



Determinants of Psychosocial Health in Psoriatic Patients: A Multi-national Study

Karolina LESNER¹, Adam REICH¹, Jacek C. SZEPIETOWSKI¹, Florence J. DALGARD², Uwe GIELER³, Lucia TOMAS-ARAGONES⁴, Lars LIEN⁵, Françoise POOT⁶, Gregor B. JEMEC⁷, Laurent MISERY⁸, Csanád SZABÓ⁹, Dennis LINDER¹⁰, Francesca SAMPOGNA¹¹, Andrea W.M. EVERS¹², Jon Anders HALVORSEN¹³, Flora BALIEVA¹⁴, Andrey LVOV¹⁵, Servando E. MARRON¹⁶, İlknur K. ALTUNAY¹⁷, Andrew Y. FINLAY¹⁸, Sam S. SALEK¹⁹ and Jörg KUPFER²⁰

¹Department of Dermatology, Venereology and Allergology, Wrocław Medical University, Wrocław, ²National Center for Dual Diagnosis, Innlandet Hospital Trust, Brumundal, Norway, ³Department of Dermatology, Justus Liebig University, Giessen, Germany, ⁴Department of Psychology, University of Zaragoza, Zaragoza, Spain, ⁵Department of Public Health, Hedmark University College, Elverum, Norway, ⁶Department of Dermatology, ULB-Erasme Hospital, Brussels, Belgium, ⁷Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark, ⁸Department of Dermatology, University Hospital of Brest, Brest, France, ⁹Department of Dermatology, University of Szeged, Szeged, Hungary, ¹⁰Section of Biostatistics, University of Oslo, Oslo, Norway, ¹¹Clinical Epidemiology Unit, Istituto Dermatologico dell'Immacolata, Rome, Italy, ¹²Health, Medical and Neuropsychology unit, Leiden University, Leiden, The Netherlands, ¹³Department of Dermatology, Institute of Clinical Medicine, Oslo University Hospital, University of Oslo, Oslo, ¹⁴Department of Dermatology, Stavanger University Hospital, Stavanger, Norway, ¹⁵Department of Clinical Dermatology and Cosmetology, Moscow Scientific and Practical Center of Dermatovenereology and Cosmetology, Moscow, Russia, ¹⁶Department of Dermatology, Alcaniz Hospital, Alcaniz, Spain, ¹⁷Department of Dermatology, Sisli Etfal Teaching and Research Hospital, Istanbul, Turkey, ¹⁸Department of Dermatology, Cardiff University School of Medicine, Cardiff, ¹⁹School of Life and Medical Sciences, University of Hertfordshire, Hatfield, and ²⁰Institute of Medical Psychology, Justus Liebig University, Giessen, Germany

There are limited data on the differences in the impact of psoriasis between various countries with respect to quality of life (QoL). The aim of this study was to explore the psychosocial health of patients with psoriasis in different European countries. A total of 682 patients were recruited in 13 European countries. All patients completed a questionnaire regarding socio-demographic information, negative life events, suicidal ideation and satisfaction with their dermatologist. Depression and anxiety were assessed with the Hospital Anxiety and Depression Scale (HADS), and QoL with the Dermatology Life Quality Index (DLQI) and EuroQoL (EQ-5D). The lowest anxiety and depression scoring was noted in patients from Denmark, the lowest level of impairment in QoL in subjects from Spain, and the highest level of impairment in QoL in patients from Italy. The most relevant parameters influencing patients' well-being were severity of pruritus and satisfaction with their dermatologist. The level of anxiety and depression symptoms correlated significantly with suicidal ideation.

Key words: psoriasis; quality of life; depression; anxiety; self-esteem.

Accepted Aug 9, 2017; Epub ahead of print Aug 10, 2017

Acta Derm Venereol 2017; 97: 1182–1188.

Corr: Jacek Szepietowski, Department of Dermatology, Venereology and Allergology, Wrocław Medical University, Chałubińskiego 1, PL-50-368 Wrocław, Poland. E-mail: jacek.szepietowski@umed.wroc.pl

Psoriasis is a common chronic inflammatory skin disorder with a substantial emotional impact on patients. Prevalence studies have shown uniformly high rates of psychopathology among people with psoriasis (1–4). For instance, anxiety symptoms were found much more commonly in patients with psoriasis compared with controls, with an adjusted odds ratio (OR) of 2.91 (95% confidence interval (95% CI) 2.01–4.21) for anxiety dis-

orders in subjects with psoriasis (4). People with psoriasis were also more likely to be clinically depressed (1). Of note, psychological factors, such as stress, anxiety and depressed mood, may influence the course of the disease and, along with the impact of psoriatic symptoms, impair patients' quality of life (QoL). Importantly, the impact of psoriasis on health-related QoL (HRQoL) seems to be as great as that of other major medical conditions, such as cancer, heart failure, diabetes and depression (3). Moreover, there was a significant association between having psoriasis and having suicidal thoughts: 67.6% of subjects with psoriasis reported suicidal ideation because of their skin problem (4). Depression in psoriasis might also be linked with higher cardiovascular morbidity and mortality, as it may play a role in promoting subclinical atherosclerosis beyond traditional cardiovascular risk factors. It was shown that depression might be associated with increased vascular inflammation and formation of coronary plaques (5, 6). Therefore, it could be recommended that patients with psoriasis should be systematically screened to identify clinically important levels of depression and anxiety that may be missed while assessing HRQoL alone (7).

It is not known whether depression level and other psychopathological symptoms in psoriasis correlate with disease severity, as current data are contradictory. Some authors have suggested that social stigmatization, high stress levels, physical limitations, depression, employment problems and other psychosocial co-morbidities experienced by patients with psoriasis are not always proportional to, or predicted by, other measurements of disease severity, such as body surface area involvement or plaque severity (2). However, other researchers report that the severity of psoriasis has a significant impact on the wellbeing of affected individuals, as the burden of overall medical comorbidities increases with disease severity in the psoriatic population, and severe psoriasis

increases overall mortality, while mild psoriasis does not (8, 9). Therefore, although there may be discordance between severity of skin lesions and distress, severity of psoriasis may have some effect on rates of depression and suicidality (8).

The psychosocial health of psoriatic patients may be influenced not only by the disease itself, but also by other factors, such as patients' economic status, occupation and family support. Also, wider factors, such as the healthcare system organization, access to different therapeutic options, or even climate may play a role (10, 11). However, despite the psychological aspects of psoriasis having been widely reported, there is little comparative information from different countries (12, 13). It is probable that patients with psoriasis from different regions may perceive their disease differently. In the present study we performed detailed analysis of data to identify differences among psoriatic patients from various countries, especially regarding determinants of psychosocial health deterioration, including HRQoL, anxiety and depression.

MATERIALS AND METHODS

This study focused on the psoriatic patients participating in the project "The psychological burden of skin diseases: a cross-sectional multicenter study among dermatological outpatients in 13 European countries" run by the European Society of Dermatology and Psychiatry (ESDaP). In this observational, cross-sectional multicentre study, patients were recruited from dermatological outpatient clinics in 13 European countries from November 2011 to February 2013. At each study centre consecutive adult outpatients were invited to participate in the study on one or more random days, until 250 participants per centre were reached. The study protocol was approved by the Regional Committee for Medical Research Ethics in Norway (REK 2011/1087). Local ethics approval was also obtained in all participating countries. The study was conducted in accordance with the principles of the Declaration of Helsinki.

All patients participating in the study met the following inclusion criteria: age ≥ 18 years; able to read and write in the local language; no severe psychosis. Subjects provided signed informed consent and were examined for dermatological and other physical conditions. Further details of the study have been published elsewhere (4). Out of a total of 3,635 dermatological patients recruited, 682 (18.8%) had psoriasis and were included in the current study for a separate analysis. The group had a mean age of 47.0 ± 15.6 years and 54.2% were male. All patients completed a questionnaire regarding socio-demographic information, negative life events and suicidal ideation. Whenever itch was reported, its severity was assessed using a visual analogue scale (VAS) and subsequently categorized as mild (>0 and <3 points), moderate (≥ 3 and <7 points), severe (≥ 7 and <9 points) and very severe pruritus (≥ 9 points) (14, 15). Anxiety and depression were assessed with the Hospital Anxiety and Depression Scale (HADS), on which a higher score means a higher level of anxiety or depression (16), and HRQoL was assessed with the Dermatology Life Quality Index (DLQI) (a skin-specific QoL measure) (17) and the EuroQoL (EQ-5D, a generic QoL measure) (18). All instruments were validated in the native languages of participating countries. According to HADS anxiety/depression were considered as unlikely, possible and probable, if a patient received <7 points, 8–10 points and >10

points in each subscale, respectively. The DLQI is a 10-item QoL scale assessing "symptoms and feelings", impairment of "daily activities", "leisure", "work and school" and "personal relationships", as well as "treatment" burden with respect to skin diseases; a higher DLQI score signifies higher impairment of HRQoL (17). Using the EQ-5D, the respondent was asked to indicate his/her general health status indicating the most appropriate statement in each of the 5 predefined dimensions, and answers were converted into scores, with a higher score referring to a higher disease burden. In addition, each participant recorded their self-rated health status with the EQ-5D VAS, where the endpoints were "Best imaginable health state" (0 points) and "Worst imaginable health state" (100 points) (18). Patients were also asked about their satisfaction with their dermatologist (from 0 to 10) and whether they were having or had had suicidal thoughts in the past (yes/no). If they confirmed the presence of suicidal thoughts they were also asked whether their suicidal thoughts were because of their skin condition (yes/no). Finally, skin disease severity was assessed by the dermatologist using a scale of "mild", "moderate" or "severe".

The results were analysed using Statistica® and Microsoft Excel® software. Frequencies (percentage values) were calculated for qualitative parameters, while means and standard deviations were calculated for normally distributed quantitative variables. The χ^2 test, Student's *t*-test, multiple regression analysis, analysis of variance (ANOVA) and Pearson's correlation test were used, where appropriate. Statistical significance level was set at 0.05.

RESULTS

Differences between psoriatic patients from various European countries

A total of 151 psoriatic patients (22.1%) had HADS-A scoring ≥ 11 points (indicating clinically relevant anxiety) and 91 patients (13.3%) recorded marked depressive symptoms (≥ 11 points). Significant differences regarding self-assessed overall health status, HRQoL, anxiety and depression were observed among psoriatic patients from various European countries (**Table I**). The lowest anxiety and depression values were scored by patients from Denmark (HADS-anxiety: 5.0 ± 4.4 points, HADS-depression: 3.2 ± 3.2 points); and the best HRQoL was observed in subjects from the Netherlands (overall health status: $77.9 \pm 14.4\%$; DLQI: 6.5 ± 5.2 points) and Spain (overall health status: $74.9 \pm 16.8\%$; DLQI: 3.7 ± 4.9 points), while patients from Italy were the most impaired (HADS-anxiety: 10.6 ± 3.9 points, HADS-depression: 9.6 ± 4.4 points, overall health status: $55.6 \pm 22.2\%$, DLQI: 14.3 ± 6.6) (**Fig. 1**). Detailed data on anxiety and depression in particular countries are shown in Table SI¹.

Analysis of psychosocial health status with respect to demographic data and disease severity

Analysis of demographic and socio-economic factors revealed significant correlation between age and general health status assessed with EQ-5D, indicating that higher age was associated with poorer general quality

¹<https://www.medicaljournals.se/acta/content/abstract/10.2340/00015555-2760>

Table I. EuroQoL (EQ-5D), Hospital Anxiety and Depression Scale (HADS) and Dermatology Life Quality Index (DLQI) scoring for psoriatic patients from various European countries

Country (% of all patients from each country)	General health status Mean±SD [95% CI]	Self-rated health status – EQ-5D Mean±SD [95% CI]	HADS – Anxiety Mean±SD [95% CI]	HADS – Depression Mean±SD [95% CI]	DLQI Mean±SD [95% CI]
Belgium (n=43, 17.4%)	6.7±1.4 [6.2–7.1]	70.2±14.8 [65.3–75.0]	9.5±4.7 [7.9–10.9]	5.6±4.1 [4.1–6.8]	5.7±5.0 [4.1–7.3]
Denmark (n=46, 16.1%)	6.9±1.6 [6.4–7.4]	70.3±17.6 [64.7–75.8]	5.0±4.4 [3.7–6.4]	3.2±3.2 [2.2–4.2]	5.2±5.8 [3.4–7.1]
France (n=17, 13.2%)	6.9±1.3 [6.2–7.6]	69.1±16.5 [60.6–77.6]	7.8±3.2 [6.1–9.4]	5.0±3.3 [3.3–6.7]	5.7±5.7 [2.5–8.8]
Germany (n=29, 9.9%)	7.4±1.5 [6.9–8.0]	62.1±22.4 [53.6–70.6]	8.6±5.4 [5.6–9.1]	6.6±5.1 [4.6–8.5]	10.4±8.3 [7.3–13.6]
Hungary (n=40, 9.8%)	6.4±1.8 [5.8–7.1]	72.5±18.8 [64.8–80.3]	5.1±4.0 [3.8–6.4]	4.8±4.1 [3.4–6.1]	6.1±7.9 [3.5–8.6]
Italy (n=83, 16.4%)	8.0±1.8 [7.6–8.4]	55.6±22.2 [50.8–60.5]	10.6±3.9 [9.7–11.4]	9.6±4.4 [8.7–10.6]	14.3±6.6 [12.8–15.7]
Netherlands (n=23, 11.5%)	6.4±1.4 [5.8–7.0]	77.9±14.4 [70.3–85.6]	5.4±4.1 [3.6–7.2]	4.6±3.9 [2.9–6.2]	6.5±5.2 [4.3–8.7]
Norway (n=138, 24.5%)	7.4±1.8 [7.1–7.7]	65.9±19.7 [62.5–69.4]	6.6±4.5 [5.8–7.4]	4.4±4.2 [3.6–5.1]	9.2±7.2 [7.9–10.4]
Poland (n=61, 22.4%)	7.7±1.8 [7.2–8.1]	58.0±20.2 [52.8–63.1]	7.6±4.8 [6.3–8.7]	6.1±3.9 [5.1–7.1]	13.3±8.1 [11.2–15.4]
Russia (n=73, 27.2%)	7.2±1.7 [6.8–7.6]	63.9±19.9 [59.2–68.5]	5.8±4.0 [4.9–6.8]	5.2±3.4 [4.4–6.0]	11.3±7.7 [9.5–13.1]
Spain (n=52, 20.1%)	6.1±1.4 [5.7–6.5]	74.9±16.8 [70.2–79.6]	6.2±3.9 [5.0–7.2]	3.8±3.2 [2.9–4.7]	3.7±4.9 [2.3–5.1]
Turkey (n=27, 10%)	7.4±1.9 [6.6–8.2]	65.2±18.1 [58.0–72.3]	6.4±4.0 [4.8–8.0]	5.7±3.9 [4.2–7.3]	11.1±6.9 [8.4–13.9]
UK (n=50, 18.3%)	6.8±2.0 [6.3–7.4]	70.0±17.0 [65.1–74.9]	7.1±4.1 [6.0–8.3]	4.8±4.0 [3.7–5.9]	6.8±7.2 [4.8–8.9]

SD: standard deviation; 95% CI: 95% confidence interval.

of life (EQ-questionnaire $r=0.15$, $p<0.001$ and EQ-VAS $r=-0.12$, $p=0.002$), and between age and HRQoL impairment measured with DLQI (similarly, higher age was linked with more decreased HRQoL, $r=-0.11$, $p=0.005$). Also, there was significant correlation, albeit weak, between patients' age and satisfaction with their dermatologist, indicating that older people are more satisfied with their treating physicians ($r=0.12$, $p=0.003$) (Table II).

Statistically significant differences between males and females were demonstrated in all analysed aspects, ex-

cept satisfaction with their dermatologists. Females presented lower overall health status, more intense anxiety and depression symptoms, greater HRQoL impairment and more intense itch compared with males (Table II).

The degree of satisfaction with a dermatologist was inversely proportional to the level of education. There was a low level of anxiety in patients with lower educational attainment, and a high level of anxiety in those with higher educational attainment (Table II).

There were no statistically significant relationships between level of education and severity of pruri-

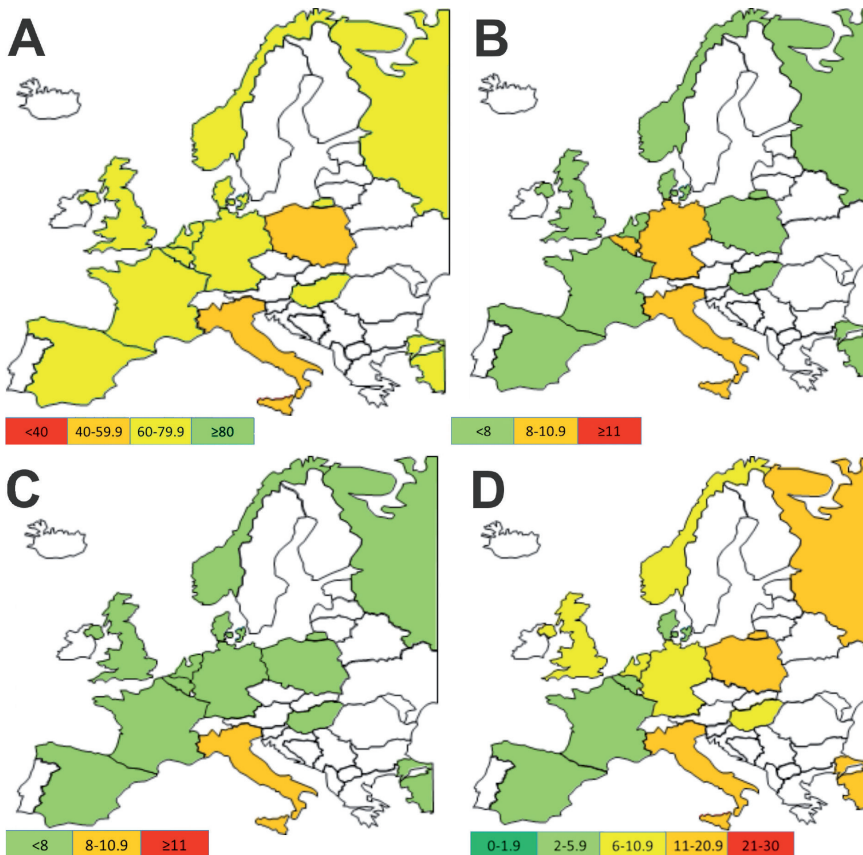


Fig. 1. Values obtained in different countries. (A) Own health status assessed with EuroQoL (EQ-5D) (red: feeling of poor health, orange: feeling of moderate health; yellow: feeling of quite good health, green: feeling of good health). (B) Anxiety level assessed with Hospital Anxiety and Depression Scale (HADS-A) anxiety subscale (green: anxiety unlikely, orange: suspected anxiety, red: clinically relevant anxiety). (C) Depressive symptoms assessed with the HADS-D depression subscale (green: depression unlikely, orange: suspected depression, red: clinically relevant depression). (D) Quality of life (QoL) assessed with Dermatology Life Quality Index (DLQI) (grass green: normal QoL, green: slightly impaired QoL, yellow: moderately impaired QoL, orange: severely impaired QoL, red: extremely impaired QoL).

Table II. Relationships between demographic data and patients' psychosocial well-being

	Age		Sex		Education level		Marital status		p-value								
	Mean±SD	[95% CI]	Males n=368 Mean±SD [95% CI]	Females n=311 Mean±SD [95% CI]	Low n=255 Mean±SD [95% CI]	Higher n=197 Mean±SD [95% CI]	University n=169 Mean±SD [95% CI]	Single n=132 Mean±SD [95% CI]		Married n=370 Mean±SD [95% CI]	Divorced n=64 Mean±SD [95% CI]	Widowed n=39 Mean±SD [95% CI]					
Itch intensity (0-10)	0.0	0.99	4.2±2.9 [3.9-4.6]	5.2±3.2 [4.8-5.5]	4.5±3.2 [4.1-4.9]	5.0±2.6 [4.6-5.4]	4.4±3.3 [3.9-5.0]	3.9±2.9 [3.4-4.5]	4.6±3.1 [4.2-4.9]	5.3±3.3 [4.4-6.2]	5.1±3.2 [4.0-6.2]	0.04					
Satisfaction with your dermatologist (0-10)	0.12	<0.01	7.7±2.6 [7.4-7.9]	7.7±2.7 [7.4-8.0]	8.1±2.4 [7.8-8.4]	7.4±2.7 [7.0-7.8]	7.2±2.8 [6.8-7.7]	7.3±2.7 [6.8-7.8]	7.9±2.6 [7.6-8.1]	7.4±2.8 [6.7-8.1]	8.0±2.4 [7.2-8.8]	0.13					
General health status: EQ-5D questionnaire	0.15	<0.001	6.9±1.7 [6.7-7.1]	7.4±1.8 [7.2-7.7]	7.1±1.8 [6.9-7.4]	7.3±1.9 [7.1-7.6]	7.0±1.6 [6.8-7.3]	6.9±1.7 [6.6-7.2]	7.0±1.7 [6.8-7.2]	7.9±1.7 [7.5-8.4]	7.5±1.9 [6.9-8.1]	<0.001					
Self-rated health status: EQ-5D (VAS)	-0.12	<0.01	67.6±19.5 [65.5-69.6]	63.2±20.2 [60.9-65.6]	64.4±19.7 [61.8-66.9]	64.8±21.1 [61.8-67.8]	67.7±18.0 [65.0-70.5]	67.1±20.6 [63.5-70.7]	66.7±19.8 [64.6-68.7]	60.5±21.3 [55.0-65.9]	64.7±13.8 [59.9-69.4]	0.13					
Anxiety level: HADS	-0.04	0.36	6.3±4.3 [5.8-6.7]	8.1±4.7	6.6±4.4 [6.0-7.2]	7.7±4.7 [7.1-8.4]	7.1±4.2 [6.4-7.7]	7.0±4.5 [6.2-7.8]	6.8±4.6 [6.3-7.2]	8.4±4.3 [7.3-9.5]	7.9±4.3 [6.4-9.3]	0.04					
Depression level: HADS	0.05	0.21	5.2±4.1 [4.7-5.6]	5.8±4.6 [5.3-6.3]	5.3±4.2 [4.7-5.8]	5.7±4.5 [5.1-6.4]	5.2±4.1	5.5±4.1 [4.8-6.2]	5.1±4.3 [4.6-5.5]	7.2±4.3 [6.2-8.3]	7.1±3.8 [5.6-8.2]	<0.001					
QoL: DLQI	-0.11	<0.01	8.4±7.3 [7.6-9.1]	10.1±7.9 [9.2-11.0]	8.4±7.3 [7.5-9.4]	9.72±7.67 [8.6-10.8]	9.8±7.6 [8.6-10.9]	10.7±7.4 [7.9-10.4]	8.6±7.7 [7.8-9.4]	10.7±7.4 [8.8-12.6]	9.6±8.2 [6.9-12.4]	0.22					
Socio-economic level																	
Economic difficulties in the last 5 years																	
Low n=120	Mean±SD	[95% CI]	Middle n=494	High n=50	Yes n=213	Mean±SD	[95% CI]	No n=451	Mean±SD	[95% CI]	Yes n=237	Mean±SD	[95% CI]	No n=430	Mean±SD	[95% CI]	p-value
Itch intensity (0-10)	5.3±3.0	[4.7-5.9]	4.4±3.1	[4.1-4.7]	5.3±2.6	[4.5-6.1]	0.01	4.4±3.1	[4.1-4.8]	4.6±3.0	[4.3-5.2]	4.8±3.3	[4.3-5.2]	4.6±3.0	[4.3-4.9]	0.51	
Satisfaction with your dermatologist (0-10)	7.6±2.8	[7.0-8.1]	7.8±2.6	[7.6-8.0]	6.9±2.6	[6.1-7.6]	<0.05	7.7±2.6	[7.4-7.9]	7.6±2.7	[7.3-8.0]	7.8±2.7	[7.5-8.2]	7.6±2.6	[7.3-7.9]	0.35	
General health status: EQ-5D questionnaire	7.9±.9	[7.5-8.2]	7.1±1.7	[6.9-7.2]	6.6±1.4	[6.2-7.0]	<0.001	6.9±1.7	[6.7-7.0]	6.9±1.9	[7.5-8.0]	7.7±1.9	[7.4-7.9]	6.9±1.7	[6.7-7.0]	<0.001	
Self-rated health status: EQ-5D (VAS)	59.0±21.4	[54.9-63.1]	66.8±19.1	[65.1-68.5]	69.5±21.2	[63.5-75.6]	<0.001	68.3±19.3	[66.5-70.1]	68.3±19.3	[57.6-63.0]	60.3±20.2	[57.6-63.0]	68.4±19.3	[66.5-70.2]	<0.001	
Anxiety level: HADS	8.7±4.9	[7.7-9.5]	6.8±4.4	[6.3-7.1]	6.5±4.1	[5.3-7.6]	<0.001	8.7±4.8	[8.0-9.3]	6.4±4.3	[5.9-6.7]	8.8±4.9	[8.0-9.3]	6.3±4.2	[5.8-6.6]	<0.001	
Depression level: HADS	7.0±4.2	[6.1-7.6]	5.1±4.2	[4.7-5.4]	5.8±4.6	[4.5-7.1]	<0.001	6.8±4.2	[6.2-7.4]	4.8±4.2	[4.4-5.2]	6.6±4.4	[6.0-7.2]	4.8±4.1	[4.4-5.2]	<0.001	
QoL: DLQI	11.3±7.9	[9.8-12.8]	8.6±7.4	[7.9-9.2]	10.2±7.8	[8.0-12.4]	<0.01	11.2±7.9	[10.1-12.3]	8.2±7.2	[7.5-8.9]	11.3±8.1	[10.3-12.4]	7.9±7.1	[7.3-8.6]	<0.001	

SD: standard deviation; 95% CI: 95% confidence interval; VAS: visual analogue scale; EQ-5D: EuroQoL; HADS: Hospital Anxiety and Depression Scale; DLQI: Dermatology Life Quality Index.

tus ($p=0.23$), overall health status ($p=0.19$, $p=0.21$), severity of depressive symptoms ($p=0.4$) and HRQoL ($p=0.12$). Marital status was significantly linked with itch intensity, general health status (EQ-5D questionnaire) and severity of anxiety and depressive symptoms. Divorced people reported more intense itch, higher overall health status impairment, higher anxiety level and more severe depressive symptoms. There were no statistically significant differences between marital status regarding satisfaction with a dermatologist ($p=0.13$), self-rated health status (EQ-5D VAS) ($p=0.13$) and QoL ($p=0.22$) (Table II).

Patients with the lowest socio-economic status (status self-assessed by the respondent as low, middle, or high) demonstrated the highest overall health status impairment, had more severe anxiety and depressive symptoms and the highest HRQoL impairment (Table II).

Disease severity was weakly related to patient's psychosocial health status, documenting that higher disease severity was linked with poorer well-being. The closest relationship was with DLQI score ($r=0.21$, $p<0.001$), followed by EQ-5D score ($r=0.18$, $p<0.001$), EQ-5D VAS ($r=-0.17$, $p<0.001$), depression ($r=0.14$, $p<0.001$), and anxiety ($r=0.1$, $p<0.001$). A detailed multiple regression analysis on the studied variables influencing the patient well-being is presented in Table SII¹.

Suicidal thoughts in psoriatic population

A total of 115 patients out of 668 (17.2%) reported present or past suicidal ideations; out of these patients, 77 (11.5%) stated such ideations to be related to their psoriasis. These patients were characterized by significantly higher severity of pruritus, lower overall health status, more severe anxiety and depressive symptoms, and lower HRQoL compared with patients without suicidal

Table III. Relationships between suicidal ideation and psychosocial well-being of psoriatic patients

	Presence of suicidal ideation (n = 115)			Suicidal ideation related to skin condition (n = 77)		
	Yes Mean ± SD [95% CI]	No Mean ± SD [95% CI]	p-value	Yes Mean ± SD [95% CI]	No Mean ± SD [95% CI]	p-value
Itch intensity	5.8 ± 3.1 [5.2–6.4]	4.4 ± 3.0 [4.1–4.7]	<0.001	6.0 ± 2.9 [5.3–6.7]	4.5 ± 3.1 [4.2–4.7]	<0.001
Satisfaction with your dermatologist	7.0 ± 3.0 [6.4–7.5]	7.8 ± 2.5 [7.6–8.1]	<0.01	7.2 ± 2.9 [6.5–7.8]	7.8 ± 2.6 [7.5–8.0]	0.07
General health status: EQ-5D questionnaire	8.4 ± 1.8 [8.1–8.7]	6.9 ± 1.7 [6.8–7.0]	<0.001	8.7 ± 1.8 [8.3–9.1]	7.0 ± 1.7 [6.8–7.1]	<0.001
Self-rated health status: EQ-5D (VAS)	55.8 ± 21.6 [51.7–59.8]	67.7 ± 19.0 [66.1–69.4]	<0.001	53.3 ± 21.6 [48.3–58.3]	67.3 ± 19.1 [65.7–68.9]	<0.001
Anxiety level: HADS	11.2 ± 4.9 [10.2–12.0]	6.3 ± 3.9 [5.9–6.5]	<0.001	11.4 ± 4.7 [10.3–12.4]	6.6 ± 4.2 [6.2–6.9]	<0.001
Depression level: HADS	8.9 ± 4.7 [7.9–9.7]	4.7 ± 3.8 [4.3–5.0]	<0.001	9.3 ± 4.6 [8.2–10.3]	4.9 ± 4.0 [4.6–5.2]	<0.001
QoL: DLQI	13.7 ± 8.4 [12.2–15.3]	8.2 ± 7.1 [7.6–8.8]	<0.001	15.6 ± 8.1 [13.8–17.5]	8.3 ± 7.1 [7.7–8.9]	<0.001

SD: standard deviation; 95% CI: 95% confidence interval; QoL: quality of life; VAS: visual analogue scale; EQ-5D: EuroQoL; HADS: Hospital Anxiety and Depression Scale; DLQI: Dermatology Life Quality Index.

ideation (Table III). The highest prevalence of suicidal thoughts was found in Turkey (44.4%), the lowest in France (5.9%) and the second lowest in Denmark (9.1%) ($p=0.02$).

Multiple regression analysis revealed that the presence of suicidal thoughts was independently related to patients' age ($\beta=-0.1$, $p<0.05$), socio-economic level ($\beta=-0.09$, $p<0.05$), stressful life events during the last 6 months ($\beta=-0.18$, $p<0.001$), general health status according to EQ-5D questionnaire ($\beta=0.12$, $p=0.04$), and anxiety level ($\beta=0.25$, $p<0.001$), while suicidal ideation related to skin condition were significantly dependent only on stressful life events during the last 6 months ($\beta=-0.1$, $p<0.05$), and anxiety level ($\beta=0.24$, $p<0.001$).

Itching in psoriatic patients

A total of 474 psoriatic patients (69.5%) reported itching, of whom 74.7% reported the presence of chronic itch, i.e. lasting longer than 6 weeks. In some countries the prevalence of itch was extremely high (Italy 91.6%, Germany 82.8%, the Netherlands 82.6%) in comparison with some other countries (France 35.3%, UK 52.0%) ($p<0.001$). Significant differences were also observed regarding itch intensity, with the highest scores reported among patients from Italy (mean VAS 6.6 ± 1.9 points), UK (mean VAS 5.8 ± 2.3) and Germany (mean VAS 5.7 ± 3.2), and the lowest scores by patients living in Russia (mean VAS 2.5 ± 3.2), Hungary (mean VAS 3.5 ± 3.3) and Spain (mean

VAS 3.5 ± 3.3) ($p<0.001$). Detailed data on itch severity scoring are demonstrated in Table SIII¹.

Patients with chronic itch had more severe pruritus than those with acute itch (6.0 ± 2.5 points vs. 5.3 ± 2.4, $p<0.01$). They were also more depressed (Table IV). Patients with itch had lower overall health status and HRQoL as well as significantly more severe anxiety and depressive symptoms compared with patients without itch. There was a statistically significant correlation between the severity of itch and satisfaction with dermatologist, overall health status, severity of anxiety and depression symptoms, and HRQoL (Table IV).

DISCUSSION

Psoriasis is a common chronic skin condition that can markedly impair patients' HRQoL (19–21). Many people with psoriasis report decreased self-esteem and problems in establishing relationships with other people (22). However, in our current study using a validated set of questionnaires we have demonstrated significant variations among different European countries of psychosocial health status of patients with psoriasis. It is possible that cultural differences, different access to possible treatments, differences in the organization of healthcare systems, and differences in climate may influence the impact of psoriasis on patient's well-being. Differences regarding well-being do not correlate with latitude,

Table IV. Relationships between itch and psychosocial parameters in psoriatic patients

	Presence of itch			Chronic itch (>6 weeks) ^a			Itch intensity	
	Yes (n = 474) Mean ± SD [95% CI]	No (n = 208) Mean ± SD [95% CI]	p-value	Yes (n = 313) Mean ± SD [95% CI]	No (n = 106) Mean ± SD [95% CI]	p-value	r	p-value
Satisfaction with your dermatologist	7.4 ± 2.7 [7.1–7.6]	8.4 ± 2.2 [8.1–8.8]	<0.001	7.2 ± 2.6 [6.7–7.7]	7.3 ± 2.8 [7.0–7.7]	0.67	-0.21	<0.001
General health status: EQ-5D questionnaire	7.5 ± 1.8 [7.3–7.6]	6.4 ± 1.5 [6.2–6.7]	<0.001	7.3 ± 1.7 [7.0–7.7]	7.6 ± 1.9 [7.4–7.8]	0.20	0.37	<0.001
Self-rated health status: EQ-5D (VAS)	62.9 ± 20.5 [61.0–64.8]	72.4 ± 16.6 [70.0–74.8]	<0.001	62.4 ± 19.6 [58.5–66.3]	62.2 ± 21.2 [59.8–64.6]	0.93	-0.30	<0.001
Anxiety level: HADS	7.7 ± 4.7 [7.3–8.1]	5.7 ± 3.8 [6.1–6.2]	<0.001	8.2 ± 4.6 [7.3–9.1]	7.6 ± 4.7 [7.0–8.1]	0.26	0.35	<0.001
Depression level: HADS	6.2 ± 4.5 [5.8–6.6]	3.7 ± 3.0 [3.2–4.1]	<0.001	7.4 ± 4.8 [6.4–8.3]	6.0 ± 4.3 [5.5–6.5]	<0.001	0.34	<0.001
QoL: DLQI	10.9 ± 7.6 [10.2–11.6]	4.9 ± 5.9 [4.1–5.8]	<0.001	11.2 ± 7.2 [9.8–2.6]	11.6 ± 7.7 [10.7–12.4]	0.66	0.47	<0.001

^aIn 55 patients the duration of itch was not provided.

SD: standard deviation; 95% CI: 95% confidence interval; QoL: quality of life; VAS: visual analogue scale; EQ-5D: EuroQoL; HADS: Hospital Anxiety and Depression Scale; DLQI: Dermatology Life Quality Index.

ambient temperature or sun exposure, or with national prosperity. The percentage of patients with psoriasis recruited in each centre was highest in Russia, Norway and Poland, and lowest in Turkey, Germany and Hungary. Differences in the patient number included in particular centres may limit the validity of results achieved. In this respect, a further limitation of this study is the lack of data on patients' nationality, in respect of their duration of stay in the country in which they had been recruited into the study. Another limitation of the study is that patients were recruited on random days, which might not ensure proper random sampling, as some types of patients may be seen on certain days of the week.

Analysis of other demographic data revealed statistically significant differences between males and females in all aspects except for satisfaction with the dermatologist. Females, as also reported by other authors (1, 23), presented lower overall health status, more intense anxiety and depression symptoms, greater HRQoL impairment and more intense itch compared with males. In addition, links were demonstrated between satisfaction with a dermatologist and level of education, between marital status and itch intensity, general health status (EQ-5D questionnaire), anxiety and depressive symptoms severity, between socio-economic status and severity of itch, overall health status, severity of anxiety and depressive symptoms and HRQoL impairment (see Table II).

One of the most important aspects of psoriasis is concomitant pruritus. Approximately 72–80% of psoriatic patients may experience pruritus (22, 24) and this symptom may be one of the main factors influencing their HRQoL (25). The present study confirmed that pruritus is very frequent in psoriasis, and that its severity is one of the main parameters affecting psoriatic patients' well-being throughout different European countries. As shown, pruritus is considered by patients to be the most bothersome symptom of psoriasis, even though the severity of itch appears to be lower than in other pruritic skin conditions (26). Patients with pruritus show more reduced HRQoL compared with those without pruritus, and pruritus intensity correlates with the degree of HRQoL impairment (26). Pruritus may alter sleep quality, which may further contribute to the alteration of psoriatic patients' well-being. Psoriatic subjects with pruritus also demonstrate more depressive symptoms (27). This finding may, at least in part, explain the link between pruritus and suicidal ideation, as we found a clear link between the intensity of anxiety and depression symptoms in psoriatic individuals and the presence of suicidal ideations.

This study has several limitations. The way in which patients were recruited and the type of dermatology clinical service may have differed between centres. Although the total number of general dermatology patients recruited at each centre was similar, the number of psoriatic patients depended on the sequential inclusion of psoriatic

patients within the larger cohort, leading to differences in numbers of psoriatic patients recruited from each centre. Depending on the local system of referral to the clinic, the clinical severity of the psoriasis patients may have differed between centres. Some of the differences in scores between countries may have been caused by cultural differences in answering the questionnaires. Although validated translations of the measures were used in different countries, giving assurance that the meaning of the questions was as close as possible in the different languages, it cannot necessarily be assumed that the scores from the measures can be directly compared between different countries (28), even though this assumption is made in the interpretation of, for example, multinational drug trials (29). This is a difficulty across all patient-reported outcome measurements in medicine and is not confined to dermatology. Furthermore, disease severity was assessed using only 3 severity categories (mild, moderate, severe). The Psoriasis Area and Severity Index (PASI) would probably be more appropriate as it gives more objective data on psoriasis severity and extent, thus not using PASI should be considered as a further limitation. The same refers to measurement of pruritus intensity, as the VAS is assessing only symptom severity, but does not take into account, for example, pruritus extent or number and durations of itch episodes. Thus, performing only one method of assessment of pruritus severity limits the results for itch. According to the guidelines published by the International Forum for the Study of Itch (IFSI) (8) VAS is one of the most widely used pruritus measures and is recommended for use in all clinical trials on itch. Of course, this instrument, as any other, has some limitations, which have been mentioned in the discussion.

Future studies focusing on the influence of pruritus on patient well-being should consider other measurement tools, such as itch questionnaires (30). However, despite the large number of questionnaires used in our study, in order to keep the study as feasible as possible we decided to include only VAS as a measure of pruritus intensity.

In conclusion, significant variations were observed among different European countries regarding the psychosocial health status of patients with psoriasis. Patient selection biases may have partly influenced the results of the present study, and these findings need to be confirmed in future studies; however, this study indicates that results from one country should not simply be transferred to patients living in other countries, as perception of psoriasis and coping with the disease may take place in a completely different ways. The study clearly indicates that psoriasis is significantly linked with depression, anxiety and impairment of QoL. It is essential to include measures of psychosocial morbidity when assessing psoriasis severity and treatment efficacy, because of the substantial role that psychosocial burden plays in patient perception of disease severity, QoL and

disease course (2). Such knowledge also requires the prompt implementation of active interventions to detect and treat psychological disturbances early, in order to improve QoL of patients with psoriasis.

REFERENCES

- Russo PA, Ilchef R, Cooper AJ. Psychiatric morbidity in psoriasis: a review. *Australas J Dermatol* 2004; 45: 155–159.
- Kimball AB, Jacobson C, Weiss S, Vreeland MG, Wu Y. The psychosocial burden of psoriasis. *Am J Clin Dermatol* 2005; 6: 383–392.
- Rapp SR, Feldman SR, Exum ML, Fleischer AB Jr, Reboussin DM. Psoriasis causes as much disability as other major medical diseases. *J Am Acad Dermatol* 1999; 41: 401–417.
- Dalgard FJ, Gielor U, Tomas-Aragones L, Lien L, Poot F, Jemec GB, et al. The psychological burden of skin diseases: a cross-sectional multicenter study among dermatological out-patients in 13 European countries. *J Invest Dermatol* 2015; 135: 984–991.
- Aberra TM, Joshi AA, Lerman JB, Rodante JA, Dahiya AK, Teague HL, et al. Self-reported depression in psoriasis is associated with subclinical vascular diseases. *Atherosclerosis* 2016; 251: 219–225.
- Egeberg A, Khalid U, Gislason GH, Mallbris L, Skov L, Hansen PR. Impact of depression on risk of myocardial infarction, stroke and cardiovascular death in patients with psoriasis: a Danish nationwide study. *Acta Derm Venereol* 2016; 96: 218–221.
- Lamb RC, Matcham F, Turner M, Rayner L, Simpson A, Hotopf M, et al. Screening for anxiety and depression in people with psoriasis: a cross sectional study in a tertiary referral setting. *Br J Dermatol* 2017; 176: 1028–1034.
- Nicholas MN, Gooderham M. Psoriasis, depression, and suicidality. *Skin Therapy Lett* 2017; 22: 1–4.
- Yeung H, Takeshita J, Mehta NN, Kimmel SE, Ogdie A, Margolis DJ, et al. Psoriasis severity and the prevalence of major medical comorbidity: a population-based study. *JAMA Dermatol* 2013; 149: 1173–1179.
- Byremo G, Rød G, Carlsen KH. Effect of climatic change in children with atopic eczema. *Allergy* 2006; 61: 1403–1410.
- Steinke S, Langenbruch A, Ständer S, Franzke N, Augustin M. Therapeutic benefits in atopic dermatitis care from the patients' perspective: results of the German national health care study 'Atopic Health'. *Dermatology* 2014; 228: 350–359.
- Zachariae R, Zachariae H, Blomqvist K, Davidsson S, Molin L, Mørk C, Sigurgeirsson B. Self-reported stress reactivity and psoriasis-related stress of Nordic psoriasis sufferers. *J Eur Acad Dermatol Venereol* 2004; 18: 27–36.
- Zachariae R, Zachariae H, Blomqvist K, Davidsson S, Molin L, Mørk C, Sigurgeirsson B. Quality of life in 6497 Nordic patients with psoriasis. *Br J Dermatol* 2002; 146: 1006–1016.
- Reich A, Heisig M, Phan NQ, Taneda K, Takamori K, Takeuchi S, et al. Visual analogue scale: evaluation of the instrument for the assessment of pruritus. *Acta Derm Venereol* 2012; 92: 497–501.
- Ständer S, Augustin M, Reich A, Blome C, Ebata T, Phan NQ, et al. Pruritus assessment in clinical trials: consensus recommendations from the International Forum for the Study of Itch (IFSI) Special Interest Group Scoring Itch in Clinical Trials. *Acta Derm Venereol* 2013; 93: 509–514.
- Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* 1983; 67: 361–370.
- Finlay AY, Khan GK. Dermatology Life Quality Index (DLQI) – a simple practical measure for routine clinical use. *Clin Exp Dermatol* 1994; 19: 210–216.
- EuroQol Group. EuroQol – a new facility for the measurement of health-related quality of life. *Health Policy* 1990; 16: 199–208.
- Sanchez-Carazo JL, López-Esteban JL, Guisado C. Comorbidities and health-related quality of life in Spanish patients with moderate to severe psoriasis: a cross-sectional study (Arizona study). *J Dermatol* 2014; 41: 673–678.
- 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: 822–826.
- Ciocon DH, Horn EJ, Kimball AB. Quality of life and treatment satisfaction among patients with psoriasis and psoriatic arthritis and patients with psoriasis only: results of the 2005 Spring US National Psoriasis Foundation Survey. *Am J Clin Dermatol* 2008; 9: 111–117.
- Reich A, Welz-Kubiak K, Rams L. Apprehension of the disease by patients suffering from psoriasis. *Post Dermatol Alergol* 2014; 31: 289–293.
- Steinke S, Bruland P, Blome C, Osada N, Dugas M, Fritz F, Augustin M, Ständer S. Chronic pruritus: evaluation of patient needs and treatment goals with a special regard to differences according to pruritus classification and sex. *Br J Dermatol* 2017; 176: 363–370.
- Szepietowski JC, Reich A, Wiśnicka B. Itching in patients suffering from psoriasis. *Acta Dermatovenerol Croat* 2002; 10: 221–216.
- Hrehorów E, Reich A, Szepietowski J. Quality of life in patients with psoriasis: relationship with pruritus, stress and symptoms of depression. *Dermatol Klin* 2007; 9: 19–23.
- Reich A, Welz-Kubiak K, Szepietowski JC. Pruritus differences between psoriasis and lichen planus. *Acta Derm Venereol* 2011; 91: 605–606.
- Reich A, Hrehorów E, Szepietowski JC. Pruritus is an important factor negatively influencing the well-being of psoriatic patients. *Acta Derm Venereol* 2010; 90: 257–263.
- Nijsten T, Meads DM, de Korte J, Sampogna F, Gelfand JM, Ongenaes K, et al. Cross-cultural inequivalence of dermatology-specific health-related quality of life instruments in psoriasis patients. *J Invest Dermatol* 2007; 127: 2315–2322.
- Ali FM, Cueva AC, Vyas J, Salek MS, Finlay AY, Piguet V. A systematic review of the use of quality of life instruments in randomised controlled trials of psoriasis. *Br J Dermatol* 2017; 176: 577–593.
- Ständer S, Augustin M, Reich A, Blome C, Ebata T, Phan NQ, Szepietowski JC; International Forum for the Study of Itch Special Interest Group Scoring Itch in Clinical Trials. Pruritus assessment in clinical trials: consensus recommendations from the International Forum for the Study of Itch (IFSI) Special Interest Group Scoring Itch in Clinical Trials. *Acta Derm Venereol* 2013; 93: 509–514.