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Clinical characteristics and comorbidities in psoriatic arthritis: Experience from a single rheumatology centre in Malaysia

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ABSTRACT

Aim of the work: To evaluate the clinical features and associated comorbidities of psoriatic arthritis (PsA) patients from a single rheumatology centre in Malaysia.
Patients and methods: 247 PsA patients in rheumatology clinic, Raja Permaisuri Bainun Hospital were included. Clinical and laboratory data were retrieved from the medical record.
Results: The mean age was 56 ± 13.5 years, 56.1% were female, and 38.9% were Indians. The onset of psoriasis and PsA was significantly earlier among Malays ($P < 0.01$) whilst Indians had longer disease duration ($P < 0.05$). The mean duration of progression from psoriasis to PsA was 8.7 years. Alcohol and nail dystrophy were common among Indians ($P < 0.05$). Plaque psoriasis was the commonest subtype (81%) in nails (pitting, 42.5%; onycholysis, 20.7%), scalp (35.6%) and limbs (32.8%). Pustular psoriasis and onycholysis were common in males ($P = 0.05$ and 0.002, respectively) whilst scalp psoriasis in females ($P < 0.05$). Peripheral arthritis was the highest (92.7%) compared to axial (8.1%); 14.6% had both. 38.9% were oligoarthritis and mostly asymmetrical (35.6%). 24% had enthesitis, 14.6% dactylitis, and 0.8% uveitis. 52.2% had hypertension, followed by dyslipidemia (44.1%), diabetes mellitus (34%), obesity (30%), ischemic heart disease (9.7%), cancer (2.4%), and tuberculosis (0.4%). No significant relationship between the pattern of arthritis and these comorbidities ($P > 0.05$).
Conclusion: PsA was more prevalent in Indians. Malays have younger disease onset. Pustular psoriasis and onycholysis were common in males, while scalp psoriasis in females. Asymmetrical oligoarthritis and plaque psoriasis were the commonest pattern and psoriasis subtype respectively. Comorbidities were not associated with the pattern of arthritis in PsA patients.

1. Introduction

Psoriatic arthritis (PsA) is a chronic inflammatory arthritis that is associated with psoriasis with negative rheumatoid factor [1] and may cause debilitating and permanent joint damage without early diagnosis and treatment. Psoriasis (PsO) may precede PsA in an average of 10 years in 60–70% of cases, and 15–20% of arthritis precedes PsO or occurs concurrently [2–4]. PsA is a heterogenous disorder and patients may present with a combination of all subtypes, enthesitis, dactylitis, psoriatic nail disease, and axial involvement [5]. Nail changes form a significant risk in developing arthritis in PsO patients and up to 80% of PsA patients have nail involvement [6]. The annual incidence of PsA in patients with PsO is 2.7%, and the reported prevalence of PsA among psoriasis patients was 6–41% in Western studies [4,7,8]. Low prevalence was noted in Asian countries such as Japan (0.00001%) [9] and China (0.01–0.1%) [10]. There was no population-based study on PsA in Malaysia. Nevertheless, epidemiological studies on PsO conducted in Malaysia revealed comparable results to other nations and PsA comprised only 13.7% of patients with PsO [11].

Comorbidity, especially cardiometabolic disorders was found to be highly prevalent in PsA patients which lead to poor quality of life and physical function [12]. Cardiometabolic disorders such as hypertension,

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obesity, dyslipidemia, diabetes mellitus and other cardiovascular diseases (CVD) were frequently found in PsA patients among the general population [12,13]. Pro-inflammatory cytokines such as tumor necrosing factor (TNF)-α and interleukins (IL) were found not only limited to CVD but also in inflammatory disorders such as inflammatory bowel disease (IBD) and pulmonary diseasesto contributeto aetiopathogenesis of these disorders. [13,14]. It was however that comorbidities do not significantlyassociated with the pattern or severity of joint affection in PsA patients. [14]. In contrast, *Song et al* had shown that diabetes mellitus was significantly common in active PsA, and other metabolic disorders tended to be more frequent [15].

The aims of this work were to evaluate the common clinical manifestation of PsA among different age, gender, and ethnic subgroups in a single rheumatology centre in Malaysia and to assess the association of PsA with comorbidity.

2. Patients and methods

This study recorded data from adult PsA patients who visited the Rheumatology clinic at Hospital Raja Permaisuri Bainun (HRPB) in Ipoh, Perak, Malaysia between 1971 and 2022. A total of 247 patients were diagnosed with PsA and met the ClASsification criteria for Psoriatic ARthritis. [16]. This work was approved by the Ministry of Health (MOH) of Malaysia Medical Research and Ethics Committee (MREC) (NMRR ID-22–00629-3LK) and the Universiti Kuala Lumpur Royal College of Medicine Perak ethics committee.

Variables were retrieved from the patients' medical and clinical records: gender, age (onset of PsO and PsA), ethnicity, type, and sites of PsO, type of PsA, extra-articular features, lifestyles, body mass index (BMI), comorbidities, and treatment. Rheumatoid factor (RF) and anti-citrullinated protein antibodies (ACPA) were not performed to all the patients.

Statistical analysis: Data analysis was performed using Statistical Package of Social Sciences (SPSS) version 28.0. Data were presented as mean ± SD and number and percent. Comparison was performed by Chi-square and Kruskal Wallis tests. Significance was set at $p < 0.05$.

3. Results

The characteristics of the 247 patients are presented in Table 1. Cardiometabolic disorders were commonly present comorbidities; hypertension followed by dyslipidemia, diabetes mellitus (DM) and ischemic heart disease (IHD). Among these patients, 30% were found to have obesity. However, there was no significant association between the pattern of arthritis and the presence of main comorbidities (DM, P = 0.20; dyslipidemia, P = 0.21, hypertension, P = 0.30; IHD, P = 0.44 and obesity, P = 0.57). Medications received by the patients are presented in Table 2. Indian ethnicity was of a higher frequency (38.9%) followed by Malay (36.4%) and Chinese (24.7%). On further stratification by ethnicity, the characteristics were comparable except for a significantly younger age in the Malay patients and higher frequency of alcohol consumption and nail dystrophy in the Indian ethnicity (Table 3).

Table 4. The relationship between pattern of arthritis and comorbidities among the psoriatic arthritis patients

The gender distribution F:M was 1.3:1. Pustular PsO and onycholysis were significantly higher in males and scalp PsO in females. Otherwise, the other characteristics, pattern and symmetry of articular involvement were similar between males and females (Table 4).

Table 1
Characteristics of the psoriatic arthritis patients.

Characteristic mean ± SD or n(%)	PsA patients (n = 247)
Age (y)	56 ± 13.5
Age at onset PsO (y)	37.5 ± 13.7
Age at onset PsA (y)	46.5 ± 13.0
Duration of PsO (y)	18.1 ± 9.7
Duration of PsA (y)	9.5 ± 6.7
From PsO to PsA (y)	8.7 ± 8.0
Gender: Female: Male	138:109 (1.3:1)
Ethnicity	
Malay	90 (36.4)
Chinese	61 (24.7)
Indian	96 (38.9)
Ever-smoker	144 (58.3)
Ever-drinker (alcohol)	120 (48.6)
Family history of PsO	15 (6.1)
Co-morbidities	
Obese	52 (30.2)
Diabetes mellitus	84 (34.0)
Hypertension	129 (52.2)
Dyslipidemia	109 (44.1)
Ischemic heart disease	24 (9.2)
Cancer	6 (2.4)
Tuberculosis	1(0.4)

PsO, psoriasis; PsA, psoriatic arthritis; y, year.

4. Discussion

In this work, plaque psoriasis was the commonest manifestation involving the nails, scalp and limbs. The highest frequency of patients with peripheral involvement had asymmetrical oligoarthritis. Hypertension, dyslipidemia, diabetes and obesity were frequently present in PsA Malaysian patients. Manifestations and comorbidities of PsA from many international studies [15,17–23] are presented in Table 5.

The mean age (56 years) in this study was higher than others [24] with a tendency to female preponderance. The reported age range for PsA was 40–59 years with female predominance [25,26]. No gender difference was found in one study [17], while others reported that the frequency could be higher in either gender [27]. The prevalence of PsA is increasing over time, hence, leading to disparity in gender proportion.

In this study, the majority of the patients were Indians, followed by Malays and Chinese. In accordance with a multi-ethnic study in Singapore, Indians with psoriasis have twice the risk of developing PsA

Table 2
Treatment regimen of the psoriatic arthritis patients.

Treatment n (%)	PsA patients (n = 247)
DMARDs	228 (92.3)
Methotrexate	203 (82.2)
Sulphasalazine	94 (38.1)
Leflunomide	41 (16.6)
Cyclosporine	17 (6.9)
Hydroxychloroquine	13 (5.3)
Mycophenolate mofetil	2 (0.8)
Azathioprine	2 (0.8)
≥ 2 cDMARDs	105 (42.5)
≥ 3 cDMARDs	36 (14.6)
Steroids	25 (10.1)
NSAIDs	195 (78.9)
Supplements	204 (82.6)
Biologics	55 (22.3)4
Etanercept	(1.6)
Adalimumab	20 (8.1)
Golimumab	3 (1.2)
Infliximab	9 (3.6)
Tocilizumab	1 (0.4)
Secukinumab	12 (4.9)
Guselkumab	4 (1.6)
Ustekinumab	1 (0.4)
Risankizumab	1 (0.4)
JAK-i: Tofacitinib	3 (1.2)
Combined treatment	
cDMARDs + Steroid	25 (10.1)
cDMARDs + Steroid + NSAIDs	22 (8.9)
cDMARDs + Biologics	34 (13.8)

PsA: psoriatic arthritis, NSAIDs: Non-steroidal anti-inflammatory drugs; Supplements include vitamin D, folic acid and calcium. DMARDs, disease modifying antirheumatic drug; JAK-I, Janine kinase inhibitor.

Table 3
Clinical characteristics of psoriatic arthritis patients according to major ethnicities.

Characteristic mean ± SD or n (%)	All (n = 247)	Malay (n = 90)	Chinese (n = 61)	Indian (n = 96)	*p*
Age (y)	56 ± 13.5	50.6 ± 14.7	59.1 ± 12.7	59.1 ± 11.2	**0.001**
Age at PsA onset (y)	46.6 ± 13	42.4 ± 13.3	49.7 ± 12.6	48.2 ± 12.1	**0.001**
Age at PsO onset (y)	37.5 ± 13.7	34.3 ± 13.2	41.1 ± 14.4	38.2 ± 13.2	**0.015**
Duration of PsO (y)	18.1 ± 9.7	15.9 ± 8.6	18.1 ± 9.3	20.3 ± 10.5	**0.02**
Duration of PsA (y)	9.5 ± 6.7	8.2 ± 5.3	9.3 ± 7.8	10.8 ± 6.9	**0.03**
From PsO to PsA (y)	8.7 ± 8	7.7 ± 6.6	9.2 ± 8.0	9.4 ± 9.2	0.62
Gender: Male	109 (44.1)	35 (32.1)	27 (24.5)	47 (43.1)	0.39
Female	138 (55.9)	55 (39.9)	34 (24.6)	49 (35.5)	
Family PsO	15 (6.1)	6 (40)	4 (26.7)	5 (33.3)	0.9
Family PsA	5 (2.0)	1 (20)	2 (40)	2 (40)	0.65
Alcohol	120 (48.6)	47 (39.2)	21(17.5)	52 (43.3)	**0.037**
Smoking	144 (58.3)	50 (34.7)	31(21.5)	63 (43.8)	0.15
RF (n = 184)	146 (79.3)	50 (34.3)20	37 (25.3)5	59 (40.4)13	0.09
negative	38 (20.7)	(52.6)	(13.2)	(34.2)	
positive					
Nail dystrophy	105 (42.5)	33 (31.4)	35 (33.3)	37 (35.2)	**0.025**
Arthritis					
Peripheral	229 (92.7)	84 (36.7)	55 (24)	90 (39.3)	0.67
Axial	20 (8.1)	6 (30)	9 (45)	5 (25)	0.08
Both	36 (14.6)	13 (36.1)	10 (27.8)	13 (36.1)	0.88
Oligoarticular	96 (38.9)	37 (38.5)	24 (25.0)	35 (36.5)	0.67
Polyarticular	90 (36.4)	35 (38.9)	19 (21.1)	36 (40)	
Undetermined	61 (24.7)	18 (29.5)	18 (29.5)	25 (41)	
Symmetrical	63 (25.5)	22 (34.9)	13 (20.6)	28 (44.4)	0.68
Asymmetrical	88 (35.6)	34 (38.6)	20 (22.7)	34 (38.6)	
Undetermined	96 (38.9)	34 (35.4)	28 (29.2)	34 (35.4)	
Dactylitis	36 (14.6)	17 (47.2)	6 (16.7)	13 (36.1)	0.28
Enthesitis	59 (23.9)	19 (32.2)	11 (18.6)	29 (49.2)	0.16
Uveitis	2 (0.8)	1 (50)	0 (0)	1 (50)	0.72

PsA: psoriatic arthritis, PsO: psoriasis, RF: rheumatoid factor. Bold* values are significant at $p < 0.05$.

Table 4
Presentations of psoriasis and arthritis in psoriatic arthritis patients by gender.

Characteristic mean ± SD or n (%)	PsA patients (n = 247)	Male (n = 138)	Female (n = 109)	P
Type of psoriasis				
Plaque	201 (81.4)	91 (45.3)	110 (54.7)	0.45
Sebopsoriasis	2 (0.8)	1 (50)	1 (50)	0.87
Palmoplantar	1 (0.4)	0 (0)	1 (100)	0.37
Guttate	7 (2.8)	2(28.6)	5 (71.4)	0.4
Erythrodermic	5 (2.0)	3(60)	2(40)	0.47
Pustular	6 (2.4)	5(83.3)	1(16.7)	**0.05**
Sites of psoriasis				
Scalp	88 (35.6)	31 (35.2)	57 (64.8)	**0.036**
Ear	21 (8.5)	7(33.3)	14 (66.7)	0.3
Elbow/Knee	60 (24.3)	26 (43.3)	34 (56.7)	0.89
Arm/Leg	81 (32.8)	35 (43.2)	46 (56.8)	0.84
Trunk	61 (24.7)	27 (44.3)	34 (55.7)	0.98
Face	28 (11.3)	13 (46.43)	15 (53.57)	0.8
Genital	7 (2.8)	3 (42.9)	4 (57.1)	0.95
Nail pitting	105 (42.5)	51 (48.6)	54 (51.4)	0.23
Onycholysis	50 (20.2)	32 (64)	18 (36)	**0.002**
Palm	13 (5.3)	6 (46.2)	7 (53.9)	0.88
Skin fold	10 (4.0)	4 (40)	6 (60)	0.79
Gluteal cleft	4 (1.6)	1 (25.0)	3 (75.0)	0.44
Dactylitis	36 (14.6)	15 (41.7)	21 (58.3)	0.75
Enthesitis	59 (23.9)	27 (45.8)	32 (54.2)	0.77
Uveitis	2 (0.8)	2 (100)	0 (0)	0.11
Joint involvement				
Peripheral	229 (92.7)	98 (42.8)	131 (57.2)	0.13
Axial	20 (8.1)	7 (35)	13 (65.0)	0.39
Both	36 (14.6)	16 (44.4)	20 (55.6)	0.97
Arthritis pattern				
Polyarthritis	90 (36.4)	40 (44.4)	50 (55.6)	
Oligoarthritis	96 (38.9)	45 (46.9)	51 (53.1)	0.65
Undetermined	61 (24.7)	24 (39.3)	37 (60.7)	
Symmetrical	63 (25.5)	31 (49.2)	32 (50.79)	
Asymmetrical	88 (35.6)	42 (47.7)	46 (52.3)	0.24
Undetermined	96 (38.9)	36 (37.5)	60 (62.5)	
Rheumatoid factor (n = 184)	38 (20.7)146	15 (39.5)65	23 (60.5)81	
positive	(79.4)	(44.5)	(55.5)	0.58
negative				
ESR (mm/1st hr)	43 ± 31.8	37.6 ± 31.7	47.4 ± 31.4	
CASPAR criteria ≥ 3	167 (67.6)	79 (47.3)	88 (52.7)	0.15

ESR: erythrocyte sedimentation rate, CASPAR: ClASsification criteria for Psoriatic Arthritis.
Bold values are significant at $p < 0.05$.

compared to Chinese and others [28]. Multi-ethnicity among Asians in the same geolocation and environment does not confer similar incidence and prevalence of PsA [28,29]. These possibly could be explained by the diversity in genetic and geographical background. The majority of patients in this study had PsO prior to the development of PsA and the duration of progression to PsA was 9 years which is comparable with others [30,31].

Plaque psoriasis is highly frequent among other types [11]. A study by *Mohd Affandi et al* showed that plaque was the commonest type of PsO (85.1%) in Malaysia [11] which is similar to this study (81%). The remarkable frequency of nail involvement in PsO (40%) and PsA (80%) is well established [11,32]. Nail changes such as pitting and onycholysis in PsO are important risk predictor for the development of PsA [33] and were common in early PsA [34]. Consistent with those studies, this study also showed that nail changes are prevalent among these PsA patients.

Polyarticular involvement had been identified in 63% of PsA patients [16]. Peripheral arthritis was the most common presentation in this work followed by enthesitis, both peripheral and axial, and axial alone. Peripheral arthritis in PsA leads to functional disability and reduced quality of life [35]. Asymmetric oligoarticular PsA was the most common pattern in this study. Over time in the majority of PsA patients, asymmetric oligoarthritis may progress to symmetrical polyarthritis [36,37]. Axial involvement and other extra-articular manifestations such as dactylitis, and uveitis were less found in PsA patients in this cohort in contrast to others [38,39].

The role of RF and ACPA in PsA patients has been widely studied in the last decades [40] despite negative RF being part of CASPAR criteria. A study by *Emad et al.* revealed that RF and ACPA were positive, and the latter was significantly associated with the severity of PsA [39]. RF was negative in most of the PsA patients in this work. ACPA test, however, was not routinely performed unless the diagnosis is doubtful especially in the patient with symmetrical polyarthritis mimicking RA without signs of PsO or PsA including extra-articular manifestations.

Comorbidities including cardiovascular, metabolic, and pulmonary disorders are associated with PsA [12,13,26]. PsA patients may have co-existing comorbidities or may develop during the course of the condition and treatment. In this work, hypertension was frequently associated with PsA followed by dyslipidemia and diabetes mellitus which was in harmony with *Gupta et al.* [12]. However, there was no significant

Table 5
International studies on characteristics of psoriatic arthritis.

Study	n	M: F	F.hx (%)	Age (y)	DD PsO (y)	PsO- PsA (y)	Manifestations (%)	Arthritis (%)	Axial (%)	Plaque (%)	Comorbidity (%)
China [18]	112	1.1:1	(31.3)	44.9	8	–	nail: (46.4) dactylitis: (13.4) enthesitis: (26.8)	Oligo (48.2)	(26.8)	(82.1)	ND
India [19]	100	0.94:1	(16.7)	43	10	5	nail: (87) dactylitis: (26) enthesitis: (67)	Poly (58)Oligo (21)	(5)	(95)	ND
Turkiye [20]	126	0.88:1	ND	45.6	17	4	nail: (51.6) dactylitis: (21.9) enthesitis: (62.5)	Oligo (53.1)	(43.8)	ND	ND
Japan [21]	431	1.5:1	(9.7)	53	13	5	nail: (39) dactylitis: (41.1) enthesitis: (43.3)	Poly (60.4) Oligo (28.6)	(40.9)	(91.9)	Lipid (43.9)DM (15.1)HTN (23.3)
Japan [22]	1775	1.9:1	(1)	>50	ND	>10	dactylitis: (59.2) enthesitis: (28.3)	Poly (36)Oligo (22)	(8)	(88)	Lipid (16)DM (11.2)HTN (21.2)Obesity (11.2)
China [15]	300	1.1:1	(37.8)	39	ND	7	nail: (41.4) dactylitis: (31.3) enthesitis: (6)	Poly (40.3) Oligo (37.9)	(15.4)	ND	DM (20.1)HTN (14)Obesity (50.7)
Egypt [26]	100	0.3:1	ND	44.4	15	12	nail: (89) dactylitis: (41) enthesitis: (86)	AxSpA (38) Poly (33)Oligo (26)	(39)	ND	DM (1)HTN (21)
China [23]	275	2.2:1	(24.4)	44.6	13.7	10.1	nail: (62.5) dactylitis: (5.6) enthesitis: (27.8)	Poly (49.1)	(8.4)	(97.8)	DM (7.3)HTN (15.1)Fatty liver (33.1)Obesity (59.6)
Malaysia (*this study*)	247	1:1	(6.1)	56	18	8.7	nail: (62.7) dactylitis: (14.6) enthesitis: (2.4)	Oligo (38.9) Poly (36.4)	(8.1)	(81)	Lipid (44)DM (34)HTN (52)Obesity (30.2)

M: male, F: female, F Hx: family history, DD: duration of psoriasis, PsA: psoriatic arthritis,PsO: psoriasis, DM: diabetes mellitus, HTN: hypertension, Poly: polyarthritis, Oligo:oligoarthritis, AxSpA: axial spondyloarthritis, ND, no data.

association between the pattern of PsA (oligo- or polyarticular) and these comorbidities (including IHD and obesity) from this study. Cytokines are implicated in the pathogenesis and other multifactorial causes include dietary habits, medication compliance and effects of TNF blockers. Diabetes mellitus and obesity are established risk factors for PsA and a shared common inflammatory pathway including insulin resistance is suggested [30]. *Mistergård et al* reported that the pattern and severity of PsA were not associated with comorbidities [14]. Treatment of comorbidities may lead to a favorable prognosis for PsA patients.

The first-line treatment of choice for the patient with PsA is still methotrexate compared to other disease modifying anti-rheumatic drugs (DMARDs). Biologic therapy is rarely used for current PsA patients due to high cost and availability. Nevertheless, 22.3% of PsA patients received biologics such as anti-TNFα and anti-IL-17, anti-IL-12/23, anti-IL-23, and Janine Kinase (JAK) inhibitors which are made available through the Malaysian MOH medical insurance. Biologic monotherapy or in combination with DMARD were used mainly for cases with refractory or inadequate response. Recent real-world study reported the effectiveness of biologics in PsA [41] but due to high cost incurred, however, majority of patients remained on conventional DMARDs.

Among the study limitations is that this work was conducted from a single rheumatology centre. Certain assessment tools for PsA including magnetic resonance imaging (MRI) for asymptomatic axial involvement are not routinely performed. Data collected relied on documentation by different clinicians. There is a need to compare between PsA and PsO patients to identify the associated factors among Malaysian patients including treatment response, and genetic background.

In conclusion, the clinical characteristics of PsA were comparable across both gender and ethnicities. PsA was more frequent in the Indian ethnic group. There was a significantly younger age in the Malay patients and higher frequency of alcohol consumption and nail dystrophy in the Indian ethnicity. Pustular psoriasis and onycholysis were significantly higher in males and scalp psoriasis in females. Articular pattern was mostly asymmetrical oligoarthritis. The main comorbidities were not significantly associated with any pattern of arthritis in PsA.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References:

[1] Karmacharya P, Chakradhar R, Ogdie A. The epidemiology of psoriatic arthritis: A literature review. Best Pract Res Clin Rheumatol 2021;35(2):101692.
[2] Gladman DD, Shuckett R, Russell ML, Thorne JC, Schachter RK. Psoriatic arthritis (PSA)-an analysis of 220 patients. Q J Med 1987;62(238):127–41.
[3] Kerschbaumer A, Fenzl KH, Erlacher L, Aletaha D. An overview of psoriatic arthritis - epidemiology, clinical features, pathophysiology and novel treatment targets. Cent Eur J Med 2016;128(21–22):791–5.
[4] Longo DL, Ritchlin CT, Colbert RA, Gladman DD. Psoriatic Arthritis. N Engl J Med 2017;376(10):957–70.
[5] Eder L, Gladman DD. Psoriatic arthritis: phenotypic variance and nosology. Curr Rheumatol Rep 2013;15:316.

[6] Sobolewski P, Walecka I, Dopytalska K. Nail involvement in psoriatic arthritis. Reumatologia 2017;55(3):131–5.
[7] Ogdie A, Weiss P. The epidemiology of psoriatic arthritis. Rheum Dis Clin North Am 2015;41(4):545–68.
[8] Alinaghi F, Calov M, Kristensen LE, Gladman DD, Coates LC, Jullien D, et al. Prevalence of psoriatic arthritis in patients with psoriasis: A systematic review and meta-analysis of observational and clinical studies. J Am Acad Dermatol 2019;80(1):251–265.e19.
[9] Hukuda S, Minami M, Saito T, Mitsui H, Matsui N, Komatsubara Y, et al. Spondyloarthropathies in Japan: nationwide questionnaire survey performed by the Japan Ankylosing Spondylitis Society. J Rheumatol 2001;28:554–9.
[10] Zeng Q, Chen R, Darmawan J, Xiao Z, Chen Su, Wigley R, et al. Rheumatic diseases in China. Arthritis Res Ther 2008;10(1):R17.
[11] Mohd Affandi A, Khan I, Ngah Saaya N. Epidemiology and clinical features of adult patients with psoriasis in Malaysia: 10-year review from the Malaysian psoriasis registry (2007–2016). Dermatol Res Pract 2018;2018:1–8.
[12] Gupta S, Syrimi Z, Hughes DM, Zhao SS. Comorbidities in psoriatic arthritis: a systematic review and meta-analysis. Rheumatol Int 2021;41(2):275–84.
[13] Woo YR, Park CJ, Kang H, Kim JE. The risk of systemic diseases in those with psoriasis and psoriatic arthritis: From mechanisms to clinic. Int J Mol Sci 2020;21(19):7041.
[14] Mistegård J, Gudbjornsson B, Lindqvist U, Laasonen L, Eistrup L, Ståhle M, et al. Comorbidities in a cohort of 66 patients with psoriatic arthritis mutilan- results from the Nordic PAM study. Front Med 2021;8:629741.
[15] Song Z, Deng X, Xie W, Li B, Zhang Z. Clinical characteristics of psoriatic arthritis in Chinese patients: A cross-sectional study. Rheumatol Ther 2021;8(4):1845–57.
[16] Taylor W, Gladman D, Helliwell P, Marchesoni A, Mease P, Mielants H. Classification criteria for psoriatic arthritis: development of new criteria from a large international study. Arthritis Rheum 2006;54(8):2665–73.
[17] D.D. Gladman C. Antoni P. Mease D.O. Clegg P. Nash Psoriatic arthritis: epidemiology, clinical features, course, and outcome Ann Rheum Dis. 2005;64 Suppl 2(Suppl 2): ii14-7.
[18] Yang Q, Qu L, Tian H, Hu Y, Peng J, Yu X, et al. Prevalence and characteristics of psoriatic arthritis in Chinese patients with psoriasis. J Eur Acad Dermatol Venereol 2011;25(12):1409–14.
[19] Kumar R, Sharma A, Dogra S. Prevalence and clinical patterns of psoriatic arthritis in Indian patients with psoriasis. Indian J Dermatol Venereol Leprol 2014;80(1):15–23.
[20] Çinar N, Bodur H, Eser F, Gül U, Gönül M, Oğuz ID. The Prevalence and characteristics of psoriatic arthritis in patients with psoriasis in a tertiary hospital. Arch Rheumatol 2015;30(1):23–7.
[21] Ohara Y, Kishimoto M, Takizawa N, Yoshida K, Okada M, Eto H, et al. Prevalence and clinical characteristics of psoriatic arthritis in Japan. J Rheumatol 2015;42(8):1439–42.
[22] Yamamoto T, Kawada A. Clinical characteristics of Japanese patients with psoriatic arthritis: Comparison with East Asian countries. J Dermatol 2018;45(3):273–8.
[23] Wang Y, Xiao Y, Li F, Gu Y, Yang M, Zhang L, et al. The clinical characteristics of psoriatic arthritis: A cross-sectional study based on the psoriatic arthritis cohort of west China hospital. Rheumatol Ther 2023;10(3):775–84.
[24] Alonso S, Tejón P, Sarasqueta C, Coto P, Alperi M, Queiro R. Age at disease onset may help to further characterize the disease phenotype in psoriatic arthritis. Joint Bone Spine 2016;83(5):533–7.
[25] Karmacharya P, Crowson CS, Bekele D, Achenbach SJ, Davis JM, Ogdie A, et al. The epidemiology of psoriatic arthritis over five decades: A population-based study. Arthritis Rheumatol 2021;73(10):1878–85.
[26] ElSherbiny DA, Elsayed AMA, El-Azizi NO, Ghalwash RA. Clinical and laboratory characteristics of psoriatic arthritis in a cohort of Egyptian patients. Egypt Rheumatol 2021;43(3):229–34.
[27] Passia E, Vis M, Coates LC, Soni A, Tchetverikov I, Gerards AH, et al. Sex-specific differences and how to handle them in early psoriatic arthritis. Arthritis Res Ther 2022;24(1).
[28] Tam LS, Leung YY, Li EK. Psoriatic arthritis in Asia. Rheumatology (Oxford) 2009;48(12):1473–7.
[29] Leung YY, Fong W, Lui NL, Thumboo J. Effect of ethnicity on disease activity and physical function in psoriatic arthritis in a multiethnic Asian population. Clin Rheumatol 2017;36(1):125–31.
[30] Shin D, Kim HJ, Kim DS, Kim SM, Park JS, Park Y-B, et al. Clinical features of psoriatic arthritis in Korean patients with psoriasis: a cross-sectional observational study of 196 patients with psoriasis using psoriatic arthritis screening questionnaires. Rheumatol Int 2016;36(2):207–12.
[31] Veerapen K. Pattern of psoriatic arthritis in an Asian population (Malaysia). APLAR J Rheumat 2007;10:287–94.
[32] Crowley JJ, Weinberg JM, Wu JJ, Robertson AD, Van Voorhees AS. National Psoriasis Foundation. Treatment of nail psoriasis: best practice recommendations from the Medical Board of the National Psoriasis Foundation. J Am Med Association Dermatol 2015;151(1):87–94.
[33] Langenbruch A, Radtke MA, Krensel M, Jacobi A, Reich K, Augustin M. Nail involvement as a predictor of concomitant psoriatic arthritis in patients with psoriasis. Br J Dermatol 2014;171(5):1123–8.
[34] ElMallah R. Nail affection as a central part of the entheseal organ in psoriasis patients for early detection of psoriatic arthritis. Egypt Rheumatol 2020;42(4):319–24.
[35] Duruöz MT, Gezer HH, Nas K, Kılıç E, Sargın B, Kasman SA, et al. Gender-related differences in disease activity and clinical features in patients with peripheral psoriatic arthritis: A multi-center study. Joint Bone Spine 2021;88(4):105177.
[36] Moll JMH, Wright V. Psoriatic arthritis. Semin Arthritis Rheum 1973;3(1):55–78.
[37] 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.
[38] Acosta Felquer ML, FitzGerald O. Peripheral joint involvement in psoriatic arthritis patients. Clin Exp Rheumatol 2015;33(5 Suppl 93):S26–30.
[39] Abdelaziz MM, Ismail N, Gamal AM, Lafy R, El-Adly W. Comparative analysis between ankylosing spondylitis and axial psoriatic arthritis patients. Egypt Rheumatol 2022;44(1):25–9.
[40] Emad Y, El-Shaarawy N, Abdelrahman W, Ragab Y, Ibrahim O, Elyaski A, et al. Rheumatoid factor and anti-citrullinated protein antibodies (ACPA) in psoriatic arthritis (PsA), and skin psoriasis: Relevance and clinical implications. Egypt Rheumatol 2023;45(2):145–51.
[41] Colombo D, Frassi M, Pagano Mariano G, Fusaro E, Lomater C, Del Medico P, et al. Real-world evidence of biologic treatments in psoriatic arthritis in Italy: results of the CHRONOS (effeCtiveness of biologic treatments for psoriatic artHRitis in Italy: an ObservatioNal lOngitudinal Study of real-life clinical practice) observational longitudinal study. BMC Rheumatol 2022;6(1).