Arch Rheumatol 2024;39(3):339-349
doi: 10.46497/ArchRheumatol.2024.10591

ORIGINAL ARTICLE

Regional variations in psoriatic arthritis: Insights from a nationwide multicenter analysis in Türkiye

Erkan Kılıç[1], Gamze Kılıç[2], İbrahim Tekeoğlu[3], Betül Sargın[4], Sevtap Acer Kasman[5], Hakan Alkan[6], Nilay Şahin[7], Gizem Cengiz[8], Nihan Cüzdan[9], İlknur Albayrak Gezer[10], Dilek Keskin[11], Cevriye Mülkoğlu[12], Hatice Reşorlu[13], İsmihan Sunar[14], Ajda Bal[15], Mehmet Tuncay Duruöz[5], Okan Küçükakkaş[16], Ozan Volkan Yurdakul[17], Meltem Alkan Melikoğlu[18], Yıldıray Aydın[3], Fikriye Figen Ayhan[19], Hatice Bodur[20], Mustafa Çalış[8], Erhan Çapkın[2], Gül Devrimsel[21], Kevser Orhan[22], Sami Hizmetli[23], Ayhan Kamanlı[3], Yaşar Keskin[17], Hilal Ecesoy[24], Öznur Kutluk[25], Nesrin Şen[26], Ömer Faruk Şendur[27], Sena Tolu[28], Murat Toprak[29], Tiraje Tuncer[25], Kemal Nas[3]

[1]*Rheumatology Clinic, Kanuni Training and Research Hospital, Trabzon, Türkiye*

[2]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Karadeniz Technical University Faculty of Medicine, Trabzon, Türkiye*

[3]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology and Immunology, Sakarya University Faculty of Medicine, Sakarya, Türkiye*

[4]*Rheumatology Clinic, Aydın State Hospital, Aydın, Türkiye*

[5]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Marmara University Faculty of Medicine, İstanbul, Türkiye*

[6]*Department of Physical Medicine and Rehabilitation, Pamukkale University Faculty of Medicine, Denizli, Türkiye*

[7]*Department of Physical Medicine and Rehabilitation, Balıkesir University Faculty of Medicine, Balıkesir, Türkiye*

[8]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Erciyes University Faculty of Medicine, Kayseri, Türkiye*

[9]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Hatay Mustafa Kemal University Faculty of Medicine, Hatay, Türkiye*

[10]*Department of Physical Medicine and Rehabilitation, Selçuk University Faculty of Medicine, Konya, Türkiye*

[11]*Department of Physical Medicine and Rehabilitation, Kırıkkale University Faculty of Medicine, Kırıkkale, Türkiye*

[12]*Department of Physical Medicine and Rehabilitation, Health Sciences of University, Ankara Training and Research Hospital, Ankara, Türkiye*

[13]*Department of Physical Medicine and Rehabilitation, Çanakkale Onsekiz Mart University Faculty of Medicine, Çanakkale, Türkiye*

[14]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Ankara University Faculty of Medicine, Ankara, Türkiye*

[15]*Department of Physical Medicine and Rehabilitation, University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Ankara, Türkiye*

[16]*NMC Speciality Hospital-Dubai Investment Park, Dubai, UAE*

[17]*Department of Physical Medicine and Rehabilitation, Bezmiâlem Foundation University Faculty of Medicine, İstanbul, Türkiye*

[18]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Atatürk University Faculty of Medicine, Erzurum, Türkiye*

[19]*Department of Physical Medicine and Rehabilitation, Atılım University Faculty of Medicine, Ankara, Türkiye*

[20]*Department of Physical Medicine and Rehabilitation, Yıldırım Beyazıt University Faculty of Medicine, Ankara, Türkiye*

[21]*Department of Physical Medicine and Rehabilitation, Recep Tayyip Erdoğan University Faculty of Medicine, Rize, Türkiye*

[22]*Rheumatology Clinic, Ankara Bilkent City Hospital, Ankara, Türkiye*

[23]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Cumhuriyet University Faculty of Medicine, Sivas, Türkiye*

[24]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Karamanoğlu Mehmetbey University, Karaman, Türkiye*

[25]*Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Akdeniz University Faculty of Medicine, Antalya, Türkiye*

[26]*Rheumatology Clinic, Kartal Dr. Lütfi Kırdar Training and Research Hospital, İstanbul, Türkiye*

[27]*Department of Physical Medicine and Rehabilitation, Medicana International İzmir Hospital, İzmir, Türkiye*

[28]*Department of Physical Medicine and Rehabilitation, Medipol University Faculty of Medicine, İstanbul, Türkiye*

[29]*Department of Physical Medicine and Rehabilitation, Yüzüncü Yıl University Faculty of Medicine, Van, Türkiye*

Correspondence: Erkan Kılıç, MD.
E-mail: ekilic.md@hotmail.com

Received: December 06, 2023
Accepted: April 16, 2024
Published online: August 26, 2024

Citation: Kılıç E, Kılıç G, Tekeoğlu İ, Sargın B, Acer Kasman S, Alkan H, et al. Regional variations in psoriatic arthritis: Insights from a nationwide multicenter analysis in Türkiye. Arch Rheumatol 2024;39(3):340-349. doi: 10.46497/ArchRheumatol.2024.10591.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes (http://creativecommons.org/licenses/by-nc/4.0/).

ABSTRACT

Objectives: The study aimed to investigate and compare clinical features, disease activity, and the overall disease burden among psoriatic arthritis (PsA) patients across seven distinct geographic regions in Türkiye.

Patients and methods: A multicenter cross-sectional study involving 1,134 PsA patients from 25 referral centers across seven regions was conducted. Demographic and clinical characteristics, comorbidities, joint involvement, extra-articular manifestations, and disease activity measures were evaluated across regions.

Results: A total of 1134 PsA patients from seven different geographic regions in Türkiye participated in this study. The highest number of participants was from the Marmara region (n=409), with subsequent representation from Central Anatolia (n=370), Aegean (n=139), Mediterranean (n=60), Black Sea (n=60), Eastern Anatolia (n=60), and Southeastern Anatolia (n=36) regions. There were significant variations in demographic profile, including age, body mass index, age of disease onset, educational status, comorbidities, and family history of both psoriasis and PsA. Clinical features, such as enthesitis, dactylitis, uveitis, and joint involvement, demonstrated significant variation across regions. Additionally, disease activity measures, including pain, patient and physician global assessments, acute phase reactants, disease activity indices, quality of life, and functional status, displayed considerable regional differences.

Conclusion: This nationwide study revealed substantial regional diversity in demographic data, clinical characteristics, disease activity, and quality of life among PsA patients in Türkiye. These findings stress the need to customize treatment approaches to address regional needs and to conduct further research to uncover reasons for disparities. It is crucial to enhance region-specific approaches to improve patient care and outcomes for PsA.

Keywords: Arthritis, differences, geographic locations, psoriatic, regional, spondyloarthritis.

Psoriatic arthritis (PsA) is a multifaceted and heterogeneous chronic inflammatory disorder that affects approximately one-third of individuals with psoriasis.[1] It is characterized by a wide range of clinical manifestations, including joint inflammation, enthesitis, dactylitis, and skin and nail involvement, all contributing to a substantial reduction in patients' quality of life and overall functional capacity. Furthermore, individuals with PsA face a variety of comorbidities, such as cardiometabolic disorders, stroke, osteoporosis, and depression, further complicating their health challenges.[2,3] In addition to these complexities, PsA is also associated with extra-articular manifestations, such as psoriasis, uveitis, and inflammatory bowel disease, adding to the clinical diversity of this condition. It is noteworthy that the multifaceted nature of PsA can exhibit substantial variation between patients and may even change within the same patient over time.[4]

Several genetic and environmental factors contribute to the development of spondyloarthritis (SpA), potentially leading to variations in prevalence, disease characteristics, and patient outcomes based on geographical regions.[5-7] In a comprehensive systematic review, the clinical profiles of SpA in six distinct geographical regions, including Latin America, Asia, Europe, the Middle East, Africa, and North America, were investigated.[8] The results of this investigation provide valuable insights into the regional disparities in SpA symptoms. Notably, peripheral arthritis and enthesitis were more frequently observed among SpA patients in Latin America and Asia, while there was a slightly higher prevalence of inflammatory bowel disease among patients in the Middle East and North Africa. Another systematic review and meta-regression analysis demonstrated that higher PsA prevalence rates are observed in Europe and North America compared to other regions globally.[9] Additionally, the ASAS-PerSpA study, which encompasses the global SpA population across a diverse geographic area, has notably underscored the considerable interregional variability in the prevalence and distribution of peripheral musculoskeletal manifestations.[10]

Understanding geographic disparities is crucial for providing personalized patient care and unraveling the determinants responsible for the multifaceted nature of PsA. To the best of our knowledge, there is a notable lack of data in the literature addressing differences in patient clinical characteristics within various regions of the same country. Therefore, to address this gap, this study aimed to analyze and compare the clinical characteristics, disease activity, and overall disease burden within a substantial cohort of PsA patients residing in seven distinct regions of Türkiye.

PATIENTS AND METHODS

This observational cross-sectional study involved adult patients with PsA from 25 secondary or tertiary referral centers across seven geographic regions in Türkiye, including Marmara, Central Anatolia, Aegean, Mediterranean, Black Sea, Eastern Anatolia, and Southeastern Anatolia. Participants were recruited from the Turkish League Against Rheumatism-Network, an extensive web-based multicenter registry initially established in 2018.[11-13] A total of 1,134 participants were included in this study from the registry, which continues to actively enroll patients. All enrolled patients were aged 18 years or older and met the Classification Criteria for Psoriatic Arthritis.[14] Additionally, individuals who were pregnant or lactating, as well as patients with mental health disorders, malignancies, or other rheumatic diseases that could potentially influence the outcome assessments, were excluded from the study. Patients were grouped according to the seven geographical regions within Türkiye for the assessments.

Data were gathered from each participant through face-to-face interviews and a review of their medical records. The clinical and demographic data encompassed the following parameters: age, sex, body mass index (BMI), symptom duration, diagnostic delay, PsA phenotype, extra-articular manifestations, comorbidities, family history, and medications.

To describe the level of disease activity in PsA patients, a combination of well-established indices was utilized. The Disease Activity Score in 28 joints (DAS28) was employed to evaluate peripheral joint involvement and assess disease severity.[15] In addition, the Disease Activity in Psoriatic Arthritis (DAPSA) index was utilized to assess disease activity specifically in the context of PsA.[16] Furthermore, the minimal disease activity (MDA) criteria were applied to identify patients who achieved a state of minimal disease activity, indicating a favorable treatment outcome. The MDA criteria include various aspects of the disease, including joint tenderness and swelling, skin involvement, enthesitis, pain, physical function, and general patient-based evaluation.[17] The Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) was also used to assess disease activity.[18]

Recognizing the psychosocial impact of PsA, the Hospital Anxiety and Depression Scale (HADS) was utilized.[19] Functional impairment and disability were evaluated using the Health Assessment Questionnaire (HAQ) and the Bath Ankylosing Spondylitis Metrology Index (BASMI).[20,21] The level of psoriasis severity was determined using the Psoriasis Area and Severity Index (PASI).[22] Fibromyalgia-related symptoms and the severity of fatigue were assessed using the Fibromyalgia Rapid Screening Tool (FiRST) and the Functional Assessment of Chronic Illness Therapy (FACIT)-Fatigue scale, respectively.[23,24] For a comprehensive evaluation of the physical, emotional, and social well-being of PsA patients, we administered the widely accepted Psoriatic Arthritis Quality of Life (PsAQoL) questionnaire.[25] Additionally, patient-reported outcomes were collected using Visual Analog Scale (VAS) to measure pain, patient global assessment (PtGA), and physician global assessment (PhGA).[26] This comprehensive set of assessments allowed insights into various aspects of the patients' well-being and disease experience.

Statistical analysis

The statistical analyses were conducted using the IBM SPSS version 23.0 software (IBM Corp., Armonk, NY, USA). The normality of the data distribution was assessed using the Kolmogorov-Smirnov test. Variables were reported as frequency (%) for categorical data and mean ± standard deviation (SD) for continuous data. Descriptive statistics were employed to summarize the demographic and clinical characteristics of the patients. Differences between groups were evaluated using appropriate statistical tests, including Pearson's chi-square for categorical variables and analysis of variance for continuous variables. A p-value <0.05 was considered statistically significant.

RESULTS

We observed significant variations in demographic and clinical characteristics among PsA patients across seven distinct geographic regions in Türkiye (Table 1). The mean age of whole PsA patients was 46.96±12.25 years, and 36% of the patients were male. Age distribution varied significantly ($p<0.001$) across regions,

Table 1. Comparison of demographic and clinical characteristics among patients with PsA in seven geographic regions of Türkiye

	Marmara (n=409)		Central Anatolia (n=370)		Aegean (n=139)		Mediterranean (n=60)		Black sea (n=60)		Eastern Anatolia (n=60)		Southeastern Anatolia (n=36)		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	*p*
Age (year)*	46.12±12.05		47.94±12.04		49.01±12.99		50.42±11.47		47.58±10.35		40.03 ±13.19		43.33±11.18		<0.001
Sex															
Male	146	35.7	135	36.5	52	37.4	12	20.0	26	43.3	24	40.0	13	36.1	0.194
BMI (kg/m²)*	29.15±4.9		28.69±5.09		28.92±5.78		29.79±5.45		28.68±3.96		26.33±3.57		27.87±4.63		0.002
Educational states															
Primary school or low	193	47.2	168	45.4	76	54.7	28	46.7	29	48.3	19	31.7	23	63.9	
Middle/High School	144	35.2	152	41.1	39	28.1	23	38.3	23	38.3	31	51.7	11	30.6	
University/higher	72	17.6	50	13.5	24	17.3	9	15.0	8	13.3	10	16.7	2	5.6	
Comorbidity ≥1	178	43.6	175	47.6	56	40.6	21	35.0	21	35.0	19	31.7	4	11.10	<0.001
PsA symptom onset age (year)*	37.27±12.74		38.91±12.33		36.76±14.57		39.23±14.08		36.60±11.17		31.96±14.03		38.09±10.82		0.008
Family history of RMD	137	33.6	103	28.0	37	26.8	13	21.7	10	16.7	23	38.3	5	13.9	0.009
Family history of PsA	70	17.1	29	7.8	23	16.5	6	10.0	4	6.7	12	20.0	5	13.9	0.002
Family history of PsO	162	39.7	131	35.6	37	26.8	23	38.3	12	20.0	19	31.7	7	19.4	<0.001
Enthesitis current/past	216	52.9	211	57.3	12	8.7	27	45.0	32	53.3	29	48.3	26	72.2	<0.001
Dactylitis current/past	119	29.2	131	35.6	11	8.0	26	43.3	2	3.3	27	45.0	9	25.0	<0.001
Uveitis	24	5.9	18	4.9	6	4.3	1	1.7	13	21.7	9	15.0	0	0	<0.001
IBD current/past	4	1.0	10	2.7	2	1.4	1	1.7	0	0	6	10.0	0	0	<0.001
PsO skin lesion+	321	78.7	291	79.1	116	84.1	51	85.0	48	80.0	50	83.3	31	86.1	0.646
Axial involvement	148	36.3	161	43.8	78	56.5	20	33.3	3	5.0	3	5.0	7	19.4	<0.001
PsA joint type (n=1,087)															
Mono/oligoarthritis	138	34.6	160	45.3	34	26.7	14	26.4	14	23.3	21	35.0	10	27.7	
Polyarthritis	87	21.9	62	17.6	15	11.8	32	60.4	19	31.7	25	41.7	8	22.2	
DIP joint	12	3.0	23	6.5	4	3.1	2	3.8	0	0	2	3.3	0	0	
Arthritis mutilans	0	0	1	0.3	0	0	3	5.7	0	0	0	0	0	0	
Initial sing and symptoms															
Peripheral arthritis	286	69.9	270	73.0	45	32.4	52	86.7	39	65.0	46	76.7	23	63.9	<0.001
LBP	130	31.8	130	35.1	33	23.7	26	43.3	27	45.0	12	20.0	9	25.0	0.004
Enthesitis	57	13.9	51	13.8	3	2.2	8	13.3	1	1.7	7	11.7	8	22.2	<0.001
Dactylitis	35	8.6	42	11.4	1	0.7	7	11.7	2	3.3	2	3.3	5	13.9	0.002
Skin/nail	1	0.2	8	2.2	67	48.2	0	0	2	3.3	8	13.3	0	0	<0.001
DMARD usage	196	47.9	220	59.5	57	41.0	42	70.0	32	53.3	24	40.0	25	69.4	<0.001
Biologic usage	101	24.7	108	29.2	37	26.6	18	30.0	26	43.3	19	31.7	7	19.4	0.075

* Mean±SD: Standard deviation; BMI: Body mass index; PsA: Psoriatic arthritis; RMD: Rheumatic musculoskeletal diseases; PsO: Psoriasis; IBD: Inflammatory bowel disease; DIP: Distal interphalangeal; LBP: Low back pain; DMARD: Disease-Modifying Antirheumatic Drugs.

Table 2. Comparison of disease activity measures and quality of life among PsA patients in seven geographic regions of Türkiye

	Marmara (n=409)	Central Anatolia (n=370)	Aegean (n=139)	Mediterranean (n=60)	Black sea (n=60)	Eastern Anatolia (n=60)	Southeastern Anatolia (n=36)	
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	*p*
Disease activity measures								
VAS-pain	4.54±2.72	4.79±2.61	4.43±2.51	4.32±2.23	4.58±2.08	4.73±2.56	7.33±2.11	<0.001
PtGA	4.46±2.75	4.66±2.53	4.16±2.23	4.02±1.83	4.97±2.15	4.65±2.46	5.39±2.11	0.046
PhGA	3.67±2.29	4.11±2.22	3.91±2.08	3.48±1.93	3.85±1.84	4.38±2.35	5.17±2.18	<0.001
ESR (mm/h)	22.17±16.32	18.61±15.34	25.71±15.5	16.32±10.57	18.78±10.9	23.3±16.34	26.67±18.94	<0.001
CRP (mg/L, n=1,085)	9.13±15.2	7.46±8.87	6.22±8.01	8.83±11.58	10.06±11.66	7.37±12.22	11.32±21.6	0.092
DAS28 (n=1,056)	3.32±1.21	3.35±1.26	3.4±1.11	3.41±1.27	3.24±0.94	3.82±1.23	4.24±1.32	<0.001
BASDAI (n=1,019)	4.32±2.46	3.91±2.41	3.14±1.86	3.44±1.65	3.38±1.28	3.63±2.05	5.03±2.11	<0.001
DAPSA (n=1,034)	15.62±12.47	18.18±13.04	14.45±10.34	18±14.06	16±7.75	20.43±13.69	24.54±15.39	<0.001
MDA positive (n=1,060)*	81 (21.4%)	55 (16.1%)	27 (21.3%)	9 (15.0%)	16 (27.1%)	5 (8.6%)	3 (8.3%)	0.033
PASI total (n=1,127)	2.91±5.01	3.29±5.46	3.21±4.04	1.28±1.63	1.31±1.45	3.59±3.05	4.84±5.62	0.001
QoL and mental health								
PsAQoL	7.5±6.33	7.28±6.44	5.57±6.25	6.88±7.01	5.2±4.61	4.22±4.85	6.75±6.12	<0.001
HADS-anxiety (n=1,128)	7.38±4.32	6.44±4.04	6.17±5.02	8.37±3.03	4.48±3.76	7.2±2.86	4.63±3.52	<0.001
HADS-depression (n=1,128)	7.04±4.25	6.85±4.33	5.25±4.45	7.97±2.72	5.97±3.39	7.67±3.13	5.51±4.49	<0.001
FACIT (n=1,128)	20.36±10.91	20.09±10.88	15.09±10.3	21.42±8.24	15.5±10.22	20.52±8.65	15.57±10.49	<0.001
FIRST (n=1,128)	2.72±2.13	2.6±2.23	1.93±2.43	1.52±1.59	1.92±2.04	2.2±1.95	3±2.01	<0.001
BASMI (n=1,097)	1.57±1.39	1.95±2.03	2.99±2.07	3.82±1.52	0.73±0.84	2.23±1.29	1.86±1.73	<0.001
HAQ (n=1,129)	0.42±0.47	0.43±0.47	0.35±0.45	0.65±0.58	0.34±0.31	0.45±0.42	0.54±0.38	0.001

* Number (%); VAS: Visual Analog Scale; PtGA: Patient Global Assessment; PhGA: Physician Global Assessment; ESR: Erythrocyte sedimentation rate; CRP: C-reactive protein; DAS28: Disease Activity Score in 28 joints; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; DAPSA: Disease activity in psoriatic arthritis; MDA: Minimal disease activity; PASI: Psoriasis Area and Severity Index; QoL: Quality of life; PsAQoL: Psoriatic Arthritis Quality of Life questionnaire; HADS: Hospital anxiety and depression scale; FACIT: Functional assessment of chronic illness therapy; FiRST: Fibromyalgia rapid screening tool; BASMI: Bath Ankylosing Spondylitis Metrology Index; HAQ: Health Assessment Questionnaire.

with the Mediterranean region having the highest (50.42 years) and the Eastern Anatolia region having the lowest (40.03 years) mean age. Sex distribution did not yield statistically significant differences (p=0.194). BMI exhibited significant regional disparities (p=0.002), with the Mediterranean region having the highest mean BMI (29.79 kg/m^2) and the Eastern Anatolia region having the lowest mean BMI (26.33 kg/m^2). Educational attainment exhibited regional variations (p=0.052), although these variations were not statistically significant. However, notable differences were observed regionally (p<0.001) in the prevalence of comorbidities and family history of rheumatic diseases, PsA, and psoriasis.

Clinical features such as enthesitis, dactylitis, uveitis, inflammatory bowel disease, and joint involvement types showed significant regional differences (p<0.001). Additionally, the primary complaint leading to the initial healthcare provider visit varied significantly among regions (p<0.001 to p=0.004). Psoriasis skin lesions were widespread without significant regional differences (p=0.646).

The presence of axial involvement in PsA patients differed significantly by region, with the highest prevalence in the Aegean region and the lowest in the Black Sea and Eastern Anatolia regions, and joint involvement type also showed significant regional variation (p<0.001).

The use of conventional synthetic (cs) and biologic (b) disease-modifying antirheumatic drugs (DMARDs) exhibited regional disparities. Use of csDMARDs was highest in the Mediterranean region (70.0%) and lowest in the Eastern Anatolia region (40.0%, p<0.001). Use of bDMARDs showed regional differences, but this was not statistically significant (p=0.075).

Analysis of PsA disease activity measures across regions revealed significant variations (p<0.001, Table 2). Measures such as VAS for pain, Patient Global Assessment (PtGA), and Physician Global Assessment (PhGA) displayed notable differences among regions with the highest level in the Southeastern Anatolia region and the lowest in the Mediterranean region. In terms of acute phase reactants, erythrocyte sedimentation rate (ESR) and C-reactive protein displayed regional differences. ESR was highest in the Southeastern Anatolia region and lowest in the Mediterranean region (p<0.001).

Three clinical indices, the BASDAI, DAS28 and DAPSA were highest in the Southeastern

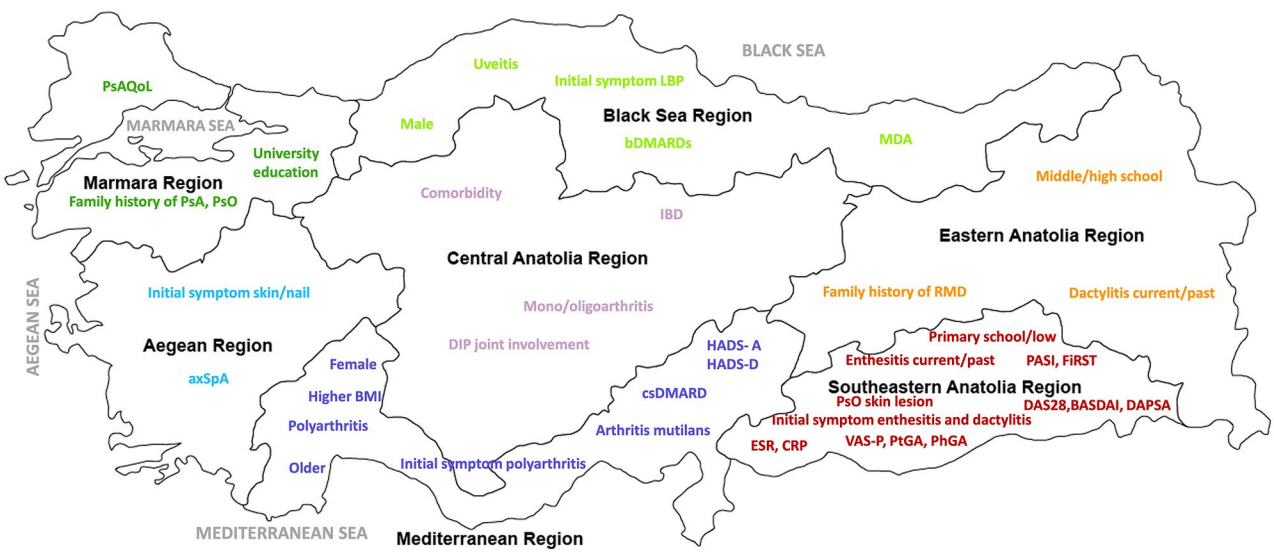

Figure 1. Regional disparities in PsA patients across Türkiye, and the distribution of demographic characteristics, clinical Findings, disease Activity, quality of life, functional status, and disability. The figure highlights the region exhibiting the highest scores.

PsA: Psoriatic arthritis.

Anatolia region, wheras BASDAI and DAPSA lowest in the Aegean region. Moreover, the proportion of patients meeting MDA criteria differed significantly, with the highest rate in the Black Sea region and the lowest in the Southeastern Anatolia region (p=0.033). Measures of total PASI were highest in the Southeastern Anatolia region and lowest in the Mediterranean region (p<0.001).

Quality of life and mental health assessments demonstrated significant regional variations. The PsAQoL index was highest in the Marmara region and lowest in the Eastern Anatolia region (p<0.001). The HADS anxiety and depression scores were highest in the Mediterranean region, whereas the anxiety score was lowest in the Black Sea region, and the depression score was lowest in the Aegean region (p<0.001). The mean FACIT-Fatigue score was highest in the Mediterranean region, while it was lowest in the Aegean region. Additionally, the mean FiRST score was highest in the Southeastern Anatolia region and lowest in the Mediterranean region (p<0.001). Functional status and disability measures, measured by BASMI and HAQ, were highest in the Mediterranean region and lowest in the Black Sea region (p<0.001).

Figure 1 offers a detailed summary of regional differences among PsA patients in Türkiye and outlines the distribution of demographic characteristics, clinical findings, disease activity, quality of life, functional status, and disability. Notably, it highlights the region with the highest scores, providing valuable insights into substantial variations across geographic areas.

DISCUSSION

Psoriatic arthritis is a multifaceted disease with substantial clinical heterogeneity, necessitating a comprehensive understanding of its manifestations for early diagnosis and effective management. To the best of our knowledge, this is the first multicenter study to investigate the clinical characteristics, disease activity, and overall disease burden within a significant group of patients with PsA across various geographic regions of the same country. The findings from this research provide invaluable insights into the geographical differences in disease activity, quality of life, disability, and mental health among PsA patients in Türkiye.

There is limited research examining variations in the prevalence, demographic, and clinical characteristics of patients with SpA across distinct geographic regions within the same country. A study using five years of health insurance claims data in the USA reported that patients presenting with low back pain were more commonly diagnosed with ankylosing spondylitis in metropolitan statistical areas and had lower usage of corticosteroids and opioids, as well as reduced pharmacy costs, compared to patients living in low-detection metropolitan statistical areas.[27] A recent retrospective cross-sectional study using a national database spanning from 2014 to 2019 in the USA has revealed significant geographic disparities in both the diagnosis and treatment preferences in patients with ankylosing spondylitis. Notably, the utilization rates of bDMARD/targeted synthetic DMARD treatments exhibited a considerable range, with rates as high as 91% in Minnesota and as low as 69% in Idaho for patients diagnosed by rheumatologists. Furthermore, the study revealed that the highest prevalence of ankylosing spondylitis diagnoses tended to be concentrated predominantly in the Western region of the USA.[28] When analyzing our study findings, it is noteworthy that although there was no statistically significant difference in the usage rates of bDMARDs, there was a notable difference in the usage rates of csDMARDs. Use of csDMARDs was most prevalent in the Mediterranean region, with a usage rate of 70%, and least prevalent in the Eastern Anatolia region, where the rate was 40%. These findings indicate significant variations in treatment preferences among patients with PsA across different geographical regions in our country. Additionally, it is important to note that there are regional differences in the demographic and clinical characteristics of patients as well.

Geographic or ethnic variations may indeed influence the onset and progression of the disease, resulting in differences in disease incidence and clinical manifestations among patients with PsA. Various studies have indicated that the male and female patients in Asian populations affected by PsA are approximately equal.[29-31] Recent investigations involving PsA cohorts in Europe have revealed a female predominance,[32,33]

with female-to-male ratios ranging from 1.2 to 2.[33-35] Our multicenter registry study also observed a female predominance in PsA patients, consistent with these findings. In the context of variations in the clinical patterns of PsA, it was observed that polyarthritis was the most prevalent articular involvement pattern among Asian PsA patients.[31] Furthermore, the mono/oligoarticular phenotype was more frequently observed in PsA patients from Italy,[7] consistent with our findings.

Our study demonstrated considerable diversity in PsA joint types, initial visit symptoms, and presence of extra-articular manifestations, such as uveitis, inflammatory bowel disease, and skin lesions across seven regions in Türkiye. In Central Anatolia, we predominantly observed mono/oligoarthritis and distal interphalangeal joint involvement. In contrast, the Mediterranean region showed a higher prevalence of polyarthritis. When considering initial visit symptoms in PsA, peripheral arthritis was most common in the Mediterranean region (86.7%) and least common in the Aegean region (32.4%). The significance of these results can be emphasized in two ways. First, these findings underscore the complexity and diversity of clinical characteristics across different regions in the country. Second, they are crucial for tailoring treatment and care to meet regional needs and for comprehending the broader epidemiology of PsA in Türkiye.

Another significant finding of this study concerns the variation in disease burden among patients with PsA included from seven geographic regions. This observation is consistent with a multicenter, cross-sectional, observational study conducted by Mease et al.,[4] which investigated the impact of geographic region across 44 sites in the USA. Their study revealed that patients in western areas of the USA exhibited less severe disease characteristics compared to those in central or eastern areas. In our study, the PsA patients in the Mediterranean region showed the highest levels of fatigue, physical disability, depression, anxiety scores, and poorer functional outcomes compared to other regions in Türkiye. Furthermore, PsA patients in the Marmara region had the highest quality of life scores, while those in the Eastern Anatolia region exhibited the lowest scores. These findings suggest the potential role of geographical factors on the overall well-being and functional status of PsA patients in Türkiye. These variations between regions may be influenced by socioeconomic factors, environmental influences, access to healthcare services, and awareness levels.

Moreover, concerning disease activity, PsA patients in the Southeastern Anatolia region exhibited the highest scores for pain, patient and physician global assessments, acute phase reactants (ESR and C-reactive protein), and most disease activity indices (DAPSA, DAS28, BASDAI, and PASI). Notably, the proportion of patients meeting the MDA criteria varied significantly, with the highest rate observed in the Black Sea region (27.1%) and the lowest in the Southeastern Anatolia region (8.3%). Additionally, the utilization of bDMARDs was numerically lower among patients from the Southeastern Anatolia region compared to other regions. Furthermore, the level of education in this region was numerically lower compared to other regions. The high disease activity scores observed in the Southeast Anatolia region could be due to various factors, such as the interaction of environmental, socioeconomic, and healthcare system-related characteristics. Economic status, education level, and social living conditions can influence patients' access to and compliance with treatment. Variations in the recognition of disease symptoms and the process of seeking treatment among patients can lead to regional diversity. Additionally, the utilization of bDMARDs was numerically lower among patients from this region compared to others, which may further exacerbate disease activity due to limited access to advanced treatment options. Furthermore, the lower level of education in this region compared to other regions may contribute to limited awareness about the disease and available treatment options, potentially leading to delayed management.

This research endeavor fills an important gap in the existing literature, as prior investigations have typically focused on ethnic differences or limited patient groups, particularly patients with ankylosing spondylitis.[8,27,28,36] This study, which included multiple centers and encompassed seven distinct regions, offers invaluable insights into the geographic disparities in disease activity,

quality of life, disability, and mental health among PsA patients. Regional variations in PsA may arise from several factors. First, there is regional heterogeneity in genetic susceptibility loci associated with PsA, indicating specific genetic influences in different areas. Second, diverse climates, dietary habits, and lifestyles contribute to environmental disparities, impacting the presentation and severity of PsA. Additionally, disparities in healthcare access and awareness play a crucial role. Beyond the medical realm, socioeconomic factors, such as income and education, influence disease perception, treatment adherence, and overall well-being. Lastly, cultural nuances influence health-seeking behaviors and treatment attitudes, emphasizing the importance of culturally competent healthcare strategies for comprehensive PsA management.

Although this comprehensive study offers a holistic perspective on PsA within the same country, it has several limitations. This retrospective observational study conducted in Türkiye may not be generalizable to other countries. Another limitation of our study is the limited number of patients who underwent HLA (human leukocyte antigen)-B27 testing, which hinders our ability to examine its impact on the clinical subtypes of PsA. Additionally, the study did not explore the potential influence of socioeconomic and environmental factors, as well as treatment adherence, on regional disease burden, which could be the focus of future research.

In conclusion, this study emphasized the complexity of PsA and its heterogeneous nature across distinct geographic regions in Türkiye. The differences observed in demographic data, clinical features, and disease activity underline the importance of developing tailored healthcare services, treatment strategies, and interventions to address the unique needs and challenges of PsA patients in specific areas of the country. Further research is required to uncover the underlying reasons for these differences and to formulate location-specific approaches to enhance the care and outcomes of PsA patients.

Ethics Committee Approval: The study protocol was approved by the Sakarya University Local Ethics Committee (date: 28.1.2018, no: 25.01.2018/42). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Patient Consent for Publication: A written informed consent was obtained from each patient.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: Significant contributions to the conceptualization and design of the study were made: E.K., G.K., K.N., İ.T.; Participated in data analysis: E.K., G.K.; The initial manuscript was drafted: E.K., G.K. All authors critically revised the manuscript for important intellectual content. The final version for publication received approval from all authors. Full responsibility for the integrity and accuracy of all aspects of the work is assumed by all authors. All authors were involved in the acquisition of data and its interpretation.

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding: The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Gladman DD, Antoni C, Mease P, Clegg DO, Nash P. Psoriatic arthritis: Epidemiology, clinical features, course, and outcome. Ann Rheum Dis 2005;64 Suppl 2:ii14-7. doi: 10.1136/ard.2004.032482.
2. Gupta S, Syrimi Z, Hughes DM, Zhao SS. Comorbidities in psoriatic arthritis: A systematic review and meta-analysis. Rheumatol Int 2021;41:275-84. doi: 10.1007/s00296-020-04775-2.
3. Nas K, Karkucak M, Durmus B, Karatay S, Capkın E, Kaya A, et al. Comorbidities in patients with psoriatic arthritis: A comparison with rheumatoid arthritis and psoriasis. Int J Rheum Dis 2015;18:873-9. doi: 10.1111/1756-185X.12580.
4. Mease PJ, Liu C, Siegel E, Richmond H, Wu M, Chen L, et al. Impact of clinical specialty setting and geographic regions on disease management in patients with psoriatic arthritis in the United States: A multicenter observational study. Am J Clin Dermatol 2019;20:873-80. doi: 10.1007/s40257-019-00470-6.
5. McInnes IB. Psoriatic arthritis: Embracing pathogenetic and clinical heterogeneity? Clin Exp Rheumatol 2016;34(4 Suppl 98):9-11.
6. Solmaz D, Eder L, Aydin SZ. Update on the epidemiology, risk factors, and disease outcomes of psoriatic arthritis. Best Pract Res Clin Rheumatol 2018;32:295-311. doi: 10.1016/j.berh.2018.09.006.
7. Bakirci S, Ayan G, Gazel U, Tinazzi I, Solmaz D, Kasapoglu E, et al. Patient characteristics and minimal disease activity in psoriatic arthritis: A transcontinental comparison. Clin Rheumatol 2021;40:3169-74. doi: 10.1007/s10067-021-05648-0.

8. Bittar M, Yong WC, Magrey M, Khan MA. Worldwide differences in clinical phenotype of axial spondyloarthritis. Curr Rheumatol Rep 2021;23:76. doi: 10.1007/s11926-021-01043-5.
9. Stolwijk C, van Onna M, Boonen A, van Tubergen A. Global prevalence of spondyloarthritis: A systematic review and meta-regression analysis. Arthritis Care Res (Hoboken) 2016;68:1320-31. doi: 10.1002/acr.22831.
10. López-Medina C, Molto A, Sieper J, Duruöz T, Kiltz U, Elzorkany B, et al. Prevalence and distribution of peripheral musculoskeletal manifestations in spondyloarthritis including psoriatic arthritis: Results of the worldwide, cross-sectional ASAS-PerSpA study. RMD Open 2021;7:e001450. doi: 10.1136/rmdopen-2020-001450.
11. Kılıç G, Kılıç E, Tekeoğlu İ, Sargın B, Cengiz G, Balta NC, et al. Diagnostic delay in psoriatic arthritis: Insights from a nationwide multicenter study. Rheumatol Int 2024;44:1051-9. doi: 10.1007/s00296-023-05479-z.
12. Kılıç G, Kılıç E, Tekeoğlu İ, Sargın B, Cengiz G, Balta NC, et al. Beyond expectations: Disease duration and psychological burden in psoriatic arthritis. Rheumatol Int 2023;43:1695-704. doi: 10.1007/s00296-023-05379-2.
13. Keskin Y, Nas K, Kiliç E, Sargin B, Acer Kasman S, Alkan H, et al. Clinical characteristics, disease activity, functional status, and quality of life results of patients with psoriatic arthritis using biological and conventional synthetic disease-modifying antirheumatic drugs. Arch Rheumatol 2020;36:1-9. doi: 10.46497/ArchRheumatol.2021.7874.
14. Taylor W, Gladman D, Helliwell P, Marchesoni A, Mease P, Mielants H; CASPAR Study Group. Classification criteria for psoriatic arthritis: Development of new criteria from a large international study. Arthritis Rheum 2006;54:2665-73. doi: 10.1002/art.21972.
15. Helliwell PS, FitzGerald O, Fransen J. Composite disease activity and responder indices for psoriatic arthritis: A report from the GRAPPA 2013 meeting on development of cutoffs for both disease activity states and response. J Rheumatol 2014;41:1212-7. doi: 10.3899/jrheum.140172.
16. Schoels M, Aletaha D, Funovits J, Kavanaugh A, Baker D, Smolen JS. Application of the DAREA/DAPSA score for assessment of disease activity in psoriatic arthritis. Ann Rheum Dis 2010;69:1441-7. doi: 10.1136/ard.2009.122259.
17. Coates LC, Fransen J, Helliwell PS. Defining minimal disease activity in psoriatic arthritis: A proposed objective target for treatment. Ann Rheum Dis 2010;69:48-53. doi: 10.1136/ard.2008.102053.
18. Garrett S, Jenkinson T, Kennedy LG, Whitelock H, Gaisford P, Calin A. A new approach to defining disease status in ankylosing spondylitis: The Bath Ankylosing Spondylitis Disease Activity Index. J Rheumatol 1994;21:2286-91.
19. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67:361-70. doi: 10.1111/j.1600-0447.1983.tb09716.x.
20. Küçükdeveci AA, Sahin H, Ataman S, Griffiths B, Tennant A. Issues in cross-cultural validity: Example from the adaptation, reliability, and validity testing of a Turkish version of the Stanford Health Assessment Questionnaire. Arthritis Rheum 2004;51:14-9. doi: 10.1002/art.20091.
21. Jenkinson TR, Mallorie PA, Whitelock HC, Kennedy LG, Garrett SL, Calin A. Defining spinal mobility in ankylosing spondylitis (AS). The Bath AS Metrology Index. J Rheumatol 1994;21:1694-8.
22. Feldman SR, Fleischer AB Jr, Reboussin DM, Rapp SR, Exum ML, Clark AR, et al. The self-administered psoriasis area and severity index is valid and reliable. J Invest Dermatol 1996;106:183-6. doi: 10.1111/1523-1747.ep12329912.
23. Celiker R, Altan L, Rezvani A, Aktas I, Tastekin N, Dursun E, et al. Reliability and validity of the Turkish version of the fibromyalgia rapid screening tool (FiRST). J Phys Ther Sci 2017;29:340-4. doi: 10.1589/jpts.29.340.
24. Webster K, Cella D, Yost K. The Functional Assessment of Chronic Illness Therapy (FACIT) Measurement System: Properties, applications, and interpretation. Health Qual Life Outcomes 2003;1:79. doi: 10.1186/1477-7525-1-79.
25. McKenna SP, Doward LC, Whalley D, Tennant A, Emery P, Veale DJ. Development of the PsAQoL: A quality of life instrument specific to psoriatic arthritis. Ann Rheum Dis 2004;63:162-9. doi: 10.1136/ard.2003.006296.
26. Tälli S, Etcheto A, Fautrel B, Balanescu A, Braun J, Cañete JD, et al. Patient global assessment in psoriatic arthritis - what does it mean? An analysis of 223 patients from the Psoriatic arthritis impact of disease (PsAID) study. Joint Bone Spine 2016;83:335-40. doi: 10.1016/j.jbspin.2015.06.018.
27. Shafrin J, Griffith J, Shim JJ, Huber C, Ganguli A, Aubry W. Geographic variation in diagnostic ability and quality of care metrics: A case study of ankylosing spondylitis and low back pain. Inquiry 2017;54:46958017707873. doi: 10.1177/0046958017707873.
28. Deodhar A, Kruzikas D, Zhou L, Biljan A, Saffore CD. Geographic variations in diagnosis and treatment of ankylosing spondylitis in the United States: A real-world study. Rheumatol Ther 2022;9:447-63. doi: 10.1007/s40744-021-00406-9.
29. Thumboo J, Tham SN, Tay YK, Chee T, Mow B, Chia HP, et al. Patterns of psoriatic arthritis in Orientals. J Rheumatol 1997;24:1949-53.
30. Jamshidi F, Bouzari N, Seirafi H, Farnaghi F, Firooz A. The prevalence of psoriatic arthritis in psoriatic patients in Tehran, Iran. Arch Iran Med 2008;11:162-5.

31. Tam LS, Leung YY, Li EK. Psoriatic arthritis in Asia. Rheumatology (Oxford) 2009;48:1473-7. doi: 10.1093/rheumatology/kep230.
32. Alenius GM, Jidell E, Nordmark L, Rantapää Dahlqvist S. Disease manifestations and HLA antigens in psoriatic arthritis in northern Sweden. Clin Rheumatol 2002;21:357-62. doi: 10.1007/s100670200097.
33. Love TJ, Gudbjornsson B, Gudjonsson JE, Valdimarsson H. Psoriatic arthritis in Reykjavik, Iceland: Prevalence, demographics, and disease course. J Rheumatol 2007;34:2082-8.
34. Kerola AM, Sexton J, Wibetoe G, Rollefstad S, Crowson CS, Mars N, et al. Incidence, sociodemographic factors and treatment penetration of rheumatoid arthritis and psoriatic arthritis in Norway. Semin Arthritis Rheum 2021;51:1081-8. doi: 10.1016/j.semarthrit.2021.08.006.
35. Tarannum S, Leung YY, Johnson SR, Widdifield J, Strand V, Rochon P, et al. Sex- and gender-related differences in psoriatic arthritis. Nat Rev Rheumatol 2022;18:513-26. doi: 10.1038/s41584-022-00810-7.
36. Roussou E. Spondyloarthritis in African populations compared to Europeans living in the United Kingdom. Mediterr J Rheumatol 2020;32:39-55. doi: 10.31138/mjr.32.1.39.