



Anger, Emotional Fragility, Self-esteem, and Psychiatric Comorbidity in Patients with Hidradenitis Suppurativa/Acne Inversa

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Abstract

Hidradenitis suppurativa/acne inversa (HS) is one of the most debilitating inflammatory chronic skin diseases and it heavily impairs the emotional and relational life of the patients. Despite its clinical and epidemiological relevance, its psychological correlates are still largely unexplored. The aim of the present study was to investigate the psychological and emotional impact of HS, with a specific focus on psychiatric symptoms, particularly depression, suicidal ideation, self-esteem, anger, and some personality traits. Thirty eight patients diagnosed with HS (HS Group) were compared with a control group of 28 outpatients diagnosed with nevi (N Group) and assessed with psychometric questionnaires (GHQ-28, STAXI-2, BDI-II, BHS, RSES, EF Questionnaire, and I–R Questionnaire). Results showed significant differences between the two groups, with more psychiatric symptoms, lower self-esteem, and higher levels of state anger and of emotional fragility in HS patients. These findings suggest the evidence of a significant psychiatric comorbidity in HS and of a strong emotional impact of the disease.

Keywords Hidradenitis suppurativa/acne inversa · Psychiatric comorbidity · Self-esteem · Anger · Emotional fragility

Introduction

Chronic dermatological disease exposes the individual to protracted levels of suffering. This includes the involvement of the affective and relational spheres, with negative effects on self-image and self-esteem and a significant impact on social life. Depression, lack in self-confidence, fears of stigmatization, relationship anxiety, and avoidance of interpersonal situations may contribute to a significant generalized sense of reduced quality of life (Papadopoulos, Bor & Legg, 1999; Balieva et al., 2017; Jafferany & Pastolero, 2018). Several studies report the presence of high levels of psychosocial distress in dermatological patients (Ramussen, 1990; Root, Kent & Al'Abadie, 1994), and a greater prevalence of psychological and psychiatric comorbidity compared

to the general population or to other medical pathologies (Hughes, Barraclough, Hamblin & White, 1983; Dalgard et al., 2015; Balieva et al., 2016). Psychiatric comorbidities are observed in 25–30% of dermatological patients (Gupta & Gupta, 1996; Gupta & Levenson, 2017; Picardi, Abeni, Melchi, Puddu, & Pasquini, 2000), and psychosocial comorbidities prevalence rates are even higher, reaching as much as 85% (Bewley, Fleming, & Taylor, 2012).

Hidradenitis suppurativa/acne inversa (HS) is one of the most debilitating chronic skin diseases. It heavily impairs the emotional and relational life of the patient, his/her sexuality, and the quality of life of family members. HS is a chronic, recurrent, inflammatory skin disease that affects the apocrine gland-bearing areas of the body, most commonly the axillae, inguinal, and anogenital regions (Danby & Margesson, 2010; Zouboulis et al., 2015). It usually presents after puberty with painful subcutaneous nodules, burning, pruritus, hyperhidrosis and pain, and it results in abscesses, fistulas, and scars. With the evolution of skin lesions, pain and purulent-malodorous secretions become the dominant symptoms. Over time the process causes fibrosis, dermal contractures, and induration of the skin, with permanent scarring residues (Alikhan, Lynch & Eisen, 2009). HS affects about 1% of the population—with prevalence rates ranging from 0.00033 to 4.1% (Miller, McAndrew & Hamzavi,

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2016). Those affected are mainly women and young people (Dessinioti, Katsambas & Antoniou, 2014; Bettoli et al., 2016; Zouboulis et al., 2015). The etiology remains largely unknown and presently HS is considered a multifactorial disease (Dessinioti, Katsambas & Antoniou, 2014; Nazary, Van der Zee, Prens, Folkerts, & Boer, 2011; Yazdanyar & Jemec, 2011).

The clinical characteristics of HS include a chronic and relapsing course, potential for misdiagnosis and delays in diagnosis (Nazary et al., 2011; von der Werth & Jemec, 2001). Several studies have found that the disease is diagnosed, on average, 7–14 years after the first occurrence of symptoms (Smith, Chao & Teitelbaum, 2010; Saunte et al., 2015; Kluger, Ranta & Serlachius, 2017). The partial and transient efficacy of treatments account for the adverse impact of this disease on the emotional, social, and working lives of patients, and the association with significant psychological distress and psychiatric comorbidity (Dufour, Emtestam & Jemec, 2014; Gooderham & Papp, 2015; Deckers & Kimball, 2016; Balieva et al., 2017; Matusiak, 2018). Somatic pain (Smith, Chao & Teitelbaum, 2010; Horváth, Janse & Sibbald, 2015; Vangipuram, Vaidya, Jandarov & Alikhan, 2016; Jemec, 2017), the intensity of pruritus (Matusiak et al., 2018) and fatigue (Matusiak, Bieniek & Szepletowski, 2010a), together with the severity and the progression of the disease (Matusiak, Bieniek & Szepletowski, 2010a, b; Wolkenstein, Loundou, Barrau, Auquier, & Revuz, 2007; Alavi, Anooshirvani, Kim, Coutts, & Sibbald, 2015), heavily impair the quality of life in HS patients.

Intimate and sexual relationships are also significantly damaged by HS (Kennedy, 2008; Kurek et al., 2012; Smith, Chao & Teitelbaum, 2010; Sampogna et al., 2017; Jemec, 2018) primarily for females (Janse et al., 2017; Ofenloch, 2017). Indeed, 66.7% of patients with HS report sexual difficulties (Sampogna et al., 2017). Sexual distress is an aggravating factor for depression in HS patients (Kurek, Johanne Peters, Sabat, Sterry, & SchneiderBurrus, 2013) and the incidence of sexual dysfunction is higher among HS patients with depressive and anxiety disorders (Slyper, Strunk & Garg, 2018). The finding of a major impairment in the sexual health and quality of life in females could be related to the fact that lesions on the lower abdomen are significantly more frequent in women than in men (Jemec, Heidenheim & Nielsen, 1996). Other factors include the negative impact of physical appearance (Ofenloch, 2017), the different cultural connotations of disfigurement in men and women (Kurek et al., 2012), and, finally, the higher emotional and neuroendocrine responsiveness in the female population (Kurek et al., 2012).

Comorbidity with Psychological Disorders

Despite the clinical and epidemiological relevance of HS in the general population, the psychological impact of this disease has only been investigated in recent years. A high comorbidity burden in patients with HS was found by Shlyankevich, Chen, Kim, and Kimball (2014), with psychiatric disorders among the comorbidities in 57% of the sample. In a sample of 3207 patients with HS, Shavit et al. (2015) found comorbid diagnoses of depression (5.9%) and anxiety (3.8%), and trends for an association with schizophrenia (1.5%), psychosis (1.3%), and bipolar disorder (0.4%). The nationwide retrospective database study by Huilaja, Tiri, Jokelainen, Timonen, and Tasanen (2018) showed that at least one psychiatric disorder was diagnosed in 24.1% of patients with HS (vs 19.1% of patients with psoriasis and 13.5% of patients with melanocytic nevi), and that this comorbidity was more frequent in women (25.5%) than in men (22.0%). The prevalence rates for the different comorbidities were 15.3% for major depression, 6.9% for anxiety disorders, 3.1% for bipolar disorder or manic episodes, and finally, 4.7% for all psychotic disorders. Tiri, Jokelainen, Timonen, Tasanen, and Huilaja (2018) found a prevalence rate of psychiatric disorders of 15.7% in a young HS population at the age of 18 years and a higher prevalence rate (23.5%) at the age of 23 years, highlighting that the prevalence of psychiatric comorbidity increases rapidly during young adulthood.

The association between HS and depression has been found across all studies but with widely different prevalence rates, ranging from 5.9 to 42.9% (Shavit et al., 2015; Onderdijk et al., 2013; Matusiak et al., 2010a; Kirby, Butt, Esmann & Jemec, 2017; Kurek et al., 2013; Vazquez et al., 2013; Porter & Kimball, 2017; Kjaersgaard Andersen, Theut Riis & Jemec, 2018; Huilaja et al., 2018; Vangipuram et al., 2016). The risk of depression seems to be related to the intensity of the emotional burden (Crowley et al., 2014) due to the severity or the extent of the disease (Onderdijk et al., 2013; Vangipuram et al., 2016), its clinical stage (Matusiak et al., 2010a), and the degree of impairment of the body image due to disfigurement (Schneider Burrus et al., 2018). An increased risk of completed suicide among HS patients (hazard ratio 2.42) has recently been highlighted (Thorlaciuc, Cohen, Gislason, Jemec, & Egeberg, 2018), with a greater than two-fold risk of completed suicide compared to people without HS. The greatest effect of HS on suicide risk is among patients aged over 60 years (Garg et al., 2017).

Importance of the Study

Our team has already explored the above issues in previous studies (Tugnoli et al., 2015, 2016, 2017; Tugnoli, Bettoli, Agnoli & Caracciolo, 2016). The goal of this study was to

investigate the psychological and psychopathological impact of HS in a population of patients with a focus on psychiatric symptoms, emotional reactions, and specific personality traits. We hypothesized that HS patients would be more affected by psychiatric comorbidity and experience higher psychological distress than a control group of healthy subjects, showing lower self-esteem, higher levels of anxiety, depression, and suicidal ideation, and higher expression of anger, emotional fragility, irritability, and rumination. In particular, we aimed to highlight two new aspects which previous quantitative studies have not considered: anger as a specific emotional reaction of the patient and emotional fragility as a personality trait that is made evident by the disease.

Methods and Assessment Instruments

The study was conducted at the University of Ferrara (Italy) in collaboration between the Operative Unit of Dermatology—Azienda Ospedaliero-Universitaria and the Neurological, Psychiatric and Psychological Sciences Section of the Department of Biomedical and Specialty Surgical Sciences—School of Medicine. It was a cross-sectional study that compared a group of patients diagnosed with HS (*HS Group*) with a control group consisting of participants with melanocytic nevi (*N Group*). All consecutive adult dermatological patients diagnosed with HS and Nevi referred to the Dermatology Unit from March 2016 to July 2016 were considered for enrollment. Demographic and clinical data were collected during dermatological examination and retrieved from the records used for the Italian Register of hidradenitis suppurativa/acne inversa.

For each participant in the *HS Group*, the following information was collected: gender, age, age of disease onset, disease duration, and disease severity at the time of evaluation. This last variable was evaluated using the Sartorius Severity Score (Sartorius, Lapins, Emtestam & Jemec, 2003; Sartorius, Emtestam, Jemec & Lapins, 2009; Sartorius et al., 2010), a well-known, specific instrument for measuring the clinical severity of HS. A global score is calculated by counting the anatomical regions involved, the numbers and scores of lesions, the longest distance between two relevant lesions (or size of lesion if single) in each region, and whether all lesions are clearly separated by normal skin. Regional scores are added and summed to obtain the patient's total score. The upper limit of the scale is open and a higher score reflects greater clinical severity (Zouboulis et al., 2015).

Patients diagnosed with HS aged over 15 years old, without previous major psychiatric disorders or cognitive impairment, and not under treatment with psychotropic drugs and isotretinoin, were recruited. The diagnosis of HS used the

diagnostic criteria according to international standards, as set out in the Second International HS Research Symposium of 2009 and in the European guidelines on hidradenitis suppurativa (European Dermatology Forum, EDF) (Zouboulis et al., 2015).

For each participant in the *N Group*, gender and age were recorded. Subjects aged < 15 years, having pre-existing or current comorbidities, positive psychiatric anamnesis or under psychotropic medication, were excluded from the study.

Participants in both the *HS Group* and *N Group* underwent a psychometric evaluation consisting of the following questionnaires.

Scaled General Health Questionnaire-28 (GHQ-28)

The General Health Questionnaire (GHQ) is a self-administered psychometric tool widely used in screening investigations to detect the presence of non-psychotic and minor psychiatric disorders in the general population and in non-psychiatric clinical contexts (Goldberg, 1978). It focuses on breaks in normal psychic functioning, and it is designed to identify an inability to carry out one's normal "healthy" functions and the appearance of new distressing phenomena.

In the present study, the Italian version of the 28-item scaled GHQ (GHQ-28) was used to investigate the mental health status of participants (Goldberg & Hillier, 1979; Goldberg et al., 1997). Somatic symptoms (SS—Scale A, items 1–7), anxiety and insomnia (AI—Scale B, items 8–14), social dysfunction (SDys—Scale C, items 15–21), and severe depression (SDep—Scale D, items 22–28) are the four seven-item subscales. The subscales are not independent of one another and are not useful in making distinct psychiatric diagnoses, but they help to highlight the individual profiles of prevalent psychological distress. Respondents indicate if their current state differs from the usual state "over the past few weeks." We used the so-called "GHQ score," an alternative binary scoring method that evaluates answers according to dichotomous coding: a score of "0" indicates the absence of a symptom and a score of "1" indicates the presence of a symptom (Jackson, 2007). Total scores range from 0 to 28, and higher scores indicate a greater probability of psychiatric distress. The cut-off value used to identify the possible "psychiatric cases" when the GHQ-28 score was 5 or 6 (Goldberg, 1972, 1978). This threshold offers a good balance between specificity (79.6%), and sensitivity (79.2%) (Goldberg et al., 1997), and enabled us to split our sample into two subgroups: participants in one group reporting considerable psychological distress (GHQ-28 scores ≥ 5) and participants in the other group reporting stress below the threshold (GHQ-28 scores < 5). Cronbach's alpha for the GHQ-28 across several studies ranges between 0.82 and 0.86 (Goldberg et al., 1997). In our sample, Cronbach's alpha

could not be calculated due to too many missing cases and null variances.

State-Trait Anger Expression Inventory-2 (STAXI-2)

STAXI-2 is a 57-item self-report psychometric tool that is used to evaluate the experience, expression, and control of anger. The emotional-behavioral dimensions (Spielberger, 1999) are assessed according to six scales. *State Anger (S-Ang)* assesses the intensity of anger at the time of its evaluation. *Trait Anger (T-Ang)* refers to the personality disposition of angry reactivity to frustration, and measures how often angry feelings are experienced over time. *Anger Expression-Out (AX-O)* measures the frequency of expression of anger toward persons or objects in the environment. *Anger Expression-In (AX-I)* measures the tendency to hold back or suppress angry feelings. *Anger Control-Out (AC-O)* assesses the individual's control over his or her own expressions of anger toward other persons or objects in the environment. *Anger Control-In (AC-I)* evaluates the ability of the individual to control suppressed angry feelings by calming down or cooling off. Finally, the *Anger Expression Index (AX Index)* provides an overall measure of total anger expression.

We used the validated Italian version of STAXI-2 (Comunian, 2004). In our sample, Cronbach's alpha for the subscale "State Anger" was 0.86 and, for the subscale "Trait Anger," it was 0.92.

Beck Depression Inventory II (BDI-II)

The BDI-II is the most widely used instrument for detecting the existence and severity of symptoms of depression taking into account both the affective and somatic domains (Beck, Steer & Brown, 1996). It is a self-administered tool containing 21 items each using a 4-point scale. The patient is asked to consider each statement relating to the way he or she has felt over the past 2 weeks, and the following domains are evaluated: sadness, pessimism, past failure, loss of pleasure, guilty feelings, punishment feelings, self-dislike, self-criticalness, suicidal thoughts or wishes, crying, agitation, loss of interest, indecisiveness, worthlessness, loss of energy, changes in sleeping pattern, irritability, changes in appetite, concentration difficulty, tiredness or fatigue, and loss of interest in sex. Scores in each item range from 0 (absence of symptoms) to 3 (severe symptoms) and the total score ranges from 0 to 63. Higher scores indicate more severe depressive symptoms. In our study, we used the Italian version of the BDI-II (Ghisi et al., 2006), using a cut-off score ≥ 14 as the threshold for detecting a clinically significant presence of depressive symptoms (Beck et al., 1996). Cronbach's alpha for the BDI-II is 0.87 and the split-half reliability coefficient is 0.77. In our sample, Cronbach's alpha was 0.88.

Beck Hopelessness Scale (BHS)

The BHS was designed to detect and quantify hopelessness, and to assess suicidal ideation and the risk of suicide. It measures three major aspects: negative feelings about the future, loss of motivation, and loss of expectations (Beck, Weissman, Lester & Trexler, 1974; Beck & Steer, 1993).

This 20-item scale evaluates the respondent's feelings over the previous week using "True/False" responses corresponding to a score of 0 or 1. The total score ranges from 0 to 20 and higher scores indicate a higher prevalence of suicidal ideation. We used the Italian version of the BHS (Pompili et al., 2009) with a threshold of > 9 as a cut-off score to detect significant suicidal ideation. The internal consistency reliability of the BHS measured using the KR-20 index (Kuder-Richardson Formula, analogous to Cronbach's alpha for dichotomous measures) ranges between 0.87 and 0.93 for the original version (Beck & Steer, 1993). In the Italian version, the KR-20 index ranges between 0.75 (university student sample) and 0.89 (psychiatric sample) (Pompili et al., 2009). In our sample, Cronbach's alpha was 0.78.

Rosenberg Self-esteem Scale (RSES)

The RSES is the most widely used tool that measures individual self-esteem. It is a self-administered Likert scale with 10 items that assess global self-worth by measuring both positive and negative feelings about the self at the moment of assessment using a 4-point scale. Total scores range from 0 up to 30. A higher score reflects higher self-esteem (Rosenberg, 1965). Typical scores on the Rosenberg scale are around 22, with most people scoring between 15 and 25, and a score of less than 15 suggests low self-esteem (Rosenberg, 1965; Heatherton & Wyland, 2003).

We used the Italian version of the RSES (Prezza, Trombaccia & Armento, 1997). This shows good internal consistency and solid construct validity (Cronbach's alpha is 0.84 and the split-half reliability coefficient is 0.85). In our sample, Cronbach's alpha was 0.89.

Emotional Fragility Scale (EF Questionnaire)

The Emotional Fragility Scale is an Italian self-report 7-point Likert scale consisting of 30 items (20 effective items and 10 control items). It provides a measure of feelings of personal inadequacy and vulnerability in situations perceived as dangerous or offensive, as well as persecutory feelings (Caprara, 1982; Caprara et al., 1983, 1986, 1985). Total scores range from 20 to 140 (Caprara, 1983; Caprara, Perugini, Barbaranelli & Pastorelli, 1991) and higher scores

reflect higher emotional fragility. For the EF Questionnaire, Cronbach's alpha is 0.91 and the split-half reliability coefficient is 0.92. In our sample, Cronbach's alpha was 0.86.

Irritability and Rumination/Dissipation Scale (I–R Questionnaire)

The Irritability and Rumination/Dissipation Scale (I–R Questionnaire) is an Italian self-rating scale. The *Irritability Scale (IR)* and the *Dissipation–Rumination Scale (D/R)* each consist of 15-items (10 effective items and 5 control items) that are scored using a 7-point Likert scale (Caprara, Barbanelli, Pastorelli, & Perugini, 1991). Total scores range from 10 to 70 and higher scores indicate a higher intensity of the personality trait evaluated. The *IR Scale* measures irritability, defined as the tendency to react impulsively, controversially or rudely at the slightest provocation or disagreement (Caprara et al., 1985) and detects the impulsive components of aggressive conduct. The *D/R Scale* assesses the tendencies of the individual to harbor and even to increase, with the passing of time, feelings, and desires of vengeance (Caprara, 1986). Its purpose is to detect the cognitive elements underlying aggressive behavior.

For the *IR Scale* and *D/R Scale*, Cronbach's alpha is 0.79 and 0.88, respectively, and the split-half reliability coefficient is 0.82 and 0.85, respectively. In our sample, Cronbach's alpha was 0.73 for the *IR Scale* and 0.77 for the *D/R Scale*.

Statistical Analysis

Normal distribution was tested using the Kolmogorov–Smirnov test. Due to the small sample size and non-normal distribution of the data, a non-parametric test (Mann–Whitney U test) was used to compare continuous variables, as appropriate, whereas differences in categorical variables were assessed using the Chi-square test or Fisher's exact test, as appropriate. For all of the statistical analyses, one-tailed tests were performed and *p*-values equal to or less than .05 were considered statistically significant. Statistical analyses were performed using the software “Statistica 7.1” (StatSoftItalia).

Results

All 57 patients diagnosed with HS who were referred to the Dermatology Unit for initial assessment or follow-up during the period from March 2016 to July 2016 were examined. A total of 13 patients did not give their consent to be enrolled in our study, and six patients were excluded because they did not meet the inclusion criteria. Finally, 38 participants,

22 females (58%) and 16 males (42%), were recruited (*HS Group*) and compared with an age- and gender-matched control group of 28 outpatients diagnosed with nevi (*N Group*). The control group comprised 15 females (54%) and 13 males (46%) who were referred to the Dermatology Unit for a consultation (see Fig. 1).

Descriptive Statistics

In the *HS Group*, the mean age was 34.3 ± 13.3 years, the mean age of disease onset was 21.0 ± 9.6 years, the mean disease duration was 13.2 ± 11.9 years and the mean Sartorius score was 52.84 ± 56.33 . Females and males did not significantly differ in terms of age, disease onset, disease duration or Sartorius score, meaning that findings should not be attributable to biases resulting from gender differences for these variables.

No significant differences between genders were observed for the psychometric assessments except AC-I (*Anger Control-In*), in which higher values were found for females than males ($p = .039$). A gender comparison analysis was also performed using the cut-off values for the GHQ-28, RSES, BDI-II, and BHS scales and no statistically significant differences were found between females and males.

In the *N Group*, the mean age was 39.5 ± 17.1 years. Females and males did not differ significantly in terms of age or any of the psychometric variables except for EF (*Emotional Fragility*) and I (*Irritation*), for which significantly higher values were found for females compared to males ($p = .042$ and $p = .019$, respectively).

Comparisons Between Groups

The *HS Group* and the *N Group* did not differ significantly for age ($p = .163$), meaning that they were comparable for this variable and it was possible to compare the groups on all the psychometric variables. Furthermore, there was no statistically significant difference between the *HS Group* and *N Group* in terms of male/female composition (Chi-square test, $p = .726$).

The comparison between the *HS Group* and the *N Group* (Mann–Whitney U test) showed significant differences, with higher values in the *HS Group* for the following scales and subscales: GHQ-28 ($p = .001$), Somatic Symptoms ($p = .002$), Anxiety and Insomnia ($p = .003$), Social Dysfunction ($p = .039$), State Anger ($p = .000$), RSES ($p = .019$), BDI-II ($p = .003$), and EF ($p = .007$). No significant differences were found for the other GHQ-28 subscale (Severe Depression, $p = .337$), the other STAXI-2 subscales or the BHS, IR and D/R scales (see Table 1).

Using the rating scales with threshold values to identify “caseness” (GHQ-28, RSES, BDI-II, BHS), the following findings were observed in the *HS Group*: 19 patients (50%)

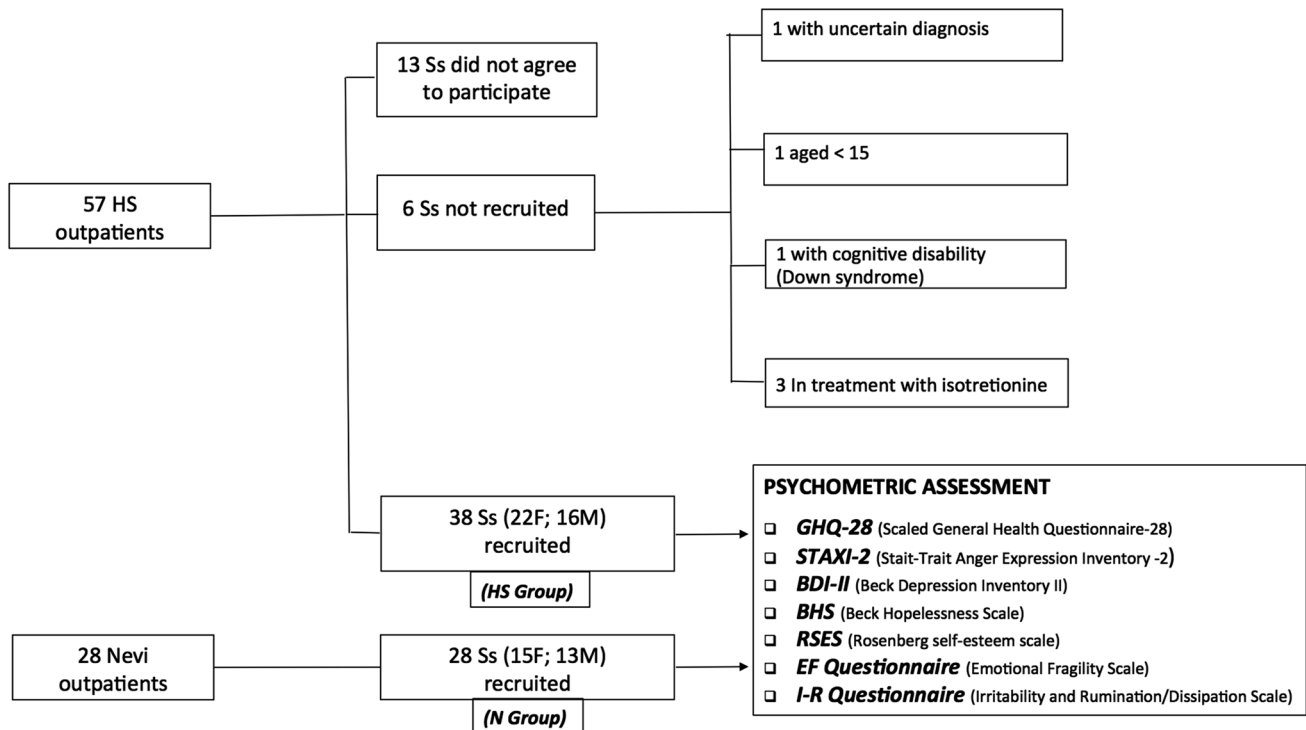


Fig. 1 Flow chart: material and methods

reported a GHQ-28 score ≥ 5 , suggestive of the presence of clinically significant psychiatric symptoms. In five patients (13%) RSES scores were below 15 indicating low self-esteem. In nine patients (24%), the BDI-II score was ≥ 14 , indicating the presence of clinically significant depressive symptoms. In four patients (11%), the global BHS score was > 9 , highlighting an increased risk for suicidal ideation. In the N Group, only four participants (14%) were identified as “psychiatric cases” with a GHQ-28 score ≥ 5 . One participant (4%) showed low self-esteem with an RSES score < 15 . For two participants (7%), the BDI-II and BHS scores were above the thresholds (see Table 2).

The comparisons between the two groups using the cut-off points for the GHQ-28, RSES, BDI-II, and BHS, showed a statistically significant difference for the GHQ-28 with significantly higher scores for the *HS Group* than the *N Group* ($p = .002$).

These findings show that patients suffering from HS may have a significantly higher psychiatric comorbidity compared to control participants not affected by HS. No significant differences were found between the two groups for the RSES, BDI-II, and BHS scales (see Table 3; Fig. 2).

Discussion

HS is a condition that forces patients to endure physical, psychological, and socioeconomic impairments. The impact of HS can be devastating due to associated depression, anxiety and insomnia, low self-esteem, impaired sexual activity, social stigma, absence from work, and consequent economic difficulties (Bettoli et al., 2016).

The results of our study show that, compared with matched controls, patients diagnosed with HS have higher scores for the GHQ-28 and the subscales related to somatic symptoms, anxiety and insomnia, and social dysfunction, indicating the relevance of these symptomatic areas. This is supported by the significant difference in psychiatric symptoms between the two groups when using the cut-off value for the GHQ-28, and by the significantly higher percentages of cases over the threshold in HS patients compared to control subjects. The 50% prevalence of patients identified with psychiatric illness having a GHQ28 score ≥ 5 seems to confirm a high psychiatric comorbidity in HS patients. This figure

Table 1 Comparison between HS Group and N Group

Psychometric variable	HS Group	N Group	<i>p</i> value (one-tailed)
GHQ-28	4 [1–9]	0.5 [0–2]	.001
Somatic symptoms	1 [0–3]	0 [0–0]	.002
Anxiety and insomnia	1 [0–4]	0 [0–1]	.003
Social dysfunction	0 [0–2]	0 [0–0]	.039
Severe depression	0 [0–0]	0 [0–0]	.337
State anger	18.5 [15–24]	15 [15–16]	.000
Trait anger	16 [13–20]	15.5 [12–18]	.174
Anger expression-out	13 [12–15]	12 [11–17]	.218
Anger expression-in	16 [13–20]	15.5 [12–19]	.200
Anger control-out	22.5 [20–27]	25 [20.5–28]	.129
Anger control-in	24 [21–27]	25 [21–29]	.195
Anger Expression Index	30.5 [23–40]	29 [18–38]	.184
Rosenberg Self-Esteem Scale	19.5 [17–23]	22 [19.5–25]	.019
Beck Depression Inventory II	7.5 [1–13]	2 [0–6]	.003
Beck Hopelessness Scale	4 [3–8]	4 [3–5]	.284
Emotional fragility	108 [96–125]	95.5 [87.5–104.5]	.007
Irritability	48 [41–65]	48.5 [40.5–54]	.258
Dissipation–rumination	61.5 [52–73]	60.5 [45–67.5]	.087

Data are reported as median [IQR]. Mann–Whitney *U* test. Significant value at .05 level

Table 2 Comparison between HS Group and N Group

Cut-off points in Rating Scales	HS Group <i>n</i> (%)	N Group <i>n</i> (%)
GHQ-28 ≥ 5	19 (50.00)	4 (14.2%)
RSE < 15	5 (13.16)	1 (3.57)
BDI-II ≥ 14	9 (23.68)	2 (7.14)
BHS > 9	4 (10.53)	2 (7.14)

Data are reported as number of cases (*n*) and percentages (%)

is consistent with previous research (Shavit et al., 2015; Onderdijk et al., 2013; Vazquez et al., 2013; Shlyankevich et al., 2014; Huilaja et al., 2018; Tiri et al., 2018).

Somatic Symptoms

Undoubtedly, somatic symptoms in HS patients should be primarily attributed to the underlying skin condition. However, we must nonetheless consider that the items from subscale A of the GHQ-28 reveal subjective feelings related to somatic aspects of generic suffering not directly related to somatic symptoms specific to HS and could be ascribed to the emotional distress caused by HS. This should, however, be taken with caution as we know that patients with physical symptoms tend to score higher on the GHQ scale and false-positives may be over-represented on the somatic subscale (Bridges & Goldberg, 1986; Thompson, 1989; Finlay-Jones & Murphy, 1979, Rabins & Brooks, 1981, Bridges & Goldberg, 1986). Furthermore, we should point out that the validity coefficients of the somatic subscale are lower than those of the other three subscales (van Hemert, den Heijer, Vorstenbosch & Bolk, 1995).

Table 3 Comparison between HS Group and N Group

Cut-off points in Rating Scales	GHQ-28 ≥ 5	GHQ-28 < 5	RSES < 15	RSES ≥ 15	BDI-II ≥ 14	BDI-II < 14	BHS > 9	BHS ≤ 9
HS Group	19	19	5	33	9	29	4	34
N Group	4	24	1	27	2	26	2	26
Fisher’s exact test	<i>p</i> = .002		<i>p</i> = .230		<i>p</i> = .100		<i>p</i> = 1.000	

Fisher’s exact test. Significant value at .05 level

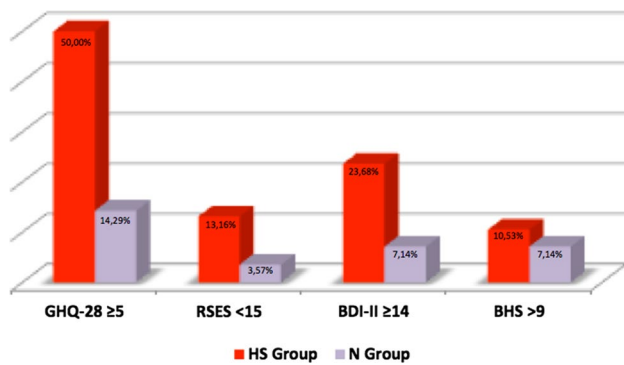


Fig. 2 Cut-off points in Rating Scales. Percentages based histogram

Anxiety and Insomnia

Our findings suggest that HS patients were more heavily affected by anxiety and insomnia than the control group. Anxiety in HS patients could be attributed to the fear of disease flare-ups, the risk of malodorous discharge (Patel et al., 2017), stigmatization (Kouris et al., 2016), and financial distress (Kouris et al., 2016; Shavit et al., 2015) resulting from the time spent in medical care, its cost, and the interference with the ability to properly perform work duties (Kouris et al., 2016; Matusiak et al., 2010a; Deckers & Kimball, 2016). Insomnia could be related primarily to the recurrence of pain and pruritus (Vossen et al., 2017; Kaaz, Matusiak & Szeptowski, 2017).

Social Dysfunction

Our findings for Subscale C of the GHQ-28 show that HS patients are impaired in their capacity to effectively carry out tasks, in their perception of being active, effective, and useful within their social context, and in the satisfaction and pleasure they derive from daily life. Somatic symptoms such as pain, pruritus, fatigue, and their psychological consequences, the fear of other people's reactions to the bad smell of discharging lesions, and impaired mobility, could contribute to these kinds of difficulty, and thus interfere with work, self-care, and social and leisure activities, leading to an impairment in health-related quality of life (Balieva et al., 2016; Delany et al., 2018; Kouris et al., 2016; von der Werth & Jemec, 2001). This is especially relevant if we consider that HS onset and diagnosis occur during the most potentially productive years of life (Dufour et al., 2014). Social dysfunction thus negatively affects the patient's life and contributes to the fear of stigmatization, feelings of loneliness, and social isolation.

Depression

To the best of our knowledge, the only published study measuring depression in HS patients using the Beck Depression Inventory found a rate of 38.5% in a sample of 26 participants (Kluger et al., 2017). In our study, 24% of the patients in the *HS Group* reported clinically significant depressive symptoms ($BDI-II \geq 14$). As previously reported, no statistically significant differences between females and males in the *HS Group* were found and no significant differences were found for Scale D of the GHQ-28 (severe depression) when comparing the two groups. In any case, the statistical significance observed between the two groups for BDI-II scores (with higher values in the *HS Group*) shows that depression is a psychopathological correlate of primary importance in HS patients.

A significant difference in BDI-II scores between the HS and N groups was not found. This finding could be interpreted by considering that the median values detected by the BDI-II in both groups were below the cut-off value (≥ 14), indicating no clinically significant depression; however, the HS Group experienced more depressive symptomatology than the N Group (7.5 vs 2; p value: 0.003).

Self-esteem

Our study detected lower self-esteem scores in the *HS Group* compared to the *N Group* but the medians in both groups (*HS Group*: 19.5 [17–23]; *N Group*: 22 [19.5–25], respectively) were within the normal range for self-esteem. Thus, we can say that our sample of HS patients, as a whole, was without severe impairment in self-esteem although patients did have lower scores than the control group. No significant difference was found in group comparison considering the cut-off values of the RSES. To explain these data, we suggest that the severity of HS in our sample was low, as shown by the mean Sartorius score (52.84 ± 56.33), and that the impact on self-esteem was more strictly related to the negative perception of body image, to the malodorous discharges and to the location of the lesions in the exposed skin areas than to the severity of the condition (Kouris et al., 2016; Patel et al., 2017; Alavi, Farzanfar, Lee & Almutairi, 2018; Matusiak et al., 2010a).

Our findings are consistent with the one previous study that explored this psychological dimension using the RSES, which found lower self-esteem scores in HS patients (18.91 ± 1.79 vs. 19.77 ± 2.53 , $p = .008$) than in healthy controls, even if the means detected in this study, as well as in our own, were all above the threshold value compatible with low self-esteem (Kouris et al., 2016).

Suicidal Ideation

In our assessment of suicidal ideation, (11%) of HS patients showed BHS scores that suggested the presence of suicidal ideation in about 1 in 10 cases but no significant differences were detected in the comparison between the *HS Group* and *N Group*.

Anger

With regard to anger, the comparison between the two groups indicated a higher presence of state anger in patients diagnosed with HS.

The lack of significant differences on the I–R Questionnaire scores in the comparison between the *HS Group* and *N Group* could suggest the fact that the emotional reactivity of the patient, in particular, anger, was not governed by pre-existing personality traits—specifically, by the impulsive reactivity (*Irritability Scale*) or by the mode of cognitive processing of aggression (*Dissipation–Rumination Scale*)—but rather could be more directly due to the dermatological disease. This finding is consistent with the lack of significant differences between the *HS Group* and the control group for STAXI-2 scores related to personality features, such as *Trait Anger (T-Ang)*—i.e., the disposition to angry reactivity to frustration. Thus, findings could support our hypothesis that the emotion of anger in HS patients can be attributed mainly to the presence of the dermatological disease and to its clinical implications.

To the best of our knowledge, no quantitative research has been published to date using a specific tool for assessing anger across several dimensions, and our present study is the first to highlight the relevance of anger in these patients. Only a few previous studies have reported anger as an emotion detected via single interviews and focus group interviews (Esmann & Jemec, 2011), or hypothesized as an experienced emotion due to impairment in the quality of life of HS patients (Wolkenstein et al., 2007; Benjamins, van der Wal & de Korte, 2009).

Emotional Fragility

The emotional reactions of the patient to any illness are inevitably shaped by individual personality but we are not aware of any studies that have assessed the personality traits of patients with HS.

In our study, higher emotional fragility was found in HS patients. This finding could be interpreted as the emergence of emotional fragility in vulnerable participants as a consequence of the psychological distress caused by HS. If one considers that emotional fragility refers to feelings of subjective inadequacy and to persecutory anxieties, this seems plausible in HS patients because of the specificities of the

disease and its negative impact on the somatic, psychological, and relationship fields of the patient's experience.

Limitations of the Study

Our study has several limitations. First, the small sample size could have affected our results, may have amplified selection biases, and thus limit the generalizability of data. It is necessary to take these issues into account when interpreting the results. Future research will require a larger sample size to obtain results with more robust statistical evidence. The power of the tests performed was estimated, and this ranged between 30 and 50%, depending on the specific test considered. We made a calculation of the number of participants required to have a power of 90% using the student t-test with the following hypothesis: significance equal to 0.05, minimum clinically significant difference equal to 5 (this was our choice), and standard deviation equal to 10 (not always respected in the data in our possession). We obtained an estimate for 70 individuals in each group.

Second, 33% (19 participants) of the consecutive outpatients diagnosed with HS referred to the Dermatology Unit were not recruited (13 participants because they did not agree to participate and 6 participants because they did not fit the inclusion criteria), so that we have to consider the possibility of selection bias due to the response rate. The lower number of participants in the control group compared to the *HS Group* (28 participants vs 38 participants), could introduce further bias affecting the reliability of the statistical comparisons.

Third, data about psychiatric symptoms were collected only using self-administered questionnaires, tools that inevitably are less accurate than observer-rated scales or structured interviews (Sajatovic & Ramirez, 2003; Wood & Gupta, 2017) even when completed in the presence of a researcher and in the context of a clinical interview.

Fourth, the evaluation of psychiatric comorbidity with a screening questionnaire such as the GHQ-28 may increase the risk of a high false positive rate in the prevalence of psychiatric symptoms detected by our study. The best assessment of the psychiatric comorbidity of the sample would require the use of more specific standardized assessment tools and a diagnostic evaluation carried out in accordance with the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-V) (American Psychiatric Association, 2013).

For these reasons, further studies are recommended in order to increase the sample size and to develop a more specific methodology to explore the psychological implications of HS and the correlations between psychological and HS variables.

Conclusion

Despite these limitations, our study, in accordance with previous studies, shows significant psychiatric comorbidity in HS patients and the strong emotional impact of the disease. Psychiatric symptoms, including depression, somatic symptoms, social dysfunction, anxiety, and insomnia, were higher than among matched controls. State anger, emotional fragility, and low self-esteem were found to be important psychological correlates of HS. To the best of our knowledge, this is the first study with a control group to consider anger and emotional fragility as psychological correlates in patients affected by HS.

We know that patient's subjective experience of illness is strongly influenced by personality traits, cognitive frames and individual emotional reactivity, and that stress and emotions may exacerbate inflammatory skin disorders (de Zoysa, 2013; Shenefelt, 2010; Rodriguez-Vallecio & Woodbury-Farina, 2014; Connor, 2017). In HS, patient anger can affect the severity of the clinical picture, and impair compliance to treatment. Anger can affect the quality of the doctor–patient relationship, triggering negative counter-transference on the part of the clinician, escalating interpersonal discord and diminishing empathy and active listening, leading to reduced quality of care and treatment effectiveness (Romas & Sharma, 2017). Emotional fragility in the patient can contribute to increased experiences of discomfort, vulnerability, and persecutory anxiety, which can intensifying feelings of inadequacy in dealing with their HS. All this can activate a cycle between skin disease flares and maladaptive emotional responses.

Moreover, we believe that observation of state anger and emotional fragility in a sample of HS patients who did not show clinically significant mean depression scores, and who did not show substantially low mean self-esteem scores, could be indicative of the significant emotional impact of HS on the psychological status of the patient independently from, or even before, the onset of a depressive syndrome and before self-esteem is compromised. It could also be hypothesized that anger and emotional fragility triggered by HS are factors that contribute, in the long term, to depressive suffering and self-esteem decreases in patients. This hypothesis, clearly, has to be verified with a longitudinal study and a larger sample size.

Placing emphasis on assessment of state anger and emotional fragility in HS patients can mean a reduction in psychological suffering due to the skin condition through enhancement of the therapeutic alliance and breaking the disease flare and maladaptive emotional response cycle, possible reducing the risk of developing other psychiatric comorbidities.

Another aspect we believe to emerge from our study is the relevance of screening for psychological distress and psychiatric symptoms in the assessment of HS patients. Even though the evaluation of the psychometric instruments for HS patients was not within the scope of this study, we highlight the clinical value of carrying out psychopathological screening early in the stage of patient care. For this purpose, the GHQ-28 provides a quick and easily administrable tool.

To date, there are no formal guidelines for treating HS-specific psychological comorbidities (Patel et al., 2017) and no specific studies are available to describe the effect of psychosocial support measures in HS (Zouboulis et al., 2015). However, several studies provide recommendations for assessment and intervention, and many issues are to be considered in order to meet the needs of patients. It is essential to make psychological counseling and/or psychiatric consultation available (Huilaja et al., 2018; Vekic & Cains, 2018), referring patients to psychosocial support services and/or to psychiatric services if necessary (Saunte & Jemec, 2017; Dauden et al., 2018; Kouris et al., 2016; Bettoli et al., 2016). Self-report psychometric instruments and psychological interviews are specific tools for assessment, and psychological supervision would be helpful for staff support (Shah, 2018). The best strategy would be to provide psychological and psychiatric intervention within a multidisciplinary team that could be configured as a psychodermatology service in which patients can feel welcomed and treated in an integrated way (Poot, Sampogna & Onnis, 2007; Bewley et al., 2012; Yadav, Narang & Kumaran, 2013; Maikhanh Nguyen et al., 2015; Azambuja, 2017; Connor, 2017; Jafferany & Pastolero, 2018; Shah, 2018): HS patient should be able to find in the clinical interview the right empathic listening, a therapeutic holding environment and the possibility for working through his/her anger. Clinicians should take into particular consideration anxiety, depression, suicidal risk, and sexual problems of patients (Patel et al., 2017; Janse et al., 2017; Ofenloch, 2017; Kurek et al., 2012), thus “*treating the HS patient with psychiatric comorbidities in mind*” (Thorlaciuc et al., 2018). Furthermore, it is useful to provide patients the opportunity to share common experiences through participation in self-help groups (Kontochristopoulos et al., 2017; Esmann & Jemec, 2011; Vekic & Cains, 2018; Smith et al., 2010; Alikhan et al., 2009). Finally, good communication and ongoing provision of information to patients will be important to help them better understand their illness, to gain greater awareness of their illness, and to increase their compliance with treatment (Vekic & Cains, 2018; Smith et al., 2010; Bettoli et al., 2016). It should be taken into account that the provision of information should never be detached from the psychological support that can be ensured through the establishment of a good therapeutic relationship.

Therefore, both as in the initial assessment and in the subsequent intervention, a psychodermatological approach is needed to ensure the fundamental goals of clinical practice are met, and to manage the emotional and relational problems that could arise throughout the treatment and evolution of the disease.

Compliance with Ethical Standards

Conflict of interest Stefano Tugnoli, Chiara Agnoli, Ambra Silvestri, Silvia Giari, Stefano Caracciolo, and Vincenzo Bettoli declare that they have no conflicts of interest.

Human and Animal Rights All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (the Ethics Committee of the province of Ferrara), and with the Helsinki Declaration of 1975, as revised in 2000.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

- Alavi, A., Anooshirvani, N., Kim, W. B., Coutts, P., & Sibbald, R. G. (2015). Quality-of-life impairment in patients with hidradenitis suppurativa: A Canadian study. *American Journal of Clinical Dermatology*, *16*, 61–65.
- Alavi, A., Farzanfar, D., Lee, R. K., & Almutairi, D. (2018). The contribution of malodour in quality of life of patients with hidradenitis suppurativa. *Journal of Cutaneous Medicine and Surgery*, *22*, 166–174.
- Alikhan, A., Lynch, P. J., & Eisen, D. B. (2009). Hidradenitis suppurativa: A comprehensive review. *Journal of the American Academy of Dermatology*, *60*, 539–561.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)*. Washington, DC: American Psychiatric Publishing.
- Azambuja, R. D. (2017). The need of dermatologists, psychiatrists and psychologists joint care in psychodermatology. *Anais Brasileiros de Dermatologia*, *92*, 63–71.
- Balieva, F., Kupfer, J., Lien, L., Gieler, U., Finlay, A. Y., Tomás-Aragónés, L., ... & Dalgard, F. J. (2017). The burden of common skin diseases assessed with the EQ5D™: A European multicentre study in 13 countries. *British Journal of Dermatology*, *176*, 1170–1178.
- Balieva, F., Lien, L., Kupfer, J., Halvorsen, J. A., & Dalgard, F. (2016). Are common skin diseases among Norwegian dermatological outpatients associated with psychological problems compared with controls? An observational study. *Acta Dermato-Venereologica*, *96*, 227–231.
- Beck, A. T., & Steer, R. A. (1993). *Manual for the Beck hopelessness scale* (2nd ed.). San Antonio, TX: Psychological Corporation.
- Beck, A. T., Steer, R. A., & Brown, G. (1996). *BDI-II. Beck depression inventory-II Manual*. New York: Psychological Corporation.
- Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: the hopelessness scale. *Journal of Consulting and Clinical Psychology*, *42*, 861–865.
- Benjamins, M., van der Wal, V. B., & de Korte, J. (2009). Quality of life in Dutch patients with hidradenitis suppurativa (acne inversa). *Nederlands Tijdschrift voor Dermatologie en Venereologie*, *19*, 446–450.
- Bettoli, V., Pasquinucci, S., Caracciolo, S., Piccolo, D., Cazzaniga, S., Fantini, F., ... & Naldi, L. (2016). The hidradenitis suppurativa patient journey in Italy: Current status, unmet needs and opportunities. *Journal of the European Academy of Dermatology and Venereology*, *30*, 1965–1970.
- Bewley, A. P., Fleming, C., & Taylor, R. (2012). Psychocutaneous medicine and its provision in the UK. *British Journal of Dermatology*, *167*, 36–37.
- Bridges, K., & Goldberg, D. P. (1986). The validation of the GHQ-28 and the use of the MMSE in neurological in-patients. *British Journal of Psychiatry*, *148*, 548–553.
- Caprara, G. V. (1982). A comparison of the frustration-aggression and emotional susceptibility hypotheses. *Aggressive Behavior*, *8*, 234–236.
- Caprara, G. V. (1983). La misura dell'aggressività: contributo di ricerca per la costruzione e la validazione di due scale per la misura dell'irritabilità e della suscettibilità emotiva. *Giornale Italiano di Psicologia*, *10*, 91–111.
- Caprara, G. V. (1986). Indicators of aggressiveness: The dissipation-rumination scale. *Personality and Individual Differences*, *7*, 763–769.
- Caprara, G. V., Barbaranelli, C., Pastorelli, C., & Perugini, M. (1991a). *Indicatori della condotta aggressiva: Irritabilità e Ruminazione/Dissipazione—Manuale*. Firenze: Organizzazioni Speciali.
- Caprara, G. V., Cinanni, V., D'Imperio, G., Passerini, S., Renzi, P., & Travaglia, G. (1985). Indicators of impulsive aggression: Present status of research on irritability and emotional susceptibility scales. *Personality and Individual Differences*, *6*, 665–674.
- Caprara, G. V., Perugini, M., Barbaranelli, C., & Pastorelli, C. (1991b). *Scala per la misura della fragilità emotiva—Manuale*. Firenze: Organizzazioni Speciali.
- Caprara, G. V., Renzi, P., Alcini, P., D'Imperio, G., & Travaglia, G. (1983). Instigation to aggress and escalation of aggression examined from a personological perspective: the role of irritability and of emotional susceptibility. *Aggressive Behavior*, *9*, 345–351.
- Caprara, G. V., Renzi, P., D'Aguello, D., D'Imperio, G., Rielli, I., & Travaglia, G. (1986). Interpolating physical exercise between instigation to aggress and aggression: The role of irritability and emotional susceptibility. *Aggressive Behavior*, *12*, 83–91.
- Comunian, A. L. (2004). *STAXI-2—State-trait anger expression inventory. La misura della rabbia*. Firenze: OS Organizzazioni Speciali.
- Connor, C. J. (2017). Management of the psychological comorbidities of dermatological conditions: practitioners' guidelines. *Clinical, Cosmetic and Investigational Dermatology*, *20*, 117–132.
- Crowley, J. J., Mekkes, J. R., Zouboulis, C. C., Scheinfeld, N., Kimball, A., Sundaram, M., ... & Kerdel, F. (2014). Association of hidradenitis suppurativa disease severity with increased risk for systemic comorbidities. *British Journal of Dermatology*, *171*, 1561–1565.
- Dalgard, F. J., Gieler, U., Tomas-Aragones, L., Lien, L., Poot, F., Jemec, G. B., ... & Kupfer, J. (2015). The psychological burden of skin diseases: A cross-sectional multicenter study among dermatological out-patients in 13 European countries. *Journal of Investigative Dermatology*, *135*, 984–991.
- Danby, F. W., & Margesson, L. J. (2010). Hidradenitis suppurativa. *Dermatologic Clinics*, *28*, 779–793.
- Dauden, E., Lazaro, P., Aguilar, M. D., Blasco, A. J., Suarez, C., Marin, I., ... & García Campayo, J. (2018). Recommendations for the management of comorbidity in hidradenitis suppurativa. *Journal of the European Academy of Dermatology and Venereology*, *32*, 129–144.
- de Zoysa, P. (2013). Psychological interventions in dermatology. *Indian Journal of Dermatology*, *58*, 56–60.

- Deckers, I. E., & Kimball, A. B. (2016). The handicap of hidradenitis suppurativa. *Dermatologic Clinics*, *34*, 17–22.
- Delany, E., Gormley, G., Hughes, R., McCarthy, S., Kirthi, S., Markham, T., ... & Kirby, B. (2018). A cross-sectional epidemiological study of hidradenitis suppurativa in an Irish population (SHIP). *Journal of the European Academy of Dermatology and Venereology*, *32*, 467–473.
- Dessinioti, C., Katsambas, A., & Antoniou, C. (2014). Hidradenitis suppurativa (acne inversa) as a systemic disease. *Clinics in Dermatology*, *32*, 397–408.
- Dufour, D. N., Emtestam, L., & Jemec, G. B. (2014). Hidradenitis suppurativa: a common and burdensome, yet underrecognised, inflammatory skin disease. *Postgraduate Medical Journal*, *90*, 216–221.
- Esmann, S., & Jemec, G. B. (2011). Psychosocial impact of hidradenitis suppurativa: A qualitative study. *Acta Dermato-Venereologica*, *91*, 328–332.
- Finlay-Jones, R. A., & Murphy, E. (1979). Severity of psychiatric disorder and the 30-item GHQ. *British Journal of Psychiatry*, *134*, 609–616.
- Garg, A., Pomerantz, H., Midura, M., Papgermanos, V., Strunk, A., Merson, J., & Alloo Hofstra, A. (2017). Completed suicide in patients with hidradenitis suppurativa: A population analysis in the United States. *Journal of Investigative Dermatology*, *137*, S38.
- Ghisi, M., Flebus, G. B., Montano, A., Sanavio, E., & Sica, C. (2006). *Beck Depression Inventory-II. Manuale italiano*. Firenze: Organizzazioni Speciali.
- Goldberg, D. P. (1972). *The detection of psychiatric illness by questionnaire. Maudsley Monograph No 21*. London: Oxford University Press.
- Goldberg, D. P. (1978). *Manual of the General Health Questionnaire*. Windsor: NFER Publishing.
- Goldberg, D. P., Gater, R., Sartorius, N., Ustun, T. B., Piccinelli, M., Gureje, O., & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine*, *27*, 191–197.
- Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine*, *9*, 139–145.
- Gooderham, M., & Papp, K. (2015). The psychosocial impact of hidradenitis suppurativa. *Journal of the American Academy of Dermatology*, *73*, S19–S22.
- Gupta, M. A., & Gupta, A. K. (1996). Psychodermatology: An update. *Journal of the American Academy of Dermatology*, *34*, 1030–1036.
- Gupta, M. A., & Levenson, J. L. (2017). Dermatological Disorders. In J. L. Levenson & S. J. Ferrando (Eds.), *Clinical manual of psychopharmacology in the medically ill* (pp. 515–554). Arlington, VA: American Psychiatric Association Publishing.
- Heatheron, T. F., & Wyland, C. L. (2003). Assessing self-esteem. In S. J. Lopez & C. R. Snyder (Eds.), *Positive psychological assessment: A handbook of models and measures* (pp. 219–233). Washington, DC: American Psychological Association.
- Horváth, B., Janse, I. C., & Sibbald, G. R. (2015). Pain management in patients with hidradenitis suppurativa. *Journal of the American Academy of Dermatology*, *73*, S47–S51.
- Hughes, J. E., Barraclough, B. M., Hamblin, L. G., & White, J. E. (1983). Psychiatric symptoms in dermatology patients. *British Journal of Psychiatry*, *143*, 51–54.
- Huilaja, L., Tiri, H., Jokelainen, J., Timonen, M., & Tasanen, K. (2018). Patients with hidradenitis suppurativa have a high psychiatric disease burden: A Finnish nationwide registry study. *Journal of Investigative Dermatology*, *138*, 46–51.
- Jackson, C. (2007). The General Health Questionnaire. *Occupational Medicine*, *57*, 79.
- Jafferany, M., & Pastolero, P. (2018). Psychiatric and psychological impact of chronic skin disease. *The Primary Care Companion for CNS Disorders*. <https://doi.org/10.4088/PCC.17nr02247>.
- Janse, I. C., Deckers, I. E., van der Maten, A. D., Evers, A. W. M., Boer, J., van der Zee, H. H., ... & Horváth, B. (2017). Sexual health and quality of life are impaired in hidradenitis suppurativa: A multicentre cross-sectional study. *British Journal of Dermatology*, *176*, 1042–1047.
- Jemec, G. B. (2017). Quality of life considerations and pain management in hidradenitis suppurativa. *Seminars in Cutaneous Medicine and Surgery*, *36*, 75–78.
- Jemec, G. B. (2018). Hidradenitis suppurativa and intimacy. *International Journal of Women's Dermatology*, *5*, 72–73.
- Jemec, G. B., Heidenheim, M., & Nielsen, N. H. (1996). The prevalence of hidradenitis suppurativa and its potential precursor lesions. *Journal of the American Academy of Dermatology*, *35*, 1914.
- Kaaz, K., Matusiak, L., & Szepletowski, J. C. (2017). Sleep disturbances among hidradenitis suppurativa patients. *Experimental Dermatology*, *26*, 3–38.
- Kennedy, J. (2008). Hidradenitis suppurativa: A diagnostic dilemma for sexual health. *New Zealand Medical Journal*, *121*, 58–62.
- Kirby, J. S., Butt, M., Esmann, S., & Jemec, G. B. E. (2017). Association of resilience with depression and health-related quality of life for patients with hidradenitis suppurativa. *JAMA Dermatology*, *153*, 1263–1269.
- Kjaersgaard Andersen, R., Theut Riis, P., & Jemec, G. B. E. (2018). Factors predicting the self-evaluated health of hidradenitis suppurativa patients recruited from an outpatient clinic. *Journal of the European Academy of Dermatology and Venereology*, *32*, 313–317.
- Kluger, N., Ranta, M., & Serlachius, M. (2017). The burden of hidradenitis suppurativa in a cohort of patients in Southern Finland: A pilot study. *Skin Appendage Disord*, *3*, 20–27.
- Kontochristopoulos, G., Sygros, A., Kouris, A., Tzanetakou, V., Platsidaki, E., Christodoulou, C., Dessinioti, C., & Antoniou, C. (2017). Quality of life and psychosocial implications in hidradenitis suppurativa. *Journal of the American Academy of Dermatology*, *76*.
- Kouris, A., Platsidaki, E., Christodoulou, C., Efstathiou, V., Dessinioti, C., Tzanetakou, V., ... & Kontochristopoulos, G. (2016). Quality of life and psychosocial implications in patients with hidradenitis suppurativa. *Dermatology*, *232*, 687–691.
- Kurek, A., Johanne Peters, E. M., Sabat, R., Sterry, W., & Schneider-Burrus, S. (2013). Depression is a frequent comorbidity in patients with acne inversa. *Journal der Deutschen Dermatologischen Gesellschaft*, *11*, 743–749.
- Kurek, A., Peters, E. M., Chanwangpong, A., Sabat, R., Sterry, W., & Schneider-Burrus, S. (2012). Profound disturbances of sexual health in patients with acne inversa. *Journal of the American Academy of Dermatology*, *67*, 422–428.
- Maikhanh Nguyen, C., Danesh, M., Beroukham, K., Sorenson, E., Leon, A., & Koo, J. (2015). Psychodermatology: A Review. *Practical Dermatology*, *5*, 49–54.
- Matusiak, L. (2018). Profound consequences of hidradenitis suppurativa: A review. *British Journal of Dermatology*. <https://doi.org/10.1111/bjd.16603>.
- Matusiak, L., Bieniek, A., & Szepletowski, J. C. (2010a). Hidradenitis suppurativa markedly decreases quality of life and professional activity. *Journal of the American Academy of Dermatology*, *62*, 706–708.
- Matusiak, L., Bieniek, A., & Szepletowski, J. C. (2010b). Psychophysical aspects of hidradenitis suppurativa. *Acta Dermato-Venereologica*, *90*, 264–268.
- Matusiak, L., Szczęch, J., Kaaz, K., Lelonek, E., & Szepletowski, J. C. (2018). Clinical characteristics of pruritus and pain in patients

- with hidradenitis suppurativa. *Acta Dermato-Venereologica*, 98, 191–194.
- Miller, I. M., McAndrew, R. J., & Hamzavi, I. (2016). Prevalence, risk factors, and comorbidities of hidradenitis suppurativa. *Dermatologic Clinics*, 34, 7–16.
- Nazary, M., Van der Zee, H. H., Prens, E. P., Folkerts, G., & Boer, J. (2011). Pathogenesis and pharmacotherapy of hidradenitis suppurativa. *European Journal of Pharmacology*, 672, 1–8.
- Ofenloch, R. F. (2017). Healthrelated quality of life in hidradenitis suppurativa. *British Journal of Dermatology*, 176, 861–862.
- Onderdijk, A. J., Van der Zee, H. H., Esmann, S., Lophaven, S., Dufour, D. N., Jemec, G. B., & Boer, J. (2013). Depression in patients with hidradenitis suppurativa. *Journal of the European Academy of Dermatology and Venereology*, 27, 473–478.
- Papadopoulos, L., Bor, R., & Legg, C. (1999). Psychological factors in cutaneous disease: An overview of research. *Psychology, Health & Medicine*, 4, 107–126.
- Patel, Z. S., Hoffman, L. K., Buse, D. C., Grinberg, A. S., Afifi, L., Cohen, S. R., ..., & Seng, E.K. (2017). Pain, psychological comorbidities, disability, and impaired quality of life in hidradenitis suppurativa. *Current Pain and Headache Report*, 21, 49.
- Picardi, A., Abeni, D., Melchi, C. F., Puddu, P., & Pasquini, P. (2000). Psychiatric morbidity in dermatological outpatients: an issue to be recognized. *British Journal of Dermatology*, 143, 983–991.
- Pompili, M., Iliceto, P., Lester, D., Innamorati, M., Girardi, P., & Tatarelli, R. (2009). *BHS Beck Hopelessness Scale. Manuale*. Firenze: Giunti O.S. Organizzazioni Speciali.
- Poot, F., Sampogna, F., & Onnis, L. (2007). Basic knowledge in psychodermatology. *Journal of the European Academy of Dermatology and Venereology*, 21, 227–234.
- Porter, M. L., & Kimball, A. B. (2017). Comorbidities of hidradenitis suppurativa. *Seminars in Cutaneous Medicine and Surgery*, 36, 55–57.
- Prezza, M., Trombaccia, F. R., & Armento, L. (1997). La scala dell'autostima di Rosenberg: traduzione e validazione italiana. *Bollettino di Psicologia Applicata*, 223, 35–44.
- Rabins, P. V., & Brooks, B. R. (1981). Emotional disturbance in multiple sclerosis patients: Validity of the General Health Questionnaire (GHQ). *Psychological Medicine*, 11, 425–427.
- Ramussen, J. E. (1990). Psychosomatic dermatology. *Archives of Dermatology*, 126, 90–93.
- Rodriguez-Vallecio, E., & Woodbury-Farina, M. A. (2014). Dermatological manifestation of stress in normal and psychiatric population. *Psychiatric Clinics of North America*, 37, 625–651.
- Romas, J. A., & Sharma, M. (2017). Managing anger and resolving conflicts. In J. A. Romas & M. Sharma (Eds.), *Practical stress management* (pp. 91–109). Cambridge: Academic Press.
- Root, S., Kent, G., & Al'Abadie, M. S. K. (1994). Disease severity, disability and stress in patients undergoing PUVA treatment for psoriasis. *Dermatology*, 189, 234–237.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Sajatovic, M., & Ramirez, L. F. (2003). *Rating scales in mental health* (2nd ed.). Hudson, OH: Lexi-Comp.
- Sampogna, F., Abeni, D., Gieler, U., Tomas-Aragones, L., Lien, L., Titeca, G., ..., & Dalgard, F. (2017). Impairment of sexual life in 3485 dermatological outpatients from a multicentre study in 13 European countries. *Acta Dermato-Venereol*, 97, 478–482.
- Sartorius, K., Emtestam, L., Jemec, G. B., & Lapins, J. (2009). Objective scoring of hidradenitis suppurativa reflecting the role of tobacco smoking and obesity. *British Journal of Dermatology*, 161, 831–839.
- Sartorius, K., Killasli, H., Heilborn, J., Jemec, G. B., Lapins, J., & Emtestam, L. (2010). Interobserver variability of clinical scores in hidradenitis suppurativa is low. *British Journal of Dermatology*, 162, 1261–1268.
- Sartorius, K., Lapins, J., Emtestam, L., & Jemec, G. B. (2003). Suggestions for uniform outcome variables when reporting treatment effects in hidradenitis suppurativa. *British Journal of Dermatology*, 149, 211–213.
- Saunte, D. M., Boer, J., Stratigos, A., Szepietowski, J. C., Hamzavi, I., Kim, K. H., ..., & Jemec, G. B. (2015). Diagnostic delay in hidradenitis suppurativa is a global problem. *British Journal of Dermatology*, 173, 1546–1549.
- Saunte, D. M. L., & Jemec, G. B. E. (2017). Hidradenitis suppurativa: Advances in diagnosis and treatment. *JAMA*, 318, 2019–2032.
- SchneiderBurrus, S., Jost, A., Peters, E. M. J., WitteHaendel, E., Sterry, W., & Sabat, R. (2018). Association of hidradenitis suppurativa with body image. *JAMA Dermatology*, 154, 447–451.
- Shah, R. B. (2018). Impact of collaboration between psychologists and dermatologists: UK hospital system example. *International Journal of Women's Dermatology*, 4, 8–11.
- Shavit, E., Dreier, J., Freud, T., Halevy, S., Vinker, S., & Cohen, A. D. (2015). Psychiatric comorbidities in 3207 patients with hidradenitis suppurativa. *Journal of the European Academy of Dermatology and Venereology*, 29, 371–376.
- Shenefelt, P. D. (2010). Psychological interventions in the management of common skin conditions. *Psychology Research and Behavior Management*, 3, 51–63.
- Shlyankevich, J., Chen, A. J., Kim, G. E., & Kimball, A. B. (2014). Hidradenitis suppurativa is a systemic disease with substantial comorbidity burden: A chartverified casecontrol analysis. *Journal of the American Academy of Dermatology*, 71, 1144–1150.
- Slyper, M., Strunk, A., & Garg, A. (2018). Incidence of sexual dysfunction among patients with hidradenitis suppurativa: A population based retrospective analysis. *British Journal of Dermatology*, 179, 502–503.
- Smith, H. S., Chao, J. D., & Teitelbaum, J. (2010). Painful hidradenitis suppurativa. *Clinical Journal of Pain*, 26, 435–444.
- Spielberger, C. D. (1999). *State-trait anger expression inventory-2: Professional manual*. Odessa, FL: Psychological Assessment Resources Inc.
- Thompson, C. (Ed.). (1989). *The instruments of psychiatric research*. Chichester: Wiley-Blackwell.
- Thorlacius, L., Cohen, A. D., Gislason, G. H., Jemec, G. B. E., & Egeberg, A. (2018). Increased suicide risk in patients with hidradenitis suppurativa. *Journal of Investigative Dermatology*, 138, 52–57.
- Tiri, H., Jokelainen, J., Timonen, M., Tasanen, K., & Huilaja, L. (2018). Somatic and psychiatric comorbidities of hidradenitis suppurativa in children and adolescents. *Journal of the American Academy of Dermatology*, 79, 514–519.
- Tugnoli, S., Bettoli, V., Agnoli, C., & Caracciolo, S. (2016a). Emotions and bodily experience in hidradenitis suppurativa-acne inversa. *Clinica Terapeutica*, 167, 55–62.
- Tugnoli, S., Bettoli, V., Agnoli, C., Giari, S., Toni, G., Virgili, A., & Caracciolo, S. (2016b). Psychiatric morbidity and anger in patients with hidradenitis suppurativa-acne inversa and the impact on quality of life of caregivers. *Experimental Dermatology*, 25, 13.
- Tugnoli, S., Bettoli, V., Agnoli, C., Giari, S., Virgili, A., & Caracciolo, S. (2015). Correlati psicoaffettivi in pazienti con idrosadenite suppurativa-acne inversa. *Medicina Psicosomatica*, 60, 44.
- Tugnoli, S., Silvestri, A., Agnoli, C., Giari, S., Caracciolo, S., & Bettoli, V. (2017). Psychiatric comorbidity, depression, self-esteem and anger in patients with hidradenitis suppurativa-acne inversa. *Experimental Dermatology*, 26, 31.
- van Hemert, A. M., den Heijer, M., Vorstenbosch, M., & Bolk, J. H. (1995). Detecting psychiatric disorders in medical practice using the General Health Questionnaire. Why do cut-off scores vary? *Psychological Medicine*, 25, 165–170.

- Vangipuram, R., Vaidya, T., Jandarov, R., & Alikhan, A. (2016). Factors contributing to depression and chronic pain in patients with hidradenitis suppurativa: Results from a single-center retrospective review. *Dermatology*, *232*, 692–695.
- Vazquez, B. G., Alikhan, A., Weaver, A. L., Wetter, D. A., & Davis, M. D. (2013). Incidence of hidradenitis suppurativa and associated factors: A population-based study of Olmsted County, Minnesota. *Journal of Investigative Dermatology*, *133*, 97–103.
- Vekic, D. A., & Cains, G. D. (2018). Hidradenitis suppurativa, a review of pathogenesis, associations and management. Part 2. *Australasian Journal of Dermatology*, *59*, 261–266.
- von der Werth, J. M., & Jemec, G. B. (2001). Morbidity in patients with hidradenitis suppurativa. *British Journal of Dermatology*, *144*, 809–813.
- Vossen, A. R. J. V., Schoenmakers, A., van Straalen, K. R., Prens, E. P., & van der Zee, H. H. (2017). Assessing pruritus in hidradenitis suppurativa: A cross-sectional study. *American Journal of Clinical Dermatology*, *18*, 687–695.
- Wolkenstein, P., Loundou, A., Barrau, K., Auquier, P., & Revuz, J. (2007). Quality of life Group of the French Society of Dermatology. Quality of life impairment in hidradenitis suppurativa: A study of 61 cases. *Journal of the American Academy of Dermatology*, *56*, 621–623.
- Wood, J. M., & Gupta, S. (2017). Using rating scales in a clinical setting: A guide for psychiatrists. *Current Psychiatry*, *16*, 21–25.
- Yadav, S., Narang, T., & Kumaran, M. S. (2013). Psychodermatology: A comprehensive review. *Indian Journal of Dermatology, Venereology and Leprology*, *79*, 176–192.
- Yazdanyar, S., & Jemec, G. B. (2011). Hidradenitis suppurativa: A review of cause and treatment. *Current Opinion in Infectious Diseases*, *24*, 118–123.
- Zouboulis, C. C., Desai, N., Emtestam, L., Hunger, R. E., Ioannides, D., Juhász, I., ..., & Jemec, G. B. (2015). European S1 guideline for the treatment of hidradenitis suppurativa/acne inversa. *Journal of the European Academy of Dermatology and Venereology*, *29*, 619–644.

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