Original article

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Comorbidities in Chilean patients with psoriasis: a Global Healthcare Study on Psoriasis

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Abstract

Background. Psoriasis is a chronic inflammatory skin disease associated with several important medical comorbidities. There are scant data available on the comorbidities of patients with psoriasis in South America.

Aim. To examine the comorbidity profile of adult patients with psoriasis in Chile and its association with severity of psoriasis.

Methods. This was a multicentre, cross-sectional study involving 16 hospitals and clinics in Chile, which used a 48-item questionnaire to study clinician- and patient-reported outcomes and comorbidities. Inferential analyses were performed by psoriasis severity, using Fisher exact test, Student *t*-test and multivariable logistic regression.

Results. In total, 598 adult patients with psoriasis were included (51.1% male; mean age 49.2 ± 15.1 years); 48.5% mild and 51.4% moderate to severe; Psoriasis Area and Severity Index 11.6 ± 11.5; body surface area 14.7 ± 18.2%. Plaque psoriasis was the most common phenotype (90.2%), followed by guttate (13.4%). Psoriatic arthritis occurred in 27.3% of patients. Comorbidities were reported in 60.2% of all patients with psoriasis. Frequent concomitant diseases were obesity (25.3%), hypertension (24.3%), Type 2 diabetes mellitus (T2DM) (18.7%), dyslipidaemia (17.4%), metabolic syndrome (16.7%) and depression (14.4%). After adjustment, significant associations were found between moderate to severe psoriasis and obesity, T2DM and nonalcoholic fatty liver disease (NAFLD) compared with mild psoriasis.

Conclusions. We report a large study of comorbidities, including depression, dyslipidaemia, T2DM and NAFLD, in people with psoriasis in Chile. The prevalence of comorbidities with psoriasis in Chile appears similar to that found in Western

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countries, and emphasizes the importance of assessing patients with psoriasis for risk factors for and presence of, comorbid disease in a multidisciplinary setting.

Introduction

Psoriasis is a chronic, immune-mediated inflammatory skin disease with a significant negative impact on quality of life and lifespan.[1,2] It is associated with multiple comorbidities such as psoriatic arthritis (PsA), cardiovascular disease and metabolic syndrome (MetS).[3] Understanding the comorbidity profiles of patients with psoriasis is essential to improve management of the disease and thereby lower its burden on both the individual and society.[4–6]

The global prevalence of psoriasis varies from 0.05% to 6.6% and appears to be higher in high-income countries.[7] An estimated prevalence of psoriasis of 0.87% was reported from high-income countries of southern Latin America.[7] The incidence rates of psoriasis in Chile, a country of 19.6 million people, were 22.1 and 22.7 per 100 000 person-years,[8] but there is currently no available information on the prevalence and comorbidity risk in Chile.[9] Recognizing the characteristics of the population of patients with psoriasis in Latin America and its comorbidities may enhance public health decisions and thereby improve patient care.

This study investigated the comorbidity profile of adult patients with psoriasis in Chile and its association with disease severity.

Methods

Setting and study design

This multicentre, cross-sectional study was performed in 16 specialized dermatology centres across Chile (12 private and 4 public health centres in the 3 main regions of the country for tertiary health centres) from January to April of 2020.

Study population

In total, 598 adult patients, with a clinical diagnosis of psoriasis made by a dermatologist, completed a 48-item questionnaire specifically designed for this study. Twenty dermatologists were also invited to complete the questionnaire, of whom 14 responded. Psoriasis severity and extent were measured by the Psoriasis Area Severity Index (PASI) and the percentage body surface area (BSA) affected by psoriasis. The survey was designed to determine patent demographics, lifestyle and disease characteristic, treatments and comorbidities, based on the physician's report. The questions were comparable to those of previous international surveys, European registries [such as the British Association of Dermatologists Biologics and Immunomodulators Register, the German Psoriasis Registry (PsoBest) and the Swiss Dermatology Network for Targeted Therapies].

Comorbidities

Medical personnel classified the comorbidities of PsA, Type 2 diabetes (T2DM), dyslipidaemia, hypertension, MetS and depression according to the Classification of Psoriatic Arthritis criteria, American Diabetes Association, LDL and triglyceride levels above the recommended values according to cardiovascular risk (European Society of Cardiology/European Atherosclerosis Society guidelines) or use of statins or fibrates, blood pressure > 140/90 mmHg, the Adult Treatment Panel III, and the *Diagnostic and Statistical Manual of Mental Disorders* (fifth edition), respectively. Nonalcoholic fatty liver disease (NAFLD) refers to the presence of hepatic steatosis with no other causes for hepatic fat accumulation. Connective tissue diseases were classified by a list of common diseases, including lupus erythematosus, rheumatoid arthritis, scleroderma/systemic sclerosis and polymyositis, among others.

Statistical analysis

Summary statistics were expressed as mean ± SD for normally distributed continuous variables and as numbers and frequencies (%) for categorical variables. The data distribution for continuous variables was determined using the Shapiro–Wilk test. The severity of psoriasis was dichotomized, being defined as moderate to severe at PASI ≥ 10 or BSA ≥ 10, and mild otherwise. Inferential analyses were performed according to severity of psoriasis with respect to the different comorbidities and clinical variables with χ^2 and Fisher exact test, as appropriate, for categorical data, and Student *t*-test for continuous variables. Multivariable logistic regression was performed, with psoriasis severity as the dependent variable and comorbidities, age, sex, body mass index and clinical type of psoriasis as

independent variables. These comorbidities were selected in accordance with the most recent available review of comorbid diseases presented in patients with psoriasis.[3,10] We used the Charlson Comorbidity Index (CCI), which predicts survival as a prognostic index for 17 major systemic comorbid diseases.[11] OR and corresponding 95% CI were calculated, and $P < 0.05$ was considered significant. Statistical analysis was performed using STATA (V13®; StataCorp, College Station, TX, USA) and *R* (https://www.r-project.org) software programs.

Results

Clinical characteristics of the study population

Data from 598 adults with psoriasis were available; 15 patients were excluded due to missing data on PASI or BSA, thus 583 patients (51.1% men, 18.9% women; mean age 49.2 ± 15.1 years) and were included for the severity analysis. Overall, there were 283 (48.5%) patients with mild psoriasis and 300 (51.4%) with moderate to severe psoriasis (Table 1). Mean PASI was 11.6 ± 11.5 and mean BSA was 14.7 ± 18.2.

Psoriasis characteristics

The main types of psoriasis were plaque and guttate disease (90.2% and 13.4%, respectively), with 16.5% of patients having more than one type of psoriasis (Fig. 1a). Inverse psoriasis was more prevalent in patients with moderate to severe psoriasis than in those with mild disease ($P < 0.02$). Psoriasis duration was associated with disease severity; hence, individuals with more severe psoriasis had a longer history of psoriasis (a median of 15 years for moderate to severe psoriasis vs. 11 years for mild psoriasis, $P < 0.01$). Nail psoriasis was present in 32.2% of patients, and a significantly higher prevalence was observed in the moderate to severe group compared with the mild psoriasis group (37.7% vs. 26.5%, respectively; $P < 0.01$). PsA had been diagnosed in 27.3% of patients with psoriasis, with no significant difference regarding psoriasis severity (30% for moderate to severe psoriasis vs. 24.4% for mild psoriasis, $P = 0.14$). No difference in the severity of psoriasis with regard to the health insurance was seen (Fig. 1b).

Concomitant diseases in the study population

Comorbidities were reported by physicians in 60.2% of patients with psoriasis (Table 1). The most frequent concomitant diseases were obesity (25.3%), hypertension (24.3%), T2DM (18.7%), dyslipidaemia (17.4%), MetS (16.7%) and depression (14.4%). In the moderate to severe psoriasis group, more patients had at least one comorbidity and a higher CCI than in the mild psoriasis group, with no significant differences between the two groups ($P = 0.06$ and $P = 0.46$, respectively. Table 2).

In the adjusted analysis, the following comorbidities remained associated with moderate to severe psoriasis: obesity (OR = 1.86, 95% CI 1.03–3.30, $P = 0.03$), T2DM (OR = 1.85, 95% CI 1.02–3.40, $P = 0.04$) and NAFLD (OR = 4.0, 95% CI 1.44–13.30, $P = 0.01$) (Fig. 2).

For every year of psoriasis duration since reported onset, the odds of having moderate to severe disease increased by 2% (OR = 1.02, 95% CI 1.00–1.03, $P = 0.04$) after adjustment.

Table 1 Demographic and clinical characteristics of patients with psoriasis.

	Psoriasis severity			
Parameter	Any	Mild	Moderate o severe	P[a]
Total patients, *n*	598	283	300	
Age, years[a]	49.2 ± 15.1	49.7 ± 14.7	48.7 ± 15.3	0.43
Sex, %				
Male	51.1	46.6	55.3	0.07
Female	48.9	53.4	44.7	
Health insurance, %				
Public	52.9	53.6	52.2	0.90
Private	46.4	45.7	47.1	
Type of psoriasis, %				
Plaque	90.2	88.7	91.7	0.27
Pustular	5.0	6.7	3.3	0.09
Inverse	6.5	3.9	9	**0.02**
Guttate	13.4	12.7	14	0.72
Psoriasis duration, years[b]	13 (19)	11 (19)	15 (19)	< **0.01**
Nail psoriasis, %	32.2	26.5	37.7	< **0.01**
Fingernails affected[c]	5.9 ± 3.1	5.5 ± 3.0	6.4 ± 3.1	0.08
Onset, years[c]	9.1 ± 8.8	7.9 ± 7.9	10.3 ± 9.3	0.15
PsA, %	27.3	24.4	30	0.14
Type, %				
Dactylitis	45.0	46.7	43.7	0.75
Enthesitis	22.9	20	27.5	0.35
Arthritis	76.6	84.4	72.8	0.17
Duration of PsA, years[c]	8.7 ± 7.3	10.3 ± 8.7	8.8 ± 9.1	0.36

PsA, psoriatic arthritis. [a]Significant values are shown in bold; [b]median (interquartile range); [c]mean ± SD.

Discussion

We report a study of comorbidities in patients with psoriasis in Chile. There was a high prevalence of

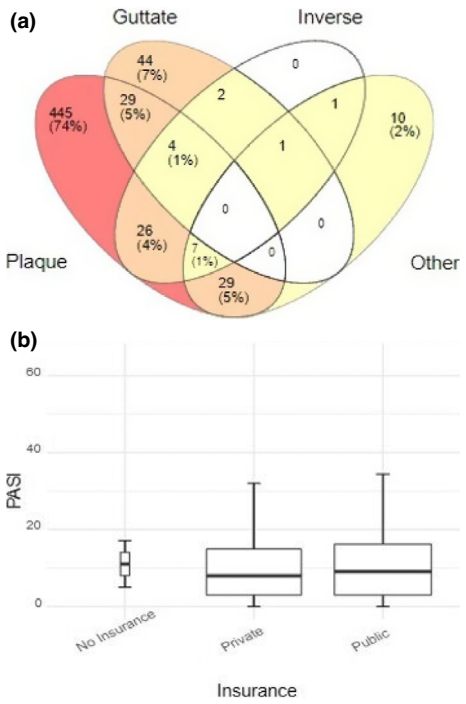

Figure 1 (a,b) Clinical characteristics of the study population. (a) The diagram shows the different types of psoriasis, the main one corresponding to plaque followed by guttate. The other type corresponds to pustular, palmoplantar and erythrodermic subtypes. (b) There were no differences in the severity of psoriasis among the different health insurance mechanisms. PASI, Psoriasis Area Severity Index.

comorbidities, with at least one comorbidity in 60.2% of all patients with psoriasis. The most frequent comorbidities were obesity, hypertension, T2DM, dyslipidaemia and depression. We found a correlation between severity and concomitant disease, with significant associations seen between moderate to severe psoriasis and obesity, diabetes mellitus and NAFLD. Our study is one of the most comprehensive profiling the Latin American population, using nonadministrative data and primary evaluation by dermatologists.

Concerning severity measured by PASI and BSA, 51.4% of our patients had moderate to severe psoriasis. In a cross-sectional study of 9035 patients with psoriasis from the UK, only 12.4% of patients with psoriasis had moderate to severe psoriasis with PASI > 10. While these data cannot be compared directly, our results show that more patients in our study had moderate to severe disease, which may be due to difficulties in accessing dermatological care and more limited options for therapy. A cross-sectional study conducted in nine countries (Brazil, France, Germany, Italy, Mexico, Russia, South Korea, Spain and the UK) with 3821 patients showed that only 23% had moderate to severe psoriasis with PASI > 10.[1] These results suggest that our patients had more severe disease, which may be due to difficulties in accessing dermatological care and limited options for therapy. Systemic treatments such as biologics are usually not covered by medical insurance in our country, and therefore are not commonly used in the public health system.

In our study, 27.3% of patients had PsA, which is within the upper range of the 1.3–34.7% reported by the World Health Organization global report on psoriasis.[12] In the aforementioned cross-sectional study conducted in nine countries,[1] the prevalences of PsA in Italy, France, Brazil, Spain and the UK were 29%, 20%, 18%, 17% and 17%, respectively. Thus, our results are similar to those of Western countries.

We observed a high prevalence of comorbid disease in our population. Compared with Chile's general population,[13] a higher prevalence in the psoriasis population was noted for some comorbidities, particularly T2DM (18.7% in patients with psoriasis vs. 12.3% in the general population) and depression (14.4% vs. 6.2%, respectively). Depression was highly prevalent in our group and was more than twice that of the general population in Chile; this difference may be underestimated, as 60% of the population in Chile do not have access to adequate psychiatric care.[14]

Studies in other populations have supported associations of comorbidities with psoriasis. A US longitudinal database study of 469 097 patients with psoriasis found that dyslipidaemia, hypertension, depression, T2DM and obesity were the most frequent concomitant diseases, with prevalences of 45.6%, 42.2%, 17.9%, 17.5% and 14.4%, respectively.[15] Another cross-sectional study of 9035 patients with psoriasis from the UK, found a higher prevalence of T2DM (5.3%), liver disease (1.0%), chronic obstructive pulmonary disease (15.1%), myocardial infarction (1.1%), peripheral vascular disease (0.8%), renal disease (2.8%) and rheumatoid disease (1.8%), which were more likely associated with severe psoriasis.[16] This study evaluated the CCI, finding a mean of 0.40 ± 0.85 and 0.45 ± 0.92 in patients with severe disease (BSA > 10%), with significant differences between mild to severe cases.[16] These results are similar to those found in our Chilean population; severe disease had a higher comorbidity score (mild psoriasis 0.40 ± 0.76 and moderate to severe psoriasis 0.46 ± 0.75). In the cross-sectional multicountry study, the prevalence of obesity was 12.6% (with the highest prevalence of 19.7% seen in Mexico), T2DM

Table 2 Comorbidities in patients with psoriasis.

	Psoriasis severity			
	Any	Mild	Moderate to severe	*P*
≥ 1 comorbidity, %	60.2	56.2	64	0.06
CCI, mean ± SD	0.41 ± 0.74	0.40 ± 0.76	0.46 ± 0.75	0.46
CCI by score points, %				
0	70.9	72.1	67	0.39
1	19.9	18.6	22.7	
2	6.90	5.90	8.30	
3	1.80	2.90	1.30	
4	0.50	0.50	0.70	
Depression, %	14.4	13.9	17.3	0.31
Type 2 diabetes, %	18.7	16.4	21.7	0.14
Dyslipidaemia, %	17.4	19.2	17.0	0.52
BMI, mean ± SD	27.7 ± 5.0	26.6 ± 4.1	28.5 ± 5.3	0.001
Body weight, %				
Normal	29.8	36.4	23.3	0.001
Underweight	0.60	0.00	1.20	
Overweight	44.3	47.7	44.9	
Obesity	25.3	15.9	30.6	
NAFLD	4.70	2.90	7.30	0.03
Hypertension	24.3	23.6	25.3	0.65
MetS	16.7	14.2	18.2	0.27
CTD	2.01	3.85	1.33	0.08
HIV	0.17	0.00	0.33	1.00
Latent TB	2.51	2.40	3.33	0.61
Cancer, %				
Solid tumour	4.90	5.80	5.00	0.70
Lymphoma	0.33	0.96	0.00	0.17

BMI, body mass index; CCI, Charlson Comorbidity Index; CTD, connective tissue disease; MetS, metabolic syndrome; NAFLD, nonalcoholic fatty liver disease; TB, tuberculosis.

was 4.8% and anxiety or depression was 14.1%.[1] In an analysis of records of patients receiving specialist care in Brazil, Colombia, Argentina and Mexico (941 patients), the most common comorbidities were hypertension (33.2%), dyslipidaemia (23.9%), anxiety (23.7%), depression (14.9%) and T2DM (18.1%).[17] While these results are not directly comparable with ours as that report analysed only patients who had received at least one systemic treatment, we found that the rates of hypertension (24.3%) and dyslipidaemia (17.4%) were lower, while those of depression (14.4%) and T2DM (18.7%) were about the same. Our results are similar to those of Western countries, indicating that in Latin America, the prevalence of comorbidities and the correlation between psoriasis severity and the presence of chronic comorbidities are similar. We found an increased risk of moderate to severe psoriasis with duration of disease (OR = 1.02), obesity (OR = 1.86), T2DM (OR = 1.85) and NAFLD (OR = 4.0).

Comprehensive management of patients with psoriasis is essential as additive or cumulative physical, psychological and social damage over time can cause long-term deterioration. Psoriasis may induce significant cumulative life course impairment (CLCI),[18–20] which results from an interaction between the burden of stigmatization, physical and psychological comorbidities, coping strategies and external factors. This interaction of intrapersonal components makes patients vulnerable to CLCI.[18] In our study, we suspect that patients with psoriasis are at high risk for CLCI because of the high level of social stigmatization with low knowledge of the disease, the high burden of comorbidities, difficulty in accessing medical specialists and lack of access to effective treatments.

This survey was performed during healthcare campaigns by dermatologists, and the diagnosis of psoriasis and estimation of its severity were made by dermatologists. Previous studies were carried out using diagnostic codes from medical records of general practitioners or

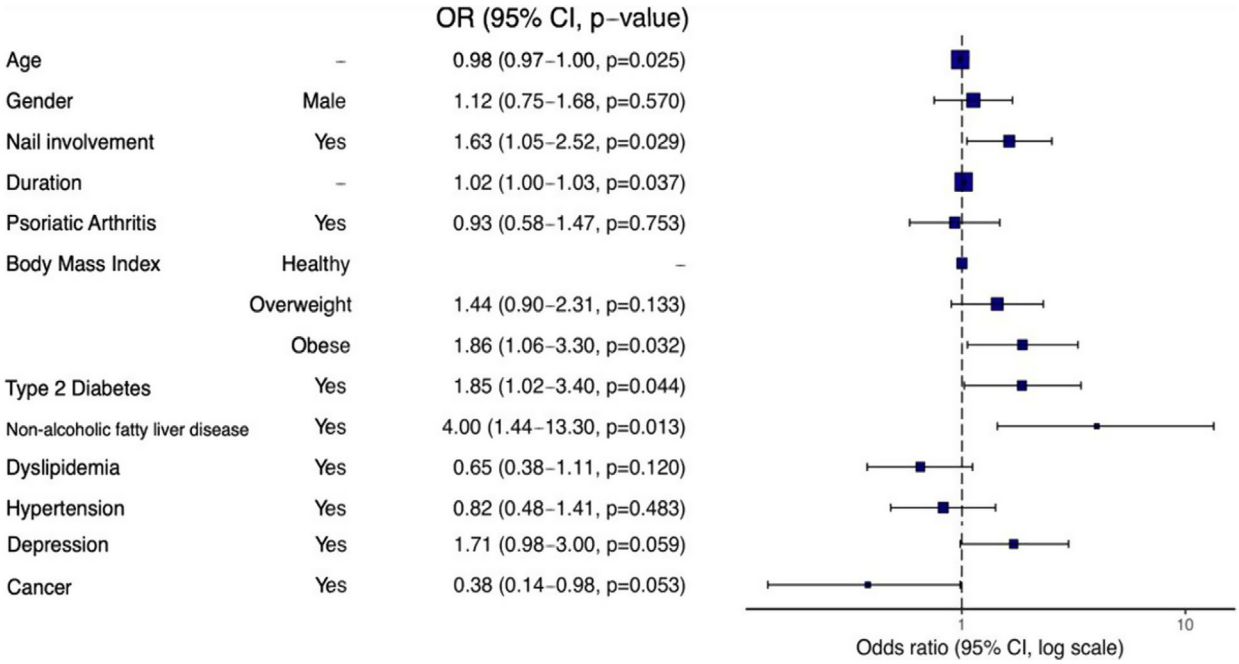

Figure 2 Forest plot of odds ratios for presenting moderate to severe psoriasis by the presence of different comorbidities. For example, the presence of Type 2 diabetes increases the odds of moderate to severe psoriasis in 85% of patients (OR = 1.85, 95% CI 1.02–3.40, $P = 0.04$).

administrative claims.[13,15] A major advantage of the current work is that this multicentre study included patients of different cultural and socioeconomic backgrounds. A limitation of this work is a potential selection bias, as a proportion of the respondents were referred from primary care to receive a dermatological evaluation, therefore, more severe psoriasis could be expected. This selection bias is difficult to overcome as it is related to Chile's structural problem of access to dermatologists.[21]

Conclusions

This is the most extensive study on psoriasis comorbidities in Chile. A high prevalence of comorbidities was found, and their presence correlated with psoriasis severity. Obesity, hypertension and T2DM were the most frequent comorbid diseases in our study, as reported in other countries. Dermatologists should be aware of this high prevalence of comorbidity in order to provide optimal care in Chilean patients. To conclude, the high numbers of comorbidities indicate a need for better treatment options and therapeutic management to improve clinical outcomes and lower the burden of psoriasis in Chile.

What's already known about this topic?

- Psoriasis is associated with several important medical comorbidities.
- There are scant data available on the comorbidities of patients with psoriasis in South America.

What does this study add?

- This is the most extensive study on psoriasis comorbidities in Chile.
- Comorbidities were reported in 60.2% of all patients with psoriasis.
- Frequent concomitant diseases were obesity, hypertension, T2DM, dyslipidaemia, MetS and depression.

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Conflict of interest

FV has served as advisor and/or received speaking fees and/or participated in clinical trials sponsored by AbbVie, Amgen, Eli Lilly, LEO Pharma, Janssen-Cilag, Novartis, Pfizer and Sanofi. CDLC has served as advisor and/or received speaking fees and/or participated in clinical trials sponsored by AbbVie, Amgen, Boehringer-Ingelheim, Bristol Myers Squibb, Coherus, Eli Lilly, Genentech, Janssen-Cilag, Novartis, Pfizer, Sanofi and UCB. CL has participated in clinical trials sponsored by Sanofi, Pfizer and Novartis. JF has participated in clinical trials sponsored by Pfizer and Novartis. DA has served as advisor and/or received speaking fees and/or participated in clinical trials sponsored by AbbVie, Janssen-Cilag and LEO Pharma. CP has participated in clinical trials sponsored by SANOFI Genzyme and Novartis. HC has served as advisor and/or received speaking fees and/or participated in clinical trials sponsored by Serono, Novartis and Galderma. AG has served as advisor and/or received speaking fees and/or participated in clinical trials sponsored by AbbVie, Janssen-Cilag, Novartis and Pfizer. CEMG has received honoraria and/or research funding from AbbVie, Almirall, Amgen, Boehringer Ingelheim, Bristol Myers Squibb, GSK, Janssen-Cilag, LEO Pharma, Novartis, Pfizer and UCB. RR has served as a scientific consultant, speaker or clinical study investigator for AbbVie, Boehringer Ingelheim, Galderma, Janssen-Cilag, Eli-Lilly, Leo-Pharma, Novartis, Pfizer, TEVA and UCB. JTM has served as advisor and/or received speaking fees and/or participated in clinical trials sponsored by AbbVie, Almirall, Amgen, BMS, Celgene, Eli Lilly, LEO Pharma, Janssen-Cilag, MSD, Novartis, Pfizer, Pierre Fabre, Roche, Sanofi and UCB. LVM has served as advisor and/or received speaking fees and/or participated in clinical trials sponsored by Almirall, Amgen, BMS, Celgene, Eli Lilly, MSD, Novartis, Pierre Fabre, Roche and Sanofi. JJW is or has been an investigator, consultant or speaker for AbbVie, Almirall, Amgen, Arcutis, Aristea Therapeutics, Bausch Health, Boehringer Ingelheim, Bristol Myers Squibb, Dermavant, DermTech, Dr Reddy's Laboratories, Eli Lilly, EPI Health, Galderma, Janssen, LEO Pharma, Mindera, Novartis, Pfizer, Regeneron, Samsung Bioepis, Sanofi Genzyme, Solius, Sun Pharmaceutical, UCB and Zerigo Health. JPT is an advisor for AbbVie, Almirall, Arena Pharmaceuticals, Coloplast, OM Pharma, Aslan Pharmaceuticals, Union Therapeutics, Eli Lilly & Co, LEO Pharma, Pfizer, Regeneron and Sanofi-Genzyme; a speaker for AbbVie, Almirall, Eli Lilly & Co, LEO Pharma, Pfizer, Regeneron and Sanofi-Genzyme; and received research grants from Pfizer, Regeneron and Sanofi-Genzyme. AE has received research funding from Pfizer, Eli Lilly, Novartis, Bristol Myers Squibb, AbbVie, Janssen Pharmaceuticals, the Danish National Psoriasis Foundation, and the Kgl Hofbundtmager Aage Bang Foundation; and has received honoraria as consultant and/or speaker from AbbVie, Almirall, Leo Pharma, Zuellig Pharma Ltd. Galápagos NV, Sun Pharmaceuticals, Samsung Bioepis Co. Ltd. Pfizer, Eli Lilly and Company, Novartis, Union Therapeutics, Galderma, Dermavant, UCB, Mylan, Bristol-Myers Squibb and Janssen Pharmaceuticals. The remaining authors declare that they have no conflict of interest.

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Ethics approval

The data were based on a completely anonymous survey and therefore no informed patient consent was required according to local law in Chile. The study was approved by the Swiss Ethics Committee (EK2020–00002), and conducted according to the principles of the Declaration of Helsinki. Data protection under EU, Swiss and Chilean standards was guaranteed and enforced for all study patients. Informed consent not applicable.

Data availability

Data are available on request from the corresponding author.

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