CheckAP: Prevalence of Psoriatic Arthritis (PsA) and performance evaluation of the EARP Questionnaire in the population of Portuguese patients with Psoriasis followed in a dermatology setting

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Abstract

Background: The percentage of Portuguese psoriasis patients with psoriatic arthritis is unknown but musculoskeletal complaints related to PsA affect up to a third of patients. Dermatologists can identify early PsA as skin symptoms often precede joint symptoms in 80% of patients. Efficient and easy to perform screening tools are needed to help dermatologists effectively discriminate between Pso and PsA patients. The present study aims to evaluate the prevalence of PsA in Pso patients followed in Portuguese dermatology clinics. Additionally, it aims to evaluate the EARP-PT performance (validity, sensitivity, specificity) and the best cut-off point to allow an early identification of PsA potential patients.
Methods: A multicentre national, cross-sectional, observational study with two independent assessments (dermatologist and rheumatologist), was performed. A PsA case was defined by a combination of expert opinion and classification criteria for psoriatic arthritis (CASPAR). The EARP-PT questionnaire screening performance was evaluated.
Results: Pso patients (n=172) were included with a mean age of 53.8 ± 14.5 years, 53.5% were male with a mean time of diagnosis of 17.4 ± 14.9 years. The prevalence of PsA in patients with Pso in our sample was 8.70% (95% CI: 4.8-14.2). The EARP-PT questionnaire displayed good internal consistency (Cronbach's α=0.81) and, using a validated initial cut-off point of 3, demonstrated a sensitivity of 71.4% and specificity of 40.1%.
Conclusion: The estimated prevalence of PsA in a population of Pso patients followed in Portuguese dermatology clinics, is 8.7%. The EARP-PT questionnaire appears to be a useful tool for dermatologists in the early detection of PsA.

Keywords: Psoriatic arthritis; Psoriasis; EARP Questionnaire; Rheumatology; Dermatology.

Introduction

The prevalence of psoriasis (Pso) in Portugal has recently been estimated at 4.4% (95% CI 3.95 - 4.98)[1]. However, the proportion of Portuguese Pso patients who also develop psoriatic arthritis (PsA) remains unknown. It is well-recognized that up to one-third of Pso patients may experience musculoskeletal complaints, which are often associated with PsA[2].

In approximately 80% of PsA cases, skin involvement precedes joint involvement, placing dermatologists in a pivotal position to identify PsA at an early stage. Consequently, there is a pressing need for concise, easily administrable screening tools to assist dermatologists in determining which Pso patients require further assessment and possible intervention[3].

The identification of PsA in patients with Pso is crucial for several reasons. Firstly, if left untreated, PsA can result in substantial joint damage and disability[4]. Timely diagnosis and treatment may avert or delay joint damage, ultimately enhancing long-term quality of life[5]. Secondly, untreated PsA can lead to a higher incidence of comorbid conditions, such as cardiovascular disease and depression[4,6]. Lastly, recognizing PsA in Pso patients is pivotal in guiding treatment decisions, as the approach to managing PsA differs significantly from treating Pso alone. Ogdie et al. (2018) discussed the impact of PsA on patient-reported outcomes, work productivity, and healthcare resource utilization, emphasizing the importance of timely diagnosis and appropriate management of PsA to control inflammation, manage symptoms, and improve long-term outcomes and overall well-being[7].

Several screening tools were developed to allow PsA detection in dermatology and primary healthcare settings. These include the Toronto Psoriatic Arthritis Screening Questionnaire (TOPAS)[8]; the Psoriasis Epidemiology Screening Tool (PEST)[9]; the Psoriatic Arthritis Screening and Evaluation (PASE)[10]; and the Psoriasis and Arthritis Screening Questionnaire (PASQ)[11]. However, none of these tools proved to be a simple and fast self-report experience for the patient and are not focused on detecting PsA at early stages[12]. Moreover, most of the questionnaires require high level of health literacy from patients, making them difficult to apply in a medical setting with limited resources and time to meet the needs of the population[13].

To overcome these difficulties, the Early Arthritis for Psoriatic Patients (EARP) questionnaire was developed[12]. It appears to be user-friendly, uncomplicated and does not require extensive assistance from healthcare professionals, making it a valuable tool in dermatology and primary care[13]. The original Italian version of this questionnaire demonstrated favourable psychometric properties and the initial validation study of the EARP questionnaire demonstrated its

effectiveness in detecting PsA in patients diagnosed with Pso[8]. Our team has completed the linguistic and cultural adaptation of the EARP Questionnaire to Portuguese (EARP-PT)[14].

The questionnaire consists of four main sections addressing various aspects of the disease, including joint pain and swelling, skin symptoms, functional status and quality of life. The questionnaire contains 10 dichotomous ('yes'/'no') questions, each affirmative response scoring 1 point. The total score ranges from 0 to 10, with a score of 3 or higher indicating a potential PsA diagnosis. One study showed that implementing the cut-off of 3 points yielded a sensitivity of 83.3% and a specificity of 80.9%[8]. However, it is important to emphasize that the EARP questionnaire is intended to identify potential PsA patients and should not be used as a definitive diagnostic tool. A conclusive diagnosis should only be made after a thorough evaluation by a rheumatologist.

The present study aims to assess the prevalence of PsA in Pso patients treated at dermatology clinics in Portugal. It also aims to evaluate the performance of the EARP-PT (validity, sensitivity, specificity) and determine the optimal cut-off point for early identification of potential PsA patients.

Material and Methods

Study Design and Recruitment

This national multicentre, cross-sectional observational study involved two independent medical assessments, conducted by a dermatologist and a rheumatologist. Patients were recruited at eight Portuguese study sites (both private and public) from May 2021 to August 2022. The study sites included were: Centro Hospitalar e Universitário de Lisboa Norte – Hospital de Santa Maria, Lisboa; Centro Hospitalar de Lisboa Ocidental – Hospital de Egas Moniz, Lisboa; Hospital CUF Descobertas, Lisboa; Hospital Lusíadas Lisboa, Lisboa; Centro Hospitalar do Baixo Vouga, Aveiro; Centro Hospitalar de Leiria, Leiria; Centro Hospitalar Universitário de São João, Porto; and Instituto Médico de Estudos Imunológicos, Porto.

Study Population

Patients diagnosed with Pso and being treated in a dermatology clinic were included based on the following inclusion criteria: a) adults (≥ 18 years-old); b) ability to comprehend Portuguese language. Exclusion criteria were: a) patients currently receiving systemic treatment (except for acitretin, psoralen (P) and ultraviolet A (UVA) phototherapy) or immunosuppressants (conventional or biotechnological), unless treatment had been stopped for at least 6 months prior to enrolment; b) individuals who did not attend the rheumatology assessment during the

study; c) patients with skin conditions other than Pso. All included patients expressed their willingness to participate and signed the informed consent form before enrolment.

Sample size

The sample size calculation was based on an expected prevalence of PsA in a dermatology setting of 15% with a 5% margin of error. A total sample size of 196 individuals was calculated.

Procedures

Adults attending dermatology consultations with a diagnosis of Pso who met the eligibility criteria were invited to participate in the study.

The criteria for assessing disease activity in both Pso and PsA were determined by experts in dermatology and rheumatology.

Dermatologist Evaluation

During the initial dermatologist assessment, patients were asked to complete a questionnaire that collected sociodemographic and clinical relevant data, including the time of diagnosis, previous and current treatments, Psoriasis Area Severity Index (PASI), Body Surface Area (BSA), and Nail Psoriasis Severity Index (NAPSI). Additional assessments included disease activity scores, a dermatology-specific quality of life questionnaire (Dermatology Life Quality Index [DLQI]), and the EARP-PT questionnaire[15].

Rheumatologist Evaluation

After the dermatologist's assessment, all patients were invited to attend a second assessment with a rheumatologist, who evaluated the participants and applied another set of questions to determine the presence of symptoms and signs of PsA. The criteria assessed included the CASPAR criteria (which includes assessment of dactylitis and nail dystrophy), the Ankylosing Spondylitis Disease Activity Score (ASDAS) for evaluating axial involvement**,** and information about past and current treatments.

If a patient was diagnosed with PsA during this phase, disease activity scores were recorded, including Disease Activity in Psoriatic Arthritis (DAPSA), Spondyloarthritis Research Consortium of Canada Enthesitis Index (SPARCC), DAS28 (Disease Activity Score for 28 joints), and BASDAI (Bath Ankylosing Spondylitis Disease Activity Index).

The rheumatologist was blinded to the result of the first-stage screening (i.e., the EARP-PT questionnaire results).

Complementary tests

Additional complementary tests were performed if needed for the definitive diagnosis of PsA. These included blood tests and imaging such as MRI of the sacroiliac, lumbar, dorsal and cervical spine, as well as X-rays of the hands, feet, lumbar spine, dorsal spine, and cervical spine.

Case definition

A PsA case was defined based on the clinical judgement of a rheumatologist, along with the fulfilment of CASPAR classification criteria when available. In cases where the rheumatologist´s opinion differed from the CASPAR criteria, the rheumatologist's opinion prevailed. If the rheumatologist was unable to confirm or exclude PsA even after complementary tests, the patient was excluded. This case definition followed a predefined protocol[14].

Covariates of interest

Sociodemographic data (including gender, age, education level, and employment status) were collected. Anthropometric data (self-reported weight and height) were used to calculate body mass index (BMI), categorized into 4 levels: Underweight (below 18.5 kg/m^2), Normal (18.5 to 24.9 kg/m^2), Overweight (25.0 to 29.9 kg/m^2) and Obese (30 kg/m^2 or higher).

Clinical data for Pso included date of diagnosis, onset of symptoms, subtype of Pso based on morphology (plaques, guttate, erythrodermic, and pustular) and anatomic location (scalp, palmoplantar, genital, nails and anal), disease activity (psoriasis involvement [PASI and BSA]) and nail involvement [NAPSI], quality of life (DLQI) and current and past treatments.

Clinical data for PsA included date of diagnosis, onset of joint symptoms (pain and/or swollen joints, low back pain), disease activity (BASDAI, DAPSA and DAS28), enthesis involvement using SPARCC, presence of dactylitis, CASPAR criteria,visual analogue scale [VAS] for patient global assessment, peripheral joint pain, fatigue, morning stiffness, and VAS physician global assessment.

Statistical Analysis

Descriptive data for categorical variables was presented as absolute frequency and corresponding proportion. For continuous variables, mean and standard deviation were presented. Non-adjusted logistic regression was performed to compare participants with and without PsA.

The estimated global and stratified (by gender and age) prevalence for PsA were computed as proportions with a 95% confidence interval. The internal consistency of the EARP-PT was

assessed using Cronbach's alpha coefficient, with a recommended value between 0.70 and 0.90[17]. The optimal cut-off was determined using Youden's Index. PsA screening results from the EARP-PT questionnaire were compared to the gold-standard (our case definition which considerer a PsA diagnosis defined by a rheumatologist and meeting CASPAR classification criteria when available. Sensitivity, specificity, positive predictive value, negative predictive value, and area under the curve were calculated.

All analyses were performed using Stata IC version 17 (StataCorp. 2011 Stata Statistical Software: Release 17, College Station, TX, USA).

Results

Sample Characteristics

In this study, 197 Pso patients participated in the first phase (Dermatology evaluation), and 161 of them were included in the prevalence estimation as shown in Figure 1. Twenty-five patients did not attend the rheumatology appointment in the second phase and were excluded. Furthermore, eleven participants were excluded from the analysis due to the rheumatologist's uncertainty regarding the PsA diagnosis. Three participants met the CASPAR criteria, but the rheumatologist was unsure if it was a definite diagnosis of PsA. Additionally, eight patients were excluded because the rheumatologist remained uncertain about the PsA diagnosis even after complementary tests.

The prevalence of PsA in patients with Pso in our sample was 8.7% (95% CI: 4.8-2) with similar prevalence between genders. The group between 31-59 years had the highest prevalence of PsA (Figure 2).

The sociodemographic characteristics were similar in both groups with (n=14, 8.7%) and without (n=147, 91.3%) PsA diagnosis (Table I). Patients with PsA had higher levels of education, normal weight, and lower quality of life (DLQI) (Table I) compared to those without PsA.

Table II shows clinical data of Pso and PsA. In terms of the characteristics related to Pso, the two groups do not show significant differences. However, participants with PsA seem to have higher BSA, NAPSI, PASI, and DLQI scores.

EARP Questionnaire

Based on the EARP-PT questionnaire and the established cut-off of 3 points for potential PsA diagnosis, 60.9% of Pso patients met the criteria for referral to a rheumatologist for suspected

PsA (Table III). The questionnaire showed a sensitivity of 71.4% and specificity of 40.1%, with an AUC of 0.558 (95% CI: 0.429-0.687). However, in our study, the optimal cut-off value based on the Youden index was 5, demonstrating improved clinometric properties (with a sensitivity of 57.1% and specificity of 64.6%). The AUC for this cut-off was 0.636 (95% CI: 0.481-0.791) (Table V). The internal consistency of the EARP-PT was high, with a Cronbach´s alpha of 0.81, ranging from 0.78 to 0.81 (Table IV).

Discussion

The association between PsA and Pso is well established, with several studies emphasizing the importance of early diagnosis to prevent irreversible joint damage and improve long-term outcomes[3-7]. In our study, the prevalence of PsA among Pso patients was 8.7%, which was lower than expected. The sample size, while meeting representativeness criteria, was smaller than anticipated, potentially influencing the observed results.

In a meta-analysis, Alinaghi et al. (2019) reported a pooled prevalence of PsA of 19.7% among patients with Pso[18], with higher rates in European and North American cohorts compared to Asian populations. These variations highlight the significance of population characteristics in assessing PsA prevalence and emphasize the importance of region-specific studies for a more precise understanding of the disease.

Another possible explanation for our lower-than-expected prevalence could be the use of anti-inflammatory medications, which may indicate a history of joint pain and, consequently, a higher likelihood of PsA. Mease et al. (2013) reported a PsA prevalence of 30%, with 73% of PsA patients using anti-inflammatory medications compared to 49% of non-PsA patients. In contrast, our study found that only 35.7% of PsA-diagnosed participants and 26.7% of non-PsA participants reported taking anti-inflammatories for joint pain more than twice a week in the last two months. This suggests that our population may have had fewer risk factors for PsA development, leading to the lower prevalence observed. Additionally, one of the exclusion criteria for our study was patients under systemic treatment (except for acitretin and PUVA phototherapy) or immunosuppressants (conventional or biotechnological), unless stopped 6 months before study enrolment. This further supports that our population was not enriched with risk factors for PsA development.

The EARP questionnaire was used to screen for PsA in our study. The EARP-PT version showed an acceptable sensitivity of 71.4%, but a specificity of only 40.1% at the standard cut-off point of 3, similar to findings in the English [20] and Dutch versions [7]. The lower-than-expected

prevalence of PsA in our sample may have influenced these results. To address this, we explored different cut-offs values to improve the screening tool's performance. Using a cut-off of 5 slightly decreased sensitivity to 57.1% while specificity increased to 64.6%, enhancing its clinical utility. With this cut-off, 71 patients (36.04%) were identified as showing signs of PsA, compared to 114 (57.87%) patients at the cut-off 3.

Different validation processes have proposed alternative cut-off points, such as the cases of the Spanish and Chinese populations, with 4[22] and 2[23] being suggested as optimal values, respectively. Nevertheless, the most used cut-off values remain 3 and 5, which have been evaluated in previous research studies.

It is important to highlight that the choice of a specific cut-off value should be determined by several factors, such as the clinical context, the desired balance between sensitivity and specificity, and the consequences of false-positive and false-negative results. That is the case for the Dutch population[7], where individuals already experienced musculoskeletal complaints, which placed them at a higher risk of developing PsA. In the Spainish population[21], the characteristics are similar to ours, with patients having Pso diagnosed by dermatologists without prior rheumatological monitoring. For the Chinese population[22], while specific details about the cohort are limited, it is mentioned that 17.5% of participants diagnosed with PsA were undergoing biological therapy. Finally, in the Japanese population[23], where responses to the EARP questionnaire are presented, the population exhibits slightly more symptomatology compared to the Portuguese population.

Healthcare professionals should consider these factors and interpret the EARP questionnaire results conjunction together with other clinical findings.

This study has several strengths and limitations. The strengths include being the first evaluation of PsA in Pso patients in the Portuguese context, and the cross-cultural adaptation and validation of the EARP in both public and private settings, which expanded the demographic characteristics of the study population, making it more representative. However, the recruitment process was delayed due to the COVID-19 pandemic, affecting the timing between the linguistic and cultural adaptation to European Portuguese and the validation study. Although the sample size ensured representativeness, it was smaller than originally anticipated.

Conclusions

The estimated prevalence of PsA in a population of Pso patients followed in Portuguese dermatology clinics is 8.7%. The EARP-PT questionnaire appears to be a valuable tool for

dermatologists in detecting PsA early. Early referral to a rheumatology clinic is essential for optimal outcomes.

Tables and Figures

Table I- Sociodemographic and anthropometric data.

		Total (*n*=161)	PsA- Yes (*n*=14)	PsA- No (*n*=147)	p-value
Gender *n* (%)					
	Male	84 (52.2)	7 (50.0)	77 (52.4)	Ref
	Female	77 (47.8)	7 (50.0)	70 (47.6)	0.865
Age (mean ±sd)		54.0 (14.4)	47.8 (13.1)	54.6 (14.4)	0.094
Education level, *n* (%)					
	Doctorate and master	49 (30.4)	7 (50.0)	42 (28.6)	Ref
	Secondary school	44 (27.3)	2 (14.3)	42 (28.6)	0.132
	Former high school or 3rd cycle of basic education (9 yrs of education)	22 (13.7)	2 (14.3)	20 (13.6)	0.546
	Former preparatory cycle or 2nd cycle of basic education (6 yrs of education)	17 (10.6)	2 (14.3)	15 (10.2)	0.794
	Complete primary school or 1st cycle of basic education (4 yrs of education)	25 (15.5)	1 (7.1)	24 (16.3)	0,160
	Incomplete primary school, illiterate	4 (2.5)	-	4 (2.7)	
Employment status, *n* (%)					
	Full time active worker	93 (57.8)	8 (57.1)	85 (57.8)	Ref

	Part-time active worker	5 (3.1)	1 (7.1)	4 (2.7)	
	Retired	43 (26.7)	3 (21.4)	40 (27.2)	0.666
	Unpaid household worker	13 (8.1)	1 (7.1)	12 (8.2)	
	Student	1 (0.6)	-	1 (0.7)	0.909
	Temporary work leave	1 (0.6)	-	1 (0.7)	
	Unemployed	5 (3.1)	1 (7.1)	4 (2.7)	
Body Mass Index (kg/m^2), *n* (%)					
	Underweight	4 (2.5)	1 (7.7)	3 (2.1)	Ref
	Normal	58 (36.5)	7 (53.9)	51 (34.9)	
	Overweight	53 (33.3)	2 (15.4)	51 (34.9)	0.103
	Obese	44 (27.7)	3 (23.1)	41 (28.1)	0.319

Sample size is not constant due to missing values in some variables:
Total: Gender (*n*=161); Age (*n*=159); Education level (*n*=161); Employment status (*n*=161); Body Mass Index (*n*=159).
PsA yes: Gender (*n*=14); Age (*n*=14); Education level (*n*=14); Employment status (*n*=14); Body Mass Index (*n*=13).
PsA no: Gender (*n*=147); Age (*n*=145); Education level (*n*=147); Employment status (*n*=147); Body Mass Index (*n*=146).
Non-adjusted logistic regression was used to compare participants with and without PsA. For these comparisons, the categories of educational level—'Former preparatory cycle or 2nd cycle of basic education (6 years of education)' and 'Complete primary school or 1st cycle of basic education, incomplete primary school, illiterate'—were combined. The categories 'Part-time worker' and 'Full-time worker' were also combined, while 'Unpaid household worker,' 'Student,' 'Temporary work leave,' and 'Unemployed' were merged into a new category labeled 'Other.' Additionally, the BMI categories 'Underweight' and 'Normal weight' were combined.

Table II- Psoriasis and Psoriatic Arthritis specific characteristics

		Total (*n*=161)	**PsA- Yes (*n*=14)**	**PsA- No (*n*=147)**	**p-value**
Psoriasis duration (year) (mean ±sd)		17.4 (14.9)	14.4 (13.8)	17.6 (15.0)	0.431
Psoriasis treatment, *n* (%)					
	No	14 (8.8)	1 (7.1)	13 (8.9)	Ref
	Yes	146 (91.3)	13 (92.9)	133 (91.1)	0.824
Psoriasis area (mean ±sd)		10.2 (11.2)	10.6 (7.6)	10.1 (11.6)	0.869
NAPSI (mean ±sd)		2.1 (4.0)	3.8 (6.0)	1.9 (3.8)	0.116
PASI (mean ±sd)		7.2 (5.9)	7.8 (5.3)	7.2 (6.0)	0.719
PASI categories, *n* (%)					
	No disease	2 (1.3)	4 (28.6)	2 (1.5)	Ref
	Mild	60 (39.7)	7 (50.0)	56 (40.9)	
	Moderate	46 (30.5)	3 (21.4)	39 (28.5)	0.324
	Severe	43 (28.5)	-	40 (29.2)	
DLQI (mean ±sd)		6.4 (5.3)	10.8 (5.8)	6.0 (5.0)	0.014
DLQI categories, *n* (%)					
	No effect at all on patient's life	19 (19.0)	-	19 (21.1)	Ref
	Small effect on patient's life	32 (32.0)	3 (30.0)	29 (32.2)	
	Moderate effect on patient's life	26 (26.0)	1 (10.0)	25 (27.8)	
	Very large effect on patient's life	21 (21.0)	5 (50.0)	16 (17.8)	0.174
	Extremely large effect on patient's life	2 (2.0)	1 (10.0)	1 (1.1)	

Peripheral joint pain in last 48 hours (VAS)	Yes	56 (35.7)	10 (76.9)	46 (31.9)	0.004
Low back pain in the last 3 months (VAS)	Yes	34 (21.9)	8 (57.1)	26 (18.4)	0.002
DAPSA (mean ±sd)		24 (0)	24 (0)	Not applicable	-
DAS28 (mean ±sd)		1.9 (1.7)	1.9 (1.7)	Not applicable	-
Complementary exams for Psa diagnosis (Yes)		26 (30.6)	8 (57.1)	18 (25.4)	
	Analysis	25 (96.2)	7 (87.5)	18 (100.0)	
	Rnm	7 (26.9)	3 (37.5)	4 (22.2)	
	Rx	24 (92.3)	7 (87.5)	17 (94.4)	

Sample size is not constant due to missing values in some variables:
Total: Psoriasis duration (*n*=160); Psoriasis treatment (*n*=160); Psoriasis area (*n*=153); PASI score (*n*=161); PASI categories (*n*=151); DLQI score (*n*=100); DLQI categories (*n*=100); Complementary exams (*n=26*).
PsA Yes: Psoriasis duration (*n*=14); Psoriasis treatment (*n*=14); Psoriasis area (*n*=14); PASI score (*n*=14) PASI categories (*n*=14) DLQI score (*n*=10); DLQI categories (*n*=10); Complementary exams (*n=8*).
PsA No: Psoriasis duration (*n*=146); Psoriasis treatment (*n*=146); Psoriasis area (*n*=139); PASI score (*n=147*) PASI categories (*n*=137) DLQI score (*n*=90); DLQI categories (*n*=90); Complementary exams (*n=18*).
Non-adjusted logistic regression was used to compare participants with and without PsA. For these comparisons, the PASI categories 'No disease' and 'Mild' were combined. Similarly, for the DLQI categories, 'No effect' and 'Small effect' were combined, as well as the categories 'Moderate' to 'Extremely large effect.
PASI- psoriasis area and severity index; DLQI- dermatology life quality index; VAS- Visual analogue score; DAPSA- disease activity in psoriatic arthritis

Table III- Results of EARP questionnaire by item

Items		Total (*n*=161)	PsA- Yes (*n*=14)	PsA- No (*n*=147)
1-Do your joints hurt?				
	No	49 (30.6)	3 (21.4)	46 (31.5)
	Yes	111 (69.4)	11 (78.6)	100 (68.5)
2-Have you taken, in the past three months, anti-inflammatory drugs for joint pain more than twice a week?				
	No	117 (72.7)	9 (64.3)	108 (73.5)
	Yes	44 (27.3)	5 (35.7)	39 (26.5)
3-Do you wake up at night as a result of low back pain?				
	No	111 (68.9)	6 (42.9)	105 (71.4)
	Yes	50 (31.1)	8 (57.1)	42 (28.6)
4-Do you fell stiffness in your hand for a period longer than 30 minutes in the morning?				
	No	119 (73.9)	8 (57.1)	111 (75.5)
	Yes	42 (26.1)	6 (42.9)	36 (24.5)
5-Do your wrists and fingers hurt?				
	No	84 (52.2)	6 (42.9)	78 (53.1)
	Yes	77 (47.8)	8 (57.1)	69 (46.9)
6-Do your wrists and fingers swell?				
	No	111 (68.9)	8 (57.1)	103 (70.1)
	Yes	50 (31.1)	6 (42.9)	44 (29.9)
7-Do any of your fingers hurt and swell for more than 3 days?				
	No	134 (83.2)	12 (85.7)	122 (83.0)
	Yes	27 (16.8)	2 (14.3)	25 (17.0)
8-Does your Achilles tendon swell?				
	No	125 (78.1)	12 (85.7)	113 (77.4)
	Yes	35 (21.9)	2 (14.3)	33 (22.6)

9-Do your feet or ankles hurt?				
	No	83 (51.9)	4 (28.6)	79 (54.1)
	Yes	77 (48.1)	10(71.4)	67 (45.9)
10- Do your elbow or hips hurt?				
	No	95 (59.0)	5 (35.7)	90 (61.2)
	Yes	66 (41.0)	9 (64.3)	57 (38.8)
Final Score	<3	63 (39.1)	4 (28.9)	59 (40.1)
	≥3	98 (60.9)	10(71.4)	88 (59.9)
	<5	101 (62.7)	6 (42.9)	95 (64.6)
	≥5	60 (37.3)	8(57.1)	52 (35.4)

Table IV- Internal consistency (Cronbach's alpha)

Items	Raw item total correlation	Raw-item rest correlation	Alpha of Cronbach (α)
1	0.65	0.54	0.78
2	0.48	0.34	0.81
3	0.65	0.54	0.79
4	0.59	0.46	0.79
5	0.67	0.57	0.78
6	0.64	0.53	0.79
7	0.48	0.33	0.81
8	0.50	0.36	0.81
9	0.69	0.57	0.78
10	0.72	0.62	0.78
Total			0.81

Table V- Calculated sensitivity and specificity of the EARP questionnaire using a cut off of 3 and the optimal cut-off of 5, based on the Youden index from ROC curve analysis. CI: Confidence Interval; PsA: Psoriatic Arthritis; PPV: Positive Predictive Value; NPV: Negative Predictive Value.

	Cut-off point	Signs of PsA	Sensitivity	Specificity	PPV	NPV	AUC
EARP	3	51.87%	71.4%	40.1%	10.2%	93.7%	0.558 (95% CI: 0.429-0.687)
	5	36.04%	57.1%	64.6%	13.3%	94.1%	0.636 (95%CI: 0.481-0.791)
PsA prevalence (95% CI)			8.7% (4.8%, 14.2%)				

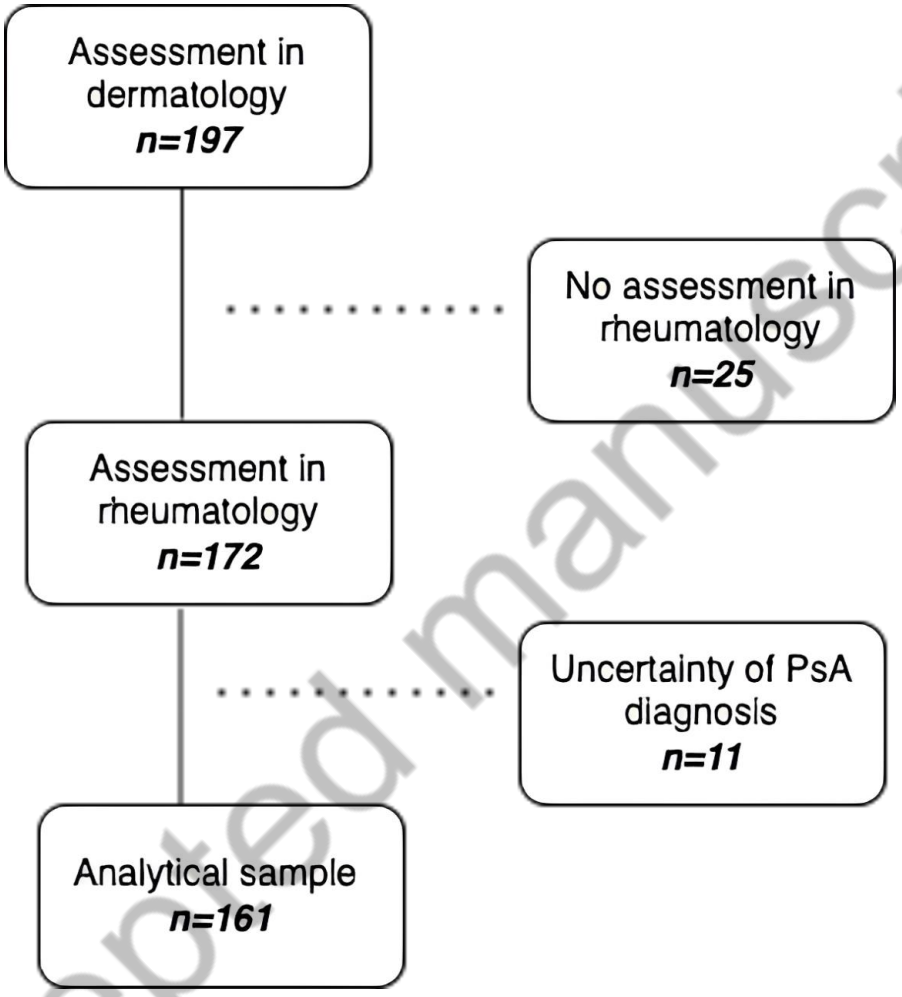

Figure 1- Study design flow-chart

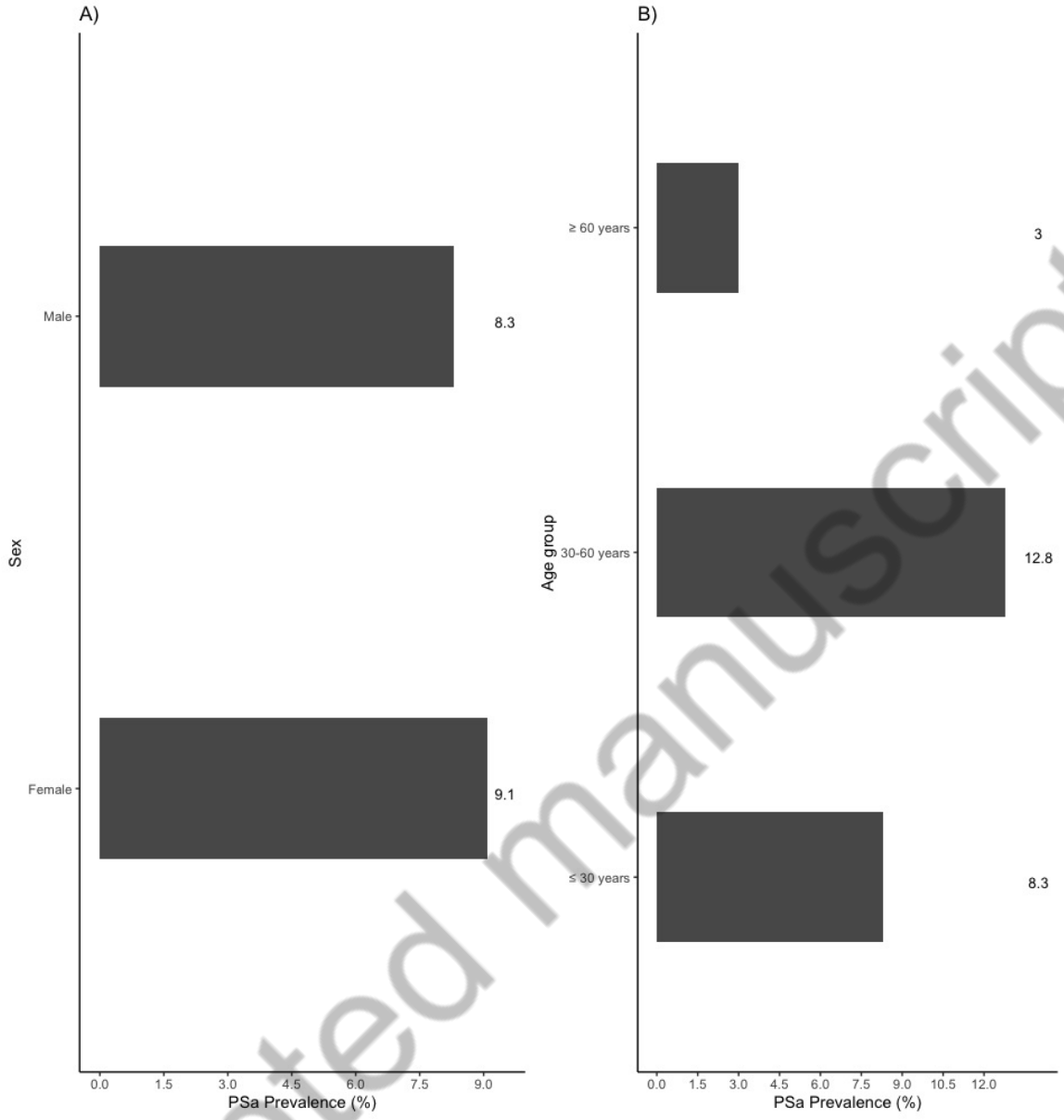

Figure 2- Prevalence of PsA by gender and age group.

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Availability of data and materials

The codebook and analytic code are available pending request from the authors while the dataset is available pending application and approval by the Coordinator - Ana Rodrigues (ana.m.rodrigues@nms.unl.pt).

Declarations

Ethics approval

The study protocol was approved by the ethics committee of each research centres. All participants who agreed to take part in the study gave their written informed consent.

Conflicts of interest

P Mendes-Bastos has worked as a consultant/speaker/principal investigator for AbbVie, Amgen, Bayer, Biogen, Cantabria Labs, Eli-Lilly, Janssen-Cilag, Leo-Pharma, L'Oreal, Novartis, Pfizer, Pierre Fabre, Sanofi, Regeneron, Teva, Evelo Biosciences, Organon, CS Labs and Viatris.

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The other authors have disclosed no conflicts of interest.

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