus, dermatologists should provide extra care, especially for those with family members affected by this condition.

**Keywords:** Anxiety, depression, Hidradenitis suppurativa, stress, sociodemographic

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**H**idradenitis suppurativa (HS) is a chronic and systemic inflammatory disorder characterized by painful, deep-seated, inflamed nodules, abscesses, sinus tracts, and scars. Women are more frequently affected by this condition compared to men. Environmental and behavioral factors such as smoking, obesity, sweating, and friction have been suggested to trigger or exacerbate HS on a genetic background.<sup>[1,2]</sup> Research has demonstrated that the chronic nature of the disease with unpredictable flare-ups, besides physical disability associated with intense pain, malodor, discharge, and itch can greatly impact an individual's daily life and contribute to psychosocial distress encompassing a range of emotional and social difficulties.<sup>[3-5]</sup> It is not surprising that depression, anxiety, and impaired quality of life (QoL) are commonly present among adults with HS, given the nature of the disease.<sup>[6]</sup> A recent systematic review including 58 eligible studies highlighted a strong negative impact on patients' lives based on symptoms, gender disparities, and disease severity.<sup>[7]</sup> Furthermore, cultural and regional discrepancies may be important, as reported by a recent investigation conducted in Singapore.<sup>[8]</sup>

More studies are needed on the factors that may be effective in this psychosocial impact. Our study aimed to provide further insight into how the mental health of patients with HS was affected within the Turkish population and to evaluate the influence of sociodemographic factors and disease characteristics on the psychological impact.

## Methods

### Participants and Protocol

Eighty patients aged between 18 and 85 years, admitted to our Dermatology and Venereology outpatient clinic from March 2022 to September 2023 and diagnosed with HS, agreed to participate in this prospective, single-center study. Diagnosis of HS was based on three criteria: typical lesions (deep-seated painful nodules), typical anatomical predilection (axillae, groins, perineal and perianal regions, buttocks, infra-mammary and inter-mammary folds), and chronicity and recurrence of lesions.<sup>[9]</sup> After recording sociodemographic data, the researcher asked all participants to complete study questionnaires.

Data including socio-demographic information, clinical features of HS, comorbidities, smoking, alcohol, and substance use were recorded. Hurley staging was used to assess the severity of HS, with patients categorized into three stages based on the Hurley classification.<sup>[10]</sup> Informed consent was obtained from all participants, and the study was conducted in accordance with the principles of the latest version of the Helsinki Declaration. Ethical approval for the research was received from the local ethics committee (date: 08.03.2022, decision no: 2005).

### Scales

The QoL of the patients was assessed using the Dermatology Life Quality Index (DLQI), which was developed by Finlay and Khan<sup>[11]</sup> and has been validated in Turkish.<sup>[12]</sup> DLQI scores of 10 and above were considered severe impairment in QoL.<sup>[13]</sup> Depression, anxiety, and stress levels were evaluated with the Depression Anxiety Stress Scale-21 (DASS-21), which includes three subdimensions: depression (D), anxiety (A), and stress (S). The DASS-21, which was conducted by Henry and Crawford<sup>[14]</sup> in 2005, is the short form of the 42-item scale<sup>[15]</sup> and has been validated in Turkish.<sup>[16]</sup> The General Health Questionnaire-12 (GHQ-12), which consists of 12 items and was developed by Goldberg and Hillier<sup>[17]</sup>, was used to investigate mental well-being. The validity and reliability study of the scale in Turkish was conducted.<sup>[18]</sup> Psychological disorder levels were categorized using the GHQ-12 dichotomous scoring method (0-0-1-1), referred to as traditional scoring<sup>[19]</sup>, while the Likert scoring method was used in correlation analyses.

### Statistical Analysis

SPSS Statistics 15.0 (IBM, Chicago, Illinois, USA) for Windows program was used for statistical analysis. Mann Whitney U test was performed to compare two independent groups in nonparametric values. Kruskal-Wallis test was performed to compare more than two independent groups in nonparametric values. Relationships between numerical variables were examined with Spearman Correlation Analysis if the parametric test condition was not met.  $p < 0.05$  was accepted for statistical significance. Linear regression analysis was used to investigate independent factors that impact DASS-21 scores.

## Results

Eighty patients with HS were included in this study (female,  $n=30$ ; male,  $n=50$ ). The mean age of onset of HS was  $24.35 \pm 8.95$  years, and the mean age of the diagnosis was  $31.20 \pm 10.45$  years. Fifteen percent of the patients ( $n=12$ ) had a family history, and among those with a family history, 58.3% ( $n=7$ ) had first-degree relatives. The mean body mass index (BMI) of the patients was  $29.86 \pm 6.14$ . The axillae ( $n=65$ , 81.3%) and inguinal fold ( $n=38$ , 47%) were the most frequently involved areas. Two-site involvement was the most common presentation ( $n=23$ ), and the mean of the total involved sites was  $3.06 \pm 1.73$ . Twenty percent of the patients were in Hurley stage I, 46.3% were in stage II, and 32.5% were in stage III. The sociodemographic and clinical characteristics of the patients are presented in Table 1.

The means of the scales were calculated as follows; DASS-21A:  $10.45 \pm 10.00$ , DASS-21D:  $13.73 \pm 11.19$ , DASS-21S:

**Table 1.** Sociodemographic and clinical characteristics of patients with HS

	n	%
Gender		
Female	30	37.5
Male	50	62.5
Education		
Uneducated	1	1.3
Primary school	7	8.8
Middle school	16	20.0
High school	22	27.5
Junior college and above	34	42.6
Marital status		
Single	45	56.3
Married	35	43.8
HS familial history		
Absent	68	85.0
Present	12	15.0
Family degree		
First	7	58.3
Second	4	33.3
Both first and second	1	8.3
Smoking status		
Never smoked	14	17.5
Former smoker	2	2.5
Current smoker	64	80.0
Alcohol drinking status		
Never drank	46	57.5
Former drinkers	14	17.5
Active drinkers	20	25.0
Involved area		
Axillae	65	81.3
Submammary fold	28	35.0
Gluteal	17	21.3
Inside part of thigh	26	32.5
Inguinal	38	47.5
Pubic	17	21.3
Perianal	28	35.0
Vulva/ scrotum	8	10.0
Other*	18	22.5
Total number of affected areas		
1	14	17.5
2	23	28.8
3	16	20.0
4	12	15.0
5 and above	15	18.8
Hurley stage		
1	16	20.0
2	38	47.5
3	26	32.5
HS-related disease/ syndrome		
Absent	72	90.0
Follicular occlusion triad	7	8.8
Steatocystoma multiplex	1	1.3

\*Scalp, face, neck, back, abdomen, atypical; HS: Hidradenitis suppurativa.

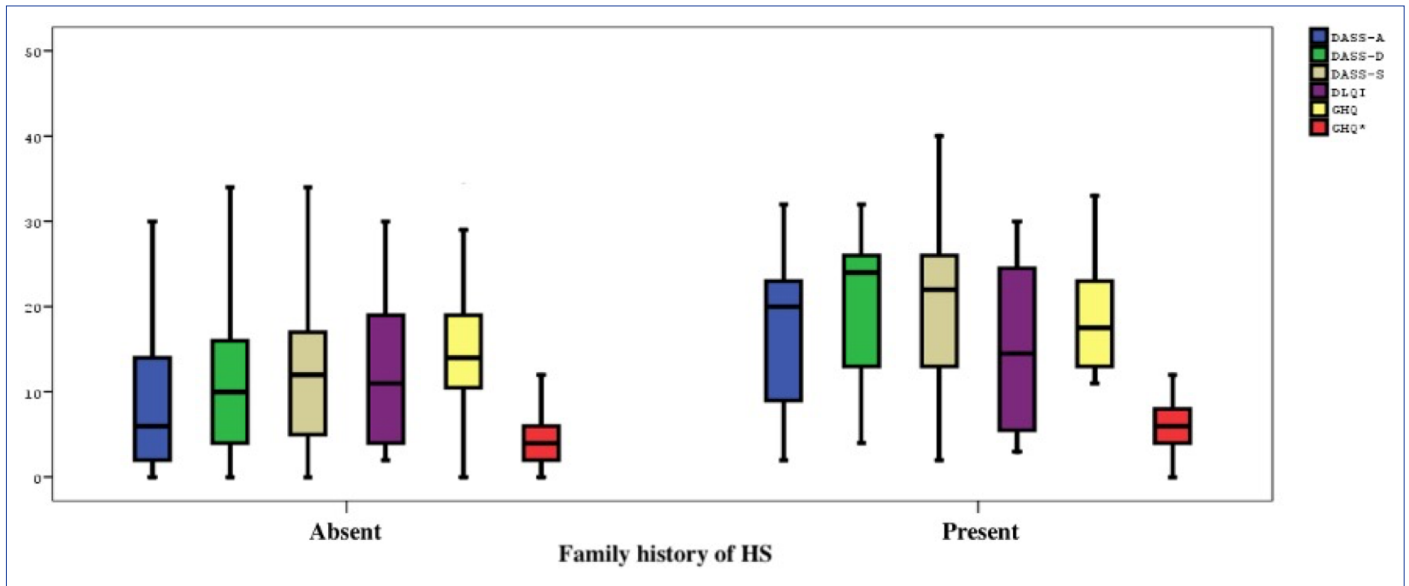
14.38±11.22, DLQI: 12.78±8.73, GHQ-12 (Likert scoring): 14.99±6.53, GHQ-12 (traditional scoring): 4.25±2.95. There were 43 patients (53.8%) with a DLQI score above 10. The percentage of patients with severe and extremely severe scores in DASS-21D, DASS-21A, and DASS-21S was 48.75%, 52.5%, and 48.75%, respectively. GHQ-12 traditional scoring was above 4 points in 60% of patients. Patients were classified according to DASS-21 subscales and GHQ-12 scale cut-off values in Table 2.

DLQI, all subscales of DASS-21, and GHQ-12 were evaluated according to gender, age, education, marital status, BMI, disease onset age and age of diagnosis, family history, involvement areas, the total number of involved areas, and Hurley staging. DASS-21A negatively correlated with education level ( $r=-0.222$ ;  $p=0.047$ ) and positively with BMI ( $r=0.260$ ;  $p=0.020$ ). There were no significant correlations between the Hurley stages and the other three scales except for the DASS-21 stress subscale. DASS-21S was only positively correlated with the Hurley stages ( $r=0.258$ ;  $p=0.021$ ). Patients with a family history had higher DASS-21A, DASS-21D, DASS-21S, and GHQ-12 (both Likert and

**Table 2.** Classification of patients according to DASS-21 and GHQ-12 cut-off values

	n	%
DASS-21D		
Normal	22	27.5
Mild	19	23.75
Severe	5	6.25
Extremely severe	34	42.5
DASS-21A		
Normal	26	32.5
Mild	5	6.25
Moderate	7	8.75
Severe	4	5
Extremely severe	38	47.5
DASS-21S		
Normal	24	30
Mild	5	6.25
Moderate	12	15
Severe	14	17.5
Extremely severe	25	31.25
GHQ-12 (traditional scoring)		
Low	16	20
Medium	16	20
High	48	60

DASS-21: Depression Anxiety Stress Scale-21; DASS-21A: Depression Anxiety Stress Scale-21 Anxiety subscale; DASS-21D: Depression Anxiety Stress Scale-21 Depression subscale; DASS-21S: Depression Anxiety Stress Scale-21 Stress subscale; GHQ-12: General Health Questionnaire-12.



**Figure 1.** Patients with a family history of HS had higher DASS-21 total, DASS-21A, DASS-21D, DASS-21S, and GHQ-12 (both Likert and traditional scoring) scores than those without.

DASS-21A: Depression Anxiety Stress Scale-21 Anxiety subscale; DASS-21D: Depression Anxiety Stress Scale-21 Depression subscale; DASS-21S: Depression Anxiety Stress Scale-21 Stress subscale; GHQ-12: General Health Questionnaire-12 (Likert scoring); GHQ-12\*: General Health Questionnaire-12 (traditional scoring); DLQI: Dermatology Life Quality Index.

traditional scoring) scores than those without ( $p=0.004$ ;  $p=0.007$ ;  $p=0.017$ ;  $p=0.025$ ;  $p=0.043$ , respectively) (Fig. 1). There was no statistically significant difference in the DLQI mean scores between patients with and without a family history of HS ( $p>0.05$ ). No statistically significant correlation was found between scales and other parameters, including gender, age, marital status, age at onset and age at diagnosis, areas of involvement, and total number of involved areas ( $p>0.05$ ). Significant correlation analyses between the variables and the scales are presented in Table 3. Sociodemographic and clinical predictive factors potentially leading to high DASS-21 subscale scores were analyzed. Linear regression analysis revealed that positive family history is the most significant predictive variable affecting DASS-21A, DASS-21D, and DASS-21S scores ( $p=0.002$ ;  $p=0.019$ ;  $p=0.022$ ).

**Discussion**

Our findings indicated that nearly half of the patients with HS in our study experienced significant psychological impairment. The important result of this study was that patients with a family history of HS showed higher psychological impairment in all subscales of the DASS-21 and GHQ-12. More importantly, a family history of HS was found to be an important predictor of psychological impact among patients with HS.

Our study stood out from others because we evaluated the stress with depression and anxiety in patients with an alternative measurement tool, the DASS-21 scale. The percentages of our patients with severe and extremely severe scores for depression, anxiety, and stress were 48.75%, 52.5%, and 48.75%, respectively. Depression and anxiety in patients with HS have been evaluated with meta-analyses

**Table 3.** Significant correlation analyses between variables and scales

	DASS-A		DASS-D		DASS-S		DLQI		GHQ	
	r	p	r	p	r	p	r	p	r	p
Education	-0.222	0.047	-0.098	0.385	-0.143	0.205	-0.107	0.346	-0.008	0.945
BMI	0.260	0.020	0.075	0.508	0.191	0.090	-0.010	0.933	0.199	0.077
Hurley staging	0.203	0.071	0.160	0.157	0.258	0.021	0.090	0.430	0.169	0.133

DASS-21A: Depression Anxiety Stress Scale-21 Anxiety subscale; DASS-21D: Depression Anxiety Stress Scale-21 Depression subscale; DASS-21S: Depression Anxiety Stress Scale-21 Stress subscale; GHQ-12: General Health Questionnaire-12; DLQI: Dermatology Life Quality Index; BMI: Body Mass Index.

in the literature.<sup>[6,20,21]</sup> Our findings were consistent with the literature about depression and anxiety in HS.<sup>[6,20]</sup> In a meta-analysis including 27 articles, it was reported that approximately 1 in 4 adults with HS have depression, and 1 in 5 have anxiety.<sup>[21]</sup> In our study, these data were found to show a relatively high prevalence in the Turkish population. Herein, sociocultural influences are likely to play a role. The stress factor in patients with HS has not been examined much with a stress-specific questionnaire. In a study that assessed stress in four inflammatory skin diseases (psoriasis, atopic dermatitis, adult acne, and HS) based on a perceived stress scale, it was found that 52.9% of patients with HS had high perceived stress scores.<sup>[22]</sup> Similarly, in our study, approximately half of the patients have high emotional stress levels.

More than half of our patients had a DLQI score above 10, indicating that the disease had a very large and extremely large effect on the patient's dermatologic QoL. Many studies, including a meta-analysis<sup>[23]</sup>, have reported impaired QoL in patients with HS, consistent with our findings<sup>[5,24,25]</sup> Moreover, some studies in the literature reported that the impact of HS on QoL is significantly higher than other skin conditions, such as psoriasis and eczema.<sup>[26,27]</sup>

The findings of this study showed that 60% of the patients had high scores of GHQ-12, in other words, most of the patients had minor nonpsychotic psychiatric disorders. In a previous study conducted on alexithymia and psychological disorders in 90 patients with HS, they found high psychological disorders, which affected 46.1% of the patients.<sup>[28]</sup> The lower level of psychological disorders may be due to the rate of Hurley stage III patients comprising only 9% of the sample, which was 32.5% in our study.

Our findings revealed that gender, age, age at onset, and age at diagnosis were not significantly associated with psychological impact, including QoL, depression, anxiety, stress, and psychological disorder. In the literature, there are variable outcomes of factors related to depression, anxiety, and QoL. Wright et al.<sup>[29]</sup> reported that factors associated with depression included female sex and BMI/obesity in adults. In contrast, Jørgensen et al.<sup>[30]</sup> found that female sex and obesity were not statistically significantly correlated with depression, which was consistent with our findings. Since men were more dominant than women in our patient sample, there might not be a correlation between female gender and psychological impact. Contrary to our findings, one study found that younger age was associated with impaired QoL<sup>[31]</sup>, while another identified younger age as a risk factor for depression.<sup>[30]</sup>

Unlike some studies in the literature, our study did not find a significant correlation between psychosocial impact and

involvement areas and the total number of involved areas. Jørgensen et al.<sup>[31]</sup> found that high overall DLQI scores were associated with the number of anatomical sites involved, axillary, groin, and gluteal localization. Additionally, Ooi et al.<sup>[8]</sup> found that inguinal and gluteal involvement was correlated with anxiety/depression as well as inguinal, gluteal, and suprapubic involvements, which were also associated with poorer QoL.

Based on our analysis, the level of anxiety statistically correlated negatively with education levels. This result could be explained by the fact that patients with higher education levels who were informed about the nature of HS tended to have lower anxiety. Whereas lacking knowledge or fear of the unknown might lead to anxiety. Thus, raising awareness about the disease among patients might also reduce their anxiety levels. Additionally, in our study, BMI/obesity was found to be associated positively with anxiety levels. Despite our findings, Cohn et al.<sup>[32]</sup> investigated risk factors for anxiety in patients with HS and found only depression, female gender, and young age as risk factors.

Ooi et al.<sup>[8]</sup> reported that higher disease severity, based on Hurley staging, physician global assessment, and International HS Severity Score, correlated with poorer QoL and higher Hospital Anxiety and Depression Scale scores. Additionally, associations between higher disease severity and decreased QoL were found in other studies.<sup>[8,31,33]</sup> In our study, Hurley stages of patients were not found to be associated with QoL impairment as well as depression and anxiety levels. A study investigating depression in patients with HS, similar to ours, reported that the severity of HS and depression did not appear to be related. It was concluded that even objectively 'mild' HS constituted a severe condition.<sup>[34]</sup> Our results may also suggest that negative psychological effects and impairment in QoL might occur in Turkish patients with HS even in the early Hurley stage and that HS also had a great burden on Turkish patients. In this study, only the stress subscale of DASS-21 showed a positive correlation with Hurley staging. This might be the result of the increased noticeability of the disease, treatment failure, and dissatisfaction.

As a new outcome, patients with a family history of HS had higher levels of depression, anxiety, stress, and psychological disorder than those without in our study. Furthermore, a positive family history was a significant predictor factor for depression, anxiety, and stress. We inferred that patients' awareness of the psychological, physical, and social effects of the disease within their families increased their levels of psychological impact. Witnessing the illness's impact on loved ones could lead to height-

ened levels of stress, guilt, and concerns about burdening family members. In addition, as a positive family history had a higher risk of early onset HS, a longer duration of the disease might increase psychosocial impact.<sup>[35]</sup> However, unlike our result, Schneider-Burrus et al.<sup>[36]</sup> found no association between QoL impairment and positive family history in patients with HS.

Our study had several potential limitations. First of all, we did not include a control group and did not exclude the presence or absence of comorbidities. Another limitation was the generalizability of the results to the entire population since the study was conducted in a single tertiary care hospital and the small number of study samples. Our study's single-center design and relatively small sample size might have influenced the results. Multicenter studies with larger patient populations investigating the psychosocial effects in patients with HS could reveal new findings and guide future clinical practice.

## Conclusion

In conclusion, there is limited data in the literature assessing stress levels and general mental health/psychological disorders in patients with HS. Our results provide valuable insights into the psychosocial burden of HS in patients. Approximately half of the patients with HS exhibited severe or extremely severe scores on all the scales included in our study. Patients experienced negative psychosocial effects at each Hurley stage, emphasizing the importance of addressing psychosocial aspects throughout HS management. Low education level and high BMI were significantly associated with higher anxiety levels. Additionally, a family history of HS was found to be a predictive factor for the level of psychosocial impairment, and we recommend that physicians give extra attention to these patients.

## Disclosures

**Ethics Committee Approval:** The study was approved by the Sisli Hamidiye Etfal Training and Research Hospital Clinical Research Ethics Committee (date: 08.03.2022, no: 2005).

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

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**Authorship Contributions:** Concept – I.K.A., B.O.K., A.A., C.A.T., S.I.A.; Design – I.K.A., B.O.K., A.A., C.A.T., S.I.A.; Supervision– I.K.A., B.O.K., A.A., C.A.T., S.I.A.; Fundings –C.A.T., S.I.A.; Materials – C.A.T., B.O.K.; Data Collection and/or Processing – C.A.T., B.O.K., I.K.A.; Analysis and/or Interpretation – C.A.T., B.O.K., I.K.A.; Literature Review – C.A.T., B.O.K., I.K.A.; Writing – C.A.T., B.O.K., I.K.A.; Critical Review –B.O.K., I.K.A.

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