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ORIGINAL ARTICLE

Burden of Disease in Psoriatic Arthritis in Latin America: a Systematic Literature Review

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Abstract

Introduction Psoriatic arthritis is a chronic inflammatory pathology that generates a substantial and progressive deterioration of functionality and quality of life. It is associated with comorbidities (cardiovascular and metabolic) and involvement of mental health. In Latin America, information regarding the disease is limited. This study reviews the burden of disease (disease activity, functional involvement, clinical manifestations, comorbidities, patient-reported outcomes, quality of life, and use of health resources) in PsA patients in Latin America.

Methods Systematic literature review of publications in PUBMED, EMBASE, Cochrane Database of Systematic Reviews–CDSR/Database of Abstracts of Reviews of Effects, LILACS, Scielo, Redalyc, conference abstracts, and grey literature. Two independent assessors selected studies and extracted information. Quality was assessed according to the type of study.

Results We identified 692 references, selecting 50 studies: 41 cross-sectional, four economic-studies, four cohort studies and one systematic review. The information comes mainly from Brazil, Argentina, and Mexico. The estimated disease prevalence for Latin America ranges from 0.004 to 0.08% (95% CI 0.02–0.20). Measurements with validated instruments suggest suboptimal assessment of disease domains, significant functional compromise, loss of productivity, and high frequency of comorbidities, including mental health. Methodological and population considerations limit the generalizability of the findings.

Conclusions The available information reports a considerable burden of disease in patients with PsA in Latin America, with involvement of quality of life associated with disability in relation to disease activity and its various manifestations. Future research and funding efforts should be aimed at generating more standardized information about the impact of PsA in the region.

Key Points

- *The functional involvement related to disease activity, the impact on the quality of life, and the frequency of cardiometabolic and psychological comorbidities are remarkable in Latin American patients with PsA.*
- *The current synthesis offers an overview of the burden of disease (disease activity, functional involvement, clinical manifestations, comorbidities, patient-reported outcomes, quality of life, and use of health resources) in PsA patients in Latin America.*
- *Future research efforts and clinical strategies are required in order to generate standardized data on the patients and better estimate the burden of disease in the region.*

Keywords Comorbidities · Latin American · Psoriatic arthritis

Introduction

Psoriatic arthritis (PsA) is a heterogeneous condition that affects the skin and musculoskeletal system and characterized by joint and intestinal inflammation, including the axial skeleton. The group defined as "spondyloarthritis" includes additional subtypes such as axial spondyloarthritis, reactive arthritis, and arthritis related to inflammatory bowel disease, sharing a significant genetic, etiopathogenic, and response to treatment component [1, 2]. Studies have estimated a prevalence between 0.01% in the Middle East and 0.19% in

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Europe, with wide variations by geographical area, gender, and age group. For South America, the reported prevalence is 0.52% (1.10 to 1.25) [3]. PsA affects about one-third of psoriasis patients. A recent systematic review and meta-analysis revealed a pooled overall prevalence of 19.7% (95%CI 18.5–20.9%) for PsA in patients with psoriasis. This prevalence increases to 24.6% in patients with moderate to severe psoriasis [4]. This same study described that in people with psoriasis in South America, the prevalence of the disease is 19.5% (95%CI 17.1–22.1%), and the incidence is 0.27–2.7 cases per 100,000 people year [4]. Another Latin American study estimated the incidence of PsA in the general population at 6.3 cases per 100,000 inhabitants-years, similar to that reported for North America and Northern Europe where 6–6.59 cases per 100,000 inhabitants are recorded [5–7].

The diagnosis of PsA is mainly based on the clinical phenotype due to the various associated characteristics [8]. In addition to cutaneous, nail and joint symptoms, PsA can be associated with enthesitis, dactylitis, uveitis, psoriasis, and inflammatory bowel disease [1]. Also, compared to the general population, it has been shown that patients with PsA have higher rates of cardiovascular disease, obesity, diabetes, depression, high blood pressure, atherosclerosis, and autoimmune or inflammatory diseases [9]. These manifestations and comorbidities can lead to significant disability in patients, with significant impairment of quality of life, mainly due to pain and musculoskeletal compromise. PsA has also been associated with social-emotional and mental health alterations compared to healthy controls and patients with inflammatory arthritis [10]. Since it is a chronic condition with onset in young adults, the economic burden of PsA can significantly impact direct medical costs and indirect costs associated with lost productivity [11].

Previous studies have reported an increased risk of mortality among patients with PsA compared to the general population [12]; however, knowledge gap remains. This is particularly true in Latin America where available information about epidemiology, phenotypes, and response to treatment is scarce, and optimization of diagnosis and treatment in PsA is an unmet need [13]. Management recommendations for PsA are adapted from studies in Europe and North America [14, 15]. In this regard, the ILAR-PsA group (International League of Associations for Rheumatology — Psoriatic Arthritis) developed specific recommendations for regions of the world with human and economic resource limitations [16] in order to homogenize and guide the management of these patients. In conjunction with local research efforts, this issue highlights the need to address these aspects towards better control of disease [17].

Considering the above, the objective of this systematic literature review (SLR) is to explore and describe the specific burden and impact of the disease in patients with PsA in Latin America, evaluating clinical and functional outcomes, quality of life, patient reports, and use of resources, in order to provide evidence and recognize potential opportunities for improvement that can be addressed in the regional context.

Methods

This systematic literature review was developed from a protocol registered in PROSPERO on July 12, 2022 (https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022361295).

Search criteria were defined to estimate the burden of disease in patients over 18 years of age with PsA in Latin America, in terms of disease activity, disability, extra-articular manifestations (uveitis, inflammatory bowel disease, psoriasis), comorbidities, quality of life, productivity and employment status (disabilities, employment rate, presenteeism, absenteeism), reported patient outcomes (fatigue, pain, social participation, adherence), and resource consumption (direct and indirect costs, hospitalization, outpatient costs, medications). Primary studies or secondary sources, in English, Spanish and Portuguese, were included without date limit in published documents, in the press, grey literature, or even in summary format if they provided information of interest. We excluded studies that did not provide accurate information about outcomes.

Search strategy

A systematic review of the literature was carried out to determine the burden of PsA in Latin America, under a qualitative and quantitative approach, for which the reporting recommendations of the PRISMA guidelines [18] were used. The following sources were consulted: PUBMED, EMBASE, Cochrane Database of Systematic Reviews — CDSR / Database of Abstracts of Reviews of Effects (Ovid Platform), LILACS (Virtual Health Library — VHL), Scielo, Redalyc, and conference abstracts: ACR (*American College of Rheumatology*), EULAR (*European Alliance of Associations for Rheumatology*), PANLAR (*Pan American League of Rheumatology Associations*), AAD (*American Academy of Dermatology*), EADV (*European Academy of Dermatology and Venereology*). Search strategies were designed for each of the sources using the PICO question structure based on key disease-related terms, geographic context, and outcomes of interest. MeSH, Emtree and DEC terms, free language, synonyms, abbreviations, acronyms, spelling variations, and plurals were used. (See supplementary material 1). A manual "snowball" search was performed by reviewing the bibliographic reference list of the selected studies. In order to have traceability on the identified records, all articles were extracted from the different databases in RIS format, and all searches were

exported in a Microsoft Excel® file to filter duplicates and perform their elimination.

Screening, assessment of methodological quality, and risk of bias

Two investigators independently reviewed the titles and/or abstracts of retrieved studies. Any disagreement between them about the eligibility of particular studies was resolved by consensus. (See supplementary material 2). Risk of bias assessment was performed with the instrument validated by Hoy et. al. [19] for cross-sectional studies; for cohort studies, the instrument validated by the *Clinical Advances Through Research and Information Translation* (CLARITY) of the McMaster University group was used [20]. The Joanna Briggs quality tool [21] (See supplementary material 3) was used for economic evaluations. To reduce publication bias, we searched grey literature with special care not to incorporate non-peer-reviewed sources.

Extraction, presentation, and synthesis of results

The full texts of potentially eligible studies were assessed independently, extracting in each the data requested by a prespecified data collection instrument. Results are presented as means and standard deviations or medians for continuous variables and as frequencies (percentages) for categorical variables. We performed meta-analyses of effect measures where possible; these pooled measures are presented with their respective confidence interval.

Results

We identified 692 references, 687 from searches of the PubMed ($n=128$), Embase ($n=269$), Cochrane Library ($n=11$), Scielo ($n=69$), Lilacs ($n=115$), and Redalyc ($n=95$) and five references by hand search. After removing duplicates, and after selection by title and abstract, 137 manuscripts were evaluated. Fifty documents (40 full texts and 10 summary format) were selected for information extraction (see PRISMA in Fig. 1). The quality of the body of evidence revealed low to moderate risk of bias (see supplementary material 3). The highest proportion of studies came from Brazil (60%, $n=29$), followed by Argentina (30%, $n=14$) and then, in order, Mexico, Colombia, Costa Rica, Peru, Venezuela, Uruguay, Chile, Cuba, and Ecuador.

Disease frequency and demographics

A systematic review determined the prevalence of PsA in Latin America at 0.004 to 0.008% [22]. Four studies reported the prevalence of PsA in the general population: one Argentine study [7] recorded a prevalence of 74/100,000 (95% CI: 57 to 94/100,000) in a population belonging to a private regime; a Colombian study [23] reported a prevalence of 0.004% from administrative data; and two population-based surveys in Mexico reported prevalence of 0.08% (95% CI 0.02–0.20) in Nuevo León [24] and 0.02% (95% CI not reported) in Yucatán [25]. A study in Argentina reported an incidence of 6.26/100,000 person-years (95% CI 4.2 to 8.3/100,000 person-years) [7].

Five studies [26–30] reported the prevalence of PsA in patients with psoriasis, with an overall estimate of 32.4%

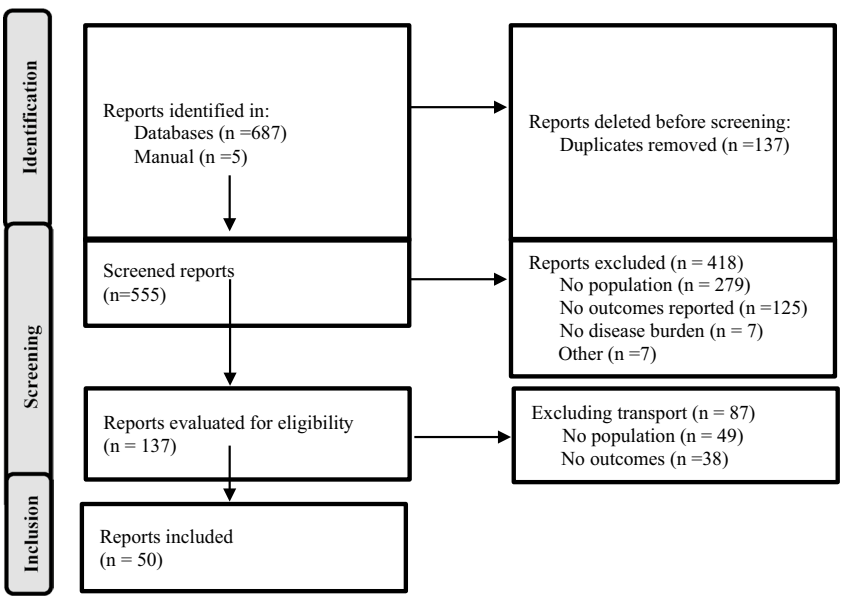

Fig. 1 Flowchart of search, screening, and selection of evidence

(range 17.4–53.3%). On the other hand, the prevalence of PsA in patients with spondyloarthritis was reported in eight studies [31–38] with an overall estimate of 20% (range 6.1–60.2%).

Demographic profile information was obtained from 16,096 subjects with PsA in 25 studies (see Table 1). From the available reports, 50.2% (range 35.3 to 73.3%) was women. The mean age was 48.2 years (95% CI 47.9–48.4). Seven studies [31, 38–43] reported ethnicity; studies from Argentina, Brazil, and Uruguay were predominantly white, while studies from Chile, Costa Rica, Mexico, Peru, and Venezuela were predominantly mestizos. A study conducted in Peru reported that PsA also occurs in populations originating in the Andes [43].

Clinical characterization and comorbidities

The duration of psoriasis in patients with PsA was reported with averages of 6 to 15 years in four studies [26, 29, 51, 52]. The duration of PsA was reported with a mean of 7.2 years (95% CI 6.94–7.52) in 19 studies. Regarding other domains, enthesitis was reported in 38.04% (range 10.7 to 85.3%) of patients in nine studies [26, 27, 29, 35, 38, 43, 45, 47, 51], dactylitis in 39.6% (range 11.8 to 85.3%) in seven studies [26, 27, 29, 35, 43, 47, 51], while nail involvement occurred in an average of 46.1% (range 8.3 to 65.8%) in five studies 26 [28, 45, 51] (Table 2).

Regarding extra-articular manifestations, a study in Brazil reported a prevalence of uveitis of 5% in the population with PsA [55]. No studies were identified regarding the frequency of inflammatory bowel disease in this population.

Studies in Brazil reported that 29 to 75.9% of subjects with PsA had at least one comorbidity such as hypertension, diabetes mellitus, dyslipidemia, or obesity [41, 48, 60]. The pooled prevalence of hypertension was 31.7%, with a range between 4.8% in Colombia [58] and 42.5% in Brazil [39, 41, 47, 51, 55]. Heterogeneous obesity data were reported between 3% for Colombia [58] and 30% for Argentina [52], with variable data in Brazil [41, 47]. Studies in Brazil reported prevalence of dyslipidemia from 20 to 43% [39, 41, 47] and diabetes mellitus from 17.5 to 28.9% [47, 51, 55].

One study showed that metabolic syndrome is more frequent in patients with PsA versus healthy controls (53.9% vs 18.4%, $p < 0.001$). PsA was associated with hypertension, diabetes mellitus, increased abdominal circumference, increased body mass index, and elevated blood glucose and triglyceride levels [51]. Other comorbidities reported in PsA were osteoporosis with a frequency of 2.4 to 10% [41, 47, 58] and depression from 17.9 to 43.2% [39, 41, 47, 56]. A Brazilian study with 212 patients reported some level of anxiety and/or depression in 69.8% of subjects with PsA [41] (Table 3).

Disease activity

Measurement of disease activity in PsA in Latin American patients was reported in 14 studies, specifically Argentina and Brazil (see Table 4). The DAS28 disease activity score recorded the majority of the population evaluated (224 patients) between mild to moderate disease activity (mean 3.01–3.51; range 1.94–5.05). The evaluation of the Index of Clinical Activity of the Disease (CDAI) was reported only in Brazil with an average of 24 ± 16. The Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) was estimated on average at 4.8 ± 2.44. Those treated with biologics had lower disease activity compared to those treated with NSAIDs (nonsteroidal anti-inflammatory drugs), DMARDs (disease-modifying anti-rheumatic drugs) or without treatment [40]. Similarly, lower disease activity was reported in patients with normal body weight *versus* those who were overweight or obese [52].

The extent of skin involvement in patients with PsA was evaluated by the Psoriasis Area Severity Index (PASI) with variable reports of moderate to severe skin involvement. The physician's global assessment (PGA) in response to treatment reported in a study in Brazil values of 3.4 ± 2.7 [47] and in Argentina values of 1.2 (SD $\pm$ 1.3) to 1.9 (SD $\pm$ 1.7), variations related to the body mass index of patients with PsA [52].

Function and disability

Measures of function and disability were reported in 15 studies involving 1763 patients with PsA. Assessments of the Bath functional index of ankylosing spondylitis (BASFI) reflect some degree of functional impairment in these patients (median approx. 3). Of every 10 patients with PsA, six are engaged in their daily activities [59]. Similarly, disability assessed through the Health Assessment Questionnaire-Disability Index (HAQ-DI) reports data around 1.1 ± 0.7 (Table 5). Patients treated with biologics had fewer impairments in function than those treated with NSAIDs, without treatment or with DMARD [40]. Similarly, higher levels of BASFI, which represent greater functional limitation, occur in obese and overweight patients compared to those patients with PsA and normal weight [52].

Quality of life and patient-reported outcomes

Validated measurements for the population with PsA were reported in 1859 patients in 15 studies (see Table 6). Five studies report some degree of involvement (up to 15/20 in the PsA Quality of Life Questionnaire — PsAQoL), generally with worse outcomes for patients in Brazil than in Argentina. In six studies evaluating EQ5D, which includes

Table 1 Demographic characteristics of the population with psoriatic arthritis in Latin America

Authors (year)	Country	Population under study	Total *N*	Population PsA *n* (%)	Men *n* (%)	Women *n* (%)	Age (years)	Ethnic group
Barba-Gómez et al. [26]	Mexico	PsO	90	48 (53.3)	19 (39.6)	29 (60.4)	Mean 50 (SD 15)	NR
Bautista-Molano et al. [44]	Colombia	SpA	21	PsA (3.6)	12 (57.1)	9 (42.9)	Mean 48.3 (SD 10.7)	NR
Buschiazzo et al. [31]	Argentina	SpA	402	242 (60.1)	133 (55.0)	109 (45.0)	Median 51 (IQR 44–61)	White 169 (69.8%) White-native 63 (26%) Another 10 (4.2%)
Carneiro et al. [27]	Brazil	PsO	133	47 (35.3)	NR	NR	Mean 47.5 (SD 13.4)	NR
Castresana-Isla et al. [45]	Costa Rica	PsA	55	55 (100)	17 (30.9)	38 (69.1)	Mean 40.5 (Range 12–74)	NR
Cordovés et al. [28]	Cuba	PsO	63	11 (17.5)	6 (54.5)	5 (45.5)	NR	NR
Da Silva et al. [39]	Brazil	PsA	122	122 (100)	NR	NR	Median 51.5 (IQR 42.6–58.2)	White 68 (55.7%) Mestizo 37 (30.3%) Other 17 (13.9%)
Da Silva et al. [46]	Brazil	PsA	11008	11,008 (100)	5679 (51.6)	5329 (48.4)	Mean 47.74 (SD 13.07)	NR
Da Silva et al. [47]	Brazil	PsA	130	130 (100)	59 (45.4)	71 (54.6)	NR	NR
De Carvalho et al. [32]	Brazil	SpA	1505	277 (18.4)	NR	NR	NR	NR
Faria et al. [48]	Brazil	PsA	1999	1999 (100)	798 (39.9)	1201 (60.1)	Mean 51.11 (SD 12.77)	
Gamonal et al. [29]	Brazil	PsO	300	73 (24.3)	40 (54.8)	33 (45.2)	Mean 49.98 (SD 11.12)	NR
Gallino et al. [49]	Argentina	PsA	110	110 (100)	56 (48.3)	54 (46.6)	Median 55 (IQR 45–63)	NR
García-Kutzbach et al. [33]	Guatemala, El Salvador and Costa Rica	SpA	233	21 (9.0)	NR	NR	NR	NR
Gehlen et al. [34]	Brazil	SpA	102	16 (15.7)	NR	NR	NR	NR
Molina et al. [40]	Argentina	PsA	148	148 (100)	61 (41.2)	87 (58.8)	Mean 53.2 (SD 13.6)	White 104 (70.3%) White-indigenous 38 (25.7%) Indigenous 3 (2%) White-black 2 (1.4%) Black 1 (0.7%)
Moraes et al. [41]	Brazil	PsA	212	212 (100)	87 (41.0)	125 (59.0)	Mean 51.2 (SD 11.48)	White 109 (51.7%) Mestizo 73 (34.6) Other 29 (13.7%)
Oliveira et al. [42]	Brazil	Biological	302	39 (12.9)	14 (35.9)	25 (64.1)	Mean 52.15 (SD 9.96)	White 25 (64.1%)

Table 1 (continued)

Authors (year)	Country	Population under study	Total *N*	Population PsA *n* (%)	Men *n* (%)	Women *n* (%)	Age (years)	Ethnic group
Paniagua et al. [30]	Argentina	PsO	236	87 (36.8)	42 (48.3)	45 (51.7)	Mean 47.2 (SD 16.2)	NR
Sampaio-Barros et al. [35]	Brazil	SpA	1036	139 (13.4)	82 (59.0)	57 (41.0)	Mean 39.7 (SD 12.2)	NR
Skare et al. [36]	Brazil	SpA	1424	256 (25)	NR	NR	NR	NR
Skare et al. [37]	Brazil	SpA	1318	241 (18.3)	NR	NR	NR	NR
Soriano et al. [7]	Argentina	General population	138288	100 (0.1)	64 (64.0)	36 (36.0)	Mean 53.8 (SD 16)* Mean 40.3 (SD 12.9)**	NR
Toloza et al. [38]	Argentina	SpA	405	185 (45.7)	83 (44.9)	102 (55.1)	Mean 43.3 (SD 14.9)	Caucasian 126 (68.1%) Mestizo 56 (30.2%)
	Brazil	SpA	1036	139 (13.4)	82 (59.0)	57 (41.0)	Mean 39.7 (SD 12.2)	Predominantly Caucasian
	Chile	SpA	109	28 (25.7)	14 (50.0)	14 (50.0)	Mean 48 (SD 21.9)	Predominantly mestizo
	Costa Rica	SpA	33	2 (6.1)	NR	NR	NR	Predominantly mestizo (white and indigenous)
	Mexico	SpA	172	17 (9.9)	6 (35.3)	11 (64.7)	Mean 51.5 (SD 14.1)	Predominantly mestizo (white and indigenous)
	Peru	SpA	60	4 (6.7)	NR	NR	NR	Predominantly mestizo (white and indigenous)
	Uruguay	SpA	53	9 (17.0)	5 (55.6)	4 (44.4)	NR	Predominantly Caucasian
	Venezuela	SpA	69	15 (21.7)	4 (26.7)	11 (63.3)	Mean 44.5 (SD 19.5)	Predominantly mestizo (black and white)
Toloza et al. [43]	Peru	Rheumatological diseases	8191	17 (0.2)	11 (64.7)	6 (35.3)	Mean 53 (SD 13.3)	Native (Quechua and Aymara) 6 (37.5%) Mestizo (Quechua and European) 10 (62.5%)
Zazzeti et al. [50]	Argentina, Mexico, Colombia, and Venezuela	PsA	293	293 (100)	152 (51.9)	141 (48.1)	Mean 49.9	NR

PsO psoriasis, *PsA* psoriatic arthritis, *SpA* spondyloarthritis, *SD* standard deviation, *RIC* interquartile range, *NR* not reported

[a]Incident cases

[b]Prevalent cases

Table 2 Disease duration and clinical features of psoriatic arthritis in Latin American patients

Authors	Country	*N*	Age at diagnosis (years)	Duration of PsA (years)	Diagnostic delay[a] (years)	Entesitis *n* (%)	Dactilitis *n* (%)	Nail compromise *n* (%)
Adeodato et al. (2021) [51]	Brazil	76		Mean 6.0 (SD 17.8)		39 (51.3)	29 (38.2)	50 (65.8)
Barba-Gómez et al. (2021) [26]	Mexico	48				19 (40)	11 (23)	21 (44)
Buschiazzo et al. (2021) [31]	Argentina	242		Median 8 (IQR 5–12)	1 (RIC 0–4)			
Carneiro et al. (2012) [27]	Brazil	47				10 (33.3)	14 (46.7)	2 (8.3)
Castresana-Isla et al. (1995) [45]	Costa Rica	55	40.5 (CI 95% 12–74)			30 (54.5)		28 (50.9)
Cazenave et al. (2011) [53]	Argentina	31		Median 9 (IQR 4–17)				
Cordovés et al. (2015) [28]	Cuba	11						7 (63.6)
Da Silva et al. (2019) [46]	Brazil	114		Mean 5.10 (SD 7.00)				
Da Silva et al. (2018) [39]	Brazil	122		Median 3.0 (IQR 1.0–10.0)				
Da Silva et al. (2022) [47]	Brazil	130			12.2 a 14.5	111 (85.3)	111 (85.3)	
Faria et al. (2022) [48]	Brazil	1999						
Gallino et al. (2016) [49]	Argentina	116		Median 10 (IQR 6–17)				
Gamonal et al. (2021) [29]	Brazil	73	34.6 (SD 16.1)			26 (35.6)	16 (21.9)	
Gonçalves et al. (2021) [54]	Brazil	52		Mean 8.9 (SD 6.6)				
Lima et al. (2012) [55]	Brazil	40		Mean 8 (SD 10.5)				
Lopes et al. (2017) [56]	Brazil	90		Mean 11.9 (SD NR)				
Molina et al. (2007) [40]	Argentina	148		Mean 9.3 (SD 8.9)				
Moraes et al. (2021) [41]	Brazil	212		Mean 5.81 (SD 7.39)				
Oliveira et al. (2015) [42]	Brazil	39		Mean 8.97 (SD 7.6)				
Palominos et al. (2018) [57]	Brazil	28		Mean 16.5 (SD 12.5)				
Paniagua et al. (2015) [30]	Argentina	87	44 (NR)	Mean 10.1 (SD NR)				
Sampaio-Barros et al. (2011) [35]	Brazil	139	39.7 (SD 12.2)			26 (18.7)	27 (19.4)	
Santos-Moreno (2021) [58]	Colombia	83						
Soriano et al. (2011) [7]	Argentina	100	54 (SD 16)	Mean 8.01 (SD 9.00)				
Salario et al. (2018) [59]	Argentina	37	40.3 (CI 95% 37– 43.6)	Mean 5.2 (SD 2.18)				

Table 2 (continued)

Authors	Country	*N*	Age at diagnosis (years)	Duration of PsA (years)	Diagnostic delay[a] (years)	Entesitis *n* (%)	Dactilitis *n* (%)	Nail compromise *n* (%)
Toloza et al. (2011) [38]	Argentina	185	43.3 (SD 14.9)	Mean 9.9 (SD 8.2)	9.9 (SD 8.2)	63 (34)		
	Brazil	139	39.7 (SD 12.2)			26 (18.7)		
	Chile	28	48 (SD 21.9)	Mean 7 (range 0–25)	7 (0–25)	3 (10.7)		
	Costa Rica	2						
	Mexico	17	51.5 (SD 14.1)			10 (58.8)		
	Peru	4						
	Uruguay	9				1 (11)		
	Venezuela	15	44.5 (SD 19.5)	Mean 9.1 (SD 5.7)	9.1 (5.7)	6 (40)		
Toloza et al. (2012) [43]	Peru	17		Native Mean 4.3 (SD 2.4) Mestizo Mean 3.5 (SD 2.1)		2 (11.8)	2 (11.8)	9 (52.9)
Zaffarana et al. (2017) [52]	Argentina	110		Median 10 (IQR 6–17)				

PsA psoriatic arthritis, *SD* standard deviation, *RIC* interquartile range, *NR* not reported

[a]Time between symptom onset and diagnosis

five dimensions of health (mobility, self-care, activities of daily living, pain/discomfort, and anxiety/depression), they reported mean values between 0.6 and 0.8. The results of the SF-12 health survey, provided by two studies, report averages of 43 for the physical component and 42–45 for the mental component. A study in Argentina reported greater physical involvement of the disease for patients with NSAID use, compared to those using DMARDs and biological drugs [40].

Importantly, age and sex were not found to be related to impairment of quality of life [40, 50]. PROs (patient-reported outcomes) referring to pain and patients' global assessment of disease were recorded in seven studies. The assessment of pain using the Visual Analog Scale (VAS) averaged 1.6 to 5.5, with lower values for Mexico and higher values for Brazil where eight to nine out of 10 patients with PsA-reported pain. Patients who were normal weight reported lower values than those who were overweight or obese (statistically significant differences) [52]. Patients treated with biologic drugs had lower VAS measurements than those treated with NSAIDs, DMARDs, or no treatment [40].

Two studies reported fatigue as a stand-alone item, based on the first BASDAI question. An Argentine study [59] reported a mean fatigue of 6.7 ± 2.4, and a Brazilian study reported a median of 5.70 (IQR 2.62–8.18) before anti-TNF treatment and 3.80 (1.35–6.70) at 6 months after this treatment [39].

Additionally, in patients with PsA in Latin America, levels of satisfaction with the treatment and control of the disease are reported between 91 and 92% [17, 50] particularly in reference centers.

Work capacity and productivity

In a registry of Latin American patients with PsA, 39.6% of these were employed. The greater the severity of the disease, the lower was the employment rate (mild: 50%, moderate: 38.7%, severe: 38.5%), the higher the unemployment/retirement rate (mild: 28.6%, moderate: 85.7%, severe: 75%), and the longer the time of work disability (mild: 8.5%, moderate: 11.1%, severe: 19.7%). Absenteeism was reported between 19.7% and 5.2%, and presenteeism was estimated at 25.6%, significantly higher figures than in patients with psoriasis without arthritis [47, 56].

One study reported loss of work productivity in 31.9% in PsA *versus* 19.5% in psoriasis patients without arthritis [56]. Patients on biological therapy experienced less deterioration of work capacity than those who did not receive these drugs being medically indicated [63].

Resource use and economic burden of disease

A study in Brazil reported that, on average, the diagnosis of PsA occurred 1.8 years (SD 2.8) after the onset of symptoms, and during this time, 6.8% of patients received only topical therapy or phototherapy, 56.8% received conventional NSAIDs or DMARDs or systemic corticosteroids, and 21.9% received biologics or phosphodiesterase-4 inhibitors. Despite being symptomatic, 14.4% of patients did not start treatment [64]. Another study reported that the median time between the medical order and the first dispensing was 66 days (IQR 44–90), with the procedure until the authorization of treatment being the longest [46].

Twelve studies reported frequency of medication use, 30.3% (range 6.2 to 42.5%) of patients receiving corticosteroids, 47.8% (range 38.5 to 82.4%) methotrexate, 38.3% (range 9.2 to 40.6%) leflunomide, and 23.5% (range 8 to 56.2%) biologic medications. None of these studies reported adverse events. Regarding the persistence in treatment, 54.5% of patients remained in treatment up to 12 months [46]. Medication persistence was highest for leflunomide (58.9 at 6 months and 28.2% at 12 months), followed by methotrexate (51.6 at 6 months and 25.4% at 12 months). Sulfasalazine and cyclosporine had a higher proportion of treatment discontinuations than leflunomide and methotrexate [48]. Overall persistence with anti-TNF agents was 78.1% at 6 months, 56.5% at 12 months, 44.3% at 18 months, and 37.6% at 24 months. The predictors of medication non-persistence were a higher Charlson comorbidity index, younger age, and use of etanercept and infliximab [65]. On the other hand, treatment change was generally infrequent and delayed despite documentation of therapeutic failure [11].

Two studies addressed the resource use of patients with PsA. In Brazil, a hospitalization rate of 14% was reported in 1 year [48], and in a Colombian study, 2.2 average visits to the dermatologist, 3.8 average visits to the rheumatologist, and two average imaging studies per patient were reported per year. Fifty percent of patients received physiatry consultations, on average two per year [65].

Regarding costs, a Colombian study reported that medical visits, therapies, laboratory, and imaging accounted for 3.2% of total expenses and medicines for the remaining 96.8%. A Brazilian study reported leflunomide as the most expensive drug among conventional DMARDs, followed by sulfasalazine and cyclosporine, while methotrexate was the most cost-effective [48]. The cost of biological agents represents approximately 90% of the total cost of treating PsA. The costs of anti-TNF agents were similar between adalimumab, etanercept, and infliximab for most scenarios. Non-persistent patients generate higher costs compared to outpatient and hospital procedures, while in persistent patients, the main cost is due to biological agents, with a percentage decrease in outpatient and hospital costs [60, 65]. Men and age younger than 60 years were also associated with higher drug treatment costs [58].

Some cost-effectiveness studies have been conducted for specific drugs, particularly biological agents, reflecting the cost impact of introducing these drugs in Latin American health systems [66–68]. These results compare specific drugs in different countries with heterogeneous scenarios of population, access, and provision of health services.

Discussion

This study is one of the first systematic reviews of characterization of patients with PsA in Latin America evaluating incidence, prevalence of the disease, sociodemographic and clinical characteristics of patients, disease activity, functional involvement and disability, quality of life, patient-reported outcomes, productivity, and use of health resources. The literature available at the time for this review is limited and highly heterogeneous; for the 50 publications identified, 54% correspond to the

Table 3 Comorbidities in patients with psoriatic arthritis in Latin America

Authors	Country	*N*	HTA *n* (%)	DM *n* (%)	Obesity *n* (%)	Depression *n* (%)	Dyslipidemia *n* (%)	Osteoporosis *n* (%)
Adeodato et al. (2021) [51]	Brazil	76	32 (42.1)	22 (28.9)				
Da Silva et al. (2018) [39]	Brazil	122	35 (28.7)			28 (23)	25 (20.5)	
Da Silva et al. (2022) [47]	Brazil	130	55 (42.3)	27 (20.8)	41 (31.5)	56 (43.2)	56 (43)	13 (10)
Lima et al. (2012) [55]	Brazil	40	17 (42.5)	7 (17.5)				
Lopes et al. (2017) [56]	Brazil	90				25 (30)		
Moraes et al. (2021) [41]	Brazil	212	67 (31.6%)		7 (3.3)	38 (17.9)	48 (22.6)	5 (2.4)
Santos-Moreno (2021) [58]	Colombia	83	4 (4.8)		3 (3.6)			3 (3.6)
Zaffarana et al. (2017) [52]	Argentina	110			41 (37.3)			

HTA hypertension; DM diabetes mellitus

Table 4 Measures of disease activity in patients with psoriatic arthritis in Latin America

I am a student	*n*	Country	DAS28	BASDAI	CDAI	MDA	NS	PGA
Molina et al. [40]	148	Argentina	3.51 (SD 1.21)	Biologics 1.8 (SD 1.6) NSAID 4.7 (SD 2.6) DMARD 3.9 (SD 2.3)			2 (IQR 0–4.6)	
Buschiazzo et al. [31]	242	Argentina		3.8 (IQR 2–6.1)			12 (SD 11)	
Sampaio-Barros et al. [35]	139	Brazil		4.0 (SD 2.5)				
Costa et al. [61]	289	Argentina, Brazil, Costa Rica, Chile, Ecuador, Mexico, Peru, Uruguay and Venezuela		4.13 (SD 2.47)				
Oliveira et al. [42]	39	Brazil		5.27 (SD 2.26)	26.90 (SD 14.80)			
Paniagua et al. [30]	87	Argentina					11.2 (SD 6.1)	
Gallino et al. [49]	110	Argentina		4.37 (IQR 1.83–6.53)			1.6 (IQR 0.4–4.48)	
Zaffarana et al. [52]	110	Argentina		Normal weight 3.8 (SD 2.5) Overweight 3.9 (SD 2.9) Obesity 4.9 (SD 2.8)		Normal weight 5 (SD 23.8) Overweight 10 (SD 20.8) Obesity 4 (SD 9.75)	Normal weight 1.5 1.7) overweight 3.1 (2.8) obesity 2.5 (2.9)	Normal weight 1.2 (SD 1.3) Overweight 2.2 (SD 1.5) Obesity 1.9 (SD 1.7)
da Silva et al. [39]	122	Brazil		5.24 (IQR 3.05–6.85)	16.7 (RIC 8.78–32.8)			
Adeodatus et al. [51]	76	Brazil	With MS: 3.01 (2.21–4.01) Without MS: 3.17 (1.94–5.05)	With MS: 2 (1.40–5.65) Without MS: 3.85 (2.40–5.70)			With MS: 1.4 (IQR 0–3) Without MS: 0.2 (IQR 0–2.8)	
da Silva et al. [60]	114	Brazil		5.41 (SD 2.46)	22.58 (SD 16.46)			
Moraes et al. [41]	212	Brazil		5.18 (SD 2.53)	22.54 (SD 16.89)			
Gamonal et al. [29]	73	Brazil					17.08 (SD 4.68)	
da Silva et al. [47]	130	Brazil						3.4 (SD 2.7)

The values reported with interquartile range (IQR) present the median. The values reported with standard deviation (SD) present the mean

BASDAI Bath Ankylosing Spondylitis Disease Activity Index, *DAS28* Disease Activity Score 28-joint counts, *CDAI* Clinical Disease Activity Index, *SD* standard deviation, *MDA* Minimal Disease Activity (MDA), *PASI* Psoriasis Area Severity Index, *PGA* Physician's Global Assessment, *IQR* Interquartile range, *MS* metabolic syndrome

Table 5 Measures of function and disability in patients with psoriatic arthritis in Latin America

I am a student	*N*	Country	BASFI	HAQ-DI
Molina et al. [40]	148	Argentina	Biologics 1.4 (SD 1.8) NSAIDs 3.6 (SD 3.2) DMARD 3 (DE 2.9)	1.03 (SD 0.78)
Buschiazzo et al. [31]	242	Argentina	2.5 (IQR 0.7–5.4)	
Sampaio-Barros et al. [35]	139	Brazil	4.0 (SD 2.9)	
Oliveira et al. [42]	39	Brazil		1.30 (SD 0.64)
Gallino et al. [49]	110	Argentina	3.55 (IQR 0.92–5.8)	0.75 (IQR 0.16–1.22) *
Lopes et al. [56]	90	Brazil		
Zaffarana et al. [52]	110	Argentina	Normal weight 2.7 (SD 2.5) Overweight 3.3 (SD 2.7) Obesity 4.4 (SD 2.8)	Normal weight 0.63 (SD 0.6) Overweight 0.71 (SD 0.6) Obesity 0.96 (SD 0.6)
da Silva et al. [39]	122	Brazil		1.25 (IQR 0.50–1.75)
Palominos et al. [57]	15	Brazil		HAQ > 1: 11 (73.1%)
Salario et al. [59]	37	Argentina		1.4 non-working group 0.6 Working group
Soriano et al. [17]	179	Mexico, Colombia, and Argentina		12.9 (SD 17) **
Adeodatus et al. [51]	76	Brazil		With MS 1.37 (IQR 0.37–1.62) Without MS 0.87 (IQR 0.25–1.50)
da Silva et al. [60]	114	Brazil		1.21 (SD 0.74)
Moraes et al. [41]	212	Brazil		1.20 (SD 0.71)
da Silva et al. [47]	130	Brazil		0.76 (SD 0.7)

The values reported with interquartile range (IQR) present the median. The values reported with standard deviation (SD) present the mean

BASFI Bath Ankylosing Spondylitis Functional Index, ranges from 0 (no limitation) to 10 (maximum limitation on function), *HAQDI* Health Assessment Questionnaire Disability Index. Range 0 to 3 where higher scores indicate greater deficiency, *IQR* interquartile range, *SM* metabolic syndrome

[a]HAQ Argentinian version

[b]Patient-Reported Outcomes Measurement Information System Health Assessment Questionnaire [PROMISHAQ], range of 0–100

last 5 years, mostly in individual countries and some of them multinationals. Despite the scarce and heterogeneous information in addition to the limitation of accurately estimating the burden of the disease, the current synthesis offers an overview of patients with PsA in Latin America. The functional involvement related to disease activity and the impact on the quality of life of patients with PsA in Latin America is remarkable, in conjunction with the high frequency of cardiometabolic and psychological comorbidities.

Data on the prevalence of PsA in the region are scarce, with only one report in Argentina [7], so it is not possible to generalize to the Latin American population. Regarding the prevalence of PsA in patients with psoriasis and spondyloarthritis, the reported data were variable (17.4–53.3% and 6.1–60.2%, respectively) depending on the data source and geographical location. The predominant breed depends on the geographical location where the studies are conducted; a study in Peru reported that PsA also occurs in populations originating in the Andes, contrary to what was found in the literature [43].

In clinical characterization, the average proportion of enthesitis (38%) and dactylitis (39.6%) in Latin America is higher than reported in studies in other geographic regions [69] (30% and 25%, respectively). On the other hand, nail involvement appears to be lower in Latin American patients (46% *versus* 60%), although again, there is wide variation in the data. Information on extra-articular manifestations in Latin America is very scarce, although the only report of uveitis from a small group of Brazilian patients reports a low prevalence, similar to that reported in other regions (5% *versus* 3.2%) [69].

It is known that patients with PsA have an increased risk of presenting several comorbidities. In this review, the high prevalence of conditions such as hypertension, diabetes, metabolic syndrome, dyslipidemia, and obesity is observed up to one-third of patients, in accordance with the proportions expected in this population [70–72]. Previous studies have shown the relationship of comorbidities with worse clinical outcomes of functional involvement, pain, fatigue, work disability, and quality of life [73]. Previous studies in PsA [74, 75] report increased disease activity and pain in

Table 6 Patient-reported quality of life measures and outcomes in patients with psoriatic arthritis in Latin America

I am a student	*n*	Country	PsAQoL	EQ5D	SF-12 physical	SF-12 mental	VAS pain	VAS global[a]
Molina et al. [40]	148	Argentina	10 (IQR 5–14)		Biologics 38.7 (SD 12.4) NSAIDs 33.9 (SD 10.5) DMARD 35.7 (SD 10.6)			Biologics 1.9 (SD 2.1) NSAID 5.5 (SD 3.0) DMARD 4.4 (SD 2.6)
Sampaio–Barros et al. [35]	139	Brazil					3.3 (SD 3.2)	4.6 (SD 2.9)
Toloza et al. [38]	399	Argentina, Brazil, Chile, Costa Rica, Mexico, Peru, Uruguay, Venezuela					Argentina 3.04 (SD 3) Chile 4.4 (SD 3.4) Mexico 1.6 (SD 2.4) Venezuela 2.3 (SD 3.2)	
Oliveira et al. [42]	39	Brazil		0.61 (SD 0.17)				
Gallino et al. [49]	110	Argentina	Median 6 (IQR 1–12)				Median 5 (IQR 2.7–6)	Median 4.25 (IQR 2.13–7)
Lopes et al. [56]	90	Brazil			43,7	41,9		
Zaffarana et al. [52]	110	Argentina	Normal weight 4.7 (SD 5.3) Overweight 6.4 (SD 6.1) Obesity 8.5 (SD 6.5)				Normal weight 4.6 (SD 2.4) Overweight 4.3 (SD 2.9) Obesity 6.7 (SD 7.6)	
da Silva et al. [39]	122	Brazil		0,66 (IQR 0,52 – 0,82)				
Palominos et al. [57]	15	Brazil					5.5 (SD 2.7) (range 0.3–8.2)	5.4 (SD 2.7) (range 0.7–9.2)
Papadimitropoulos et al. [62]	ND	ND		0,8				
Soriano et al. [17]	179	Mexico, Colombia and Argentina		0.7 (SD 0.2)			2.8 (SD 1.9)	
da Silva et al. [60]	114	Brazil		0.64 (SD 0.18)				
Gonçalves et al. [54]	52	Brazil	9 (range 3–14)					
Moraes et al. [41]	212	Brazil	0,65 (SD 0,12 (QoL)	0,65			185 (87.3%) dimension of the EQ-5D	
da Silva et al. [47]	130	Brazil			42.8 (SD 9.7)	45.2 (SD 11.8)		

The values reported with interquartile range (IQR) present the median. The values reported with standard deviation (SD) present the mean

ASQoL Ankylosing Spondylitis Quality of Life Questionnaire, *EQ5D* EuroQol OF 5 dimensions, *PsAQoL* Psoriatic Arthritis Quality of Life Questionnaire, *SF-12* 12-Item Short-Form Health Survey, *VAS* visual analogue scale, *ND* no data

[a]Morning stiffness, pain and global evaluation of the disease by patients

patients with anxiety and/or depression, who are generally not receiving treatment for these psychological conditions. A recent systematic review assessing mental health comorbidities in PsA, reported that seven out of 10 patients have some degree of anxiety and/or depression [74], which highlights the importance of mental health care and management in this population.

Information about disease activity includes population measurements from Brazil and Argentina. Although there is variability, validated measurements (DAS28 and BASDAI) reflect suboptimal management in patients with PsA. Minimal disease activity (MDA), a measure recommended in the literature as a treatment target in PsA, was only mentioned in one study [52], reporting a higher proportion of patients achieving MDA among those receiving biologic DMARDs compared to conventional DMARDs. These findings were similar to a study with 148 patients where the higher rate of control of the disease occurred in those receiving treatment with biological DMARDs compared to conventional DMARDs or NSAIDs [40]. This data highlights the relevance of therapeutic decisions, in order to achieve better disease outcomes including health-related quality of life [76].

Previous studies in PsA from other regions have reported about 78% of patients with limitations in physical activity, and 69% with moderate impact on emotional or mental well-being [10]. Based on assessments of functionality and disability in populations in Brazil, Argentina, Mexico, and Colombia, patients with PsA present an important limitation for the performance of their activities of daily living. Pain is a determining factor in the evaluation of patients, with heterogeneous data for Latin American countries suggesting a considerable negative impact of the disease on daily life. Despite the high clinical burden and quality of life reported by the studies, there has been 91–92% of satisfaction with the treatment and control of the disease in patients with PsA in Latin America [17, 50], probably related to optimal care of the disease in reference and academic centers.

PsA significantly impacts labor productivity in relation to disease severity [11]. Approximately 50% of people with the disease lose their jobs, and the remaining have a significant decrease in their work effectiveness [77]. PsA patients are more prone to retire for work associated to disability earlier than people without the disease [78]. This reflects the importance of adequate control of the disease to improve other outcomes, and to assess the state and labor productivity as an estimate of the social impact of the disease [63].

The use of resources and economic burden was addressed by few studies, with variable results. The analysis suggests that there are opportunities to improve the time to diagnosis and treatment of patients with PsA, through greater detection among patients with psoriasis and ensuring the initiation of effective and timely treatment at diagnosis [64]. In general, patients with PsA have a higher use of health care resources such as medical consultations, physical and occupational therapy, hospitalizations, and also a greater use of medications compared to patients with psoriasis without arthritis. The largest proportion of direct costs is provided by biological drugs, which in some countries are difficult to have access because of their associated cost. This issue raises the need of implementation of strategies that optimize the use of health care resources and allowing better access to treatment at a lower cost in the region [58, 68].

There are limitations in this review that need to be considered. The demographic, clinical, and PRO data come mostly from studies conducted in Brazil and Argentina, so the findings are not generalizable to Latin America. About half of the publications include relatively small population sizes (less than 100 subjects) and the available publications report information from 11 countries in the region so other countries may not be represented. Additionally, the methodology of the studies was variable, and some reports had limited or inconsistent data for pooled quantitative analysis. Similarly, the data presented is descriptive mainly due to the scarce information available in the literature and the heterogeneity of the data and study design. However, we strongly believe, that it may represent a window of opportunity to develop a research agenda to fulfill these unmet needs and identify regional variations in disease presentation, access to treatment, and patient outcomes, which can help bridge existing knowledge gaps, enhance healthcare equity, and improve the overall quality of life for patients in Latin America. It may hopefully provide a list of supplies looking forward to have additional information available in the coming years. Moreover, this research contributes to the global understanding of PsA, potentially offering insights and solutions that can benefit patients.

Considering the research agenda, many challenges are now visible in the region. Among others, studies evaluating prevalence, incidence, and socioeconomic impact of PsA in various Latin American countries are needed. Using a multidisciplinary approach, combining epidemiological studies, patient interviews, and healthcare utilization to gains a holistic understanding of the challenges faced by PsA patients. By shedding light on the unique characteristics and the burden of PsA in the region, we strongly believe it may help to develop healthcare policies and strategies to improve the diagnosis, treatment, and overall management of this condition.

In conclusion, the present SLR provides an overview of the burden of disease and characteristics of patients with PsA in Latin America. Due to the limitations previously mentioned, the results may not accurately reflect the burden of disease across all of the continent. The relevant functional involvement related to disease activity, the impact on the quality of life of these patients, and the high frequency of cardio-metabolic and psychological comorbidities are

remarkable. This data will serve as support to the design and implementation of strategies to improve early diagnosis and timely treatment within the framework of multidisciplinary management, ensuring monitoring and co-joint decision-making that include the patient's preferences and values. Future research efforts should be done in order to generate additional standardized data on patients with PsA and better estimate the burden of disease in Latin America.

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