Original paper

Psoriatic itch from the patients' perspective: a cross-sectional study

Magdalena M. Kotewicz[1], Piotr K. Krajewski[1], Andrzej K. Jaworek[2], Jacek C. Szepietowski[1]

[1]Department of Dermatology, Venereology and Allergology, Wroclaw Medical University, Wroclaw, Poland
[2]Department of Dermatology, Jagiellonian University, Krakow, Poland

Adv Dermatol Allergol 2025; XLII (1): 21–27
DOI: https://doi.org/10.5114/ada.2024.143787

Abstract

Introduction: Psoriasis is a chronic inflammatory skin disease that affects mental health and is often associated with itch.

Aim: To investigate the influence of itch on the symptoms of anxiety, depression, quality of life, and stigmatization in psoriasis patients.

Material and methods: The studied group included 106 adults with psoriasis (34% females; mean age: 42.1 ±13.0 years). Disease severity was evaluated using the Psoriasis Area and Severity Index (PASI). The itch intensity was assessed by a numerical rating scale (NRS) and 4-Item Itch Questionnaire (4-IIQ). Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder-7 (GAD-7) questionnaires were utilized to estimate the severity of depression and anxiety, respectively, and so was the Hospital Anxiety and Depression Scale (HADS). Quality of life (QoL) was evaluated using the Dermatology Life Quality Index (DLQI), while stigmatization was studied by the 6-Item Stigmatization Scale (6-ISS).

Results: Psoriasis patients with itch scored significantly higher ($p = 0.037$) in HADS total score and DLQI ($p < 0.001$) than those without itch. Itch NRS correlated significantly with the HADS total score ($p = 0.027$), GAD-7 ($p = 0.008$), PHQ-9 ($p = 0.008$), and DLQI ($p = 0.001$).

Conclusions: Itch significantly impacts the quality of life and well-being of patients with psoriasis.

Key words: psoriasis, itch, depression, anxiety, quality of life, stigmatization.

Introduction

Psoriasis is a common chronic inflammatory disease that affects skin, nails and joints. Typical lesions involve sharply demarcated erythematous plaques covered by silvery scales on the extensor surfaces of forearms and shins, periumbilical, perianal regions, and scalp. Nail involvement occurs in about 50% of psoriasis patients, while psoriatic arthritis is present in up to 30% of all affected subjects. The manifestations of the disease are the consequence of dysregulated interactions between innate and adaptive immunity, where tumor necrosis factor-α (TNF-α) and the interleukin-23/T helper cell 17 axes play the central role [1].

The subjective symptoms of the disease include itch, irritation, burning, sensitivity, and pain [2]. Itch is recognized as the most burdensome symptom of psoriasis [3]. The visible nature of the lesions can cause stigmatization, exert a negative impact on sexual life [4] and even lead to suicidal ideations [5]. Compared to other chronic diseases involving cancer, congestive heart failure, and myocardial infarction, only chronic lung diseases and depression influenced quality of life more than psoriasis [6].

Aim

The present study aimed to investigate the impact of itch on the prevalence and severity of anxiety, depression, quality of life, and stigmatization in psoriasis patients.

Material and methods

The studied population included 106 patients recruited from the private practice, the Department of Dermatology, Venerology, and Allergology of the Wroclaw Medical University in Wroclaw, Poland, and the Department of Dermatology at the University Hospital in Krakow, Poland, between March 2023 and January 2024. The study was performed in accordance with guidelines for human studies and the World Medical Association of Helsinki (KB-234/2023, date of approval: 09.03.2023).

Address for correspondence: Jacek C. Szepietowski, Department of Dermatology, Venereology and Allergology, Wroclaw Medical University, 50-368 Wroclaw, Poland, e-mail: jacek.szepietowski@umw.edu.pl
Received: 2.08.2024, **accepted:** 26.08.2024, **online publication:** 3.10.2024.

Every patient underwent a thorough dermatological clinical examination. Psoriasis was diagnosed based on clinical criteria. The severity of psoriasis was evaluated using the Psoriasis Area and Severity Index (PASI) [7]. Shortly after the physical examination, participants were asked to complete a specially designed questionnaire that included demographic data as well as itch and psychometric assessments. The worst itch intensity during the past week was evaluated using an 11-point Numerical Rating Scale (NRS) and the 4-Item Itch Questionnaire (4-IIQ) [8, 9]. The interpretation of the NRS score was the following: mild itch (1–-3 points), moderate itch (4–6 points), severe itch (7–8 points), and very severe itch (ł 9 points) [8]. 4-IIQ is an instrument that measures the extent, severity, frequency, and sleep disturbances due to chronic itch [9].

To assess the burden of itch, all subjects were asked to fulfill several questionnaires, including the Hospital Anxiety and Depression Scale (HADS), Generalized Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9), Dermatology Life Quality Index (DLQI) and 6-Item Stigmatization Scale (6-ISS).

The Hospital Anxiety and Depression Scale (HADS) is a standardized self-assessment instrument designed to measure the symptoms of anxiety (HADS Anxiety, HADS-A) and depression (HADS Depression, HADS-D) in clinical settings. The questionnaire consists of 14 items, with 7 items addressing anxiety symptoms and 7 items addressing depression symptoms. Each item is scored on a 4-point scale, ranging from 0 to 3 points, resulting in a maximum total score of 42 points. The maximum score for each subscale is 21 points. The abnormal overall score is 11 points, while a score of 8 points or greater on either the anxiety or depression subscale indicates a potential clinical diagnosis of the respective condition [10].

The Generalized Anxiety Disorder-7 (GAD-7) is a screening tool for generalized anxiety disorder. The questionnaire comprises 7 items that evaluate the frequency of anxiety symptoms experienced during the past 2 weeks. Each item is scored on a 4-point scale, where 0 points are assigned for "not at all", 1 point for "several days", 2 points for "over half the days", and 3 points for "nearly every day". The total score is calculated by summing the scores from all 7 items, resulting in a possible range of 0 to 21 points. The interpretation of the GAD-7 score is as follows: minimal anxiety (0–4 points), mild anxiety (5–9 points), moderate anxiety (10–14 points), and severe anxiety (15–21 points) [11].

The Patient Health Questionnaire-9 (PHQ-9) is a 9-item screening instrument designed to assess the severity of depressive symptoms. It is based on the diagnostic criteria for major depressive disorder as outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). For each of the 9 items, the patient rates the frequency of the corresponding symptoms of depression experienced over the past 2 weeks on a 4-point scale, ranging from 0 ("not at all") to 3 ("nearly every day"). The total score is calculated by summing the scores for all 9 items, resulting in a possible range of 0 to 27 points. The interpretation of the PHQ-9 total score is as follows: minimal depression (0–4 points), mild depression (5–9 points), moderate depression (10–14 points), moderately severe depression (15–19 points), and severe depression (20–27 points). A cut-off score of 10 or greater on the PHQ-9 has been found to have 88% sensitivity and specificity for the diagnosis of major depressive disorder [12].

The Polish version of the Dermatology Life Quality Index (DLQI) questionnaire was utilized to evaluate the patient's quality of life (QoL). The DLQI consists of 10 items covering different aspects of the patient's life over the past week, including symptoms and feelings, daily activities, leisure, work and school-related matters, personal relationships, and treatment side effects. Each item is scored on a 4-point scale, where 0 represents "not at all", 1 means "a little", 2 represents "a lot", and 3 represents "very much". The individual scores are then summed to calculate the total DLQI score, ranging from 0 to 30 points. The interpretation of the total DLQI score was the following: minimal impact on QoL (0–1 points), small impact on QoL (2–5 points), moderate impact on QoL (6–10 points), large impact on QoL (11–20 points) and extremely large impact on QoL (21–30 points) [13].

The 6-Item Stigmatization Scale (6-ISS) is a dermatology-specific tool utilized to evaluate stigmatization experienced by patients due to their skin disease. The questionnaire comprises 6 questions that assess different dimensions of stigmatization, including anticipation of rejection, feelings of being flawed, sensitivity to the opinions of others, guilt and shame, negative attitudes, and secretiveness. The patient answers each question on a 4-point scale, where 0 points represent "not at all", 1 point represents "sometimes", 2 points represent "very often", and 3 points represent "always". The total score is calculated by summing the scores from all items, resulting in a possible range of 0 to 18 points [14, 15].

Statistical analysis

The statistical analysis of the results was conducted using IBM SPSS Statistics v. 26 (SPSS INC., Chicago, USA). Normality of the data distribution was tested using the Shapiro-Wilk test. Descriptive statistics including minimum, maximum, mean, and standard deviation were computed. For normally distributed data, the *T*-test was employed, while the Mann-Whitney U test was used for non-normally distributed data. Correlations were assessed using Pearson's correlation for normal distributions and Spearman's correlation for non-normal distributions. The χ^2 test was applied to qualitative data. Differences among more than two groups were analyzed using ANOVA or Kruskal-Wallis one-way analysis of variance on ranks. For multiple variables, a multivariate anal-

ysis of variance (MANOVA) with Bonferroni correction was implemented. Statistical significance was defined as a two-sided p-value ≤ 0.05.

Results

The study population comprised 106 adults with psoriasis, including 36 (34.0%) women and 70 (66.0%) men, with an age range of 18–72 (mean: 42.07 ±12.96) years. The mean PASI score was 10.93 ±8.47 points. The average disease duration was 14.89 ±12.69 years, ranging from 1 to 55 years. Out of 106 subjects, 90 (84.9%) experienced itch during the past week, with a mean intensity of 4.52 ±2.88 points in the NRS score. 25 (27.8%) adults with psoriasis reported mild itch, 34 (37.8%) of them experienced moderate itch, while 25 (27.8%) had severe and 6 (6.7%) very severe itch. The prevalence of women with itch was significantly higher than men (35 (97.2%) vs. 55 (78.6%), p = 0.011). Additionally, according to the NRS, women experienced itch of significantly higher intensity compared to men (5.69 ±2.51 points vs. 3.91 ±2.89 points, p = 0.003). Moreover, the distribution of itch severity was significantly different between both genders (p = 0.023). Analyzing itch severity cut-offs, more severe itch was reported also more commonly in female patients compared to males. The mean 4-IIQ was 6.79 ±4.37 points, with no significant difference between women and men. The data are presented in Table 1.

The mean total HADS score for the entire studied population was 10.4 ±7.47 points, with females exhibiting significantly higher scores (13.1 ±7.93 points) than males (9.0 ±6.86 points; p = 0.005). Regarding the assessment of anxiety, the mean HADS-A value was 6.25 ±4.52 points, and the average GAD-7 score was 6.01 ±5.16 points in the whole cohort. Women scored significantly higher on both the HADS-A (8.42 ±4.85 points vs. 5.14 ±3.9 points; p < 0.001; Mann-Whitney U test) and the GAD-7 (7.50 ±5.58 points vs. 5.24 ±4.79 points; p = 0.036; Mann-Whitney U test) than men. Regarding the assessment of depression, the mean HADS-D score was 4.14 ±3.68 points, and the average PHQ-9 score was 6.86 ±5.98 points in the whole population. A statistically significant difference was observed between females and males on the PHQ-9 (7.50 ±5.58 points vs. 5.24 ±4.79 points, p = 0.021; Mann-Whitney U test) but not on the HADS-D. Concerning the assessment of QoL and stigmatization, the mean DLQI was 8.09 ±6.99 points, and the average 6-ISS was 4.72 ±3.63 points. No statistically significant differences were noted between females and males for these parameters (Table 2).

Psoriasis patients who reported itch in the past week scored significantly higher in HADS total score (11.06 ±7.69 points) and had a higher prevalence of HADS abnormal score (26 (28.9%)) than the rest of the studied group (6.69 ±4.72 points, p = 0.037; 1 (6.3%), p = 0.037 respectively; Mann-Whitney U test). Individuals with itch had significantly more impaired QoL than those without itch (8.90 ±7.01 points vs. 3.56 ±4.95 points, p < 0.001; Mann-Whitney U test) and the distribution of QoL was significantly different between patients with and without itch (p < 0.001). There was no significant difference in the assessments of anxiety, depression, and stigmatization between individuals reporting itch and the rest of the participants (Tables 3, 4).

The intensity of itch, as measured by NRS, correlated significantly with the HADS total score (r = 0.234; p = 0.027), GAD-7 (r = 0.279; p = 0.008), PHQ-9 (r = 0.213; p = 0.044), and DLQI (r = 0.336; p = 0.001) (all assessed with Spearman's correlation). No relationship between

Table 1. Group characteristics

Characteristics	Whole population (n = 106)	Females (n = 36)	Males (n = 70)	P-value
PASI [points] (mean ± SD)	10.93 ±8.47	10.18 ±9.87	11.32 ±7.71	0.254
Age [years] (mean ± SD)	42.07 ±12.96	39.94 ±14.00	43.16 ±12.35	0.543
Disease duration [years] (mean ± SD)	14.89 ±12.69	15.00 ±12.23	14.83 ±13.00	0.751
Systemic treatment	31 (29.2%)	13 (36.1%)	18 (25.7%)	0.265
Family history of psoriasis	50 (47.2%)	21 (58.3%)	29 (41.4%)	0.106
Itch in the past week	90 (84.9%)	35 (97.2%)	55 (78.6%)	0.011
Mild	25 (27.8%)	6 (16.7%)	19 (27.1%)	0.023
Moderate	34 (37.8%)	14 (38.9%)	20 (28.6%)	
Severe	25 (27.8%)	11 (30.6%)	14 (20.0%)	
Very severe	6 (6.7%)	4 (11.1%)	2 (2.9%)	
Itch NRS in the past week [points] (mean ± SD)	4.52 ±2.88	5.69 ±2.51	3.91 ±2.89	0.003
4 Item Itch Score [points] (mean ± SD)	6.79 ±4.37	7.69 ±4.05	6.33 ±4.48	0.083

PASI – Psoriasis Area and Severity Index, NRS – Numerical Rating Scale, SD – standard deviation, NS – not significant; differences for numerical variable assessed with Mann-Whitney U test, while for categorical ones with χ^2 test.

Table 2. The psychosocial burden of itch in the whole population, males and females

Characteristic (mean ± SD)	Whole population (*n* = 106)	Females (*n* = 36)	Males (*n* = 70)	*P*-value
HADS total score [points]	10.40 ±7.47	13.11 ±7.93	9.00 ±6.86	0.005
HADS-A [points]	6.25 ±4.52	8.42 ±4.85	5.14 ±3.92	< 0.001
HADS-D [points]	4.14 ±3.68	4.69 ±3.85	3.86 ±3.58	0.224
GAD-7 [points]	6.01 ±5.16	7.50 ±5.58	5.24 ±4.79	0.036
PHQ-9 [points]	6.86 ±5.98	8.61 ±6.18	5.96 ±5.71	0.021
DLQI [points]	8.09 ±6.99	9.83 ±7.70	7.20 ±6.47	0.072
6-ISS [points]	4.72 ±3.63	5.39 ±4.14	4.37 ±3.32	0.086

SD – standard deviation, HADS – Hospital Anxiety and Depression Scale, A – anxiety, D – depression, GAD-7 – Generalized Anxiety Disorder-7, PHQ-9 – Patient Health Questionnaire-9, DLQI – Dermatology Life Quality Index, 6-ISS – 6-Item Stigmatization Scale, NS – not significant; differences assessed with Mann-Whitney U test.

Table 3. Differences between psoriasis patients with and without itch

Characteristic (mean ± SD)	Patients with itch (*n* = 90)	Patients without itch (*n* = 16)	*P*-value
HADS total score [points]	11.06 ±7.69	6.69 ±4.72	0.037
HADS-A [points]	6.6 ±4.65	4.06 ±2.89	0.061
HADS-D [points]	4.41 ±3.78	2.63 ±2.66	0.066
GAD-7 [points]	6.38 ±5.38	3.94 ±3.02	0.130
PHQ-9 [points]	7.24 ±6.16	4.69 ±4.44	0.117
DLQI [points]	8.90 ±7.01	3.56 ±4.95	< 0.001
6-ISS [points]	4.97 ±3.76	3.31 ±2.47	0.131

SD – standard deviation, HADS – Hospital Anxiety and Depression Scale, A – anxiety; D – depression, GAD-7 – Generalized Anxiety Disorder-7, PHQ-9 – Patient Health Questionnaire-9, DLQI – Dermatology Life Quality Index, 6-ISS – 6- Item Stigmatization Scale, NS – not significant, differences assessed with Mann-Whitney U test.

itch severity and stigmatization was found. Additionally, in the subgroups of itch intensity, there were significant differences in HADS total score ($p = 0.017$), GAD-7 ($p = 0.01$), and DLQI ($p = 0.003$) (assessed with Kruskal-Wallis one-way analysis of variance on ranks). Patients with more severe itch experienced a higher psychosocial burden (Table 5). The multivariate analysis of variance (MANOVA) revealed that itch significantly influenced HADS ($p = 0.003$), GAD7 ($p = 0.003$), and DLQI ($p < 0.001$) scores but did not influence PHQ-9 ($p = 0.075$) and 6-ISS ($p = 0.094$) scores.

Discussion

Numerous authors have investigated psychiatric comorbidities in psoriasis. A recent systematic review indicated that individuals with this disease were at least one and a half times more prone to the development of depression than their healthy controls, and 23% of them exhibited symptoms of depression, as estimated by the HADS questionnaires [16]. Another meta-analysis found that the prevalence of anxiety symptoms was 34% in psoriasis patients, according to HADS [17]. In our study, the severity of depression and anxiety was higher in females with psoriasis compared to males, which is consistent with the evidence from a systematic review [18]. Interestingly, the presence of psoriatic arthritis was an additional risk factor for the development of both anxiety and depression [18].

The negative impact of psoriasis on mental health has been studied for many years. In the beginning, it was considered to be a result of associated itch, visibility of lesions, shame, and stigmatization [19]. However, recent findings have identified common inflammatory pathways between psoriasis and psychiatric disorders involving anxiety and depression. Increased levels of pro-inflammatory cytokines such as IL-6 and TNF were found in the blood of patients with depression [20]. Moreover, a positive correlation was identified between the serum levels of IL-17 and IL-23 and the severity of anxiety and depression [21]. Another mechanism in which psoriasis can lead to depression is through hyperactivation of the hypothalamus-pituitary-adrenal (HPA) axis, which was suggested by an elevated level of IL-6 found in the central nervous system of transgenic mice in response to stress [22].

Itch is defined as an unpleasant subjective sensation that leads to scratching. The prevalence of this sensation in psoriasis ranges between 62% and 97% and is most often moderate in intensity, which is in line with our findings [3]. In our study, itch was more frequent and intense in females, consistently with other research results [2,

Table 4. Prevalence of anxiety, depression, and impact on the quality of life in patients with and without itch

Characteristic (mean ± SD)	Patients with itch (*n* = 90)	Patients without itch (*n* = 16)	*P*-value
HADS abnormal score	26 (28.9%)	1 (6.3%)	0.037
Anxiety:			
HADS-A	32 (35.62%)	2 (12.5%)	0.341
GAD-7	33 (36.7%)	5 (31.3%)	0.290
Minimal anxiety	39 (43.3%)	9 (56.3%)	0.290
Mild anxiety	31 (34.4%)	6 (37.5%)	
Moderate anxiety	12 (13.3%)	1 (6.3%)	
Severe anxiety	8 (8.9%)	0	
Depression:			
HADS-D	15 (16.7%)	1 (6.3%)	0.354
PHQ-9	27 (30.0%)	3 (18.8%)	0.05
Minimal depression	42 (46.7%)	10 (62.5%)	0.05
Mild depression	26 (28.9%)	4 (25.0%)	
Moderate depression	12 (13.3%)	2 (12.5%)	
Moderately severe depression	6 (6.7%)	0	
Severe depression	4 (4.4%)	0	
Quality of life:			
Minimal impact	11 (12.2%)	9 (56.3%)	< 0.001
Small impact	28 (31.1%)	2 (12.5%)	
Moderate impact	21 (23.3%)	4 (25.0%)	
Large impact	21 (23.3%)	1 (6.3%)	
Extremely large impact	9 (10.0%)	0	

SD – standard deviation, HADS – Hospital Anxiety and Depression Scale, A – anxiety, D – depression, GAD-7 – Generalized Anxiety Disorder-7, PHQ-9 – Patient Health Questionnaire-9, DLQI – Dermatology Life Quality Index, 6-ISS – 6- Item Stigmatization Scale, NS – not significant; differences assessed with Mann-Whitney U test, while for categorical ones with χ^2 test.

Table 5. Psychosocial parameters among different itch severities (NRS)

Variable	Mild itch	Moderate itch	Severe itch	Very severe itch	*P*-value
HADS	7.76 ±6.37	11.71 ±7.05	11.80 ±8.60	18.00 ±7.51	0.017
GAD-7	4.12 ±4.10	6.32 ±5.40	7.44 ±5.59	11.67 ±5.28	0.01
PHQ-9	5.44 ±5.15	7.06 ±5.62	8.32 ±7.47	11.33 ±5.43	0.107
DLQI	5.76 ±5.36	9.09 ±6.51	9.52 ±7.13	18.33 ±7.37	0.003

NRS – numerical rating scale, HADS – Hospital Anxiety and Depression Scale, GAD-7 – Generalized Anxiety Disorder-7, PHQ-9 – Patient Health Questionnaire-9, DLQI – Dermatology Life Quality Index; differences assessed with Kruskal-Wallis one-way analysis of variance on ranks.

23]. Parts of the body most affected by this symptom include the legs, hands, back, and scalp [24]. It occurs in both lesional and non-lesional skin [24]. Aggravating factors involve stress, heating, hot water, skin dryness, sweating, bad moods, exercise, lying position, and contact with clothes, while ameliorating factors include sleep and cold showers [3, 25].

Itch exerts a significant impact on various aspects of mental health in psoriasis patients. Most of them consider itch the most important, severe, and troublesome symptom of this disease [26]. This sensation impairs sleep quality in psoriatic individuals due to scratching that can occur during the entire sleep period [27]. Consequently, sleep disturbances have a negative impact on work productivity and presenteeism [28]. Moreover, according to the study of Amatya *et al.* [23], itch significantly influences concentration, mood, appetite, and sexual desire and can cause suicidal ideations [5]. Additionally, vulvar itching and burning in females with psoriasis frequently leads to sexual problems [29].

In our study, the intensity of itch was associated with impaired QoL, anxiety, and depression, corresponding to previous research outcomes [27, 30, 31]. For instance, Reich *et al.* [30] demonstrated that psoriasis patients

with itch had significantly reduced QoL and were more depressive compared to individuals without this symptom. Moreover, the intensity of this sensation correlated with DLQI, the severity of depression and the level of stigmatization [30]. In the study of Gupta *et al*. [32], an alteration in the severity of depression correlated with the change in itch intensity. Therefore, it was suggested that depressive symptoms reduce the threshold for itch [32]. It was also demonstrated that improvement of itch following successful psoriasis treatment with etanercept was associated with improved QoL [27].

The study limitations include the small size of the studied population. Especially the group of psoriatic patients without itch was relatively small. However, the percentage of non-itchy psoriatic patients in our cohort of studied subjects was similar to a well-known one [30]. In our opinion, based on above-mentioned issues, the comparisons between itchy and non-itchy subjects should be treated with caution. Additionally, the assessment of anxiety, depression, and stigmatization was based only on questionnaires. Therefore, a thorough psychiatric examination would be needed to confirm the diagnosis of the respective conditions. We do believe that the strength of our project was the usage of multiple questionnaires to assess both anxiety and depression.

Conclusions

Itch is a very prevalent symptom of psoriasis and is often associated with anxiety, depression and impaired QoL. Therefore, a multidisciplinary approach is needed in the management of psoriasis.

Funding

The research was funded by Wroclaw Medical University science grant number SUBZ.C260.24.003.

Ethical approval

The study was conducted in accordance with the Declaration of Helsinki and accepted by the Ethics Committee of Wroclaw Medical University (KB-234/2023, date of approval: 09.03.2023).

Conflict of interest

The authors declare no conflict of interest.

References

1. Boehncke WH, Schön MP. Psoriasis. Lancet 2015; 386: 983-94.
2. Sampogna F, Gisondi P, Melchi CF, et al. Prevalence of symptoms experienced by patients with different clinical types of psoriasis. Br J Dermatol 2004; 151: 594-9.
3. Elewski B, Alexis AF, Lebwohl M, et al. Itch: an under-recognized problem in psoriasis. J Eur Acad Dermatol Venereol 2019; 33: 1465-76.
4. Hrehorów E, Salomon J, Matusiak L, et al. Patients with psoriasis feel stigmatized. Acta Derm Venereol 2012; 92: 67-72.
5. Lesner K, Reich A, Szepietowski JC, et al. Determinants of psychosocial health in psoriatic patients: a multinational study. Acta Derm Venereol 2017; 97: 1182-8.
6. Rapp SR, Feldman SR, Exum ML, et al. Psoriasis causes as much disability as other major medical diseases. J Am Acad Dermatol 1999; 41: 401-7.
7. Mrowietz U, Kragballe K, Reich K, et al. Definition of treatment goals for moderate to severe psoriasis: a European consensus. Arch Dermatol Res 2011; 303: 1-10.
8. Cheung HN, Chan YS, Hsiung NH. Validation of the 5-D itch scale in three ethnic groups and exploring optimal cutoff values using the itch numerical rating scale. Biomed Res Int 2021; 2021: 7640314.
9. Reich A, Mędrek K, Szepietowski J. Four-item itch questionnaire-validation of questionnaire. Dermatol Rev 2012; 99: 600-4.
10. Herrmann C. International experiences with the hospital anxiety and depression scale – a review of validation data and clinical results. J Psychosom Res 1997; 42: 17-41.
11. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med 2006; 166: 1092-7.
12. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. J Gen Intern Med 2001; 16: 606-13.
13. Finlay AY, Khan GK. Dermatology Life Quality Index (DLQI) – a simple practical measure for routine clinical use. Clin Exp Dermatol 1994; 19: 210-6.
14. Lu Y, Duller P, Van Der Valk PGM, Evers AWM. Helplessness as predictor of perceived stigmatization in patients with psoriasis and atopic dermatitis. Dermatol Psychosom 2003; 4: 146-50.
15. Dimitrov D, Szepietowski JC. Instruments to assess stigmatization in dermatology. Postepy Hig Med Dosw 2017; 71: 901-5.
16. Dowlatshahi EA, Wakkee M, Arends LR, Nijsten T. The prevalence and odds of depressive symptoms and clinical depression in psoriasis patients: a systematic review and meta-analysis. J Investig Dermatol 2014; 134: 1542-51.
17. Jalenques I, Bourlot F, Martinez E, et al. Prevalence and odds of anxiety disorders and anxiety symptoms in children and adults with psoriasis: systematic review and meta-analysis. Acta Derm Venereol 2022; 102: adv00769.
18. Adesanya EI, Matthewman J, Schonmann Y, et al. Factors associated with depression, anxiety and severe mental illness among adults with atopic eczema or psoriasis: a systematic review and meta-analysis. Br J Dermatol 2023; 188: 460-70.
19. Szepietowski JC, Krajewski PK, Pacan P. Psoriasis: an inflammatory skin disease affecting the mind. J Eur Acad Dermatol Venereol 2024; 38: 460-1.
20. Dowlati Y, Herrmann N, Swardfager W, et al. A meta-analysis of cytokines in major depression. Biol Psychiatry 2010; 67: 446-57.
21. Tabra SA, Abd Elghany SE, Amer RA, et al. Serum interleukin-23 levels: relation to depression, anxiety, and disease activity in psoriatic arthritis patients. Clin Rheumatol 2022; 41: 3391-9.
22. Raber J, O'Shea RD, Bloom FE, Campbell IL. Modulation of hypothalamic-pituitary-adrenal function by transgenic ex-

pression of interleukin-6 in the CNS of mice. J Neurosci 1997; 17: 9473-80.
23. Amatya B, Wennersten G, Nordlind K. Patients' perspective of pruritus in chronic plaque psoriasis: a questionnaire-based study. J Eur Acad Dermatol Venereol 2008; 22: 822-6.
24. Szepietowski JC, Reich A, Wiśnicka B. Itching in patients suffering from psoriasis. Acta Dermatovenerol Croat 2002; 10: 221-6.
25. Yosipovitch G, Goon A, Wee J, et al. The prevalence and clinical characteristics of pruritus among patients with extensive psoriasis. Br J Dermatol 2000; 143: 969-73.
26. Globe D, Bayliss MS, Harrison DJ. The impact of itch symptoms in psoriasis: results from physician interviews and patient focus groups. Health Qual Life Outcomes 2009; 7: 62.
27. Mrowietz U, Chouela EN, Mallbris L, et al. Pruritus and quality of life in moderate-to-severe plaque psoriasis: post hoc explorative analysis from the PRISTINE study. J Eur Acad Dermatol Venereol 2015; 29: 1114-20.
28. Kimball AB, Edson-Heredia E, Zhu B, et al. Understanding the relationship between pruritus severity and work productivity in patients with moderate-to-severe psoriasis: sleep problems are a mediating factor. J Drugs Dermatol 2016; 15: 183-8.
29. Zamirska A, Reich A, Berny-Moreno J, et al. Vulvar pruritus and burning sensation in women with psoriasis. Acta Derm Venereol 2008; 88: 132-5.
30. Reich A, Hrehorow E, Szepietowski JC. Pruritus is an important factor negatively influencing the well-being of psoriatic patients. Acta Derm Venereol 2010; 90: 257-63.
31. Verhoeven EWM, Kraaimaat FW, van de Kerkhof PCM, et al. Prevalence of physical symptoms of itch, pain and fatigue in patients with skin diseases in general practice. Br J Dermatol 2007; 156: 1346-9.
32. Gupta MA, Gupta AK, Kirkby S, et al. Pruritus in psoriasis: a prospective study of some psychiatric and dermatologic correlates. Arch Dermatol 1988; 124: 1052-7.