Psoriatic arthritis and ankylosing spondylitis impact on health-related quality of life and working life: a comparative population-based study

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ABSTRACT

Introduction: Psoriatic arthritis (PsA) and ankylosing spondylitis (AS) are chronic disorders that significantly impact patients' quality of life (QoL), health care systems and society. There is very limited data on the epidemiology and the impact of PsA and AS in Portugal, so in this study we aim to: 1) estimate the prevalence of PsA and AS in the adult Portuguese population; 2) compare health-related quality of life (QoL) of PsA and AS with the one of other rheumatic and musculoskeletal diseases (RMD) and with subjects with no rheumatic diseases; 3) compare early retirement and productivity loss among PsA and AS with other RMD.

Methods: We used data from EpiReumaPt, a population-based survey, conducted from 2011 to 2013, in which 10661 subjects, over 18 years old, were screened for RMD. Spondyloarthritis (SpA) was defined by a positive expert opinion combined with the fulfillment of the Assessment of Spondyloarthritis International Society (ASAS) criteria for axial and peripheral SpA. Estimates were computed as weighted proportions considering the study design. Logistic regressions were used to compare AS/PsA subjects with other RMD and the adult Portuguese population without rheumatic diseases.

Results: Prevalence rate of SpA was of 1.6% (95% CI 1.2% to 2.1%). Subjects with AS or PsA had worse QoL, reflected by EQ5D score when compared with the adult Portuguese population without rheumatic diseases (β=- 0.08; p=0.031). AS and PsA also had worse QoL when compared with participants with other RMD (β=-0.22; p>0.001). AS and in comparison to patients with other RMD, PsA subjects retired early due to their illness (OR=4.95; 95% CI 1.54% to 15.93%). A significant proportion of patients with SpA (13.6%) referred absenteeism in the previous 12 months to the interview.

Conclusions: AS and PsA were found to be associated with poor QoL and a high rate of disease-related early retirement, emphasizing the burden of such rheumatic conditions in Portugal.

Keywords: Spondylarthropathies; Absenteeism; Psoriatic arthritis; Ankylosing spondylitis; Health-related quality of life.

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INTRODUCTION

Rheumatic and musculoskeletal diseases (RMD) are prevalent and leading causes of disability, which results in greater consumption of healthcare and social resources. The prevalence of RMD has been determined in several countries, but epidemiological data in Portugal is scarce[1-3].

Among RMD, spondyloarthritis (SpA) is a group of several related but phenotypically distinct disorders. It includes psoriatic arthritis (PsA), arthritis related to in-

flammatory bowel disease, reactive arthritis, a subgroup of juvenile idiopathic arthritis, ankylosing spondylitis (AS) and undifferentiated SpA. PsA and AS are chronic inflammatory disorders[4] that significantly impact patients' quality of life (QoL)[5-7], health care systems and society[8-13]. In the group of SpA, AS is the most common subtype[14]. It predominantly affects young people, who generally present at around 26 years of age[6]. Men are more often affected than women, with a ratio of roughly 2 to 1[15]. Overall, the prevalence of AS is between 0.1% and 1.4%, with most of these data coming from Europe[6]. PsA affects between 0.04% and 1% of the general population and patients are typically aged 30–55 years at disease presentation[16]. Furthermore, PsA is equally prevalent in men and women[17].

There is very limited data on the epidemiology and the impact of PsA and AS in Portugal. For this reason, it is fundamental to estimate the prevalence and impact of these diseases in Portugal. PAASPORT is a sub analysis of EpiReumaPt that aimed to estimate the prevalence and impact of PsA and AS in the Portuguese territory. The primary objective of this work 1) was to estimate the prevalence of PsA and AS in Portugal and to characterize the national PsA and AS population. Other goals of this study included: 2) comparison of health-related quality of life (QoL) of PsA and AS with other rheumatic and musculoskeletal diseases (RMD) and with subjects without rheumatic diseases; and 3) comparison of early retirement and productivity loss among PsA and AS with other RMD.

METHODS

For this study we used data from EpiReumaPt, a large cross-sectional, population-based, observational study of RMD. Participants were selected through a process of multistage random sampling. The sample was stratified according to the Portuguese Nomenclature of Territorial Units for Statistics (NUTS II; seven territorial units: Norte, Centro, Alentejo, Algarve, Lisboa e Vale do Tejo, Madeira and Azores) and the size of the population (<2000; 2000–9999; 10 000–19 999; 20 000–99 999; and ≥100 000 inhabitants). The study methodology has been extensively described elsewhere[19,20].

EpiReumaPt study population was composed by non-institutionalized adults (≥18 years-old) living in private households in Portugal (Mainland and the Islands - Madeira and the Azores). Exclusion criteria were: residents in hospitals, nursing homes, military institutions or prisons, and individuals unable to speak Portuguese or unable to complete the questionnaire, despite being aided[4].

EpiReumaPt enrolled 10,661 subjects and was designed to primarily estimate the prevalence of RMD. In order to provide a comprehensive understanding of the burden of RMD, this survey also had as secondary aims: the evaluation of quality of life, physical function, mental health, work status and healthcare resource consumption, with the purpose of identifying differences in these health and other outcomes between individuals with and without RMD[19].

Data collection of EpiReumaPt included two different phases: Phase 1 – face-to-face interviews conducted by a team of trained interviewers (non-physicians) through door-to-door visits, and Phase 2 – clinical observations with physical examination performed by rheumatologists and conducted in all participants that were identified as potentially having an RMD by a screening questionnaire applied at Phase 1, and in 20% of asymptomatic individuals. All procedures of EpiReumaPt, including Phase 1 and 2, occurred between September 2011 and December 2013 (Figure 1).

EpiReumaPt study protocol was approved by Portuguese Data Protection Authority, *Administração Regional de Saúde do Norte I.P*, *Administração Regional de Saúde de Lisboa e Vale do Tejo* and by NOVA Medical School, *Universidade NOVA de Lisboa* Ethics Committees. A written informed consent was obtained from each patient.

In this study we focused on patients with a diagnosis of PsA or AS. SpA diagnosis was established according to the Assessment of SpondyloArthritis International Society (ASAS) criteria for axial and peripheral SpA[21-23]. SpA subtypes (AS, PsA and other SpA) were defined by expert opinion (clinical decision made by a rheumatologist).

STATISTICAL METHODS

Details regarding sample size calculation of EpiReumaPt were previously described elsewhere[4,18,19]. Prevalence estimates and confidence intervals were computed considering the sampling design. Descriptive data for each categorical variable was presented as the absolute frequency and the correspondent proportion adjusted for study design. The same adjustment was performed for the mean and standard devia-

tion (SD) of each continuous variable. Regarding SpA population characteristics, SF-36 scores were calculated according to Pedro Lopes Ferreira et al[24]. Linear or multinomial logistic regressions were used to compare subjects with AS or PsA, other RMD and subjects without rheumatic diseases. The adjusted analysis was based on models of the same type, but wherein the sex, age and NUTS II were included as covariates. The cut-off value for significance was considered to be $p<0.05$. All analyses were weighted and performed using Stata Statistical Software: Release 12.

VARIABLES DEFINITIONS

The Health Assessment Questionnaire (HAQ) score was categorized as: "mild to moderate difficulty" (score <0.8); "moderate to severe disability" (0.8 ≤ score <1.2) and "severe to very severe disability" (score ≥ 1.2)[25].The proportion of individuals with changes in their professional situation due to RMD was calculated (all individuals with information on their employment status were taken as reference population). Subjects with early retirement due to RMD were identified as those who have retired due RMD and have their lower retirement age to under 65 years (data from the 1st Phase); the proportion of subjects with early retirement due to RMD was calculated taking as reference population all individuals with information about their employment status, retired or not. Information about absenteeism and retirement was self-reported. To calculate the age at diagnosis and time since diagnosis, it was assumed that the diagnosis occurred at query time, for individuals without previous diagnosis, or the date of prior diagnosis, when available; when only the year of diagnosis was available, it was assumed that diagnosis was made on June 30 (half year). The time from first symptom to diagnosis was calculated as the difference between the diagnostic date (see previous point) and the date of the first symptom, considered as the date of the symptom that occurred first; for this, we considered the three dates of symptoms available on SpA screening (medical appointment): start date of back pain, inflammatory joint pain and other symptoms. Finally, working age population was defined as those aged 15 to 64 years.

Body mass index (BMI) categories were defined according to the World Health Organization criteria[26]: underweight (BMI < 18.5 kg/m^2), normal weight (BMI between 18.5 and 24.9kg/m^2), pre-obesity (BMI between 25.0 and 29.9 kg/m^2), obese class I (BMI between 30.0 and 34.9 kg/m^2), class II (BMI between 35.0 and 39.9 kg/m^2) and class III (BMI ≥ 40.0 kg/m^2).

Other RMD were defined as individuals who have an RMD other than a SpA and included subjects with hand, knee and hip osteoarthritis (OA), low back pain (LBP), rheumatoid arthritis (RA), fibromyalgia (FM), gout, periarticular diseases (PD), systemic lupus erythematosus (SLE), polymyalgia rheumatica (PMR) and osteoporosis (OP)[19].

RESULTS

SPA PREVALENCE

The prevalence of total SpA (which includes AS, PsA and other SpA) was 1.6% (CI 1.2%-2.1%). AS accounted for 29.6% of cases and PsA for 18.7% – corresponding to a prevalence rate of 0.5% (95% CI 0.3% to 0.7%) and 0.3% (95% CI 0.1% to 0.5%), respectively. In absolute numbers, there were 32 cases of AS and 20 PsA patients. Moreover, the relative frequency of AS and PsA among RMD patients was 0.9% (CI 0.5%;1.2%) and 0.5% (CI 0.2%;0.9%), respectively. Prevalence of SpA was also estimated according to NUTS II classification and the North Region of Portugal was found to have a lower prevalence of all types of SpA (1.3% (CI: 0.7%;2.0%)).

SPA POPULATION CHARACTERISTICS

Table I shows the clinical and sociodemographic characteristics of Portuguese subjects with SpA (total, AS, PsA and other SpA). The majority of subjects had a normal BMI, but did not practice physical exercise. Regarding lifestyle habits, most patients did not smoke and had an occasional intake of alcohol.

In EpiReumaPt, rheumatologists diagnosed 68 new SpA cases. Definitive diagnosis of SpA was made more frequently in younger patients, with a mean age at diagnosis of 42.2±17.2 years. SpA patients had a mean disease duration of 1.39±7.12 years, which was slightly higher in the AS subtype (3.77±14.13) (Table I). Disease activity was measured through the BASDAI index. Table II describes the BASDAI index for each type of SpA. When we analyzed the mean BASDAI score in the AS/PsA subjects with RMD related retirement (6.77±1,41 and 5.27±0,72, respectively), we found that it was higher than the mean overall BASDAI score of the disease (5.73±3.40 and 4.63±1,84, respectively).

COMORBIDITIES IN SPA SUBJECTS

Self-reported comorbidities of Portuguese patients with SpA were also analyzed. Subjects were asked about

TABLE I. SOCIODEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF POPULATION WITH SPA (TOTAL), AS, PSA, OTHER SPA, OTHER RMD AND SUBJECTS WITHOUT RHEUMATIC DISEASES

	Spondylo-arthritis (total) n=92	Ankylosing Spondylitis n=32	Psoriatic Arthritis n=20	Other SpA n=40	Other RMD n=3106	No rheumatic diseases n=679
Female gender	59 (63.91%)	22 (77.91%)	10 (41.88%)	27 (63.90%)	2205 (59.58%)	366 (53.90%)
Age (mean ± Sd)	43.81 ± 17.77	43.27 ±23.19	51.51 ± 15.89	41.33 ± 13.91	53.17 ± 20.90	38.08 ± 9.58
Age group, n (%)						
18-34 y	18 (34.04%)	9 (38.79%)	1 (15.21%)	8 (38.15%)	159 (18.09%)	171 (25.18%)
35-54 y	44 (41.66%)	13 (37.35%)	9 (37.66%)	22 (45.57%)	953 (33.12%)	315 (46.39%)
55-64 y	18 (14.81%)	3 (7.24%)	8 (37.19%)	7 (11.02%)	791 (18.41%)	89 (13.11%)
65-74 y	8 (5.97%)	5 (10.99%)	0 (0.00%)	3 (5.27%)	743 (17.61%)	72 (10.60%)
≥75 y	4 (3.52%)	2 (5.62%)	2 (9.93%)	0 (0.00%)	460 (12.77%)	32 (4.71%)
Years of education (mean ± Sd)	8.76 ± 4.46	9.12 ± 4.65	5.74 ± 3.96	9.65 ± 3.78	7.43 ± 4.73	9.79 ± 2.20
Education level, n(%)						
> 12 years	18 (20.87%)	5 (12.31%)	1 (3.72%)	12 (31.97%)	336 (14.59%)	207 (30.53%)
10-12 years	20 (26.29%)	9 (43.76%)	2 (16.10%)	9 (19.99%)	376 (16.52%)	138 (20.35%)
5-9 years	22 (25.82%)	8 (22.62%)	5 (19.06%)	9 (30.10%)	615 (25.39%)	179 (26.40%)
0-4 years	32 (27.03%)	10 (21.31%)	12 (61.12%)	10 (17.94%)	1758 (43.50%)	154 (22.71%)
Employment status, n(%)						
Employed full-time	43 (49.17%)	13 (34.02%)	9 (50.87%)	21 (57.21%)	851 (35.29%)	327 (48.23%)
Employed part-time	5 (4.16%)	1 (1.50%)	1 (4.23%)	3 (5.65%)	87 (3.52%)	25 (3.69%)
Domestic worker	4 (2.82%)	0 (0.00%)	1 (0.55%)	3 (5.25%)	249 (4.69%)	33 (4.87%)
Unemployed	14 (23.19%)	7 (32.71%)	1 (15.79%)	6 (20.43%)	283 (13.04%)	93 (13.72%)
Retired	23 (17.39%)	9 (22.07%)	8 (28.57%)	6 (10.67%)	1471 (37.71%)	142 (20.94%)
Student	1 (2.67%)	1 (9.05%)	0 (0.00%)	0 (0.00%)	25 (2.88%)	32 (4.72%)
Temporally work disabled	1 (0.19%)	1 (0.65%)	0 (0.00%)	0 (0.00%)	70 (1.74%)	9 (1.33%)
Other	1 (0.41%)	0 (0.00%)	0 (0.00%)	1 (0.79%)	33 (1.12%)	17 (2.51%)
Marital status, n(%)						
Single	13 (25.70%)	5 (31.22%)	1 (3.72%)	7 (30.51%)	275 (20.00%)	168 (24.74%)
Married	63 (61.14%)	22 (56.51%)	16 (90.04%)	25 (53.32%)	2009 (57.17%)	388 (57.14%)
Divorced	6 (5.62%)	2 (5.69%)	0 (0.00%)	4 (7.61%)	251 (7.93%)	53 (7.81%)
Widow(er)	7 (4.77%)	2 (5.93%)	3 (6.23%)	2 (3.58%)	506 (11.81%)	37 (5.45%)
Consensual union	3 (2.77%)	1 (0.65%)	0 (0.00%)	2 (4.98%)	65 (3.03%)	31 (4.57%)
Body Mass Index (kg/m^2) (mean ± sd)	26.01 ± 5.38	26.84 ± 5.38	25.37 ± 5.32	25.84 ± 5.18	26.73 ± 6.03	25.01 ± 2.57
Body Mass Index (kg/m^2), n(%)						
Underweight	2 (2.80%)	0 (0.00%)	0 (0.00%)	2 (5.25%)	34 (1.42%)	10 (1.51%)
Normal	39 (45.52%)	11 (37.68%)	7 (53.36%)	21 (46.57%)	890 (37.54%)	305 (45.93%)
Overweight	32 (30.19%)	15 (40.28%)	9 (32.14%)	8 (24.39%)	1198 (40.32%)	255 (38.40%)
Obese	16 (21.48%)	4 (22.04%)	4 (14.50%)	8 (23.79%)	814 (20.71%)	94 (14.16%)
Smoking habits, n(%)						
Smoker	16 (21.49%)	7 (18.77%)	1 (4.22%)	8 (29.30%)	421 (20.46%)	156 (22.97%)
Non-smoker	76 (78.51%)	25 (81.23%)	19 (95.78%)	32 (70.70%)	2683 (79.54%)	523 (77.03%)

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TABLE I. CONTINUATION

	Spondylo-arthritis (total) n=92	Ankylosing Spondylitis n=32	Psoriatic Arthritis n=20	Other SpA n=40	Other RMD n=3106	No rheumatic diseases n=679
Alcohol intake, n(%) Daily/ocasional intake	50 (61.23%)	17 (57.42%)	10 (68.20%)	23 (60.88%)	1608 (61.43%)	420 (61.86%)
Never	42 (38.77%)	15 (42.58%)	10 (31.80%)	17 (39.12%)	1493 (38.57%)	259 (38.14%)
Regular physical, n(%) Exercise						
Yes	27 (26.31%)	11 (29.40%)	5 (28.49%)	11 (23.76%)	902 (33.17%)	253 (37.32%)
No	65 (73.65%)	21 (70.60%	15 (71.51%)	29 (76.24%)	2202 (66.83%)	425 (62.68%)
Age at time of diagnosis, in years (mean ± sd)	42.16 ± 17.23	37.55 ± 22.47	50.76 ± 15.75	41.32 ± 13.66	No observations	NA
Time since diagnosis, in years (mean ± sd)	1.39 ± 7.12	3.77 ± 14.13	0.80 ± 2.83	0.49 ± 2.74	No observations	NA
Time since 1st symptom to diagnosis, in years (mean ± sd)	11.40 ± 12.75	11.34 ± 15.10	15.60 ± 12.67	10.11 ± 10.84	No observations	NA

Sd: standard deviation; SpA: spondyloarthritis; RMD: rheumatic and musculoskeletal diseases; NA: not applicable; n: number.

their comorbidities in EpiReumaPt's 1st phase (Table III). SpA population had a high prevalence of cardiovascular risk factors, namely high blood pressure (20.79%) and high cholesterol level (30.41%). In particular, PsA patients had a higher prevalence of such risk factors, with 35.99% of patients having high blood pressure and more than 45% reporting high cholesterol levels. Gastrointestinal disease was also a prevalent comorbidity in SpA (23.43%). In addition, 13.13% of SpA patients reported a mental disease (Table III).

THE BURDEN OF SPA - COMPARISON OF SPA SUBTYPES

In brief, AS patients had worse quality of life reflected by EQ5D score (EQ5D $score_{AS}$ = 0.66±0.35; EQ5D $score_{PsA}$ = 0.71 ± 0.25; EQ5D $score_{other\ SpA}$ = 0.74 ± 0.24) and also among SF-36 dimensions scores, than other SpA patients. Function is also worse among these patients (HAQ $score_{AS}$ = 0.56 ± 0.95; HAQ $score_{PsA}$ = 0.48 ± 0.75; HAQ $score_{other\ PsA}$ = 0.32 ± 0.54). Although they have a higher HAQ score, the majority of them reported mild to moderate difficulty (72.00%). Patients with AS and those with PsA have more anxiety symptoms (mean HADS Anxiety score = 8.31 ± 6.26 and 8.60 ± 5.26, respectively) and depression (mean HADS Depression score = 6.34 ± 6.51 and 4.98 ± 4.35, respectively), than those with other SpA.

THE BURDEN OF SPA - COMPARISON BETWEEN PSA/AS PATIENTS, PATIENTS WITH OTHER RMD AND SUBJECTS WITH NO RHEUMATIC DISEASES

When comparing subjects with AS or PsA with other RMD, AS/PsA patients had a significantly worse EQ5D score (β=- 0.08; p=0.031) and worse SF-36 score among the following dimensions: bodily pain (β=-13.83; p=0.001), general health (β=-12.27; p<0.001), vitality (β=-10.68; p=0.011), social function (β=-13.11; p=0.001), emotional role (β=-19.41; p=0.019) and mental health (β=-10.74; p=0.024) (Table IVa). AS/PsA patients also had worse EQ5D score (β=-0.22; p<0.001) and worse SF-36 in 8 of the 9 dimensions evaluated when compared with subjects without rheumatic diseases (Table IVb). Additionally, significant differences were found regarding anxiety symptoms, which were higher in AS and PsA, compared with other RMD (OR=2.71; p=0.033), and with subjects without rheumatic diseases (OR=8.14; p=0.001). Subjects with other RMD or no rheumatic

TABLE II. DISEASE ACTIVITY (BASDAI) IN SUBJECTS WITH SPA, (TOTAL); AS, PSA AND OTHER SPA

	Spondyloarthritis (total) n=92	Ankylosing spondylitis n=32	Psoriatic arthritis n=20	Other SpA n=40
Disease activity - BASDAI score (mean ± sd) - total population	5.87 ± 3.48	5.73 ± 3.40	4.63 ± 1.84	6.31 ± 3.57
RMD related work absenteeism, in the last 12 months	6.76 ± 1.84	5.61 ± 0.18	6.8 ± 0	7.23 ± 1.81
Non-RMD related work absenteeism, in the last 12 months	5.74 ± 3.67	5.74 ± 3.67	4.60 ± 1.76	6.13 ± 3.86
RMD related retirement	5.73 ± 1.43	6.77 ± 1.41	5.27 ± 0.72	NA
Non-RMD related retirement	5.91 ± 3.54	5.71 ± 3.49	4.57 ± 1.95	6.33 ± 3.61
Disease activity - Active (BASDAI score ≥ 4) - total population	55 (75.90%)	20 (67.09%)	10 (73.58%)	25 (82.15%)
RMD related work absenteeism, in the last 12 months	6 (90.13%)	2 (100.00%)	1 (100.00%)	3 (85.88%)
Non-RMD related work absenteeism, in the last 12 months	49 (73.87%)	18 (63.10%)	9 (73.21%)	22 (81.40%)
RMD related retirement	5 (100.00%)	2 (100.00%)	3 (100.00%)	0 (0.00%)
Non-RMD related retirement	45 (74.99%)	15 (64.06%)	7 (73.75%)	23 (81.37%)

Sd: standard deviation; SpA: spondyloarthritis; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index

diseases reported less depression (β =1.90; p=0.016 and β =2.93; p>0.001, respectively) when compared with AS/PsA patients. Concerning physical function, we found that AS/PsA patients had a higher proportion of moderate (RRR=2.44; p=0.045) and severe disability (RRR=2.97; p=0.008) than subjects with another RMD and those with no rheumatic diseases (moderate disability: RRR=4.85; p=0.041 and severe disability: RRR=17.05; p<0.001) (Table IVa and IVb).

EMPLOYMENT STATUS AND ABSENTEEISM IN SPA

Most patients with SpA were employed (Table I). However, a significant proportion of patients (13.6%) referred absenteeism in the last 12 months. Patients with PsA showed more retirement (18.16%) and more early retirement (19.54%) due to disease when compared with other SpA (1.89% and 1.97%, respectively).

When we analyzed the mean HAQ score in SpA subjects that mentioned absenteeism in the previous 12 months (0.81 ± 0.62), we found that it was higher than the mean HAQ score of the disease (0.42 ± 0.72). Moreover, the mean HAQ score in patients with disease-related early retirement (0.88 ± 1.38) was also higher than the mean HAQ score of the disease (0.42 ± 0.72).

COMPARISON BETWEEN PSA/AS PATIENTS AND PATIENTS WITH OTHER RMD REGARDING THE EMPLOYMENT STATUS AND ABSENTEEISM

When we compared subjects with AS or PsA with patients with another RMD diagnosis, we found a significantly difference in early retirement related to disease (OR=4.95; p=0.007) (Table V).

HEALTH RESOURCES CONSUMPTION IN SPA

Among SpA patients, individuals with AS showed higher consumption of health resources than patients with PsA. Nonetheless, these findings have some limitations, since they represent a very small sample size. No differences were found regarding healthcare consumption resources between AS/PsA and other RMD.

DISCUSSION

In this analysis, using a population-based epidemiological study in Portugal, we have characterized the Portuguese SpA population and its subtypes, namely AS and PsA. In the EpiReumaPt study we have used the ASAS criteria for SpA[27] and found a prevalence of 1.6%; Norte Region had the lower prevalence of all

TABLE III. COMORBIDITIES AND HEALTHCARE RESOURCES CONSUMPTION AMONG SUBJECTS WITH SPA (TOTAL), AS, PSA, OTHER SPA, OTHER RMD AND SUBJECTS WITHOUT RHEUMATIC DISEASES

	Spondylo-arthritis (total) n=92	Ankylosing Spondylitis n=32	Psoriatic Arthritis n=20	Other SpA n=40	Other RMD n=2783	No rheumatic diseases n=630
Number of comorbidities (self-reported) (mean ± sd)	1.64 ± 1.98	1.74 ± 2.32	1.66 ± 1.66	1.58 ± 1.87	1.96 ± 2.22	0.96 ± 0.71
Number of comorbidities (self-reported), n(%)						
0	21 (31.83%)	8 (33.34%)	4 (25.24%)	9 (33.40%)	444 (15.95%)	221 (35.08%)
1	21 (22.25%)	6 (21.47%)	5 (25.38%)	10 (21.53%)	583 (20.95%)	179 (28.41%)
2	18 (19.90%)	4 (15.48%)	4 (12.78%)	10 (24.69%)	591 (21.24%)	109 (17.30%)
≥ 3	25 (26.02%)	9 (29.71%)	6 (36.60%)	10 (20.37%)	1165 (41.86%)	121 (19.21%)
Comorbidities (self-reported), n(%)						
High blood pressure	20 (20.79%)	7 (20.56%)	8 (35.99%)	5 (15.40%)	1350 (33.40%)	158 (23.51%)
Diabetes	4 (4.03%)	3 (9.93%)	0 (0.00%)	1 (2.12%)	472 (15.35%)	63 (9.36%)
High cholesterol level	31 (30.41%)	12 (31.49%)	9 (45.84%)	10 (24.21%)	1344 (43.85%)	181 (27.06%)
Pulmonary disease	11 (10.81%)	6 (17.90%)	1 (9.76%)	4 (7.13%)	243 (7.87%)	41 (6.07%)
Cardiac Disease	11 (7.93%)	5 (11.73%)	3 (6.81%)	3 (6.22%)	574 (18.70%)	56 (8.33%)
Gastrointestinal disease	23 (23.43%)	5 (14.80%)	4 (21.80%)	14 (29.03%)	806 (26.23%)	78 (11.61%)
Allergy	23 (21.93%)	10 (28.88%)	4 (12.53%)	9 (21.37%)	817 (26.51%)	145 (21.61%)
Mental disease	14 (13.13%)	2 (8.44%)	4 (18.07%)	8 (13.93%)	679 (21.98%)	71 (10.52%)
Neoplasic disease	3 (3.08%)	2 (5.93%)	0 (0.00%)	1 (2.57%)	169 (5.47%)	36 (5.33%)
Thyroid and parathyroid disease	14 (12.64%)	5 (14.09%)	1 (0.89%)	8 (16.08%)	419 (13.66%)	51 (7.56%)
Hyperuricemia	5 (7.26%)	2 (7.92%)	1 (15.79%)	2 (3.78%)	303 (9.97%)	24 (3.60%)
Renal colic	11 (11.66%)	5 (15.72%)	0 (0.00%)	6 (13.38%)	377 (12.27%)	38 (5.66%)
Was hospitalized in the last 12 months, n(%)	13 (11.32%)	5 (9.43%)	1 (4.12%)	7 (15.02%)	311 (10.02%)	53 (7.81%)
Was hospitalized due to RMD, n(%)	2 (1.19%)	1 (0.65%)	0 (0.00%)	1 (1.94%)	46 (1.48%)	1 (0.15%)
Had home care in the last 12 months, n(%)	2 (2.11%)	1 (3.45%)	0 (0.00%)	1 (2.12%)	98 (3.16%)	5 (0.74%)

Sd: standard deviation; SpA: Spondyloarthritis; RMD: rheumatic and musculoskeletal diseases

types of SpA. Global prevalence values for SpA, which were calculated before the introduction of the ASAS criteria, were reported to be ≈ 1%[28], but ranging from 0.001% in Japan[29] to 2.5% in Northern Artic Natives[30]. In fact, the new ASAS classification criteria for axial SpA cover a larger disease spectrum, from no structural damage to advanced disease. When considering AS prevalence in particular, our results indicate a slightly lower prevalence than that described in other studies[31-33]. PsA prevalence was similar to that previously reported for the U.S. population (between 0.3% and 1%)[16]. We would like to emphasize the 68 new SpA diagnoses among a total of 92, suggesting that more than 70% of SpA cases in the Portuguese population are not diagnosed. This is a disturbing finding and, whether it is due to deficient referral to a rheumatology specialist or

TABLE IV.A. COMPARISON OF BURDEN BETWEEN SUBJECTS WITH AS OR PSA AND SUBJECTS WITH ANOTHER RMD DIAGNOSIS

	AS / PsA n=52	Other RMD n=3,106	Crude β [95% CI]	Crude p-value	Adjusted* β [95% CI]	Adjusted* p-value
Quality of life EQ5D score (mean ± sd)	0.68 ± 0.26	0.74 ± 0.26	-0.06 [-0.14;0.02]	0.148	-0.08 [-0.16;-0.007]	0.031
SF-36 score (mean ± sd)						
Physical function	76.56 ± 29.67	72.65 ± 29.75	4.08 [-4.52;12.69]	0.353	0.10 [-6.13;6.33]	0.975
Role physical	63.62 ± 49.35	70.11 ± 41.63	-6.27 [-21.43;8.88]	0.417	-9.06 [-23.20;5.09]	0.209
Bodily pain	50.15 ± 24.57	62.63 ± 27.47	-12.39 [-20.27;-4.51]	0.002	-13.83 [-21.62;-6.03]	0.001
General health	44.07 ± 17.29	54.09 ± 19.36	-9.94 [-14.92;-4.96]	<0.001	-12.27 [-17.32;-7.22]	<0.001
Vitality	47.12 ± 24.76	56.16 ± 24.07	-8.94 [-17.12;-0.77]	0.032	-10.68 [-18.90;-2.45]	0.011
Social function	72.07 ± 28.80	84.42 ± 23.23	-12.26 [-20.48;-4.03]	0.004	-13.11 [-21.11;-5.10]	0.001
Role emotional	61.39 ± 49.13	79.36 ± 36.90	-17.83 [-34.34;-1.32]	0.034	-19.41 [-35.63;-3.18]	0.019
Mental health	55.81 ± 27.20	65.02 ± 24.02	-9.16 [-18.47;0.15]	0.054	-10.74 [-20.03;-1.45]	0.024
Health transition	47.21 ± 16.46	50.13 ± 14.14	-2.92 [-7.97;2.13]	0.257	-3.17 [-8.19;1.85]	0.216
Physical function HAQ score (0-3) (mean ± sd)	0.53 ± 0.73	0.42 ± 0.62	0.11 [-0.10;0.32]	0.304	0.17 [-0.002;0.35]	0.052
HADS Anxiety score (mean ± sd)	8.42 ± 4.87	6.10 ± 4.12	2.32 [0.79;3.85]	0.003	2.30 [0.80;3.79]	0.003
HADS Depression score (mean ± sd)	5.81 ± 4.82	4.42 ± 3.92	1.39 [-0.21;2.99]	0.088	1.90 [0.35;3.45]	0.016
			Adjusted [OR 95% CI]			
Anxiety symptoms (score ≥ 11), n(%)	12 (34.97%)	576 (16.32%)	2.76 [1.23;6.19]	0.014	2.71 [1.09;6.78]	0.033
Depression symptoms (score ≥ 11), n(%)	6 (12.31%)	341 (8.29%)	1.55 [0.56;4.33]	0.399	2.20 [0.80;6.04]	0.124
			Crude RRR [95% CI]			
Physical function HAQ score, n(%)						
Mild to moderate difficulty (score < 0.8)	32 (70.39%)	2,217 (79.66%)	1		1	
Moderate to severe disability (0.8 ≤ score < 1.2)	8 (9.96%)	332 (7.34%)	1.54 [0.62;3.83]	0.358	2.44 [1.02;5.86]	0.045
Severe to very severe disability (score ≥ 1.2)	12 (19.66%)	557 (13.01%)	1.71 [0.75;3.88]	0.199	2.97 [1.34;6.60]	0.008

*Adjusted for sex, age and NUTS

TABLE IV.B. COMPARISON OF BURDEN BETWEEN SUBJECTS WITH AS OR PSA AND SUBJECTS WITHOUT RHEUMATIC DISEASES

	AS / PsA n=52	No rheumatic diseases n=679	Crude β [95% CI]	Crude p-value	Adjusted* β [95% CI]	Adjusted* p-value
Quality of life EQ5D score (mean ± sd)	0.68 ± 0.26	0.90 ± 0.11	-0.22 [-0.31;-0.14]	<0.001	-0.22 [-0.30;-0.13]	<0.001
SF-36 score (mean ± sd)						
Physical function	76.56 ± 29.67	90.41 ± 12.72	-13.86 [-22.67;-5.06]	0.002	-8.74 [-16.32;-1.15]	0.024
Role physical	63.62 ± 49.35	90.46 ± 15.85	-26.86 [-42.04;-11.69]	0.001	-23.47 [-38.41;-8.52]	0.002
Bodily pain	50.15 ± 24.57	86.81 ± 12.84	-36.69 [-44.69;-28.68]	<0.001	-35.41 [-43.65;-27.17]	<0.001
General health	44.07 ± 17.29	67.47 ± 10.43	-23.36 [-28.70;-18.01]	<0.001	-18.91 [-24.37;-13;45]	<0.001
Vitality	47.12 ± 24.76	72.88 ± 12.15	-25.70 [-34.12;-17.28]	<0.001	-22.91 [-31.36;-14.46]	<0.001
Social function	72.07 ± 28.80	92.99 ± 8.91	-20.88 [-29.18;-12.59]	<0.001	-19.28 [-27.64;-10.92]	<0.001
Role emotional	61.39 ± 49.13	90.30 ± 17.21	-28.88 [-46.29;-11.48]	0.001	-24.81 [-42.14;-7.48]	0.005
Mental health	55.81 ± 27.20	79.10 ± 12.07	-23.21 [-32.83; -13.59]	<0.001	-18.84 [-28.55;-9.13]	<0.001
Health transition	47.21 ± 16.46	50.21 ± 9.76	-3.00 [-8.69;2.70]	0.303	-3.34 [-8.73;2.05]	0.224
Physical function HAQ score (0-3) (mean ± sd)	0.53 ± 0.73	0.07 ± 0.18	0.46 [0.25;0.66]	<0.001	0.39 [-0.20;0.59]	<0.001
HADS Anxiety score (mean ± sd)	8.42 ± 4.87	4.64 ± 2.22	3.78 [2.16;5.39]	<0.001	3.47 [1.89;5.05]	<0.001
HADS Depression score (mean ± sd)	5.81 ± 4.82	2.19 ± 1.70	3.62 [2.01;5.24]	<0.001	2.93 [1.34;4.53]	<0.001
Adjusted [OR 95% CI]						
Anxiety symptoms (score ≥ 11)	12 (34.97%)	63 (5.31%)	9.59 [3.41;26.98]	<0.001	8.14 [2.49;26.55]	0.001
Depression symptoms (score ≥ 11)	6 (12.31%)	29 (1.35%)	1.55 [0.56;4.33]	0.399	4.18 [0.95;18.40]	0.058
Crude RRR [95% CI]						
Physical function HAQ score						
Mild to moderate difficulty (score < 0.8)	32 (70.39%)	629 (97.42%)	1		1	
Moderate to severe disability (0.8 ≤ score < 1.2)	8 (9.96%)	22 (1.37%)	10.07 [2.82;35,98]	<0.001	4.85 [1.07;22.04]	0.041
Severe to very severe disability (score ≥1.2)	12 (19.66%)	28 (1.21%)	22.49 [7.58;66.69]	<0.001	17.05 [6.43;45.21]	<0.001

*Adjusted for sex, age and NUTS

Sd: standard deviation; AS: Ankylosing Spondylitis; PsA: Psoriatic Spondyloarthritis; RMD: rheumatic and musculoskeletal diseases; HAQ: Health Assessement Questionnaire; HADS: Hospitalar Anxiety and Depression Scale; EQ5D: EuroQuol Questionnaire; SF36: Short Form 36 Health Questionnaire

TABLE V. EARLY RETIREMENT AMONG SUBJECTS WITH SPONDYLOARTHRITIS (TOTAL), ANKYLOSING SPONDYLITIS, PSORIATIC ARTHRITIS, OTHER SPA AND OTHER RMD

	Spondyloarthritis (Total) n=92	Ankylosing spondylitis n=32	Psoriatic arthritis n=20	Other SpA n=40	Other RMD n=3,106
RMD related retirement (yes), n(%)	9 (6.47%)	3 (7.08%)	5 (18.16%)	1 (1.89%)	197 (9.34%)
RMD related early retirement (yes), n(%)	8 (5.92%)	2 (4.25%)	5 (19.54%)	1 (1.97%)	181 (9.97%)

SpA: spondyloarthritis; RMD: rheumatic and musculoskeletal diseases

to an inadequate access to a rheumatology centre, should be clarified and prompt political intervention.

Our study showed that a definitive diagnosis of SpA was made more frequently in the younger population. However, the age at diagnosis presented is more than 10 years older than that previously described[6]. This could be due to delayed diagnosis, but there is some evidence that late-onset forms of SpA may become more common because of longer life expectancy[34]. Also, as described in other studies[35], PsA patients showed an older age at diagnosis when compared with AS patients.

The fact that most subjects did not practice physical exercise is a particularly alarming finding, especially considering the high prevalence of cardiovascular risk factors reported. Physical exercise has been shown to improve disease activity, symptoms, functional capacity, cardiorespiratory function and QoL, and it has been suggested that it could prevent the development of damage, with a synergistic effect with drug treatment[36,37]. The importance of exercise in SpA has led to its inclusion in the consensus for the management of SpA by diverse international organisms[38-40]. It is well known that patients with inflammatory joint diseases have increased cardiovascular disease risk, compared with the general population. Previous data indicate that cardiovascular burden of patients with SpA, PsA[41] and AS[42,43] is increased compared with the general population. These patients have a high prevalence of traditional risk factors, but there seems to be an additional disease-related risk for increased cardiovascular morbidity and mortality[41,44].

We also aimed to compare health related QoL of PsA and AS with the general population and other RMD. Our results indicate that patients with AS and PsA have a worse QoL and function than subjects without rheumatic diseases or with other RMD. Previous studies found that patients with PsA have significantly poorer health-related QoL than the general population[45]. PsA is associated with worse QoL and patients with PsA have worse functional status and greater disability than those with psoriasis alone[45]. The presence of concurrent psoriasis can confound the impact of PsA, because psoriasis is also associated with a high burden of illness[45]. Further, the impact of psoriasis is more than cosmetic, with suicidal ideation being reported in approximately 10% of patients aged 18–34 years[45]. Both cross-sectional and some longitudinal studies have showed that AS patients' QoL is diminished compared with the general population, although similar to the QoL of patients with other RMD[46]. In 2014, Ovayolu et al. reported that physical and mental QoL were remarkably impaired in AS patients, in comparison to healthy subjects[47]. Our study revealed higher anxiety and depression in patients with AS or PsA when compared with the general population and subjects with other RMD, stressing the burden of disease, not only on physical dimension, but also on mental health. Mental disease can contribute to subjects' debility along with all other complications associated with the disease. It seems that, besides all the new therapeutic strategies, QoL and mental health remain worrisome issues.

By definition, SpA is a disease that occurs in young adults at the peak of their productive lifespan[23]. Moreover, it is associated with a considerable burden in terms of restrictions in activities of daily living and in work productivity, which could ultimately lead to unemployment[48]. The reduction in work productivity is an important component of the indirect costs of SpA. In our study, although most patients were employed, almost 14% reported absenteeism in the last year. In fact, a recent study found that in Portugal, AS patients lose a mean of 110 working days per year, with a tremendous economic impact (Coelho P, Espondilite Anquilosante em Portugal). Patients with AS or PsA showed more disease-related early retirement than sub-

jects with another RMD. This appears to be related with disability, since physical function scores were worse in these patients. Chronic diseases pose serious challenges to the healthcare system, specifically through the large-scale consumption of health resources. Regarding the latter, we didn't find a difference between AS/PsA patients and subjects with another RMD, but given the very small sample size, more research is needed in order to obtain more reliable results.

CONCLUSIONS

PAASPORT analysis on EpiReumaPt data enabled the first population-based evaluation of Portuguese patients with SpA, namely AS and PsA. Our results emphasize the burden of SpA, which was associated with poor QoL and high early retirement related to disease, particularly for AS patients. The major physical, mental and socio-economic impact of PsA and AS in Portugal has also been demonstrated.

This study supports the need to adequately diagnose and treat patients to prevent long-term damage and early retirement, and the necessity to increase SpA awareness, making it a strong argument to encourage policy makers to expand the resources allocated to RMD diagnosis and treatment.

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