



Sexuality in Persons With Hidradenitis Suppurativa: Factors Associated With Sexual Desire and Functioning Impairment

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Hidradenitis Suppurativa (HS) is a chronic skin disease involving intimate and sensitive areas and affecting physical and mental health. We investigated the prevalence of sexual desire and functioning impairment, and their associations with quality of life, anxiety, depression, minor psychiatric disorders (MPD), and clinical features (e.g., disease severity) in 77 patients with HS who completed self-report measures and answered to questions assessing socio-demographic characteristics, lifestyle habits, and hindered sexuality due to HS. The majority of patients reported hindered sexuality, and poor sexual functioning, while showing good levels of dyadic and solitary sexual desire. No associations were found between clinical severity and sexuality measures. Multivariate analyses showed significant associations of sexual outcome measures with alcohol consumption, low Body Mass Index, family history of HS, and severe skin symptoms. Moreover, we found that the presence of negative psychological factors (i.e., MPD, anxiety, poor mental status) increased the risk of sexual impairment. These findings underline the important role of psychological and sexual aspects in HS patients and suggest that physicians should consider the effect of disease burden on patients' sexual health.

Keywords: dermatology, acne inversa, sexual functioning, skin-related quality of life, anxiety, psychological distress, general health

INTRODUCTION

Hidradenitis Suppurativa (HS) is a chronic, inflammatory, progressive, debilitating skin disease, characterized by painful, deep-seated, inflamed lesions, including nodules, sinus tracts, and malodorous abscesses (1). Literature reviews of previous studies (2, 3) suggested that HS causes a significant impairment of patients' quality of life (QoL) and that depression and anxiety are common comorbidities in individuals with HS. Moreover, people with HS reported high levels of alexithymia and psychological distress (4) as well as the worst quality of life among different skin conditions (5). Finally, due to the localization of lesions in sensitive and intimate body areas, HS may cause embarrassment and shame (5, 6) that hinder sexual activities (7).

Sexuality refers to “perceptions about one's body; the need to touch and connect with others, in both intimate and social settings; interest and ability to engage in sexual behaviors; communication of one's feelings and needs to others; and the ability to engage in satisfying sexual behaviors” (8).

Impairment in sexual functioning can cause different types of maladjustment, including frustration, anxiety, depression, and damaged relationships with partners (9). Most skin diseases may have negative effects on patients' self-perception, body image, and social relationships, causing impairment in sexual functioning (10, 11). The study of Sampogna et al. (12) found that about a quarter of dermatological patients reported sexual problems, with 66.7% of HS patients having the highest level of sexual impairment. This study also showed that sexual problems in the whole sample were strongly associated with depression, anxiety, and suicidal ideation, were generally more frequent in younger patients, and were positively correlated with clinical severity and itch.

Some studies (13, 14) investigated the role of HS in patients' sexual functioning, which "refers to the normal physiological and performance standards" including "sexual desire, sexual arousal, pain-free intercourse, and orgasm" (15). Recently, Cuenca-Barrales et al. (16) reviewed the scientific evidence on HS and sexual health showing that the prevalence of sexual dysfunction in HS patients ranged from 51 to 62% and that potential risk factors for sexual dysfunction were disease activity, symptoms and the absence of a stable relationship. The authors found that an increased frequency of anxiety and depression in HS patients could represent a vicious circle in which sexual functioning impairment can cause, and is consequence of, mood disorders (16).

To the best of our knowledge, little is known about HS patients' sexual desire, which is an important aspect of sexuality (15). According to a biopsychosocial approach, sexual desire can be defined as "the sum of the forces that lean us toward and push us away from sexual behavior" (17). Female Sexual Interest/Arousal Disorder is defined as "Lack of, or significantly reduced, sexual interest/arousal" (18), as manifested by at least three criteria, with a minimum duration of symptoms of 6 months that cause clinically significant distress in individuals. Instead, the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) defines Male Hypoactive Sexual Desire Disorder as a "Persistently or recurrently deficient (or absent) sexual/erotic thoughts or fantasies and desire for sexual activity," with the same duration and impact as females (18). Spector, Carey and Steinberg (19) described sexual desire as the thoughts that may prompt individuals to search for or be open to sexual opportunities. These authors also proposed a multidimensional conceptualization of sexual desire, encompassing two domains: interest in dyadic sexual behavior (e.g., desired frequency of intercourse) and interest in individual sexual behavior (e.g., desired frequency of masturbation). The aim of this study was to investigate the prevalence of sexual desire and functioning impairment, and their relationships with QoL, anxiety, depression, psychological distress, and clinical features in patients with HS.

MATERIALS AND METHODS

Sample

Seventy-seven consecutive outpatients with HS, attending the Istituto Dermopatico dell'Immacolata (IDI-IRCCS, Italy)

between January 2018 and February 2019, were enrolled at the dedicated HS outpatients' clinic and included in this cross-sectional study. Inclusion criteria were: (1) age 18 years or more; (2) a new diagnosis of HS, or attending the hospital for the first time; (3) history of at least 6 months of HS symptomatology; (4) written, informed consent. Exclusion criteria were: (1) presence of lesions associated with HS in absence of other criteria to fulfill the HS diagnosis; (2) presence of major diseases of the central nervous system; (3) presence of other dermatological diseases or medical comorbidities (e.g., hypertension, diabetes mellitus, or immune-mediated diseases); (4) current major psychiatric disorders; (5) denial of informed consent. The new diagnosis of HS, the history of previous symptoms, and the presence of HS lesions were made by a board-certified dermatologist. The presence of major medical diseases and psychiatric disorders was based on clinical judgment and retrospective assessments. The study was approved by the local Ethics Committee and was carried out in accordance with the 1964 Helsinki Declaration.

Measures

All participants completed a checklist assessing socio-demographic variables, smoking status ("never," "current," "ex-smokers" defined as those who have quit smoking for at least 6 months), alcohol consumption (yes/no), and measured height and weight to calculate Body Mass Index (BMI). Disease severity was assessed using the Hurley staging system (20), the Sartorius score (21), and the International HS Severity Scoring System (IHS4) (22). Pain experienced during the previous week was assessed with the Visual Analog Scale (range 0-10) (23). Other clinical information, including family history, age at onset, disease duration, and number and type of locations involved, was obtained from medical records.

Different measures were used to assess sexual functioning, sexual desire, and hindered sexuality after HS diagnosis. Sexual functioning was assessed using the 19-item Sexual Dysfunction Questionnaire (SDQ). Answers are given on 5-point scale (1: always; 5: never) and a score ≥ 45 indicates the presence of sexual dysfunction (24). A sample item is "I am satisfied with my sex life." Sexual desire was measured with the Sexual Desire Inventory-2 (SDI-2) (19). The questionnaire consists of 14 items, which are rated on a Likert scale, and of two subscales: dyadic sexual desire (items 1-9; maximum score 79) and solitary sexual desire (items 10-14; maximum score 44). Higher scores indicate greater sexual interest. Patients' hindered sexuality was measured using one question with dichotomous answer categories (yes/no): "Is your sexuality hindered by your Hidradenitis Suppurativa?"

Skin-related QoL was assessed with the Skindex-17 questionnaire (25), which measures symptoms and psychosocial aspects. Answers are given on a three-point scale (0: never; 1: rarely/sometimes; 2: often/always), with higher scores indicating a worst skin-related QoL. The 12-item General Health Questionnaire (GHQ-12) was used to assess symptoms of minor psychiatric disorders. Answers are given on a four-point scale. Individuals with scores of 4 or more based on the dichotomous scoring system (0-0-1-1) are defined as GHQ-cases (26). The Hospital Anxiety and Depression Scale (HADS) was used to assess anxiety and depression symptoms (27). Both anxiety and

TABLE 1 | Socio-demographic and clinical characteristics of 77 patients with Hidradenitis Suppurativa.

	N† (%)
Sex	
Males	27 (35.1)
Females	50 (64.9)
Age, years	
Mean (SD)	33.4 (10.6)
Median (IQR)	31 (25-41)
Education level, years	
Low (≤8)	22 (28.6)
Medium (9-13)	34 (44.2)
High (>13)	21 (27.3)
BMI (kg/m²)	
≤24.9	31 (40.8)
25-29.9	26 (34.2)
≥30	19 (25.0)
Smoking status	
Never smokers	14 (18.2)
Current smokers	54 (70.1)
Ex-smokers (at least 6 m)	9 (11.7)
Alcohol use	
No	49 (63.6)
Yes	28 (36.4)
Physical activity	
No	54 (70.1)
Yes	23 (29.9)
Age at onset	
<18	32 (41.6)
≥18	45 (58.4)
Disease duration, y	
Mean (SD)	11.2 (8.2)
Median (IQR)	10 (5-15)
Family history of HS	
No	68 (88.3)
Yes	9 (11.7)
Hurley stage	
I	25 (32.9)
II	45 (59.2)
III	6 (7.9)
Sartorius score	
0-49	44 (57.9)
50-99	20 (26.3)
≥100	12 (15.8)
IHS4	
Mild (≤3)	14 (18.4)
Moderate (4-10)	22 (29.0)
Severe (≥11)	40 (52.6)
Pain (VAS)	
Mean (SD)	5.3 (3.2)
Number of locations involved	
Mean (SD)	2.7 (1.5)

(Continued)

TABLE 1 | Continued

	N† (%)
Involvement of:	
Groin	62 (81.6)
Axilla	50 (65.8)
Gluteal	32 (42.1)
Mammary region	15 (19.7)
Neck	10 (13.2)
Other‡	10 (13.2)

BMI, body mass index; HS, Hidradenitis Suppurativa; SD, Standard Deviation; IQR, Interquartile Range; IHS4, International HS Severity Score System; VAS, Visual Analog Scale.

† Totals vary because of missing values.

‡ back, sacred region, face.

depression subscales include seven items, each of which are rated on a four-point scale (from 0 to 3) with total scores ranging from 0 to 21. A cutoff of 8 on each subscale is used to identify borderline cases, while a cutoff of 11 is used for identifying clinically significant symptoms of both anxiety and depression. General health status was measured using the 36-Item Short Form Health Survey (SF-36) (28). It includes eight dimensions, which are combined to provide a Physical Component Summary (PCS) and a Mental Component Summary (MCS). Scores for each domain range from 0 to 100, with higher scores indicating better health status.

Statistical Analysis

The characteristics of HS patients were described as means and standard deviations (SD), medians and Interquartile Ranges (IQR) for continuous variables, and as absolute and relative frequencies for categorical variables. Since no cutoffs have been previously determined for the SDI-2, tertiles were calculated for each of the two subscales of the instrument. The lowest tertile (T1) was used as an indicator of low dyadic sexual desire (≤42) and low solitary sexual desire (≤2), respectively.

To explore potential factors associated with sexual dysfunction, we carried out uni- and multi-variate analyses for each of the four indices: sexual functioning (presence vs. absence), dyadic and solitary sexual desire (T1 vs. T2-T3), and hindered sexuality (yes vs. no). In the multivariate analysis we used four separate logistic regression models to estimate Odds Ratio and 95% Confidence Intervals, each for a single index as the outcome. Variables significantly associated with the outcomes in the univariate analysis ($p < 0.10$; see **Supplementary Tables 1a–c**) were included in the multivariate analyses. Starting with sex and age, the likelihood ratio test was used for a forward variable selection in the model. Statistical analyses were performed using STATA, release 15 (StataCorp LLC, College Station, TX).

RESULTS

Table 1 provides descriptive statistics on socio-demographic and clinical characteristics of the 77 HS patients. Participants had a

mean age of 33.4 years (SD = 10.6). The majority of HS patients were females (64.9%), were overweight or obese (59.2%), were current or ex-smokers (81.8%), did not exercise (70.1%), were classified as Hurley II e III (67.1%), and reported severe disease according to IHS4 (52.6%).

Table 2 described variables related to sexual health, skin-related QoL, health status, psychological distress, anxiety and depression. The majority of HS patients reported hindered sexuality and sexual dysfunction (61.8 and 60.8%, respectively). The mean values of dyadic and solitary sexual desire measured with the SDI-2 were 43.3 (SD = 16.5) and 8.9 (SD = 8.3), respectively. Our results showed that disease severity and clinical characteristics were not significantly associated with any sexuality measures (see **Supplementary Table 1b**).

We performed different multivariate models (**Table 3**), each adjusted for sex and age plus variables associated with each of the four outcomes in univariate analyses (see **Supplementary Tables 1a–c**). In the first model, we found that high GHQ scores, and low BMI increased risk of sexual dysfunction, whereas family history of HS decreased risk of it. In the second model, high GHQ scores increased risk of low dyadic sexual desire. In third model, we found that low BMI, and poor mental status increased risk of low solitary sexual desire, whereas alcohol consumption decreased risk of it. In the final model, severe skin symptoms and high anxiety scores increased risk of hindered sexuality due to HS.

DISCUSSION

In this study, we found a high frequency of hindered sexuality and sexual dysfunction, and a high prevalence of medium/high levels of both dyadic and solitary sexual desire in patients with HS. Previous studies focused especially on sexual functioning impairment. For example, Alavi et al. (29) found that HS patients reported higher sexual dysfunction, impairment in sexual life, and higher sexual distress (i.e., concerns about sexuality), compared to healthy controls. This study also showed that sexual dysfunction predicted a decline in skin-related quality of life in HS patients when controlling for the effects of disease severity (29). Janse et al. (13) found that sexual health was impaired in HS patients, also showing that late onset of HS was associated with poor sexual function, whereas other clinical features, including anogenital involvement, early onset of HS, disease severity, and disease activity, were associated with worse QoL. The association between sexual functioning impairment and disease severity is still controversial. Our results did not show a higher risk of sexual dysfunction associated with increasing disease severity. These findings are consistent with previous studies (13, 14, 16, 29). For example, Kurek et al. (14) found that HS patients had higher sexual dysfunction and sexual distress compared to matched control subjects, whereas severity of cutaneous alterations correlated neither with sexual dysfunctions nor with sexual distress. Because of its clinical manifestations, HS is a debilitating and painful skin disease, which typically involves intimate body areas and affects patients' physical, social, and

TABLE 2 | Sexual health, quality of life, health status, psychological distress, anxiety and depression in 77 patients with Hidradenitis Suppurativa.

	N† (%)
Hindered sexuality	
No	29 (38.2)
Yes	47 (61.8)
Sexual dysfunction (SDQ)	
Absence (≤ 44)	29 (39.2)
Presence (≥ 45)	45 (60.8)
Dyadic sexual desire (SDI-2)	
Mean (SD)	43.3 (16.5)
Medium/high (T2, T3)	45 (64.3)
Low (T1)‡	25 (35.7)
Solitary sexual desire (SDI-2)	
Mean (SD)	8.9 (8.3)
Medium/high (T2, T3)	44 (64.7)
Low (T1)§	24 (35.3)
Skindex-17 symptoms	
Not severe (0-49.9)	20 (27.8)
Severe (≥ 50.0)	52 (72.2)
Skindex-17 psychosocial	
Mild (≤ 20.82)	13 (18.1)
Moderate (20.83-37.5)	17 (23.6)
Severe (≥ 37.51)	42 (58.3)
MCS-36	
Mean (SD)	35.3 (10.0)
Median (IQR)	34.5 (27.7-43.2)
PCS-36	
Mean (SD)	40.9 (10.8)
Median (IQR)	43.3 (33.0-49.1)
GHQ-12	
0-3	38 (50.7)
≥ 4	37 (49.3)
HADS-Anxiety	
Normal	33 (46.5)
Borderline	10 (14.1)
Positive	28 (39.4)
HADS-depression	
Normal	46 (64.8)
Borderline	15 (21.1)
Positive	10 (14.1)

SDQ, Sexual Dysfunction Questionnaire; SDI, Sexual Desire Inventory; SD, Standard Deviation; T, Tertile; MCS, Mental Component Summary; PCS, Physical Component Summary; GHQ, General Health Questionnaire; HADS, Hospital Anxiety and Depression Scale.

† Totals vary because of missing values.

‡ T1 defined as "low dyadic sexual desire (≤ 42)".

§ T1 defined as "low solitary sexual desire (≤ 2)".

sexual health. We hypothesize that HS compromise patients' sexual life regardless of disease severity.

The presence of negative psychological functioning increased the risk of worse sexuality in our sample. Indeed, patients with minor psychiatric disorders had an increased risk of having sexual dysfunction and low dyadic sexual desire, whereas

TABLE 3 | Multivariate analysis for factors associated with sexual dysfunction, dyadic sexual desire, solitary sexual desire, hindered sexuality (logistic regression models).

	Sexual dysfunction		Dyadic sexual desire		Solitary sexual desire		Hindered sexuality	
	OR (95%CI) [†]	P-value	OR (95%CI) [‡]	P-value	OR (95%CI) [§]	P-value	OR (95%CI) [¶]	P-value
Sex								
Females	1		1		1		1	
Males	0.87 (0.24-3.11)	0.828	0.79 (0.24-2.65)	0.706	0.52 (0.11-2.53)	0.418	0.50 (0.17-1.48)	0.211
Age								
<25.0	1		1		1		1	
25.0-39.9	1.78 (0.44-7.21)	0.422	1.91 (0.45-8.05)	0.381	0.42 (0.07-2.51)	0.338	0.79 (0.20-3.17)	0.745
≥40.0	9.19 (1.38-61.2)	0.022	7.37 (1.46-37.2)	0.016	3.98 (0.56-28.2)	0.166	0.68 (0.15-3.10)	0.620
BMI (kg/m²)								
≤24.9	3.96 (1.11-14.1)	0.033	...		6.27 (1.30-30.2)	0.022	...	
≥25.0	1				1			
Alcohol use								
No					1			
Yes		0.06 (0.01-0.43)	0.004	...	
Family history of HS								
No	1							
Yes	0.04 (0.005-0.43)	0.007	
GHQ-12								
0-3	1		1					
≥4	7.04 (1.93-25.7)	0.003	5.02 (1.50-16.8)	0.009	
MCS, tertiles								
Medium/high (T2, T3)					1			
Low (T1) ^{††}		8.54 (1.65-44.0)	0.010	...	
Skindex-17 symptoms								
Not severe (0-49.9)							1	
Severe (≥50.0)		3.67 (1.13-12.0)	0.031
HADS-Anxiety								
Negative							1	
Positive		4.40 (1.25-15.5)	0.021

HS, Hidradenitis Suppurativa; T, Tertile; OR, Odds Ratio; CI, Confidence Intervals; BMI, body mass index; GHQ, General Health Questionnaire; MCS, Mental Component Summary; HADS, Hospital Anxiety and Depression Scale.

[†]OR estimate the association of characteristics with presence of sexual dysfunction according to Sexual Dysfunction Questionnaire; ORs adjusted for sex, age, BMI, family history of HS and GHQ-12.

[‡]OR estimate the association of characteristics with low dyadic sexual desire according to Sexual Desire Inventory-2; ORs adjusted for sex, age and GHQ-12.

[§]OR estimate the association of characteristics with low solitary sexual desire according to Sexual Desire Inventory-2; ORs adjusted for sex, age, BMI, alcohol use and MCS tertiles.

[¶]OR estimate the association of characteristics with hindered sexuality; ORs adjusted for sex, age, Skindex-17 symptoms and HADS-Anxiety.

^{††}T1 defined as "poor health status".

poor mental status increased the risk of low solitary sexual desire. Moreover, severe skin symptoms according to Skindex-17 and high anxiety were the only factors associated with an increased risk of hindered sexuality. Although previous literature reported associations between severe skin symptoms and both psychological distress (30) and quality of life (31), no previous studies examined the role these factors in negatively affecting sexuality in HS patients. Instead, Esmann and Jemec (7) suggested that severe skin symptoms may interfere with sexuality among HS patients. The authors found that some patients stopped their sexual life because of HS symptomatology and reported that their partners lost interest in them after HS lesions appearance. The latter study also found that HS patients were afraid of others' reaction (e.g., disgust) when they showed hidden parts of their body during

sexual intercourse and they were embarrassed to explain their lesions.

Other factors decreased the risk of worse sexuality in our sample. For example, alcohol consumers among HS patients had a decreased risk of having low solitary sexual desire. Although previous research has examined the role of alcohol use in sexual behavior, little is known whether alcohol consumption is associated with sexual desire in dermatological patients. Commonly, alcohol use can influence individuals' sexual attitudes and behaviors, partly due to social disinhibition (32). Martin et al. (33) found that moderate alcohol use predicted a remission of low sexual desire among middle-aged and older men. Smith et al. (34) have shown that alcohol lowered inhibitions and increased the likelihood of engaging in sexual behaviors among women. We hypothesize that HS patients use

alcohol effects to cope with severe physical symptoms (e.g., pain, itching, smell) and this, in turn, may increase solitary sexual desire. Moreover, patients with a family history of HS had a decreased risk of having sexual dysfunction compared to patients without a family history of HS. This result seems to indicate that having a family history of HS may provide social support, which can buffer against embarrassment, shame, and stigmatization that characterize HS patients' experiences (5), especially for sexual activities. This could indicate that family support for HS patients can help these individuals to cope with the burden of the disease. Surprisingly, we found that patients with low BMI had an increased risk of having sexual dysfunction and lower solitary sexual desire in comparison to patients with high BMI. In the general population the links between sexual function and BMI are unclear. Our results differ from those of previous studies, in which obese and overweight individuals reported an increased risk of sexual dysfunction (35, 36). In contrast, Kadioglu et al. (37) did not find significant differences between obese female and healthy control groups for sexual functioning and desire. Although little is known about these associations in HS patients, Theut Riis et al. (38) found that, in HS patients with low BMI, an increase in BMI was a predictor of increased patient-reported severity. Although higher BMI is associated with low sexual desire in the general population, according to Theut Riis et al. (38) we hypothesize that, in our study, HS patients with low BMI perceived worst physical health due to HS lesions appearance, and this, in turn, may have implications for sexual functioning and desire.

This study has some limitations. First, the small sample size limits the generalizability of these findings. However, HS is a rare disease and it is difficult to collect enough data to obtain statistically significant observations. Second, the cross-sectional design prevents us from making causal interpretations. Third, our findings rely exclusively on self-report measures, which raises the possibility of common method variance problems. The use of a multi-method approach (e.g., self-report and psychophysiological measures) is needed to confirm and extend our findings.

Notwithstanding these limitations, our study is among the first to examine the relationship among sexual desire and functioning, and general health status in patients with HS. Our results suggested that HS patients could have many problems in sexual function, while reporting good levels of sexual interest and desire. In this context, we found that many psychological factors, including minor psychiatric disorders, anxiety, and poor mental status, could increase the disease burden, predisposing to a greater risk of sexual difficulties.

Our findings underline the important role of psychological aspects in HS patients, according to previous conclusions (3), and suggest that physicians should consider the impact of HS on patients' sexual health during assessment and management of the disease. A multidisciplinary therapeutic approach is recommended: in addition to medical prescriptions, HS patients could improve their mental and sexual functioning through specific psychological treatments, such as Cognitive-Behavioral Therapy and Educational Interventions, Sex Therapy, and Rational Emotive Therapy, which have been shown to be effective in previous studies (39). Given the importance of many psychological variables in HS sexual health, dermatologists should also pay more attention to different aspects of distress and suffering, in order to prevent a worsening in sexual function and mental health.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Comitato Etico IDI-IRCCS. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

RMQ and DA designed the study. RMQ, SM, FS, DA, and LI drafted the article. RMQ, LF, and RF administered the questionnaires and collected clinical data. SM and SF carried out the statistical analysis. All authors significantly contributed to the editing of manuscript, data interpretation, discussion, reviewed, and approved the final version for submission.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsy.2021.729104/full#supplementary-material>

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