# Supplementary material

**Supplementary material 1:** Extended methods

## Extended methods

In this retrospective, observational study, we investigated if patients with psoriasis, referred for rheumatological evaluation, were diagnosed with PsA or other rheumatologic conditions. Patients with a previous diagnosis of PsA were excluded from the analysis (shown in Supplementary material 4). All patients had been referred from the Department of Dermatology to the Department of Rheumatology, Aarhus University Hospital, Denmark, between 2014 and 2018. Medical record data from the Department of Dermatology were collected six months prior to the referral date. Medical record data from the Department of Rheumatology were collected from the date of referral to six months later or until diagnosis. Screening tools for psoriatic arthritis is not validated to use in the clinic in Denmark, and the decision to refer a patient from, in this case, a dermatological clinic to rheumatological evaluation is based on the patient-reported symptoms and the clinical assessment.

## Chart Review

One investigator (CHS) reviewed the charts of the 364 patients using an abstraction form developed *a priori* by the study team. For difficult or unclear cases, CHS conferred with two other investigators (TBL, a senior consultant rheumatologist; and KFH, a senior staff specialist dermatologist) to reach consensus. The chart review was performed between 24 August 2020 and 11 December 2020.

## Inclusion and Exclusion Criteria

Patients were included if they were diagnosed with psoriasis and had been referred on suspicion of PsA. Patients were excluded if they had a previous arthritis diagnosis (PsA) or were included in clinical trials at the time of their referral (shown in Supplementary material 4).

## Data Collection

The study data were collected and registered using REDCap electronic data capture tools hosted at Aarhus University [1, 2]. Demographics, clinical variables, and patient-reported variables were extracted from the dermatology and rheumatology medical records.

## Statistical Analysis

Statistical analysis was conducted using the statistical tool *Stata/MP 16.1*. Data representing a Gaussian distribution are presented as means with 95% confidence intervals, whereas other data are presented as medians with interquartile ranges. Pearson’s chi-squared test was used to evaluate if variables were correlated to either axial PsA or peripheral PsA. Statistical significance was set to a p-value < 0.05. The selected variables for axial and peripheral PsA are listed in Table 1.

Positive predictive value (PPV), negative predictive value (NPV), sensitivity, and specificity were calculated using Stata/MP 16.1.

**Supplementary material 2:** exclusion of patients with a final total of 106 included patients.

Medical records
n = 364

Patient social security number was represented more than once
n = 36

n = 328

No psoriasis diagnosis

n = 165

n = 163

Earlier diagnosis

n = 33

n = 130

Referral not for arthritis

n = 6

n = 124

No rheumatological medical record

n = 14

n = 110

Other

n = 4

n = 106

Total medical records
n = 106

**Supplementary material 3:** Characteristics for referred psoriasis patients

Due to the retrospective study design, most patient records were missing data. In case of missing data, the actual number of patients for each variable is indicated with [n]. The percentage for each field was calculated compared to the total number of patients.

|  |  |
| --- | --- |
| Fields | Psoriasis patients total n = 106 |
| Gender n (%) |  |
|  Male | 54 (50.9) |
|  Female | 52 (49.1) |
| Age years at referral, mean (95%-CI) | 49.49 (46.28;52.70) |
| Disease n (%) |  |
|  Psoriasis plaque | 95 (89.6) |
|  Guttate psoriasis | 11 (10.4) |
|  Pustulosis palmoplantaris | 10 (9.4) |
|  Crohn’s disease | 4 (3.8) |
|  Ulcerative colitis | 3 (2.8) |
| Inflammatory characteristic\* n (%), Department of Dermatology [38] | 34 (35.8) |
| Inflammatory back pain n (%), Department of Rheumatology [96] | 22 (20.8) |
| Family history n (%) |  |
|  SpA [63] | 21 (19.8) |
|  Psoriasis [67] | 20 (18.9) |
| PASI, mean (95%-CI) [40] | 7.312 (5.22;9.41) |
| DLQI, mean (95%-CI) [10] | 5.2 (-0.94;11.34) |
| Tender joints n (%) |  |
|  Patient reported [99] | 98 (92.5) |
|  Dermatologist-assessed [25] | 15 (14.2) |
| Swollen joints n (%) |  |
|  Patient reported [39] | 27 (25.5) |
|  Dermatologist-assessed [41] | 16 (15.1) |
| Redness of the joint n (%) |  |
|  Patient reported [12] | 3 (2.8) |
|  Dermatologist-assessed [8] | 1 (0.9) |
| Dactylitis n (%), Department of Dermatology [15] | 0 (0) |
| Dactylitis n (%), Department of Rheumatology [56] | 8 (7.5) |
| Enthesitis n (%), Department of Rheumatology [55] | 21 (19.8) |
| Biological indicators n (%) |  |
|  HLA-B27 positive [55] | 6 (5.7) |
|  Elevated CRP [100] | 20 (18.7) |
|  RF positive [71] | 1 (0.9) |
|  Antinuclear antibodies positive [24] | 5 (4.7) |
|  Anti-CCP positive [70] | 0 (0) |
| Comorbidity n (%) |  |
|  Hypertension | 26 (24.5) |
|  Dyslipidaemia  | 17 (16) |
|  Diabetes | 11 (10.4) |
|  Obesity  | 38 (35.8) |
|  Osteoporosis | 5 (4.7) |
|  Mental disorder | 20 (18.9) |
|  None of above | 41 (38.7) |
| 1 or more tender joint, n (%), [105] | 66 (62.26) |
| Number of tender joints, mean (95%-CI), [105] | 3.924 (2.66;5.19) |
| 1 or more swollen joint, n (%), [102] | 23 (21.9) |
| Number of swollen joints, mean (95%-CI), [102] | 0.4902 (0.23;0.75) |
| Earlier treatment n (%) |  |
|  Biologics and novel small molecule inhibitors\*\*  none 1-2 +2 | 29 (27.36)77 (72.64)27 (25.47)2 (1.96) |
|  Traditional systemics and prednisolone\*\*\* | 69 (65.09) |
|  NSAID | 51 (48.11) |
| Current treatment (Department of Dermatology) n (%) |  |
|  Biologics and novel small molecule inhibitors\*\* | 29 (27.36) |
|  Traditional systemics and prednisolone\*\*\* | 52 (49.06) |
|  NSAID | 28 (26.42) |

\* Inflammatory characteristics assessed dermatological is defined as: joint pain that improves with activity and worsens with inactivity.
\*\* Biologics and novel small molecule inhibitors: Adalimumab (Humira, Imraldi), Certolizumab (Cimzia), Etanercept (Enbrel, Benepali, Erelzi), Infliximab (Remicade, Remsima), Golimumab (Simponi), Ustekinumab (Stelara), Brodalumab (Kyntheum), Ixekizumab (Taltz), Secukinumab (Cosentyx), Guselkumab (Tremfya), Tildrakizumab (Lumetri), Risankizumab (Skyrizi), Bimekizumab, Vedolizumab (Entyvio), Tofacitinib (Xeljanz), Baricitinib (Olumiant), Apremilast (Otezla)

\*\*\* Traditional systemic and Prednisolone: Methotrexat, Leflunomid (Arava), Sulfasalazin (Salazopyrin), Azathioprine (Imurel), Ciclosporin (Sandimmun), 5-ASA (Mesalazin, Asacol etc.), Prednisolone

**Supplementary material 4:** Psoriasis patients – joint diagnosis

|  |
| --- |
| Joint diagnosis n (%) for patients with psoriasis |
| Undifferentiated spondyloarthritis 0 (0)Ankylosing spondylitis 0 (0)Axial-PsA 4 (3.8)Peripheral-PsA 22 (20.8)Inactive PsA 15 (14.2)Axial-IBD-SpA 2 (1.9)Peripheral-IBD-SpA 1 (0.9) | Inactive IBD-SpA 0 (0)Osteoarthritis 25 (23.6)Spondylosis 0 (0)Rheumatoid arthritis & other arthritis 4 (3.8)Other rheumatological diagnosis\* 27 (25.5)No rheumatological diagnosis 14 (13.2) |

Supplementary material 2 shows the joint diagnosis for psoriasis patients. 8 patients were dual diagnosed, one of whom had both axial PsA and peripheral PsA. A total of 25 (23.6%) different psoriasis patients were diagnosed with arthritis (PsA) associated with their disease.

IBD = inflammatory bowel disease

SpA = spondyloarthritis

\* Ankylosing hyperostosis (Forestier), degenerative back conditions, other dorsopathies, fibromyalgia.

## References

1. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: Building an international community of software platform partners. J Biomed Inform. 2019;95:103208.

2. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009;42(2):377-81.