

## Correlation of Psychosomatic Factors and Personality Traits with The Severity of Hidradenitis Suppurativa

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**ABSTRACT** **Introduction:** Hidradenitis suppurativa is a disease with a decisive burden on sufferers, both physical and psychological. It was expected that the more intense the severity of symptoms the patients experienced, the greater the correlation with the psychosomatic manifestations would be.

**Objectives:** The present study aimed to explore the correlation between hidradenitis suppurativa and the psychosomatic burden, the personality, and the demographic characteristics of the participants.

**Methods:** The participants were 90 outpatients of the hospital, aged 18 to 65, who had been diagnosed with hidradenitis and were sufficiently proficient in Greek. The psychometric instruments administered were the Symptom Checklist-90 (SCL90), the Beck Depression Inventory (BDI), the Eysenck Personality Questionnaire (EPQ), the short-form McGill Pain Questionnaire (SF-MPQ), the Hurley and refined Hurley classifications, the International Hidradenitis Suppurativa Severity Scoring System (IHS4), and a short demographic questionnaire. All statistical analyses were performed using the SPSS-28 statistical package.

**Results:** According to statistical analyses, there was no statistically significant relationship between disease severity, psychosomatic burden, and personality. However, there were statistically significant associations with demographic factors, such as being female or not being in a relationship, the patient's

body mass index, the locus of the skin lesion, a history of hospitalization, comorbidities, psychiatric history, and pain with psychopathological manifestations and personality.

**Conclusions:** It is important that further research be conducted that will include more mental disorders besides anxiety and depression while at the same time excluding confounding factors for safer interpretation of the results.

## Introduction

The human body as a whole is covered by the skin, thus making it the most visible organ of the body. Therefore, any problem that appears on the skin can potentially affect the mental health of the person [1]. One of the diseases that cause intense skin changes and that have been linked to a multitude of mental disorders is hidradenitis suppurativa (HS) [2]. Undoubtedly, based on the international literature, the most frequently studied aspect of diffuse hidradenitis is the positive correlation between anxiety and depression in patients [3]. Patients with HS present high rates of psychopathology which are related to the nature of the disease (the intense pain and the foul-smelling secretions that make the person's daily life difficult), as a result of which they refrain from their activities and are gradually led to isolation, which by definition is a risk factor for depression [4,5]. Psychosocial vulnerability in HS patients is related to the psychological disability and financial burden it creates, in addition to physical problems [6], and HS patients also display a significantly inferior quality of life as well as worse anxiety and depression symptomatology when compared to patients with alopecia, mild-to-moderate psoriasis, and various other dermatological diseases [7-9]. Apart from the brain-skin connection, in the literature there are reports of common behavioral habits (e.g., smoking) among those suffering from HS and mental disorders [10-12]. Another common behavior of HS and mental illness sufferers is substance abuse and alcohol consumption. Patients with HS commonly use cannabis, opioids, and alcohol in order to reduce the anxiety or the pain they experience as a result of the disease [13]. In the literature, there is a connection between dermatological diseases and obsessive-compulsive disorder [14]. A possible explanation given by the researchers is that people who suffer from obsessive-compulsive disorder, compared to the general population, visit health professionals more often, as a result of which they receive more diagnoses in all diseases, therefore also in dermatological ones [15,16]. Another important element that burdens the psychology of patients with HS is pain [17,18]. Chronic pain usually occurs in people with an advanced stage of the disease, and the sensation is described as pulsating, creating heightened sensitivity [19,20].

## Objectives

In the present study, the correlation between the severity of hidradenitis suppurativa and psychosomatic burden with personality and pain was investigated. Whether demographic factors correlate with psychopathological manifestations and personality traits was also examined.

## Methods

The sample of the study included outpatients of the Andreas Syggros Hospital who had received a diagnosis of hidradenitis suppurativa (HS). More specifically, 90 patients with HS participated; the majority were males (N=48), making up 53.3% of the total, compared to females (N=42), who formed the remaining 46.7%. In terms of the age distribution, the participants ranged in age from 18 to 65 years old. The range of age at disease onset was from two to 43, with a mean value of 12.6 years, and in 77.7% of participants (N=70), there was a large discrepancy between the date of onset of the disease and the date of diagnosis. In fact, 71.1% (N=64) had visited several medical specialties, such as general surgeons, plastic surgeons, gynecologists, and dermatologists, before they received the correct diagnosis. Additionally, regarding the site part of the physical damage, the majority had genital damage (N=72) at a percentage of 80.0%, while 43.3% (v=39) had damages in the anus or buttocks (N=39), 13.5% in inframammary fold, and only 5.6% (N=5) showing the disease on the face; 100% of the sample had at least two foci of infection from the disease. When the assessment was performed, 48.8% (N=44) scored Hurley II on the severity scale, 31.1% (N=28) had Hurley III, and 20% (N=18) had Hurley I. Regarding co-morbidity, only 40.0% (N=36) had accompanying diseases simultaneously to hidradenitis. Also, a minority of the patients had a psychiatric history at a rate of 26.7% (N=24), of which the most frequently occurring mental disorders were depression (N=16) and symptoms of anxiety (N=5).

## Research Process

The questionnaires were completed anonymously. The participants were informed about the purposes of the study and

their participation was voluntary, while at the same time anonymity and confidentiality were respected. The entire process was entirely governed by the principles of the Code of Ethics & Conduct.

### Means of Data Collection

**Brief Demographic Information Questionnaire:** Information was requested regarding age, sex, weight, smoking, employment, education level, marital status, number of children, place of birth origin, place of residence, co-morbidity with other diseases, date of disease onset, date of diagnosis, the medical specialties visited, the part of the body where there was a skin lesion, the treatment they had received for hidradenitis, the existence of hospitalization for the disease, the Hurley, refined Hurley, and International Hidradenitis Suppurativa Severity Scoring System (IHS4) scores, the existence of psychiatric history, diagnosis, taking medication, and whether they were undergoing psychotherapy.

The Symptom Checklist-90 (SCL-90) [21] is a self-completed questionnaire that measures nine psychopathology parameters (as many as its subscales): (1) somatization; (2) depression; (3) anxiety; (4) phobic anxiety; (5) obsessive compulsive; (6) paranoid ideation; (7) psychoticism; (8) hostility; (9) interpersonal sensitivity. The questionnaire includes a total of 90 questions [22].

The Beck Depression Inventory (BDI) is a 21-question multiple-choice self-assessment report inventory, one of the most widely used instruments for measuring the severity of depression. Its development marked a shift among health-care professionals, who had until then viewed depression

from a psychodynamic perspective, instead of it being rooted in the patient's own thoughts [23].

The Eysenck Personality Questionnaire (EPQ) [24] is a psychometric personality scale that consists of 84 items evaluated by the patient with a *yes* or *no* answer. The purpose of this questionnaire is to explore four dimensions of personality: psychoticism (P), neuroticism (N) extraversion (E), and lying (L) [25].

The main component of the short-form McGill Pain Questionnaire (SF-MPQ) consists of 15 descriptors (11 sensory; four 4 affective) which are rated on an intensity scale as 0 = none, 1 = mild, 2 = moderate, or 3 = severe. Three pain scores are derived from the sum of the intensity rank values of the words chosen for sensory, affective, and total descriptors [26].

In order to calculate the severity of (HS), dermatologists evaluate patients with three scales: Hurley, refined Hurley, and IHS4. The Hurley scale consists of three subtypes (I, II, and III) [27]. Finally, the IHS4 is a validated tool for the dynamic assessment of HS severity, correlates with the Hurley classification, and can be used both in real life and in a clinical trial setting [28].

### Statistical Analysis

The descriptive characteristics and Cronbach's alpha measure of the psychometric tools are presented in Table 1, where most of the scales have excellent or good reliability level, whereas only the scale of psychoticism and lying lie of the personality questionnaire have acceptable or questionable levels.

**Table 1. Descriptive Characteristics and Reliability Coefficients for BDI, SCL90, and EPQ.**

Psychometric scales		Mean	SD	Minimum	Maximum	Cronbach's Alpha
BDI		13.10	10.99	0	46	0.93
SCL90	Somatization	0.76	0.98	0	4	0.95
	Obsessive-compulsive	0.00	0.00	0	0	0.97
	Interpersonal sensitivity	0.00	0.00	0	0	0.95
	Depression	15.48	11.15	0	42	0.97
	Anxiety	8.77	7.59	0	29	0.95
	Hostility	5.53	4.89	0	23	0.85
	Phobic anxiety	3.39	5.08	0	20	0.97
	Paranoid ideation	4.83	4.71	0	20	0.90
	Psychoticism	5.18	5.98	0	24	0.85
EPQ	Psychoticism	4.62	2.40	1	12	0.70
	Neuroticism	12.12	5.72	1	22	0.81
	Extraversion	12.52	4.60	1	19	0.81
	Lying Lie	9.44	4.02	1	18	0.65

Abbreviations: Mean: mean value, SD: standard deviation, Min: minimum, Max: maximum, BDI: Beck Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL-90: Symptom Checklist

**Table 2. Mean, Standard Deviation of the Psychometric Scales by Patient Sex.**

Psychometric scales		Sex				U-value	P
		Male		Female			
		Mean	SD	Mean	SD		
BDI	BDI	10.42	9.11	16.17	12.20	720.00	0.020
SCL90	Somatization	6.33	7.98	12.40	10.04	626.50	0.002
	Obsessive-compulsive	8.31	6.54	12.38	9.26	761.50	0.046
	Interpersonal sensitivity	5.42	4.54	9.81	8.59	715.50	0.018
	Depression	11.23	8.33	17.55	12.59	743.50	0.032
	Anxiety	5.25	4.76	9.98	8.99	754.50	0.040
	Hostility	4.35	4.48	5.02	5.39	968.50	0.747
	Phobic anxiety	1.29	2.20	4.60	6.17	650.00	0.002
	Paranoid ideation	3.69	3.26	5.81	5.88	873.50	0.273
EPQ	Psychoticism	3.65	4.57	6.62	6.92	782.50	0.066
	Psychoticism	4.52	2.25	4.74	2.59	989.50	0.880
	Neuroticism	11.25	5.93	13.12	5.37	845.00	0.186
	Extraversion Introversion	13.13	4.52	11.83	4.65	844.00	0.183
	Lying Lie	8.92	3.74	10.05	4.29	847.50	0.192

Abbreviations: Mean: mean value, SD: standard deviation, BDI: Beck Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist-90.

Comparing the psychometric scales with the sex of the patients, it turns out that females diagnosed with hidradenitis had on average a higher score than did males in a multitude of variables. More specifically, females scored on average statistically significantly higher than males in BDI (mean: 16.17, SD: 12.20 vs. mean: 10.42, SD: 9.11,  $P = 0.020$ ), in somatization (mean: 12.40, SD: 10.04 vs. mean: 6.33, SD: 7.98,  $P = 0.002$ ), in obsessive-compulsive (mean: 12.38, SD: 9.26 vs. mean: 8.31, SD: 6.54,  $P = 0.046$ ), in the interpersonal sensitivity (mean: 9.81, SD: 8.59 vs. mean: 5.42, SD: 4.54,  $P = 0.018$ ), in depression (mean: 17.55, SD: 12.59 vs. mean: 11.23, SD: 8.33,  $P = 0.032$ ), in anxiety (mean: 9.98, SD: 8.99 vs. mean: 5.25, SD: 4.76,  $P = 0.040$ ), and in phobic anxiety (mean: 4.60, SD: 6.17 vs. mean: 1.29, SD: 2.20,  $P = 0.002$ ). The results are given in Table 2.

Moreover, it was examined whether family structure correlated with psychopathological symptoms and personality. Patients who were without a partner (either single, divorced, or widowed) had on average a statistically significantly higher score on the anxiety scale compared to the patients who were married or under cohabitation agreement (mean: 8.00, SD: 7.02 vs. mean: 6.37, SD: 7.83,  $P = 0.046$ , Table 3).

According to Table 4, patients who were overweight or obese compared to patients with a normal weight had

higher scores on the scales of interpersonal sensitivity (mean: 8.29, SD: 8.06 and mean: 8.91, SD: 7.26 vs. mean: 4.48, SD: 4.18,  $P = 0.031$ ) and of paranoid ideation (mean: 5.39, SD: 4.39 and mean: 5.79, SD: 5.90 vs. mean: 2.28, SD: 1.95,  $P = 0.024$ ).

Patients who had lesions in the armpit had statistically significantly more extroversion symptoms compared to patients who did not have physical lesions in the armpit (mean: 13.79, SD: 4.64 vs. mean: 11.42, SD: 4.32,  $P = 0.008$ , Table 5). On the other hand, patients who had damage to the anus or buttocks had on average a statistically significantly lower score on the extraversion scale than patients who did not have damage on anus or buttocks (mean: 11.15, SD: 4.75 vs. mean: 13.57, SD: 4.24,  $P = 0.017$ , Table 6).

Hospitalized patients had a statistically significantly lower score on the BDI depression scale (mean: 6.09, SD: 7.16 vs. mean: 14.08, SD: 11.10,  $P = 0.011$ ), of somatization (mean: 4.09, SD: 5.26 vs. mean: 9.87, SD: 9.71,  $P = 0.031$ ), of interpersonal sensitivity (mean: 3.41 vs. mean: 7.99, SD: 7.28,  $P = 0.045$ ), SCL90 depression (mean: 8.27, SD: 7.48 vs. mean: 15.00, SD: 11.13,  $P = 0.041$ ), and neuroticism (mean: 8.36, SD: 5.78 vs. mean: 12.65, SD: 5.55,  $P = 0.020$ ), and higher scores on the extroversion

**Table 3. Mean, Standard Deviation of the Psychometric Scales by the Patients' Family Status.**

Psychometric scales		Family status				U-value	P
		Not married/Divorced/ Widowed		Married/Cohabitation agreement			
		Mean	SD	Mean	SD		
BDI		13.70	11.77	12.19	9.79	946.00	0.830
SCL90	Somatization	7.70	7.65	9.60	10.57	722.00	0.758
	Obsessive compulsive	10.00	7.68	9.89	8.11	723.00	0.767
	Interpersonal sensitivity	7.70	6.97	6.80	6.91	651.00	0.306
	Depression	13.35	9.32	13.91	11.43	722.00	0.759
	Anxiety	8.00	7.02	6.37	7.83	554.50	0.046
	Hostility	4.42	3.64	5.06	6.36	687.50	0.510
	Phobic anxiety	3.40	4.95	2.37	4.91	583.50	0.074
	Paranoid ideation	4.26	4.35	4.77	4.89	721.00	0.750
	Psychoticism	4.84	5.39	4.74	5.91	691.00	0.533
EPQ	Psychoticism	4.78	2.60	4.39	2.09	927.00	0.708
	Neuroticism	12.15	6.07	12.08	5.24	966.00	0.961
	Extraversion Introversion	12.56	4.99	12.47	4.01	934.00	0.754
	Lying Lie	9.35	4.37	9.58	3.50	924.50	0.694

Abbreviations: Mean: mean value, SD: standard deviation, BDI: Beck Depression Inventory ; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist-90.

**Table 4. Mean, Standard Deviation of the Psychometric Scales by Patients' Body Mass Index.**

Psychometric scales		Body Mass Index						Kruskal-Wallis H	P
		Normal		Overweight		Obese			
		Mean	SD	Mean	SD	Mean	SD		
BDI		8.92	7.91	15.39	12.97	14.09	10.39	4.59	0.101
SCL90	Somatization	6.08	6.42	10.58	10.44	10.15	10.10	2.98	0.226
	Obsessive compulsive	6.92	4.75	10.81	9.57	12.09	8.17	5.25	0.073
	Interpersonal sensitivity	4.48	4.18	8.29	8.06	8.91	7.26	6.97	0.031
	Depression	10.00	7.23	15.42	11.89	16.12	11.74	4.20	0.123
	Anxiety	5.12	4.64	7.61	7.86	9.03	8.34	2.55	0.279
	Hostility	3.12	3.37	4.00	3.55	6.41	6.31	4.46	0.108
	Phobic anxiety	1.88	3.79	3.13	5.40	3.26	4.86	2.32	0.313
	Paranoid ideation	2.28	1.95	5.39	4.39	5.79	5.90	7.49	0.024
	Psychoticism	2.64	3.49	6.06	7.03	5.85	5.96	4.99	0.083
EPQ	Psychoticism	4.76	2.92	4.52	2.50	4.62	1.91	0.25	0.882
	Neuroticism	10.36	4.66	13.03	6.00	12.59	6.03	4.41	0.110
	Extraversion	13.48	3.03	12.55	5.21	11.79	4.95	1.38	0.501
	Lying Lie	9.80	3.67	8.81	3.68	9.76	4.57	1.20	0.550

Mean: mean value, SD: standard deviation, BDI: Beck Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist.

**Table 5. Means Standard Deviation of the Psychometric Scales by Damage in Axilla.**

Psychometric scales		Axilla				U-value	P
		No		Yes			
		Mean	SD	Mean	SD		
BDI		13.38	10.97	12.79	11.13	953.50	0.659
SCL90	Somatization	9.19	10.00	9.14	8.92	968.00	0.746
	Obsessive-compulsive	9.94	8.51	10.52	7.79	933.50	0.546
	Interpersonal sensitivity	7.44	7.72	7.50	6.29	912.50	0.438
	Depression	14.88	11.19	13.38	10.73	950.00	0.639
	Anxiety	7.33	7.95	7.60	6.83	905.50	0.406
	Hostility	4.19	5.02	5.21	4.78	824.00	0.133
	Phobic anxiety	3.19	5.58	2.43	3.69	965.50	0.717
	Paranoid ideation	4.44	4.88	4.95	4.67	886.50	0.322
EPQ	Psychoticism	4.94	6.34	5.14	5.53	915.00	0.448
	Psychoticism	4.23	2.38	5.07	2.37	779.00	0.061
	Neuroticism	12.67	5.31	11.50	6.17	915.00	0.451
	Extraversion	11.42	4.32	13.79	4.64	683.00	0.008
	Lying Lie	9.79	3.72	9.05	4.36	904.00	0.398

Abbreviations: Mean: mean value, SD: standard deviation, BDI: Beck Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist-90 Psychopathology Questionnaire.

**Table 6. Means Standard Deviation of the Psychometric Scales by Damage in Anus or Buttocks.**

Psychometric scales		Anus / buttocks				U-value	P
		No		Yes			
		Mean	SD	Mean	SD		
BDI		11.98	10.00	14.56	12.14	883.50	0.365
SCL90	Somatization						
	Obsessive-compulsive	9.45	8.50	8.79	10.68	872.00	0.317
	Interpersonal sensitivity	9.90	6.77	10.62	9.73	961.50	0.788
	Depression	6.76	6.18	8.38	8.04	906.00	0.470
	Anxiety	13.31	10.29	15.31	11.77	906.00	0.471
	Hostility	7.71	6.85	7.13	8.16	878.00	0.341
	Phobic anxiety	4.69	4.62	4.64	5.32	939.00	0.648
	Paranoid ideation	2.76	4.11	2.92	5.59	909.00	0.463
EPQ	Psychoticism	4.18	4.13	5.33	5.47	899.00	0.434
	Psychoticism	4.67	2.16	4.56	2.71	936.50	0.633
	Neuroticism	11.41	5.84	13.05	5.50	828.50	0.176
	Extraversion	13.57	4.24	11.15	4.75	703.00	0.017
	Lying Lie	9.63	4.15	9.21	3.89	924.00	0.564

Abbreviations: Mean: mean value, SD: standard deviation, BDI: Beck's Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist-90 Psychopathology Questionnaire.

scale (mean: 16.27, SD: 1.85 vs. mean: 12.00, SD: 4.63,  $P = 0.002$ , Table 7).

Patients who had comorbidities had on average statistically significantly higher scores on the obsessive-compulsive

scale (mean: 12.58, SD: 8.75 vs. mean: 8.63, SD: 7.37,  $P = 0.018$ ), of paranoid ideation (mean: 6.22, SD: 5.66 vs. mean: 3.65, SD: 3.77,  $P = 0.037$ ), and psychoticism (mean: 6.53, SD: 6.46 vs. mean: 4.04, SD: 5.41,  $P = 0.020$ , Table 8).

**Table 7. Means, Standard Deviation of the Psychometric Scales by Patient Hospitalization.**

Psychometric scales		Hospitalization for hidradenitis				U-value	P
		No		Yes			
		Mean	SD	Mean	SD		
BDI		14.08	11.10	6.09	7.16	229.00	0.011
SCL90	Somatization	9.87	9.71	4.09	5.26	260.00	0.031
	Obsessive compulsive	10.72	8.27	6.55	6.27	299.00	0.095
	Interpersonal sensitivity	7.99	7.28	3.73	3.41	274.50	0.048
	Depression	15.00	11.13	8.27	7.48	269.00	0.041
	Anxiety	7.87	7.73	4.45	3.39	353.00	0.314
	Hostility	4.78	5.06	3.82	3.74	393.50	0.610
	Phobic anxiety	3.13	5.02	0.73	1.19	309.00	0.103
	Paranoid ideation	5.01	4.92	2.27	2.33	290.50	0.074
	Psychoticism	5.38	6.11	2.55	3.96	285.00	0.063
EPQ	Psychoticism	4.61	2.46	4.73	2.05	402.50	0.690
	Neuroticism	12.65	5.55	8.36	5.78	246.00	0.020
	Extraversion	12.00	4.63	16.27	1.85	186.50	0.002
	Lying Lie	9.23	3.90	11.00	4.71	330.00	0.196

Abbreviations: Mean: mean value, SD: standard deviation, BDI: Beck Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist-90.

**Table 8. Means, Standard Deviation of the psychometric scales by the existence of comorbidities.**

Psychometric scales		Comorbidities				U-Value	P
		No		Yes			
		Mean	SD	Mean	SD		
BDI		11.69	9.80	15.22	12.41	807.00	0.173
SCL90	Somatization	7.89	8.86	11.08	10.10	780.50	0.114
	Obsessive compulsive	8.63	7.37	12.58	8.75	686.50	0.018
	Interpersonal sensitivity	6.33	5.97	9.17	8.22	759.50	0.079
	Depression	12.76	10.44	16.31	11.47	788.50	0.130
	Anxiety	6.83	7.09	8.39	7.87	821.50	0.214
	Hostility	3.96	4.00	5.72	5.92	821.00	0.209
	Phobic anxiety	2.44	3.96	3.42	5.81	928.00	0.703
	Paranoid ideation	3.65	3.77	6.22	5.66	720.00	0.037
	Psychoticism	4.04	5.41	6.53	6.46	691.50	0.020
EPQ	Psychoticism	4.37	2.40	5.00	2.39	815.00	0.191
	Neuroticism	11.87	5.65	12.50	5.89	905.50	0.583
	Extraversion	12.43	4.58	12.67	4.69	942.00	0.804
	Lying Lie	9.76	3.78	8.97	4.37	873.00	0.413

Abbreviations: Mean: mean value, SD: standard deviation, BDI: Beck Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist-90.

The existence of a psychiatric history in patients suffering from hidradenitis affected most psychiatric scales. Patients with a psychiatric history had statistically significantly higher scores on the BDI scale compared to those without a psychiatric history (mean: 22.96, SD: 13.24 vs. mean: 9.52, SD: 7.37,  $P < 0.001$ ) and in all SCL90 psychopathology

scales. Regarding the personality scales, patients with a psychiatric history scored statistically significantly higher on the scale of psychoticism (mean: 5.75, SD: 2.47 vs. mean: 4.21, SD: 2.26,  $P = 0.007$ ) and neuroticism (mean: 15.58, SD: 5.67 vs. mean: 10.86, SD: 5.23,  $P < 0.001$ ), while scoring statistically significantly lower on the extraversion

**Table 9. Means, Standard Deviation of the Psychometric Scales by the Psychiatric History.**

Psychometric scales		Psychiatric history				U-Value	P
		No		Yes			
		Mean	SD	Mean	SD		
BDI		9.52	7.37	22.96	13.24	318.00	<0.001
SCL90	Somatization	6.68	6.98	16.00	11.90	413.50	0.001
	Obsessive compulsive	7.82	5.77	16.79	10.03	368.50	<0.001
	Interpersonal sensitivity	5.20	4.27	13.71	9.24	347.00	<0.001
	Depression	10.86	7.85	23.29	13.07	364.00	<0.001
	Anxiety	4.92	4.54	14.42	9.23	335.50	<0.001
	Hostility	3.68	3.80	7.38	6.47	522.50	0.013
	Phobic anxiety	1.18	1.75	7.38	7.09	357.00	<0.001
	Paranoid ideation	3.29	3.60	8.50	5.51	357.00	<0.001
	Psychoticism	3.17	3.47	10.17	8.08	357.00	<0.001
EPQ	Psychoticism	4.21	2.26	5.75	2.47	500.00	0.007
	Neuroticism	10.86	5.23	15.58	5.67	407.00	<0.001
	Extraversion	13.23	4.09	10.58	5.41	554.00	0.029
	Lying Lie	9.58	3.65	9.08	4.99	723.50	0.530

Abbreviations: Mean: mean value, SD: standard deviation, BDI: Beck Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist-90 Psychopathology Questionnaire.

scale (mean: 10.58, SD: 5.41 vs. mean: 13.23, SD: 4.09,  $P = 0.029$ , Table 9).

The correlation between patients' psychometric scales and their age, the age at onset of the disease, the duration of the disease, and the pain scale are presented in Table 10. The pain scale seemed to influence the scores of the patients on the psychometric scales, since the BDI scale of depression is statistically significantly related with a positive correlation coefficient with the pain scale ( $r=0.65$ ,  $P < 0.001$ ). The pain scale is statistically significantly related to the scales of somatization ( $r=0.32$ ,  $P = 0.002$ ), obsessive compulsive ( $r=0.26$ ,  $P = 0.014$ ), interpersonal sensitivity ( $r=0.43$ ,  $P < 0.001$ ), depression ( $r=0.50$ ,  $P < 0.001$ ), anxiety ( $r=0.31$ ,  $P = 0.003$ ), phobic anxiety ( $r=0.32$ ,  $P = 0.002$ ), paranoid ideation ( $r=0.35$ ,  $P = 0.001$ ), and psychoticism ( $r=0.37$ ,  $P < 0.001$ ) with positive correlation coefficients. Therefore, patients who experienced more pain also scored higher on the corresponding scales. In addition, the pain scale was statistically significantly related to the neuroticism scale ( $r=0.46$ ,  $P < 0.001$ , Table 10).

## Discussion

The purpose of the present study was to investigate the correlation between psychosomatic parameters, personality, and demographic data and the severity of hidradenitis suppurativa. As can be seen from the results, there was no correlation between the severity of the disease and the psychosomatic manifestations. This correlation is contrary

to the existing literature. As was expected, the more severe damage the sufferers had (Hurley III), the higher their score in psychosomatic disorders [29,30]. A possible explanation for this finding is that the patients' mental state seemed to be affected more by the perception they had of the disease and the consequences it would have on their lives than by the severity of the disease itself, as reflected by the dermatologists' Hurley, defined Hurley, and IHS4 scales [31].

The statistical analysis showed that females were more burdened with depression, interpersonal sensitivity, anxiety, phobic anxiety, somatization, and compulsiveness. It appears that females suffering from HS show more frequent symptoms of anxiety and depression [32,33]. However, in a more recent study [34], there were no differences between the two sexes in terms of psychopathological manifestations.

Regarding body mass index, it was found that overweight and obese patients, in contrast with normal weight patients, had statistically significantly higher scores on the scales of interpersonal sensitivity and paranoid ideation. One possible explanation for the association with interpersonal sensitivity and paranoid ideation may be the constant recommendation by dermatologists to lose weight, as obesity is one of the main factors that negatively affects the progression of the disease [35], while it may also be a causative factor [36]. Additionally, the part of the body where the patients showed skin damage was correlated with the extraversion variable in the personality scale. Lesions in the armpit were associated with higher extraversion scores, while, on the contrary, those

**Table 10. Spearman Correlation Coefficient between the Psychometric Scales and Patients' Age, the Age at Onset of the Disease, the Duration of the Disease, and the Pain Scale.**

		Age		Age at the onset of disease		Duration of the disease		Pain	
		Cor. Coef.	p	Cor. Coef.	p	Cor. Coef.	p	Cor. Coef.	P
BDI		0.04	0.69	-0.02	0.876	-0.08	0.468	0.65	<0.001
SCL90	Somatization	0.06	0.587	-0.002	0.982	0.13	0.236	0.32	0.002
	Obsessive compulsive	-0.04	0.700	0.06	0.549	0.05	0.614	0.26	0.014
	Interpersonal sensitivity	-0.10	0.350	-0.06	0.602	-0.02	0.873	0.43	<0.001
	Depression	0.002	0.986	0.02	0.864	-0.05	0.656	0.50	<0.001
	Anxiety	-0.06	0.598	0.07	0.512	-0.04	0.704	0.31	0.003
	Hostility	-0.04	0.726	0.01	0.945	0.02	0.869	0.13	0.220
	Phobic anxiety	-0.18	0.083	-0.08	0.473	-0.09	0.381	0.32	0.002
	Paranoid ideation	0.08	0.485	0.03	0.811	0.02	0.886	0.35	0.001
Psychoticism	-0.09	0.382	-0.06	0.608	0.03	0.773	0.37	<0.001	
EPQ	Psychoticism	0.10	0.375	0.03	0.763	0.09	0.419	0.10	0.368
	Neuroticism	0.02	0.846	0.07	0.545	0.02	0.850	0.46	<0.001
	Extraversion	0.04	0.688	-0.04	0.747	0.10	0.359	-0.15	0.159
	Lying Lie	0.002	0.984	0.01	0.914	-0.01	0.961	-0.20	0.062

Abbreviations: Mean: mean value, SD: standard deviation, BDI: Beck Depression Inventory; EPQ: Eysenck Personality Questionnaire; SCL90: Symptom Checklist-90 Psychopathology Questionnaire.

with genital, anal, or gluteal lesions had a significantly lower score on the extraversion scale. At the same time, no differences were observed in those with lower mammary lesions. This may be because having damage to the genitals and anus can result in avoidance of sexual contact. Even the damaged area, in combination with a wrong diagnosis by specialists, can be misinterpreted as a sexually transmitted disease, with the result that these individuals are isolated from interactions, experiencing fear and social stigmatization [37], and also because skin damage is accompanied by a strong odor, which further complicates everyday life [38].

Significant connections were also found with patients who had comorbidities. These people showed higher scores on the obsessive-compulsive, paranoid ideation, and psychoticism scales. The connection between obsessive compulsive disorder and individuals experiencing various organic diseases is well known, as is the emphasis patients place on physical changes, psychologically exhausting themselves by repeatedly visiting doctors and receiving more diagnoses of all diseases in comparison with the general population [15]. Moreover, endocrine disorders, in addition to anxiety and depression, have also been positively associated with psychotic symptoms [39]. Psychiatric history was also examined, which appeared to be positively correlated with all variables of psychosomatic burden, psychoticism, and neuroticism, while there was a negative correlation with the

extraversion variable. From this analysis it appears that psychiatric history was perhaps a variable with the highest statistically significant correlations in the psychosomatic burden and in the personality scale, which can significantly increase the possibility that someone will develop a mental disorder [40]. It is worth noting that the question that the participants were asked was whether they had a psychiatric history, without specifying whether it predated the disease or whether it appeared due to the burden of the disease. In any case, the mental state of the sufferers should be assessed, and they should receive appropriate help immediately. Furthermore, the psychiatric history variable positively correlated with the personality psychoticism scale, which, according to the developers of the EPQ, measures obsessive-compulsiveness and neuroticism similar to histrionic personality. This could be because there is a high comorbidity between dermatological disorders and obsessive-compulsive personality, regardless of age for both sexes [15].

Additionally, the pain scale correlated statistically significantly with depression, anxiety, anger, paranoid ideation, psychoticism, and the neuroticism variable from the personality scale. Based on the literature, it was expected that the longer the time between the date of onset and the age at diagnosis of the disease, the greater the burden on the patients would be, because they would have symptoms of hidradenitis without knowing what diseases they had nor would they have received

the appropriate treatment, although this was not confirmed by the present study [41]. An explanation could be that all patients had a large discrepancy between the onset and diagnosis of the disease, therefore the data were homogeneous, and this is why there were no statistically significant differences. Additionally, the lack of a relationship may be due to the fact that when the sample was taken, all patients were receiving appropriate treatment and had adequate knowledge of the disease, so any mental or physical burden they had felt in the past would have been compensated for at the time of the study, and they would not have responded while being burdened. Regarding pain and its correlation with most scales of psychopathology, this is an expected outcome as, based on the international literature, pain is among the most important problems of HS patients [17], since it affects up to 97% of patients [18]. In fact, painful and smelly abscesses contribute to low self-esteem, avoidance of social interaction, and feelings of hopelessness, which trigger the appearance of psychopathology [42]. Meanwhile, the correlation with the neuroticism scale identified with histrionic personality could be due to the acting-out behaviors that are the structural feature of the disorder, something which may be triggered by pain. In any case, due to the absence of research, further investigation is needed.

## Conclusion

As can be seen from the present study and from the previous ones, there should be better education, both in the medical community and in the general population, because sufferers endure for many years the symptoms of a disease they cannot identify and receive inappropriate treatments due to both dermatologists' and other medical specialties' not making a correct differential diagnosis.

## References

1. Fabrazzo M, Cipolla S, Signoriello S, et al. A systematic review on shared biological mechanisms of depression and anxiety in comorbidity with psoriasis, atopic dermatitis, and hidradenitis suppurativa. *J Eur Psychiatry*. 2021 Nov 25;64(1):e71. DOI: 10.1192/j.eurpsy.2021.2249.
2. Gooderham M, Papp K. The psychosocial impact of hidradenitis suppurativa. *J Am Acad Dermatol*. 2015;73(5), S19-S22. DOI: 10.1016/j.jaad.2015.07.054.
3. Alikhan A, Lynch PJ, Eisen DB. Hidradenitis suppurativa: a comprehensive review. *J Am Acad Dermatol*. 2009;60(4), 539-561. DOI: 10.1016/j.jaad.2008.11.911.
4. Shavit E, Dreier J, Freud T, Halevy S, Vinker S, Cohen AD. Psychiatric comorbidities in 3207 patients with hidradenitis suppurativa. *J Eur Acad Dermatol Venereol*. 2015; 29(2):371-376. DOI: 10.1111/jdv.12567.
5. Sabat R, Jemec GB, Matusiak Ł, Kimball AB, Prens E, Wolk K. Hidradenitis suppurativa. *Nat Rev Dis Primers*. 2020 Mar 12;6(1):18. DOI: 10.1038/s41572-020-0149-1.

6. Alikhan A, Lynch PJ, Eisen DB. Hidradenitis suppurativa: a comprehensive review. *J Am Acad Dermatol*. 2009;60(4), 539-561. DOI: 10.1016/j.jaad.2008.11.911.
7. Patel KR, Lee HH, Rastogi S, et al. Association between hidradenitis suppurativa, depression, anxiety, and suicidality: a systematic review and meta-analysis. *J Am Acad Dermatol*. 2020; 83(3): 737-744. DOI: 10.1016/j.jaad.2019.11.068.
8. de Souza DF, Wartchow K, Hansen F, et al. Interleukin-6-induced S100B secretion is inhibited by haloperidol and risperidone. *Prog Neuropsychopharmacol Biol Psychiatry*. 2013;43: 14-22. DOI: 10.1016/j.pnpbp.2012.12.001.
9. Van der Zee HH, de Ruyter L, Van Den Broecke DG, Dik WA, Laman JD, Prens EP. Elevated levels of tumour necrosis factor (TNF)- $\alpha$ , interleukin (IL)-1 $\beta$  and IL-10 in hidradenitis suppurativa skin: a rationale for targeting TNF- $\alpha$  and IL-1 $\beta$ . *Br J Dermatol*. 2011;164(6), 1292-1298. DOI: 10.1111/j.1365-2133.2011.10254.x
10. Kohorst JJ, Kimball AB, Davis MD. Systemic associations of hidradenitis suppurativa. *J Am Acad Dermatol*. 2015; 73(5), S27-S35. DOI: 10.1016/j.jaad.2015.07.055.
11. König A, Lehmann C, Rompel R, Happle R. Cigarette smoking as a triggering factor of hidradenitis suppurativa. *Dermatology*. 1999; 198(3), 261-264. DOI: 10.1159/000018126.
12. Mackowick KM, Barr MS, Wing VC, Rabin RA, Ouellet-Plamondon C, George TP. Neurocognitive endophenotypes in schizophrenia: modulation by nicotinic receptor systems. *Prog Neuropsychopharmacol Biol Psychiatry* 2014; 52: 79-85. DOI: 10.1016/j.pnpbp.2013.07.010.
13. Caccavale S, Tancredi V, Boccellino MP, Babino G, Fulgione E, Argenziano G. Hidradenitis Suppurativa Burdens on Mental Health: A Literature Review of Associated Psychiatric Disorders and Their Pathogenesis. *Life*. 2023; 13(1), 189. DOI: 10.3390/life13010189.
14. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). 2013. DOI: 10.1176/appi.books.9780890425596.
15. Chou YJ, Tai YH, Dai YX, et al. Obsessive-compulsive disorder and the associated risk of autoimmune skin diseases: a nationwide population-based cohort study. *CNS Spectr*. 2023; 28(2), 157-163. DOI: 10.1017/S1092852921000973.
16. Phan K, Huo Y R, Smith SD. Hidradenitis suppurativa and psychiatric comorbidities, suicides and substance abuse: systematic review and meta-analysis. *Ann Transl Med*. 2020; 8(13):821. DOI: 10.21037/atm-20-1028.
17. Krajewski PK, Matusiak L, Von Stebut E, et al. Pain in hidradenitis suppurativa: a cross-sectional study of 1,795 patients. *Acta Derm Venereol*. 2021;101(1). DOI: 10.2340/00015555-3724.
18. Matusiak Ł, Szczęch J, Kaaz K, Lelonek E, Szepietowski JC. Clinical characteristics of pruritus and pain in patients with hidradenitis suppurativa. *Acta Derm Venereol*. 2018; 98(2), 191-194. DOI: 10.2340/00015555-2815.
19. Puza CJ, Wolfe SA, Jaleel T. Pain management in patients with hidradenitis suppurativa requiring surgery. *Dermatologic Surgery*. 2019;45(10),1327-1330. DOI:10.1097/DSS.0000000000001693.
20. Bair M J, Robinson RL, Katon W, Kroenke K. Depression and pain comorbidity: a literature review. *Archives of internal medicine*. 2003;163(20),2433-2445. DOI: 10.1001/archinte.163.20.2433.
21. Derogatis LR, Melisaratos N. The Brief Symptom Inventory: an introductory report. *Psychol Med*. 1983;13(3):595-605.

22. Donias, S.; Karastergiou, A.; Manos, N. Validation of the Symptom Checklist- 90-R in Greek Population. *Psychiatriki*. 1991; 2, 42–48. DOI: 10.5431/aramit0209.
23. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry*. 1961;4: 561-571. DOI: 10.1001/archpsyc.1961.01710120031004.
24. Eysenck HJ, Eysenck SBG. *Manual of the EPQ (Personality Questionnaire) Hodder and Stoughton Educational*; Hodder & Stoughton Educational: London, UK, 1975.
25. Dimitriou, E. EPQ Personality Questionnaire. Greek Validation in the Greek Population Dimitriou E. *Engefalos*. 1986, 23, 41–54.
26. Melzack R. The short-form McGill Pain Questionnaire. *Pain*. 1975;1(3),277-299. DOI: 10.1016/0304-3959(75)90044-5.
27. Horváth B, Janse IC, Blok JL et al. Hurley staging refined: a proposal by the Dutch Hidradenitis Suppurativa Expert Group. *Acta Derm Venereol*. 2017; 97(3):412-413. DOI: 10.2340/00015555-2513.
28. Zouboulis CC, Tzellos T, Kyrgidis A, et al. European Hidradenitis Suppurativa Foundation Investigator Group Development and validation of the International Hidradenitis Suppurativa Severity Score System (IHS4), a novel dynamic scoring system to assess HS severity. *Br J Dermatol*. 2017; 177(5), 1401-1409. DOI: 10.1111/bjd.15748.
29. Carniciu S, Hafi B, Gkini MA, Tzellos T, Jafferany M, Stamu-O'Brien C. Secondary psychiatric disorders and the skin. *Dermatological Reviews*. 2023 :4(4), 162-171. DOI: 10.1002/der2.211.
30. Esmann S, Jemec GB. Psychosocial impact of hidradenitis suppurativa: a qualitative study. *Acta Derm Venereol*. 2011; 91(3), 328-332. DOI: 10.2340/00015555-1082.
31. Onderdijk A J, Van der Zee HH, Esmann S et al. Depression in patients with hidradenitis suppurativa. *J Eur Acad Dermatol Venereol*. 2013; 27(4): 473-478. DOI: 10.1111/j.1468-3083.2012.04468.x.
32. Shavit E, Dreier J, Freud T, Halevy S, Vinker S, Cohen AD. Psychiatric comorbidities in 3207 patients with hidradenitis suppurativa. *J Eur Acad Dermatol Venereol*. 2015;29(2), 371-376. DOI: 10.1111/jdv.12567.
33. Huilaja L, Tiri H, Jokelainen J, Timonen M, Tasanen, K. Patients with hidradenitis suppurativa have a high psychiatric disease burden: a Finnish nationwide registry study. *J Invest Dermatol*. 2018;138(1), 46-51. DOI: 10.1016/j.jid.2017.06.020.
34. Rymaszewska J, Krajewski P, Szczęch J, Szepietowski J. Depression and anxiety in hidradenitis suppurativa patients: A cross-sectional study among Polish patients. *Postępy Dermatol Alergol*. 2022; 39(1). DOI: 10.5114/ada.2022.119080.
35. Wolk K, Join-Lambert O, Sabat R. Aetiology and pathogenesis of hidradenitis suppurativa. *Br J Dermatol*. 2020;183(6): 999-1010. DOI: 10.1111/bjd.19556.
36. Sabat R, Jemec GBE, Matusiak Ł, Kimball AB, Prens E, Wolk K. Hidradenitis suppurativa. *Nat Rev Dis Primers*. 2020;6(1):18. Published 2020 Mar 12. DOI: 10.1038/s41572-020-0149-1.
37. Kouris A, Platsidaki E, Christodoulou C, et al. Quality of Life and Psychosocial Implications in Patients with Hidradenitis Suppurativa. *Dermatology*. 2016;232(6):687-691. Doi: 10.1159/00045335.
38. Gooderham M, Papp K. The psychosocial impact of hidradenitis suppurativa. *J Am Acad Dermatol*. 2015;73(5), S19-S22. DOI: 10.1016/j.jaad.2015.07.054.
39. Aslan S, Ersoy R, Kuruoglu AC, Karakoc A, Cakir N. Psychiatric symptoms and diagnoses in thyroid disorders: a cross-sectional study. *Int J Psychiatry in Clinical Practice*. 2005; 9(3), 187-192. DOI: 10.1080/13651500510029129.
40. Shlyankevich J, Chen AJ, Kim GE, Kimball AB. Hidradenitis suppurativa is a systemic disease with substantial comorbidity burden: a chart-verified case-control analysis. *J Am Acad Dermatol*. 2014;71(6), 1144-1150. DOI: 10.1016/j.jaad.2014.09.012.
41. Saunte DM, Boer J, Stratigos A. Diagnostic delay in hidradenitis suppurativa is a global problem. *Br J Dermatol*. 2015 Dec;173(6):1546-9. Doi: 10.1111/bjd.14038. Epub 2015 Nov 3.
42. Dufour DN, Emtestam L, Jemec GB. Hidradenitis suppurativa: a common and burdensome, yet under-recognised, inflammatory skin disease. *Postgrad Med J*. 2014; 90(1062), 216-221. DOI: 10.1136/postgradmedj-2013-131994.