INVESTIGATIVE REPORT

Psychophysical Aspects of Hidradenitis Suppurativa

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Hidradenitis suppurativa is a recurrent, debilitating suppurative skin disease. The symptoms are much more than just physical, but studies of its impact on patients' psychological state and related quality of life are very limited. The current study was conducted with a group of 54 patients, aged 16–65 years, who had an active, but stable, course of hidradenitis suppurativa. The aim of the study was to determine the influence of hidradenitis suppurativa on a broad spectrum of psychophysical factors. Assessment was carried out using several questionnaires, which revealed the following mean scores: Dermatology Life Quality Index (DLQI) (12.67 ± 7.7), Beck Depression Inventory-Short Form (BDI-SF) (5.87 ± 4.68), Evers et al. "6-Item Scale" (3.87 ± 3.65), EQ-5D (0.66 ± 0.23 (health index) and 56.78 ± 18.84 (VAS)), Functional Assessment of Chronic Illness Therapy – Fatigue scale (FACIT-F) (32.06 ± 11.01) and Quality of Life Enjoyment and Satisfaction Questionnaire Short Form (Q-LES-Q-SF) (56.44 ± 15.17%). The results highlight the important impact of hidradenitis suppurativa on a wide spectrum of psychophysical aspects and impairment of related quality of life among patients. Our findings indicate that advancement of the disease seems to be the most important factor negatively influencing patients' well-being ($p < 0.01$). It is noteworthy that an anogenital location appears to impair the hidradenitis suppurativa patients' quality of life most of all ($p < 0.05$), but the occurrence of lesions on uncovered skin plays a crucial role in the stigmatization level ($p < 0.05$). *Key words: hidradenitis suppurativa; acne inversa; quality of life; DLQI; BDI; EQ-5D; FACIT-F; Q-LES-Q-SF.*

The skin is a very important organ for our proper psychological and physical functioning, as it is the largest and most visible part of the body, and plays an essential role in interpersonal relationships, self-esteem, and perception of self-image and public image. Therefore, the symptoms of hidradenitis suppurativa (HS), a dermatological condition characterized as recurrent, suppurative disease manifested by abscesses, fistulas and scarring, are much more than just physical (soreness, flows and odour) (1). Many sufferers also have to deal with depression and embarrassment. In addition, feelings of fever and fatigue often arise in extreme cases and may prevent individuals from performing even common, everyday tasks. Studies of the impact on psychological state and related quality of life (QoL) in patients with HS are very limited (2, 3) and have usually been performed for the assessment of the efficacy of anti-tumour necrosis factor (TNF)-α agents (4–8).

The need for wide-ranging evaluation of quality of life in patients with HS appears to be exceptionally important. Usage of set measuring instruments allows us to determine the factors modulating QoL impact in HS and to compare it with that of other diseases. For this purpose we utilized a combination of several questionnaires, including those widely used in the medical scientific literature. The findings extend our current knowledge of this chronic and debilitating skin disease, which is still under watchful investigation (9, 10).

MATERIALS AND METHODS

The study was conducted on a group of 54 Polish patients (28 women, 26 men) aged 16–65 years (mean age 39.94 ± 11.63 years) with HS. The diagnosis of HS was made according to well-established clinical criteria (11). All patients with any significant co-morbidities or abnormalities that could affect the results and jeopardize their reliable presentation in the study were excluded. The disease duration was assessed as from 1.5 to 36 years (mean 10.16 ± 7.64 years). Clinical manifestation of disease staging was based on Hurley's three-degree scale (11). Among our subjects 13 patients (24.1%) were diagnosed as exhibiting first-degree disease severity, 29 subjects (53.7%) fulfilled the criteria for second-degree HS and 12 (22.2%) third-degree HS. Both males and females had a similar morbidity rate (male:female ratio 0.93).

In order to evaluate a wide spectrum of psychophysical aspects all patients were asked to complete the Polish official language versions of multiple questionnaires, including the Dermatology Life Quality Index (DLQI), Beck Depression Inventory-Short Form (BDI-SF), Evers et al. "6-Item Scale", EQ-5D, Functional Assessment of Chronic Illness Therapy – Fatigue scale (FACIT-F) and Quality of Life Enjoyment and Satisfaction Questionnaire Short Form (Q-LES-Q-SF).

DLQI, a 10-item questionnaire developed in 1994 by Finlay & Khan (12), was used for assessment of dermatology-specific QoL (score range 0–30) – the higher the score, the greater impairment of QoL. To make interpretation of the results easier, we used the Global Question (GQ, range 0–4) indexing to determine the relationship between DLQI scores and patients' views on their overall skin-related QoL impairment (13).

To estimate the intensity of depression, all patients were additionally asked to complete the BDI-SF questionnaire, which comprised 13 items (score range 0–39). It is widely accepted for screening purposes that the BDI-SF's cut-off points are 10 or above (14). Patients who scored more than 10 on the BDI-SF were suggested to have depression.

Evers et al. "6-Item Scale" (15) was developed for assessment of stigmatization level (score range 0–18). The higher the scores, the greater stigmatization level was observed.

EQ-5D (16) is a standardized instrument for use as a measure of health outcome. For this three-level five-dimensional descriptive system of health-related QoL states there are a total of 243 EQ-5D health states ($243 = 3^5$). A utility score was assigned to each health state using the York A1 tariff (17); EQ-5D scores range between –0.594 and 1 (full health). Additionally, the EQ-5D was supplemented by a visual analogue scale (EQ-VAS) on which patients recorded an individual assessment of their own overall health status that day on a 0–100 scale (0=worst; 100=best imaginable health state).

The FACIT-F scale is a 13-item questionnaire that estimates self-reported fatigue and its influence on function and daily activities. The format of responses consists of a 5-point Likert scale evaluating fatigue during the last week. FACIT-F scores range from 0 to 52, where higher scores relate to lower fatigue levels. Scores of less than 30 were considered indicative of clinically significant fatigue (18).

The short form (16-item instrument) of the Q-LES-Q was used among patients with HS to assess an enjoyment and satisfaction of general activity related to QoL. Q-LES-Q-SF scores are reported as a percentage of the maximum possible (0–100%) (19). Therefore, the higher the percentage the greater enjoyment and satisfaction of overall activity.

The study was approved by the local ethics committee and written informed consent was obtained from all studied individuals. Statistical analysis was performed using the Mann-Whitney U test, Kruskal-Wallis test and Spearman's rank correlation coefficient. Results in which the probability factor of making a first kind error (p-value) was lower than 0.05 were treated as statistically significant.

RESULTS

Two of the studied individuals refused to complete the questionnaires. The analysis of the impact of grade of HS on patients' QoL expressed by GQ indexing showed that disease had a very large or extremely large effect for almost 60% of patients (GQ=3 and GQ=4); the mean DLQI score among our patients with HS ($n=52$) was assessed as 12.67 ± 7.7 (range 1–30; median 12). The mean score for BDI-SF was 5.87 ± 4.68 points, and it should be emphasized that, for up to 21% of studied individuals, obtained results suggested the co-existence of depression (BDI ≥ 10). Moreover, the mean age at disease onset in a group of patients with BDI-SF scores lower than 10 was assessed as 28.39 ± 10.54 years, whereas among those with 10 or more points the mean age was 36.18 ± 8.83 years, thus a statistically significant difference was found ($p=0.03$). The mean result, which reflects the stigmatization level, was assessed as 3.87 ± 3.65 points. Health index, evaluated with the EQ-5D questionnaire, was 0.66 ± 0.23 and correlated significantly with the mean scores obtained in EQ-5D-VAS (assessed as 56.78 ± 18.84 points). With reference to the FACIT-F questionnaire, the estimated fatigue level was 32.06 ± 11.01. Approximately 40% ($n=21$) of patients with HS had clinically significant fatigue (less than 30 points). The mean results obtained with Q-LES-Q-SF, which evaluated the patients' QoL-related overall activity, were assessed as $56.44 \pm 15.17\%$.

With reference to obtained scores, statistically significant differences ($p<0.01$) between each particular group (according to Hurley's classification) were found in all of the above-mentioned questionnaires. Patients with more severe disease had markedly elevated scores in the DLQI, BDI-SF and "6-Item Scale". The reverse situation occurred with the remainder of the questionnaires, i.e. EQ-5D, FACIT-F and Q-LES-Q-SF (Table I). Moreover, these results were reflected in correlations between obtained scores and the grade of disease activity; the correlations were significantly positive or nega-

Table I. *Questionnaire scores: dependences on selected clinical data (gender, clinical stage and localization)*

	DLQI	BDI-SF	6-item scale	EQ-5D	EQ-5D-VAS	FACIT-F	Q-LES-Q
Total	12.67±7.70	5.87±4.68	3.87±3.65	0.66±0.23	56.78±18.84	32.06±11.01	56.44±15.17
Males	13.08±7.47	6.08±4.32	4.58±3.41	0.60±0.25	56.96±21.37	32.00±12.65	55.50±18.87
Females	12.32±8.01	5.68±5.04	3.25±3.79	0.71±0.22	56.64±16.78	32.11±9.64	57.25±11.41
Hurley I	5.77±4.59	3.08±2.25	1.23±1.59	0.80±0.15	62.31±18.21	36.31±8.94	60.38±12.40
Hurley II	13.10±6.41	5.38±3.65	4.52±3.68	0.70±0.10	59.93±14.66	34.21±9.43	59.83±12.33
Hurley III	20.40±6.67***	10.90±5.99**	5.40±3.98**	0.35±0.33**	40.50±23.03**	20.30±10.47**	41.50±17.87**
	(R=0.67; $p<0.0001$)	(R=0.49; $p<0.001$)	(R=0.42; $p=0.002$)	(R=−0.57; $p<0.0001$)	(R=−0.32; $p=0.02$)	(R=−0.44; $p<0.001$)	(R=−0.36; $p=0.007$)
Axillae	13.08±7.54	5.87±4.94	3.45±3.29	0.65±0.24	55.13±18.49	31.03±11.23	55.58±15.19
Non-axillae	11.57±8.31	5.86±4.05	5.00±4.40	0.69±0.22	61.29±19.74	34.86±10.26	58.79±15.44
Anogenital	14.69±7.15	7.06±5.10	3.75±2.99	0.58±0.25	53.25±19.33	27.81±10.61	51.56±15.63
Non-anogenital	9.45±7.61**	3.95±3.17*	4.05±4.58	0.77±0.16*	62.45±16.99#	38.85±7.93***	64.25±10.73**
Groin	12.07±7.53	5.70±4.29	3.30±3.11	0.63±0.25	51.81±19.04	29.15±11.86	55.70±17.28
Non-groin	13.32±7.98	6.04±5.16	4.48±4.12	0.69±0.22	62.16±17.43*	35.20±9.25	57.24±12.82
Head and nape/non-head and nape	10.25±5.46	5.83±5.69	5.75±3.52	0.61±0.25	66.42±13.30	35.08±11.10	60.17±13.29
	13.40±8.17	5.88±4.42	3.30±3.53*	0.67±0.25	53.90±19.42*	31.15±10.97	55.32±15.68

#Margin of statistical significance, *$p<0.05$; **$p<0.01$; ***$p<0.001$.
DLQI: Dermatology Life Quality Index; BDI-SF: Beck Depression Inventory-Short Form; 6-item Scale: Evers et al. "6-Item Scale", FACIT-F: Functional Assessment of Chronic Illness Therapy – Fatigue scale; Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form.

tive (in accordance with instrument usage); the greater the clinical involvement, the greater the impairment of patients' psychophysical state (Table I).

Moreover, in case of QoL impairment and influence on broad spectrum of psychophysical aspects, the number of skin areas (range 0–8) involved in HS lesions was also of relevant importance; the analysis of questionnaires revealed statistically significant correlations among DLQI, EQ-5D and FACIT-F scores (R = 0.28, $p = 0.045$; R = –0.39, $p = 0.004$ and R = –0.39, $p = 0.004$, respectively) (Table II.).

Furthermore, an anogenital localization (with reference to any other body regions, e.g. axillae, groin, head and nape) demonstrated significant impairment of QoL and impact on patients' psychological status in all tests (except for the "6-Item Scale") ($p < 0.05$). On the other hand the results for the "6-Item Scale" revealed that HS involvement in exposed skin areas, such as the head and nape, plays a crucial role in the level of stigmatization ($p < 0.05$) (Table I).

Analysing several other factors, including the patients' gender, place of residence, level of education, employment status, age at onset of HS (except for Q-LES-Q-SF, Table II), and duration of disease, we were unable to find any significant relationships between these factors and the questionnaire-related scores ($p > 0.05$) (detailed data not shown).

DISCUSSION

According to our findings, the impact of HS on QoL was estimated as having a large or extremely large effect on the patient's life in approximately 60% of examined patients. The results point to the clinical stage of disease activity as the most important factor related to QoL impairment. Moreover, DLQI scores clearly demonstrate that an anogenital localization is of great importance. It should be remembered that this location not only has a huge impact on the psychological comfort of patients with HS, but also on common aspects of physical impairment, e.g. pain, tenderness, flows and odour accompanying motions or contractures limiting every movement (1).

Such a great importance of HS influence on QoL was also demonstrated by von der Werth & Jemec (2). They measured morbidity in 114 patients with HS aged 20–76 years using the DLQI questionnaire and demonstrated a total mean score of 8.9 ± 8.3 points. This result is lower than ours, but it is noteworthy that nine of their patients had inactive disease for at least the last 12 months, which may have reduced the scores; 21 (18.4%) of their patients scored zero points. Moreover, both studies showed a positive correlation between DLQI scores and the mean number of HS skin lesions. In contrast to our results, von der Werth & Jemec (2) uncovered a negative relationship between age at disease onset and DLQI scores.

Thanks to common and worldwide usage of the DLQI questionnaire it is easy to make an assessment comparing other dermatological conditions with HS. The results for HS in our study showed greater QoL impairment than has been found in some other dermatoses, including psoriasis (20–22), atopic dermatitis (23), acne vulgaris (24), alopecia (25), Darier's disease (26), Hailey-Hailey disease (26) and even chronic urticaria (27), all of which are dermatological conditions traditionally considered as causing significant disability (Table III). In comparison with these conditions, it can be concluded that HS is a highly distressing disease for many patients, probably one of the worst that has been analysed and evaluated in dermatology to date.

Our findings reveal statistically significant correlations between the DLQI scores and the other questionnaires (Table II). Therefore, further conclusions, based on the results of other inquiry forms will be similar to those presented above.

It was demonstrated that depression level is undoubtedly linked to HS clinical stage. Moreover, our BDI-SF scores showed that every fifth patient is threatened with co-existence of depression, which makes HS a disease of high risk for development of this kind of reactive disorder, even higher than those found for other dermatoses or any other serious somatic conditions. For instance, the results obtained in a study of psoriasis (28) showed that only 16.9% of patients fulfilled the criteria suggesting depression (BDI ≥ 10). With regard to a screening study (29) for depressive symptoms in the acute phase of stroke, the mean Beck scores were

Table II. *Correlations between questionnaires' scores and selected clinical data; and questionnaires between themselves (between scores of each particular questionnaire)*

	Number of involved areas	Age at disease onset	Disease duration	DLQI	BDI-SF	6-item scale	EQ-5D	EQ-5D-VAS	FACIT-F	Q-LES-Q
DLQI	R = 0.28; $p = 0.045$	R = 0.017; $p = 0.91$	R = –0.0089; $p = 0.95$		**	×	***	*	***	***
BDI-SF	R = 0.12; $p = 0.38$	R = 0.17; $p = 0.23$	R = –0.023; $p = 0.87$	**		***	***	**	***	***
6-item scale	R = 0.03; $p = 0.86$	R = –0.12; $p = 0.40$	R = –0.13; $p = 0.36$	×	***		**	×	×	×
EQ-5D	R = –0.39; $p = 0.004$	R = –0.08; $p = 0.58$	R = 0.05; $p = 0.71$	***	***	**		*	***	***
EQ-5D-VAS	R = –0.18; $p = 0.19$	R = 0.01; $p = 0.94$	R = –0.08; $p = 0.59$	*	**	×	*		***	***
FACIT-F	R = –0.39; $p = 0.004$	R = –0.21; $p = 0.14$	R = –0.04; $p = 0.80$	***	***	×	***	***		***
Q-LES-Q	R = –0.21; $p = 0.14$	R = –0.36; $p = 0.009$	R = –0.03; $p = 0.84$	***	***	×	***	***	***	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ×: lack of correlation.

DLQI: Dermatology Life Quality Index; BDI-SF: Beck Depression Inventory-Short Form; 6-item Scale: Evers et al. "6-Item Scale", FACIT-F: Functional Assessment of Chronic Illness Therapy – Fatigue scale; Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form.

Table III. *Mean Dermatology Life Quality Index scores in compared dermatoses (figures in paranthesis indicate refeences)*

Hidradenitis suppurativa (current study)	Psoriatic arthritis (19)	Plaque psoriasis (20)	Plaque psoriasis (21)	Atopic eczema (22)	Acne (23)	Alopecia (24)	Darier's disease (25)	Hailey-Hailey disease (25)	Chronic idiopathic urticaria (26)
12.67 ± 7.7; (range 1–30); (median 12)	8.6–10.30	9.8–11.80	12.10–12.50	8.80	9.20	8.30	5.89 {4}[a]	6.06 {5}[a]	8.80–9.70

[a]Median values.

assessed as 4.6 ± 5.0 (males) and 4.1 ± 4.2 (females). Those patients who could not walk by themselves or who were aphasic, had significantly higher mean BDI-SF scores (6.3 ± 5.1 and 7.0 ± 5.8, respectively). "Only" 19.5% patients had a score of at least 10 on the BDI, which might suggest the co-existence of depression.

The stigmatization level among patients with HS was (once again) proportionately dependent on the clinical stage of the disease. However, the location of the lesions was also an important factor in reducing patients' self-esteem, with head and nape locations being the major contributors. This is fully understandable, as the other locations are easier to hide under clothing, avoiding the exposure of lesioned skin to the public, as could be observed during interviews with the patients. In the case of uncovered skin areas (e.g. on the head and nape) there is no such opportunity.

The results for health-related quality of life measured with both the EQ-5D health index and the EQ-VAS were similar to those presented above. The clinical stage of HS and the number of skin areas involved in HS lesions were major factors influencing the evaluation of health quality by responders. The more severe the clinical manifestation observed, the greater was the impairment of health quality. Once again an anogenital manifestation was associated with a significant worsening in the quality of health feelings. The parameters assessing health quality (health index and VAS) were significantly lower in HS compared with other dermatoses (e.g. acne vulgaris or psoriasis) (21, 24, 30, 31). Surprisingly, the results obtained with the EQ-5D were comparable to those found in cases of very severe diseases, e.g. neoplasms (Eastern Cooperative Oncology Group (ECOG)=2 patients), (32); bronchial asthma or chronic obstructive pulmonary disease (COPD) (The Global Initiative for Chronic Obstructive Lung Disease (GOLD)=3 patients) (33); cerebral strokes (34), or blood circulation failure qualifying for heart transplantation and heart infarcts (35, 36).

The estimated level of self-reported fatigue and its influence on function in daily activities were also related to the other results. Important factors impacting on fatigue were, again: clinical stage of disease activity, number of skin regions involved by HS lesions and anogenital localization. Fatigue level evaluated by patients with HS was relatively high, which makes HS a "leader" among severe dermatoses, such as psoriasis vulgaris (Psoriasis Area Severity Index (PASI) ≥10) (21) or arthropathic psoriasis (20, 37). Moreover, the assessed fatigue level was comparable to that obtained in multiple myeloma (mean 32.09 ± 11.67) (38) or Parkinson's disease (mean 34.2 ± 9.9) (39); however, it was much lower than the result found in cases of neoplasms diseases, where fatigue level is usually notably escalated; the mean values ranged from 16.95 ± 7.93 to 19.2 ± 8.6 (40, 41).

The assessed level of enjoyment and satisfaction with QoL-related general activity among patients was inversely related to the clinical stage of HS. Individuals with less advanced disease expressed higher enjoyment and satisfaction with QoL-related general activity. Once again patients reported anogenital localization as having the greatest impact on their enjoyment and satisfaction in QoL-related general activity. Our findings also revealed that the patients' level of satisfaction was connected with age of onset of HS. Dissatisfaction was intensified in patients who were more advanced in years. We can attribute this to the fact that the level of enjoyment and satisfaction in QoL-related general activity is usually relatively low among the older population, due to a statistically higher frequency of factors that have a negative impact on their global functioning experiences. Unfortunately, the Q-LES-Q-SF questionnaire is used almost exclusively for psychiatric conditions; hence there is a lack of references to somatic diseases.

In conclusion, this study highlights the important impact of HS on a wide spectrum of psychophysical aspects (including fatigue, depression and stigmatization level, and overall activity) and impairment of related QoL among patients (even greater than previously documented). Moreover, these findings show that advancement of the disease is the most important factor negatively influencing patients' well-being. It is noteworthy that an anogenital location appears to impair the QoL of patients with HS most of all, but the occurrence of lesions on uncovered skin plays a crucial role in the stigmatization level.

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