

# Prevalence, clinical features and treatment pattern of patients with concurrent diagnoses of rheumatoid arthritis and psoriatic disease: results of a 14-year retrospective study in a tertiary referral center

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## Abstract

**Background:** Multiple comorbidities, including rheumatoid arthritis (RA), have been reported to be associated with psoriasis.

**Objective:** This study aimed to determine the prevalence and the clinical features of RA among patients with psoriasis in a tertiary referral center.

**Methods:** Between January 2000 and December 2013, all patients coded with psoriatic disease (ICD-9 CM 696.0 OR ICD-9 CM696.1) and RA (ICD-9 CM 714.0) in a tertiary medical center were enrolled.

**Results:** There were 10,844 patients and 9073 patients with psoriatic disease and RA identified by diagnostic codes, respectively. Among patients with psoriasis, 111 patients had claim-based diagnosis of RA (1.02%). By reviewing medical records and telephone interview or clinic visits, 25 of the 111 patients (0.23%) was identified unequivocally as having concurrent RA. Among them, 17 (68%) were female and 16 (64%) patients developed arthritis prior to the onset of psoriasis with a mean lag of 6.3 years (1–19 years); 8 (32%) had psoriasis skin lesions prior to the onset of arthritis with a mean lag of 6.9 years (3–20 years); 1 (4%) had skin lesions and arthritis in the same time; 17 (68%) patients also fulfilled the CASPAR classification criteria for psoriatic arthritis. The mean age of onset for arthritis was 49.6 years old.

**Conclusions:** The prevalence of RA in psoriasis might be overestimated in some previous studies using claimed database. Patients with concurrent RA and psoriasis showed a comparable age of onset and male to female ratio, but had more axial involvements compared to patients without psoriasis.

**Keywords:** comorbidities, psoriatic arthritis, rheumatoid arthritis

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## Introduction

The prevalence of rheumatoid arthritis (RA) has been reported to be increased in patients with psoriasis and psoriatic arthritis (PsA) in several epidemiological studies.<sup>1–3</sup> However, patients with unequivocal RA are rarely seen in combined

dermatology–rheumatology clinics.<sup>4</sup> Reports on the clinical manifestations of RA among patients with psoriasis are scarce.<sup>5</sup> This discrepancy may be due, in part, to overlapping clinical features of RA and PsA, and the difficulty in PsA diagnosis in the absence of psoriasis skin lesions. The treatment

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recommendations are different for RA and PsA. Some treatments useful in RA, but not in PsA, such as antimalarial drugs,<sup>6</sup> anti-CD20 agents,<sup>7</sup> and systemic corticosteroid,<sup>8</sup> have been reported to aggravate or trigger psoriasis. In this study, we aimed to re-evaluate the prevalence and determine the clinical features of RA in patients with psoriasis.

## Materials and methods

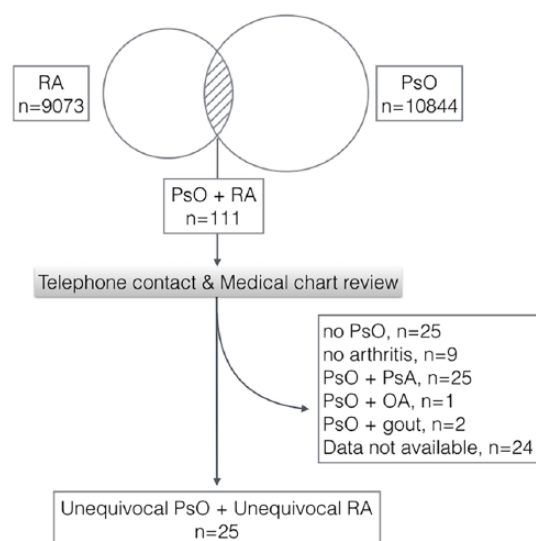
### Study design and data source

The prevalence of RA in patients with psoriasis was evaluated according to two different algorithms: (1) claim-based diagnosis: we enrolled patients who have claims-based diagnosis of both psoriasis and RA, identified by ICD-9 CM codes of psoriatic disease (696.0 or 696.1) and RA (ICD-9 CM 714.0) in National Taiwan University Hospital—a tertiary medical center—between January 2000 and December 2013. (2) unequivocal diagnosis: after identifying subjects with both claims of psoriasis and RA, we applied a more stringent criterion to identify unequivocal cases. First, we reviewed these patients' medical records including gender, age of disease onset, laboratory studies, and treatment modalities. Telephone interview or clinic visits were also arranged to clarify and validate the medical history and disease status. By doing so, we confirmed the unequivocal cases *met all* the following criteria: (a) diagnosis of RA by a rheumatologist and fulfilment of the 2010 American College of Rheumatology criteria (ACR) for RA. (b) Diagnosis of psoriasis reconfirmed by a senior dermatologist or PsA by dermatologists and rheumatologists with fulfilment of the classification for Psoriatic Arthritis (CASPAR) criteria for PsA.

The present study was approved by the local Institutional Review Board (IRB) of National Taiwan University Hospital (201510037RINC, 103-024-E and 107-007-E). A waiver of informed consent was approved by the IRB because the study was retrospective, involved no more than minimal risk to the subjects, and the waiver would not adversely affect the rights and welfare of the subjects.

### Statistical analysis

Demographic data were analyzed by descriptive statistics. Measurement data were shown in terms of means with ranges or 95% confidence intervals. The prevalence differences between multiple



**Figure 1.** Flow diagram of studied patients. OA, osteoarthritis; PsO, psoriatic diseases; RA, rheumatoid arthritis.

groups were analyzed by Fisher's exact test.  $p < 0.05$  was considered significant.

## Results

### Epidemiology

Between 2000 and 2013 in NTUH, there were 9073 patients and 10,844 patients coded with RA and psoriatic disease, respectively. The prevalence of the claim-based diagnosis of RA among psoriatic diseases was 1.02% (111 out of 10,844). However, after detailed medical chart review, telephone contact, or interviews, 86 patients were excluded (25 without psoriasis, 9 without arthritis, 25 psoriasis with only PsA but without RA, 3 psoriasis with gout or osteoarthritis, and 24 without available clinical data). The corrected prevalence of unequivocal RA among patients with psoriatic disease was 0.23% (25 out of 10,844) (Figure 1).

### Clinical manifestations

Among the 25 patients with concomitant psoriasis and RA, 17 (68%) were female; 16 (64%) patients developed arthritis prior to the onset of psoriasis skin lesions with a mean lag of 6.3 years (1–19 years); 8 (32%) had psoriasis skin lesions prior to the onset of arthritis with a mean lag of 6.9 years (2–20 years); 1 (4%) had skin lesions and arthritis at the same time. The mean age of onset for RA was 49.6 years old; 19 (76%) patients had current psoriatic skin lesions and most patients had

**Table 1.** Demographics of the 25 patients with unequivocal RA and psoriasis.

Female gender	17 (68%)
Mean age of onset for RA	49.6 years
Onset of arthritis and skin lesions	
Arthritis prior to skin lesions and mean lag (years)	16 (64%) and 6.3
Skin lesions prior to arthritis and mean lag (years)	8 (32%) and 6.9
Simultaneously	1 (4%)
Involved joints	
Polyarthritis	25 (100%)
Axial involvement	7 (28%)
Therapy which could exaggerate or induce psoriasis	
Oral corticosteroids	16 (64%)
Parenteral corticosteroids	1 (4%)
Hydroxychloroquine	16 (64%)
Anti-TNF agents	7 (28%)
Rituximab	2 (8%)
CASPAR $\geq$ 3	17 (68%)

polyarthritis affecting the hands and feet, whereas 7 (28%) had axial involvement, and 17 (68%) patients also fulfilled the CASPAR classification criteria for PsA (Tables 1 and 2).

#### Laboratory studies

Rheumatoid factor (RF) was positive in 15 patients (60%) with a mean level of 235 IU/ml (25.3–623 IU/ml). Among these 15 patients, 3 had low titers (<3 times upper limit) and 12 had high titers (>3 times upper limit). Only eight patients ever checked serum anti-cyclic citrullinated peptide (anti-CCP) antibodies levels and four (50%) were positive. Among these four patients with positive anti-CCP antibodies, all received RCI as RA, three (75%) were female, and only one (25%, patient 17) had axial involvement.

#### Treatment

Among these 25 patients unequivocally, in addition to nonsteroidal anti-inflammatory drugs (NSAIDs) for symptomatic controls, 18 (72%) had ever received methotrexate, 17 (68%)

sulfasalazine, 16 (64%) long-term low-dose oral corticosteroids (1 of them, patient 23, also received parenteral pulsed corticosteroid), 16 (64%) hydroxychloroquine, 10 (40%) leflunomide, 3 (12%) oral cyclosporine and 2 (8%) oral azathioprine. As for biologics, seven patients ever received anti-tumor necrosis factor agents (4 etanercept, 2 adalimumab, 1 etanercept and adalimumab), and two received rituximab. Only one patient (patient 23) experienced an aggravation/rebound of psoriasis presenting as erythroderma after discontinuation of parenteral pulsed corticosteroid. Among those patients who developed arthritis first, seven patients (patients 7, 11, 12, 13, 18, 22, 25) had received regular hydroxychloroquine, six (patients 1, 7, 13, 18, 22, 25) received regular oral prednisolone, and one (patient 21) received regular rituximab, before the onset of skin psoriasis.

#### Discussion

Multiple comorbidities have been associated with psoriasis, including RA.<sup>1–3,9</sup> The increase of RA in psoriasis has been explained by shared genetic backgrounds and pathogenesis between RA and

**Table 2.** Summary of clinical parameters, lab data and therapies of 25 patients with concomitant rheumatoid arthritis and psoriatic diseases.

Patient age/sex	Psoriatic skin lesions			Joint involvements			Lab data		Therapy		Biologic		
	RA RCI	Duration (years)	current	FH	nail	Duration (years)	axial	CASPAR ≥ 3	Anti-CCP	RF		UV/ Topical	Systemic
1 64/M	+	9	+	+	+	25	+	+	NA	<10.2	+/+	NSAID, HCQ, Steroid, SSZ, Lef, CyA	Ritux
2 69/M	+	15	+	+	+	12	N	N	143	<10.2	N/+	NSAID, HCQ, MTX	
3 86/F	N	46	N	RA	+	43	+	+	1.05	<10.6	N/+	NSAID, Steroid, SSZ, Lef, MTX	Eta
4 74/F	N	6	+	+	+	3	N	+	NA	41.3	N/+	NSAID, Steroid	
5 47/F	+	13	+	+	+	10	N	+	NA	<11.3	+/+	NSAID, Acitretin, MTX	
6 63/M	+	7	+	+	+	9	N	+	NA	363	N/N	NSAID, Steroid, SSZ, MTX	
7 82/M	+	3	+	+	+	16	+	+	NA	216	N/N	NSAID, HCQ, Steroid, SSZ, MTX	
8 64/F	+	34	+	+	N	14	N	N	NA	97.5	N/+	NSAID, HCQ, Steroid, SSZ, MTX	
9 52/F	+	9	+	+	+	5	N	+	>340	334	N/N	NSAID, Steroid, SSZ, Lef, MTX	
10 68/F	+	6	N	+	N	11	N	N	NA	142	+/+	NSAID, HCQ, SSZ, MTX	
11 63/F	+	8	N	+	N	11	+	N	3.3	68	N/N	NSAID, HCQ, Lef, CyA	
12 91/M	+	8	+	+	+	11	N	+	NA	93	N/+	NSAID, HCQ, Steroid, SSZ, MTX	
13 70/F	+	3	+	RA	N	22	N	+	9.33	<10.1	N/N	NSAID, HCQ, Steroid, Lef	
14 63/F	+	22	+	PsO	N	13	N	N	NA	253	N/N	NSAID, HCQ, Steroid, Lef, MTX	Ada
15 49/F	+	23	N	+	+	24	N	+	NA	<10.2	N/N	NSAID, HCQ, MTX	Ada
16 58/M	+	24	+	+	+	14	N	+	NA	200	N/+	NSAID, HCQ, SSZ, Lef, MTX	
17 76/F	+	10	+	+	+	14	+	+	85.06	87.6	+/+	NSAID, HCQ, Steroid, SSZ, MTX	Eta
18 70/F	+	8	+	+	+	17	N	+	NA	623	N/N	NSAID, HCQ, Steroid, SSZ, AZT	
19 58/F	+	15	+	+	+	20	N	N	NA	<20	N/N	NSAID, SSZ, Lef, MTX	Ada+Eta
20 77/F	+	6	+	+	+	13	N	+	NA	<11.3	N/+	NSAID, SSZ, MTX	
21 50/F	+	4	+	+	+	8	N	+	21.4	<9.69	N/N	NSAID, SSZ, Lef, MTX, Steroid	Ritux
22 67/M	+	4	N	+	N	6	+	N	NA	106	N/+	NSAID, HCQ, Steroid, SSZ, Lef, MTX	Eta
23 20/F	+	3	+	+	+	3	N	+	437	616	+/N	NSAID, HCQ, Steroid, AZT, CyA	Eta
24 63/F	+	10	N	RA	N	14	+	N	NA	512	-/-	NSAIDs, SSZ, MTX	
25 57/M	+	20	+	PSO	+	24	N	+	NA	<20	-/-	NSAIDs, HCQ, Steroid, SSZ	

Ada, adalimumab; anti-CCP, anti-cyclic citrullinated peptide antibody; axial, axial involvement; AZT, azathioprine; CyA, cyclosporine; Eta, etanercept; F, female; FH, family history; HCQ, hydroxychloroquine; Lef, leflunomide; M, male; MTX, methotrexate; N, nil; NA, not available; NSAID, nonsteroidal anti-inflammatory drug; PsO, psoriatic disease; RA, rheumatoid arthritis; RCI, registered catastrophic illness; RF, rheumatoid factor; Ritux, rituximab; UV, phototherapy.

PsA.<sup>9,10</sup> In a retrospective study in the US involving 25,341 patients with psoriasis between 2004 and 2011, 4.43% had concomitant RA. In patients with PsA, up to 28.9% had concomitant diagnosis of RA.<sup>11</sup> This percentage was comparable to results in another two US retrospective studies (31.9%<sup>12</sup> and 29.6%).<sup>13</sup> In Germany, the frequencies of RA was also found to be higher (0.95%) among patients with psoriasis compared to without psoriasis (0.25%) (prevalence ratio 3.8).<sup>14</sup> In Taiwan, 1.02% of psoriatic patients were also coded as having concomitant RA in 2006, and patients with psoriasis had a 3.02 times relative risk of RA compared with the normal population.<sup>1</sup>

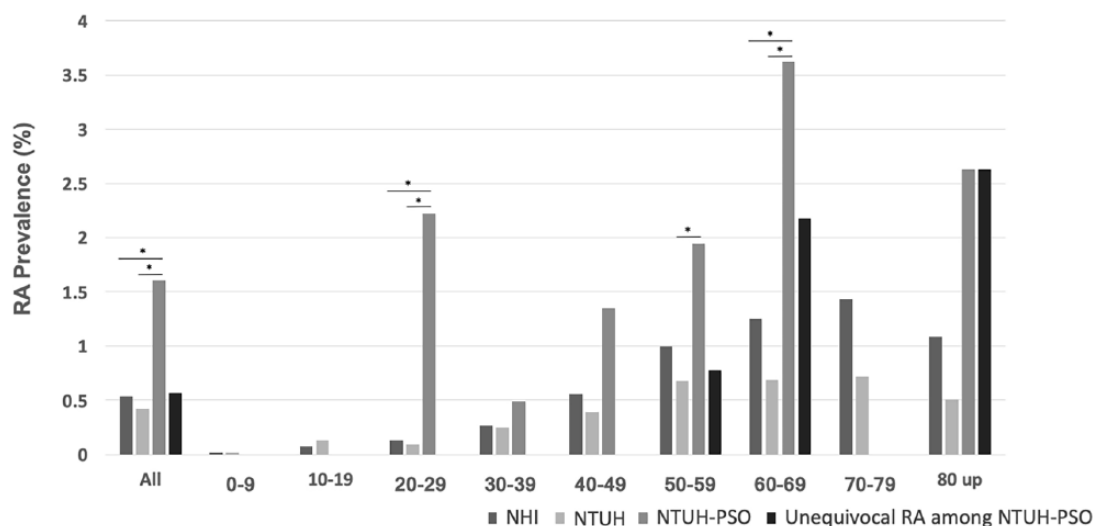
Despite the reported higher prevalence of RA in psoriasis, psoriasis patients with unequivocal RA are only rarely seen or investigated in daily clinical practice.<sup>4,5</sup> In our study, between 2000 and 2013, the prevalence of the claim-based diagnosis of RA among psoriatic diseases was 1.02% (111 out of 10,844), which was similar to studies based on claim data in Taiwan and Germany.<sup>1,14</sup> However, our results showed only 25 of 111 patients with claim-based diagnostic codes were confirmed to have dual RA and psoriatic disease, resulting in a much lower prevalence of unequivocal RA cases among psoriatic patients (0.23%). Although the prevalence of unequivocal RA cases may be underestimated because of excluding missing data, the prevalence remained lower (0.43%, 47 out of 10,844) than the previous claimed database when we counted all missing data as true dual RA and psoriasis cases.

One possible explanation for this discrepancy is misclassification or misdiagnosis due to significant clinical features overlaps among RA and PsA, especially for polyarticular type PsA,<sup>9</sup> although PsA and RA are different diseases with different cytokine profiles.<sup>5,10</sup> About 13.8% of PsA patients developed arthritis before the onset of skin psoriasis,<sup>15</sup> which made differentiation between RA and PsA even more difficult in the absence of skin lesions. As a result, 86% rheumatologists and 83% dermatologists reported challenges and difficulties in recognition of PsA in Taiwan.<sup>16</sup> As for laboratory studies, RF positivity is no longer accepted as a classification exclusion feature of PsA, and anti-CCP antibodies may also be positive in PsA.<sup>17</sup>

Another possible reason for misclassification is due to local health insurance reimbursement policy, because only RA patients but not psoriatic patients are considered as having catastrophic

illness and are exempt from copayment during clinic visits in Taiwan. In the present study, among 25 patients whose diagnosis was changed from RA to PsA, 14 were initially diagnosed and treated as RA for several months to years. The diagnosis was changed to PsA by the same clinician after comparing more recent clinical information to those at the time of diagnosis. In this study, not all patients with diagnosis switching had been viewed as unequivocal cases. Several studies also suggested that diminished misclassification of PsA as RA might be one of the contributing factor for an increase of prevalence of psoriasis and PsA,<sup>18,19</sup> and a decrease in RA in recent years.<sup>20</sup>

Our patients with concomitant RA and psoriatic diseases shared some clinical features between RA and PsA. As for gender ratio, RA was reported to be significantly female predominant,<sup>7,21</sup> whereas male predominance was seen in moderate to severe psoriatic diseases or PsA.<sup>1</sup> Regarding average age of disease onset, PsA onset is at around age 30–42 years old<sup>22</sup> whereas RA is at around 45–60 years old.<sup>23</sup> The mean age of disease onset was 49.6 years old with a female predominance (68%) among our patients, close to *sui generis* RA patients. As for the onset of symptoms of psoriatic diseases, most patients developed skin psoriasis prior to arthritis, with a mean lag of around 10 years, and 15% of patients developed arthritis simultaneously with or prior to the onset of skin lesions.<sup>9</sup> However, 64% developed arthritis prior to the onset of skin psoriasis, with a mean lag of 6.3 years in our study. As for laboratory studies, RF was positive in 15 patients (60%). This percentage is close to *sui generis* RA as RF positivity was around 50–75% in RA,<sup>7,24</sup> but only around 2–13% in PsA.<sup>5,9</sup> Anti-CCP antibodies were checked in eight patients in the current study and four (50%) were positive, with a comparable positive percentage to *sui generis* RA around 60–70%,<sup>7</sup> but not PsA (around 10–20%).<sup>25</sup> Axial involvements are uncommon in RA but account for 25–75% of pure PsA patients.<sup>9</sup> Among our patients, 28% (7 out of 25) had axial involvements, and this was close to the presentations of pure PsA. Interestingly, in a prospective study, anti-CCP antibodies were positive among 57.7% of RA (120 out of 208), 12.5% of PsA (7 out of 56), and 0% of healthy controls (0 out of 39). Among the seven anti-CCP positive PsA patients, none had axial involvements,<sup>26</sup> whereas we had one patient fulfilling CASPAR criteria for PsA with positive anti-CCP antibody and axial involvement.



**Figure 2.** A comparison of the prevalence of RA across age groups among different populations. NHI, claim-based diagnosis of RA in general patients based on National Health Insurance (NHI) data in 2013; NTUH, claim-based diagnosis of RA in general patients based on National Taiwan University Hospital (NTUH) data in 2013; NTUH-PSO, claim-based diagnosis of RA in psoriatic patients based on NTUH data in 2013.

Psoriasis aggravation or rebound had been reported to be related to several systemic treatments used for RA, such as systemic corticosteroids,<sup>8</sup> hydroxychloroquine,<sup>6,27</sup> and biologics such as rituximab.<sup>7</sup> However, the true incidence of induced psoriasis might be over-estimated.<sup>8</sup> Only one patient (patient 23) developed erythrodermic psoriasis after discontinuation of parenteral pulsed corticosteroid.

In the current CASPAR classification criteria for PsA, once inflammatory joints develops in a patient with current skin psoriasis, a diagnosis of PsA is easily made.<sup>9</sup> Among our 25 patients with concomitant RA and psoriatic diseases, 17 (68%) patients also fulfilled the CASPAR classification criteria for PsA. However, according to ACR/EULAR classification criteria,<sup>24</sup> before reaching the diagnosis of RA, other inflammatory arthritis should first be excluded. Despite the rarity, coexistence of RA and PsA was also reported in the literature.<sup>28</sup> Adjustment for the ACR/EULAR classification criteria may be therefore needed.

Several limitations of our study should be considered. First, due to lack of control group, it was difficult to draw conclusions about whether the risk of RA was higher in psoriasis patients compared with nonpsoriasis patients. No multivariate analysis can be done, and, therefore, confounding factors were not assessed. Nevertheless, we compared the aforementioned data of RA prevalence from single center, NTUH, with data from a nationwide health

claims database, National Health Insurance (NHIRD) in 2013 in Taiwan. The prevalence of RA in the general population based on Taiwan NHIRD 2013 was 0.537% (118,256 out of 22,019,136). In each age group, the prevalences of RA in the general population from NTUH data were comparable to those from NHIRD. However, the prevalence of claim-based diagnosis of RA among patients with psoriasis was significantly higher than RA prevalence in general population in NHIRD or NTUH data, especially in age groups 20s, 50s and 60s (Figure 2). But the prevalence of unequivocal RA among patients with psoriasis returned to levels comparable to general population (Figure 2 and Table 3). Nevertheless, further case controls will be needed to address whether the prevalence of RA was higher in psoriasis patients than nonpsoriasis patients. Second, a PsA-RA overlap phenotype or misclassification could not be completely ruled out. Nevertheless, a growing number of studies showed PsA and RA are completely different diseases with distinguishing key features in clinical presentation, radiographic findings, and laboratory findings, which probably resulted from the distinct cytokine activation pattern between RA and PsA.<sup>29,30</sup>

In summary, the concomitance of RA and psoriatic diseases may be overestimated in previous studies. The clinical presentations of these RA patients with psoriatic disease lie somewhat in between RA and PsA, with female predominance, frequent RF seropositivity, arthritis onset prior to



**Table 3.** Prevalence of RA among different age groups and different populations.

Age group, years	All patients, NHI			All patients, NTUH			Psoriatic patients, NTUH			Unequivocal RA among psoriatic patients, NTUH		
	Surveyed population, n	RA, n	Prevalence rate, % (95% CI)	Surveyed population, n	RA, n	Prevalence rate, % (95% CI)	Surveyed population, n	RA, n	Prevalence rate, % (95% CI)	Surveyed population, n	RA, n	Prevalence rate, % (95% CI)
All	22019136	118256	0.537 [0.534, 0.540]	522931	2204	0.421 [0.404, 0.439]	1058	17	1.607 [0.939, 2.560]	1058	6	0.567 [0.208, 1.230]
0-9	2120237	338	0.016 [0.014, 0.018]	50224	9	0.018 [0.008, 0.034]	5	0	0.000 [0.000, 52.182]	5	0	0.000 [0.000, 52.182]
10-19	2486234	2021	0.075 [0.072, 0.079]	32194	41	0.127 [0.091, 0.173]	22	0	0.000 [0.000, 15.437]	22	0	0.000 [0.000, 15.437]
20-29	3015019	4008	0.133 [0.129, 0.137]	56233	54	0.096 [0.072, 0.125]	90	2	2.222 [0.270, 7.798]	90	0	0.000 [0.000, 4.016]
30-39	3623303	9723	0.268 [0.263, 0.274]	67762	168	0.248 [0.212, 0.288]	203	1	0.493 [0.012, 2.714]	203	0	0.000 [0.000, 1.801]
40-49	3311257	18596	0.562 [0.554, 0.570]	70796	277	0.391 [0.347, 0.440]	222	3	1.351 [0.280, 3.898]	222	0	0.000 [0.000, 1.648]
50-59	3283243	32669	0.995 [0.984, 1.006]	91697	626	0.683 [0.630, 0.738]	257	5	1.946 [0.635, 4.482]	257	2	0.778 [0.094, 2.783]
60-69	2099490	26308	1.253 [1.238, 1.268]	79188	545	0.688 [0.632, 0.748]	138	5	3.623 [1.187, 8.253]	138	3	2.174 [0.451, 6.222]
70-79	1201100	17194	1.432 [1.410, 1.453]	49928	358	0.717 [0.645, 0.795]	83	0	0.000 [0.000, 4.347]	83	0	0.000 [0.000, 4.347]
80 up	679253	7399	1.089 [1.065, 1.114]	24909	126	0.506 [0.422, 0.602]	38	1	2.632 [0.067, 13.810]	38	1	0.567 [0.208, 1.230]

the onset of skin lesions, and relatively common axial involvements. Due to the overlapping features and different treatment algorithm for RA and PsA, close cooperation between dermatologists and rheumatologists is needed to optimize the treatment of patients with psoriasis presenting with joint complaints. However, due to the significant overlapping features, the definitive differentiation between RA and PsA may be difficult. The purpose of the study was to compare chart/personal interview data with claim-based data to find out the differences. However, to definitively answer the question of RA prevalence, further biomarkers or imaging tools are still needed to reach a definitive diagnosis of RA and PsA.

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The author(s) declared following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr. Tsen-Fang Tsai has conducted clinical trials or received honoraria for serving as a consultant/speaker for AbbVie, Boehringer Ingelheim, Celgene, Eli-Lilly, Galderma, Janssen-Cilag, Novartis, Pfizer, Serono International SA (now Merck Serono International), and UniPharma/Biogen Idec Pharma. Dr. Chiu has received speaking fees from AbbVie, Janssen-Cilag Pharmaceutical and Pfizer. Other authors have no conflicts of interest to declare.

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### References

1. Tsai TF, Wang TS, Hung ST, *et al.* Epidemiology and comorbidities of psoriasis patients in a national database in Taiwan. *J Dermatol Sci* 2011; 63: 40–46.
2. Chiu HY, Hsieh CF, Chiang YT, *et al.* The risk of chronic pancreatitis in patients with psoriasis: a population-based cohort study. *PLoS One* 2016; 11: e0160041.
3. Chiu HY, Lo PC, Huang WF, *et al.* Increased risk of aortic aneurysm (AA) in relation to the severity of psoriasis: a national population-based matched-cohort study. *J Am Acad Dermatol* 2016; 75: 747–754.
4. Mody E, Husni ME, Schur P, *et al.* Multidisciplinary evaluation of patients with psoriasis presenting with musculoskeletal pain: a dermatology: rheumatology clinic experience. *Br J Dermatol* 2007; 157: 1050–1051.
5. Lee KH, Son MK, Ha YJ, *et al.* Inflammatory polyarthritis in a patient with psoriasis: is it psoriatic arthritis or rheumatoid arthritis? *Korean J Intern Med* 2010; 25: 224–226.
6. Gravani A, Gaitanis G, Zioga A, *et al.* Synthetic antimalarial drugs and the triggering of psoriasis – do we need disease-specific guidelines for the management of patients with psoriasis at risk of malaria? *Int J Dermatol* 2014; 53: 327–330.
7. Thomas L, Canoui-Poitaine F, Gottenberg JE, *et al.* Incidence of new-onset and flare of preexisting psoriasis during rituximab therapy for rheumatoid arthritis: data from the French AIR registry. *J Rheumatol* 2012; 39: 893–898.
8. Coates LC and Helliwell PS. Psoriasis flare with corticosteroid use in psoriatic arthritis. *Br J Dermatol* 2016; 174: 219–221.
9. Ritchlin CT, Colbert RA and Gladman DD. Psoriatic arthritis. *N Engl J Med* 2017; 376: 957–970.
10. Zhernakova A, Withoff S and Wijmenga C. Clinical implications of shared genetics and pathogenesis in autoimmune diseases. *Nat Rev Endocrinol* 2013; 9: 646–659.
11. Wu JJ, Nguyen TU, Poon KY, *et al.* The association of psoriasis with autoimmune disease. *J Am Acad Dermatol* 2012; 67: 924–930.
12. Zhu B, Edson-Heredia E, Gatz JL, *et al.* Treatment patterns and health care costs for patients with psoriatic arthritis on biologic therapy: a retrospective cohort study. *Clin Ther* 2013; 35: 1376–1385.
13. Edson-Heredia E, Zhu B, Lefevre C, *et al.* Prevalence and incidence rates of cardiovascular, autoimmune, and other diseases in patients with psoriatic or psoriatic arthritis: a retrospective study using Clinical Practice Research Datalink. *J Eur Acad Dermatol Venereol* 2015; 29: 955–963.



14. Augustin M, Reich K, Glaeske G, *et al.* Co-morbidity and age-related prevalence of psoriasis: analysis of health insurance data in Germany. *Acta Derm Venereol* 2010; 90: 147–151.
15. Nossent JC and Gran JT. Epidemiological and clinical characteristics of psoriatic arthritis in northern Norway. *Scand J Rheumatol* 2009; 38: 251–255.
16. Li TH, Liao HT, Huang YF, *et al.* The current status and unmet needs in the management of psoriatic arthritis: viewpoint from physicians in Taiwan. *J Formos Med Assoc* 2017; S0929–S6646: 30087–6.
17. Vander Cruyssen B, Hoffman IE, Zmierzak H, *et al.* Anticitrullinated peptide antibodies may occur in patients with psoriatic arthritis. *Ann Rheum Dis* 2005; 64: 1145–1149.
18. Wang TS, Hsieh CF and Tsai TF. Epidemiology of psoriatic disease and current treatment patterns from 2003 to 2013: a nationwide, population-based observational study in Taiwan. *J Dermatol Sci* 2016; 84: 340–345.
19. Icen M, Crowson CS, McEvoy MT, *et al.* Trends in incidence of adult-onset psoriasis over three decades: a population-based study. *J Am Acad Dermatol* 2009; 60: 394–401.
20. Abhishek A, Doherty M, Kuo CF, *et al.* Rheumatoid arthritis is getting less frequent—results of a nationwide population-based cohort study. *Rheumatology (Oxford)* 2017; 56: 736–744.
21. Kuo CF, Luo SF, See LC, *et al.* Rheumatoid arthritis prevalence, incidence, and mortality rates: a nationwide population study in Taiwan. *Rheumatol Int* 2013; 33: 355–360.
22. Gladman DD, Antoni C, Mease P, *et al.* Psoriatic arthritis: epidemiology, clinical features, course, and outcome. *Ann Rheum Dis* 2005; 64(Suppl. 2): ii14–ii17.
23. Gabriel SE, Crowson CS and O’Fallon WM. The epidemiology of rheumatoid arthritis in Rochester, Minnesota, 1955–1985. *Arthritis Rheum* 1999; 42: 415–420.
24. Inanc N, Dalkilic E, Kamali S, *et al.* Anti-CCP antibodies in rheumatoid arthritis and psoriatic arthritis. *Clin Rheumatol* 2007; 26: 17–23.
25. Smolen JS, Aletaha D and McInnes IB. Rheumatoid arthritis. *Lancet* 2016; 388: 2023–2038.
26. Eker YÖ, Pamuk ÖN, Pamuk GE, *et al.* The frequency of anti-CCP antibodies in patients with rheumatoid arthritis and psoriatic arthritis and their relationship with clinical features and parameters of angiogenesis: a comparative study. *Eur J Rheumatol* 2014; 1: 67–71.
27. Rongioletti F, Fiorucci C and Parodi A. Psoriasis induced or aggravated by drugs. *J Rheumatol Suppl* 2009; 83: 59–61.
28. Mazzucchelli R, Yebra M, Barbadillo C, *et al.* Double disease in rheumatology: coexistence of rheumatoid arthritis and psoriatic arthritis. *Clin Exp Rheumatol* 1992; 10: 83–85.
29. Gravallesse EM and Schett G. Effects of the IL-23-IL-17 pathway on bone in spondyloarthritis. *Nat Rev Rheumatol* 2018; 14: 631–640.
30. Merola JF, Espinoza LR and Fleischmann R. Distinguishing rheumatoid arthritis from psoriatic arthritis. *RMD Open* 2018; 4: e000656.

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