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Original Article RHEUMATOLOGY

Sexuality and sexual dysfunction in patients with psoriatic arthritis: A cross-sectional study

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ABSTRACT

OBJECTIVE: Psoriatic arthritis (PsA) is a chronic inflammatory disorder affecting the joints, skin and entheses. Despite the importance of the topic, few studies have investigated the association between PsA and sexual function. The purpose of this study was to assess sexuality and the prevalence of sexual dysfunction (SD) in patients with PsA.

METHODS: This was an observational, cross-sectional single-center study on 23 PsA patients (male=12; female=11) evaluated with 2 male questionnaires (MSQ= Male Sexual Quotient, and IIEF=International Index of Erectile Function) and 2 female questionnaires (FSQ= Female Sexual Quotient, and FSFI=Female Sexual Function Index) validated for Brazilian Portuguese, in order to determine changes in sexual function. Clinical parameters, musculoskeletal activity and skin activity were also analyzed to identify factors associated with SD.

RESULTS: The mean age was 52.1±9.7 years (males) and 49.1±9.6 years (females). Clinically, the patients had low skin and peripheral joint disease activity or were in remission. The mean time of PsA was 10±6.2 years, and 65.2% had a steady sexual partner. The mean MSQ score was 75.8±16.8. The prevalence of SD was 91.7% in men (IIEF), with a predominance of mild SD. The mean FSQ score was 64.9±24.1. The prevalence of SD was 72.7% in women (FSFI), with low domain scores. Also, a significant association was found between female age and total and domain-specific FSFI scores. PASI (Psoriasis Area and Severity Index) and the general satisfaction domain (IIEF) were significantly correlated.

CONCLUSION: This study found a high prevalence of SD in PsA patients. Age had a negative impact on female sexual function. Physicians need to be more aware of SD in this population to provide early multidisciplinary treatment and minimize the impact of the disease on the quality of life of patients and their partners.

Keywords: Psoriatic arthritis; sexual dysfunction; sexuality.

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One of the most significant aspects of human life, sexuality is experienced through a sequence of physiological changes referred to as the sexual response cycle, which is divided into four phases: desire, arousal, orgasm and resolution [1]. Several factors highly prevalent in the general population (e.g., psychosocial, re-

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ligious, economic, chronic disease, drug use) can affect these phases, leading to sexual dysfunction (SD) [1]. In patients with chronic conditions, such as rheumatologic disease, SD tends to cause accentuated suffering and difficulty in interpersonal relationships [1, 2].

SD in rheumatic patients may be caused by the rheumatic disease itself, by associated comorbidities, and/or by drugs used for treatment [2]. Such patients are approximately three times more likely than healthy individuals to develop SD [2]. One study found a 69.9% prevalence of SD in rheumatologic patients, closely related to anxiety and depression [3]. A Brazilian study involving 163 women with different rheumatologic diseases observed SD in 18.2% [4].

Psoriatic arthritis (PsA) is a chronic inflammatory disease of the skin and joints. It is present in 5-42% of patients with psoriasis and is known to influence sexual function [5, 6]. In a study carried out in Norway, one in five PsA patients reported a negative impact of the disease on sexual activity [7]. Disease duration and musculoskeletal activity, rather than skin involvement, were reported to be associated with decreased sexual activity [7]. A recent study found impaired sexual function in PsA patients stratified by sex, especially women, seniors and people with low income and/or emotional disorders [8].

Few studies have evaluated the influence of PsA on sexuality [7, 8], although some authors have addressed the issue in patients with psoriasis alone [5, 6, 9]. In these studies, the severity of psoriasis, the location of the lesions, the presence of genital psoriasis and the association with anxiety and depression were shown to have a negative impact on sexuality [5, 6, 9–11].

The purpose of this study was to assess the prevalence of altered sexual functioning in patients with PsA and identify associations with demographic, clinical (skin and musculoskeletal disease activity) and treatment variables.

MATERIALS AND METHODS

This was a cross-sectional observational study conducted at the rheumatology service of a university hospital in northeastern Brazil from October to December 2020. All 23 study subjects (12 men and 11 women) gave their informed written consent prior to inclusion in the study protocol. The patients were recruited following good clinical practices and the study was conducted in accordance with the Declaration of Helsinki and submitted to an online national research database (Plataforma Brazil).

Highlight key points

- High prevalence of sexual dysfunction in patients with psoriatic arthritis.
- Age has a negative impact on female sexual function.
- Probing psoriatic patients for sexual dysfunction allows for early treatment, potentially improving their quality of life and that of their partners.

The study protocol was approved by the research ethics committee of the General Hospital of Fortaleza (date: 17.04.2019, number: 10589719.5.0000.5040).

The inclusion criteria were: males and females over 18 years of age with a diagnosis of PsA based on the CASPAR criteria [12], any sexual orientation, and a history of at least one sexual intercourse. Exclusion criteria: age under 18 years or over 65 years, virginity, refusal to participate in the study, cognitive impairment preventing the use of questionnaires, concomitant systemic autoimmune disease (rheumatoid arthritis, Sjögren's syndrome, systemic lupus erythematosus), heart disease (class III and IV heart failure), neurological disorders, kidney or liver failure, and drug abuse.

Patient Assessment

Information was collected through reviews of medical records, clinical examinations and administration of standardized questionnaires.

a) Male questionnaires to assess sexual function, validated for Brazilian Portuguese: MSQ (Male Sexual Quotient) [13] and IIEF (International Index of Erectile Function) [14]. The MSQ consists of 10 questions and the final score is categorized into the following sexual performance classes: 0 to 20 points (null to poor), 22 to 40 points (bad to unfavorable), 42 to 60 (unfavorable to fair), 62 to 80 (fair to good) and 82 to 100 (good to excellent). The IIEF consists of 15 questions ranging from 0 to 5 or 1 to 5, which assess 5 domains of sexuality separately: Q1 (erectile function), Q2 (orgasm and ejaculation), Q3 (sexual desire), Q4 (satisfaction with sexual intercourse) and Q5 (general satisfaction). According to the score obtained for each domain (lower scores denote the presence of SD), the patient can be classified into the following categories of SD: none, mild, mild to moderate, moderate, and severe.

b) Female questionnaires to assess sexual function, validated for Brazilian Portuguese: FSQ (Female Sexual

Quotient) [15] and FSFI (Female Sexual Function Index) [16]. The FSQ has 10 questions and the same interpretation of the final score as the MSQ. The FSFI has 19 questions ranging from 0 to 5 or 1 to 5 (the poorer the sexual performance, the lower the score). The instrument assesses 6 domains of sexuality separately with the following cutoff points: desire (4.28), excitement (5.08), lubrication (5.45), orgasm (5.05), satisfaction (5.04) and pain (5.51). The cutoff point used for the total score was 26.55.

c) Demographic variables: age, race, sex, marital status, number of children, family income, occupation, education and religion.

d) Clinical data: time of onset of psoriasis and PsA, type of involvement of PsA (axial, oligoarthritis, symmetrical polyarthritis, distal, mutilating, nail, uveitis, dactylitis, enthesitis and inflammatory bowel disease); use of medications (non-steroidal anti-inflammatory drugs [NSAIDs], glucocorticoids, synthetic and biological disease-modifying drugs [DMARDs], antidepressants); comorbidities (presence of diabetes mellitus) (defined as fasting blood glucose >126 mg/dL or casual blood glucose ≥200 mg/dL), systemic arterial hypertension (SAH) (defined as systolic pressure ≥140 mmHg and/or diastolic pressure ≥90 mmHg), dyslipidemia (defined as LDL cholesterol ≥160 mg/dL or triglycerides ≥150 mg/dL or HDL ≤40 mg/dL in men and ≤50 mg/dL in women), heart disease (defined as echocardiography with an ejection fraction of ≤55%), current or previous smoking, hypothyroidism, fibromyalgia, anxiety, depression, sedentary lifestyle and body mass index (BMI), calculated by dividing weight (kg) by height (m) squared (overweight: 25-29.9; obese: ≥30) [17].

e) Gynecological data: date of last menstruation, use of contraceptives and hormone replacement therapy.

f) Musculoskeletal activity index: peripheral disease: DAPSA (Disease Activity Index for Psoriatic Arthritis) [18]; axial disease: BASDAI (Bath Ankylosing Spondylitis Disease Activity Index) [19]. The DAPSA composite index stratifies patients into four categories: remission (0 to 4), low disease activity (>4 to 14), moderate activity (>14 to 28), and high activity (>28). BASDAI employs only two categories: inactivity (<4) and disease activity (≥4).

g) Skin activity index: PASI (Psoriasis Area and Severity Index; range: 0-72). PASI was calculated with the GRAPPA app for iOS and Android.

Statistical Analysis

Demographic and clinical findings were expressed as mean±standard deviation for continuous variables, and as frequencies and percentages for categorical variables. Medians (interquartile range) were calculated for non-normally distributed continuous variables. The median scores of continuous sociodemographic, psoriasis and general health variables were compared with the Mann-Whitney or Kruskal-Wallis tests. We analyzed the scores from the female questionnaires stratified by age, using the median as cutoff (≤48 vs. >48 years).

Spearman correlations were used to verify the association between disease activity indices and mean values stratified by sex (quantitative variables). For all inferential procedures, a 5% significance level was adopted. The data were entered in Excel spreadsheets and analyzed using the software SPSS Statistics 24.0 (Armonk, New York, United States: IBM Corp.).

RESULTS

The average age of our patients was 52.1±9.7 years (males) and 49.1±9.6 years (females) (range: 29-64) (Table 1). Most patients had a steady sexual partner (married=34.8%; domestic partnership=30.4%). The women had a higher rate of sexual abstinence (72.7%) in the 4 weeks preceding the interview.

The other clinical variables are displayed in Table 1. The mean duration of PsA was 10±6.2 years and that of psoriasis was 13.6±8.3 years. In the total sample, the most frequent clinical form of PsA at diagnosis was symmetric polyarthritis (65.2%) and the most common type of extra-articular involvement was enthesitis (43.5%). All patients had low PASI indices and most (60.9%) had low DAPSA indices (mean: 15.6±23.8), indicating low skin and peripheral joint disease activity or remission. The axial joint component was predominant in male patients (M/F ratio=7:1). Half the patients had BASDAI scores indicating active disease (mean: 4.5±2.5). The most frequent associated comorbidities were SAH (47.8%), sedentary lifestyle (87%), overweight and obesity (69.6%) (mean BMI: 28 kg/m^2).

Only two female patients were not treated with DMARDs (Table 1). Among the remaining patients, 78.5% had a biological DMARD (anti-TNF or anti-IL17) as the basis of their pharmacological treatment for PsA. The use of anti-inflammatory drugs (8.7%) and glucocorticoids (8.7%) was low in the sample. Twenty-six percent

of the patients were on antidepressants, with amitriptyline being the most common drug. None of the female patients was under the influence of hormonal contraceptives or hormone replacement therapy at the time of the evaluation, and most (n=7; 63.7%) were already in menopause.

The average scores from the male and female questionnaires are shown in Table 1. Sexual performance was better for females (mean FSQ score: 64.9±24.1). Most patients were categorized as having regular to good sexual performance (45.5%) or good to excellent performance (18.2%). In the FSFI, the prevalence of SD was 72.7% (total score: <26.5; mean total score: 13.4±12.9). Among the male patients, sexual performance was good to excellent (50%) or fair (50%) according to the MSQ (mean score: 75.8±16.8). Eleven of 12 patients (91.7%) had some degree of SD in at least one domain of the IIEF, with a predominance of mild SD, based on the mean score by domain.

Spearman's Correlation

No correlation was found between QSF scores, FSFI scores and clinical variables in women (Table 2). Likewise, no correlation was observed between MSQ scores, IIEF scores and clinical variables in men (Table 3).

When the patients were stratified by age group using the median as cutoff (≤48 vs >48 years), a statistically significant association was observed for females between age and QSF scores and total and all domain-specific FSFI scores (desire, excitement, lubrication, orgasm, satisfaction and pain) ($p<0.05$) (Table 4). On the other hand, DAPSA scores were not correlated with PASI indices in any of the domains in women (Table 5).

However, a positive correlation was found between PASI indices and IIEF scores in the general satisfaction domain in male patients ($r=0.61$; $p=0.037$). No correlation was observed between disease activity indices assessed by BASDAI and DAPSA and SD assessed by QSM and IIEF (Table 6).

DISCUSSION

In this study we assessed the prevalence of SD in Brazilian PsA patients and tested for associations with demographic, clinical (skin and musculoskeletal disease activity) and treatment variables. Sexual function was significantly impaired in both sexes. Women displayed the worst sexual performance, according to the FSFI. Also, a correlation was found for women between age and total and domain-specific FSFI scores.

Table 1. Clinical variables, sexual dysfunction scores and demografic characteristics of patients with psoriatic arthristis

	%	Mean age (DP)
Sex		
Male	52.2	52.1 (9.7)
Female	47.8	39.1 (9.6)
Marital status		
Single	21.7	
Domestic partnership	30.4	
Married	34.8	
Widowed	4.3	
Divorced	8.7	
PsA time, mean (SD)		10 (6.2)
Psoriasis, mean (SD)		13.6 (8.3)
Type of involvement		
Axial	34.8	
Oligoarthritis	34.8	
Symmetrical polyarthritis	65.2	
Dactylitis	39.1	
Enthesite	43.5	
IBD	4.3	
Disease activity indices		
DAPSA, mean (SD)		15.6 (23.8)
BASDAI, mean (SD)		4.5 (2.5)
PASI, mean (SD)		1.4 (2)
Comorbidities		
HAS	47.8	
DM2	26.1	
Dyslipidemia	34.8	
Active smoker	4.3	
Ex-smoker	26.1	
Depression	4.3	
		Mean (SD)
Women		
FSQ		64.9 (24.1)
FSFI		
Total		13.4 (12.9)
Desire		2.6 (1.3)
Arousal		1.6 (2.3)
Lubrication		1.9 (2.6)
Orgasm		1.7 (2.5)
Satisfaction		3.5 (1.5)
Pain		2.1 (2.9)
Men		
MSQ		75.8 (16.8)
IIEF		59.6 (13.4)
Total		23.5 (7.5)
Erectile function		9.4 (0.8)
Orgasm and ejaculation		8.2 (1.3)
Sexual desire		10.5 (3.9)
Satisfaction in sexual intercourse		8 (2.4)

SD: Standard deviation; IBD: Inflammatory bowel disease; DAPSA: Disease Activity Index for Psoriatic Arthritis; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; PASI: Psoriasis Area and Severity Index; SAH: Systemic arterial hypertension; DM2: Diabetes mellitus; FSQ: Female sexual quotient; MSQ: Male Sexual quotient; FSFI: Female Sexual Function Index; IIEF: International Index of Erectile Function.

TABLE 2. Correlation between QSF e FSFI questionaries and clinical variables

Variables	Median (1º–3º quartis)							
	QSF	FSFI	Desire	Arousal	Lubrification	Orgasm	Satisfaction	Pain
Hypertension[1]	p=1.000	p=0.583	p=1.000	p=0.205	p=0.243	p=0.290	p=0.229	p=0.199
Yes	69 (48–80)	4.8 (4–5.6)	2.4 (1.8–2.4)	0 (0–0)	0 (0–0)	0 (0–0)	2.6 (2.4–3.2)	0 (0–0)
No	68 (58–78)	22.6 (4.4–27.5)	2.4 (1.2–3.6)	2.7 (0–4.2)	3.9 (0–4.5)	3.6 (0–4)	4.8 (3.2–4.8)	5.2 (0–6)
Diabetes mellitus[1]	p=0.099	p=0.098	p=0.143	p=0.275	p=0.273	p=0.275	p=0.282	p=0.269
Yes	35 (12–58)	3.7 (3–4.4)	1.5 (1.2–1.8)	0 (0–0)	0 (0–0)	0 (0–0)	2.2 (1.2–3.2)	0 (0–0)
No	74 (64–80)	5.6 (4.8–27.5)	2.4 (2.4–3.6)	0 (0–4.2)	0 (0–4.5)	0 (0–4)	3.2 (2.4–4.8)	0 (0–6)
Dyslipidemia[1]	p=0.705	p=0.507	p=0.845	p=0.662	p=0.742	p=0.827	p=0.443	p=0.658
Yes	61 (30–87)	4.4 (3.5–19.4)	2.1 (1.5–3.6)	0 (0–2.6)	0 (0–3)	0 (0–3)	2.6 (1.8–4.4)	0 (0–3)
No	68 (58–80)	5.6 (4.4–27.5)	2.4 (1.2–3.6)	0 (0–4.2)	0 (0–4.5)	0 (0–4)	3.2 (2.4–4.8)	0 (0–6)
Past smoking[1]	p=0.705	p=0.925	p=0.493	p=0.662	p=0.742	p=0.827	p=0.632	p=0.658
Yes	72 (38–90)	5.2 (3.9–19.8)	2.4 (2.1–3.6)	0 (0–2.6)	0 (0–3)	0 (0–3)	2.8 (1.8–4.6)	0 (0–3)
No	68 (48–78)	4.8 (4–27.5)	2.4 (1.2–3.6)	0 (0–4.2)	0 (0–4.5)	0 (0–4)	3.2 (2.4–4.8)	0 (0–6)
Depression	p=0.752	p=0.874	p=0.870	p=0.464	p=0.462	p=0.464	p=0.336	p=0.458
Yes	64 (64–64)	4.8 (4.8–4.8)	2.4 (2.4–2.4)	0 (0–0)	0 (0–0)	0 (0–0)	2.4 (2.4–2.4)	0 (0–0)
No	71 (48–80)	5.2 (4–27.5)	2.4 (1.2–3.6)	0 (0–4.2)	0 (0–4.5)	0 (0–4)	3.2 (2.4–4.8)	0 (0–6)
Anxiety[1]	p=0.855	p=0.647	p=1.000	p=0.833	p=0.750	p=0.672	p=0.309	p=0.669
Yes	71 (44–80)	5.2 (3.6–22.6)	2.4 (1.8–2.4)	0 (0–2.7)	0 (0–3.9)	0 (0–3.6)	2.8 (2.4–4.8)	0 (0–5.2)
No	68 (58–74)	4.8 (4.4–27.5)	2.4 (1.2–3.6)	0 (0–4.2)	0 (0–4.5)	0 (0–4)	3.2 (2.8–5.2)	0 (0–6)
Fibromyalgia[1]	p=0.346	p=0.288	p=0.222	p=0.585	p=0.494	p=0.413	p=0.633	p=0.580
Yes	82 (64–100)	19.4 (4.8–33.9)	3.6 (2.4–4.8)	2.6 (0–5.1)	3 (0–6)	3 (0–6)	4.2 (2.4–6)	3 (0–6)
No	68 (48–78)	4.8 (4–22.6)	2.4 (1.2–2.4)	0 (0–2.7)	0 (0–3.9)	0 (0–3.6)	3.2 (2.4–4.8)	0 (0–5.2)
Sedentary lifestyle[1]	p=0.206	p=0.205	p=0.140	p=0.067	p=0.098	p=0.143	p=0.423	p=0.138
Yes	66 (48–78)	4.8 (4–22.6)	2.4 (1.2–2.4)	0 (0–2.7)	0 (0–3.9)	0 (0–3.6)	3 (2.4–4.8)	0 (0–5.2)
No	88 (88–88)	32.9 (32.9–32.9)	4.8 (4.8–4.8)	5.7 (5.7–5.7)	6 (6–6)	5.6 (5.6–5.6)	4.8 (4.8–4.8)	6 (6–6)
Biologic[1]	p=1.000	p=1.000	p=0.127	p=0.386	p=0.386	p=0.386	p=0.280	p=0.386
Anti-IL17	64 (12–80)	4.8 (3–5.6)	2.4 (1.8–2.4)	0 (0–0)	0 (0–0)	0 (0–0)	2.4 (1.2–3.2)	0 (0–0)
Anti-TNF	66 (51–76)	4.2 (3.8–13.5)	1.2 (1.2–1.8)	0 (0–1.4)	0 (0–2)	0 (0–1.8)	3 (2.6–4)	0 (0–2.6)
Antihypertensive[1]	p=1.000	p=0.583	p=1.000	p=0.205	p=0.243	p=0.290	p=0.229	p=0.199
Yes	69 (48–80)	4.8 (4–5.6)	2.4 (1.8–2.4)	0 (0–0)	0 (0–0)	0 (0–0)	2.6 (2.4–3.2)	0 (0–0)
No	68 (58–78)	22.6 (4.4–27.5)	2.4 (1.2–3.6)	2.7 (0–4.2)	3.9 (0–4.5)	3.6 (0–4)	4.8 (3.2–4.8)	5.2 (0–6)
DAPSA[2]	p=0.567	p=0.492	p=0.418	p=0.732	p=0.704	p=0.673	p=0.555	p=0.724
Remission	78 (78–78)	3.6 (3.6–3.6)	1.2 (1.2–1.2)	0 (0–0)	0 (0–0)	0 (0–0)	2.4 (2.4–2.4)	0 (0–0)
Low activity	68 (44–80)	5.6 (4–27.5)	2.4 (1.2–3.6)	0 (0–4.2)	0 (0–4.5)	0 (0–4)	3.2 (2.8–4.8)	0 (0–6)
Moderate activity	48 (48–48)	4.8 (4.8–4.8)	2.4 (2.4–2.4)	0 (0–0)	0 (0–0)	0 (0–0)	2.4 (2.4–2.4)	0 (0–0)
High activity	82 (64–100)	19.4 (4.8–33.9)	3.6 (2.4–4.8)	2.6 (0–5.1)	3 (0–6)	3 (0–6)	4.2 (2.4–6)	3 (0–6)

QSF: Female sexual quotient; FSFI: Female Sexual Function Index; DAPSA: Disease Activity Index for Psoriatic Arthritis; Anti-TNF: Anti-tumor necrosis factor blockers; anti-Il-17: Anti-interleukin-17; 1: Mann-Whitney test; 2: Kruskal-Wallis test.

The present study has the advantage of evaluating sexuality and SD in patients with PsA against the patients' demographic, clinical and treatment profiles. Also, we used questionnaires on sexuality validated for Brazilian Portuguese [13–16] and correlated the findings with disease activity and skin involvement indices, stratifying the sample by age and segregating men from women to test for gender differences between the validated questionnaires.

Table 3. Correlation between MSQ and IIEF scores and clinical variables

Variables	Median (1º–3º quartis)						
	MSQ	IIEF	EF	OE	SD	SSI	GS
Hypertension[1]	p=0.463	p=0.254	p=0.805	p=0.360	p=0.448	p=0.458	p=0.155
Yes	74 (56–82)	59 (58–62)	24 (24–26)	10 (10–10)	7 (7–9)	10 (10–11)	8 (6–8)
No	82 (64–88)	63 (62–68)	26 (23–29)	9 (9–10)	9 (7–9)	11 (10–14)	9 (8–10)
Diabetes mellitus[1]	p=0.609	p=0.306	p=0.667	p=0.632	p=0.791	p=0.388	p=0.221
Yes	69 (52–91)	58.5 (42.5–67)	24 (17–27)	10 (9–10)	8 (6.5–9.5)	10 (5–12.5)	7 (4–9)
No	79 (69–87)	63 (62–67)	26 (23.5–29)	9.5 (9–10)	8.5 (7–9)	11 (10.5–13)	9 (8–10)
Dyslipidemia[1]	p=0.609	p=0.306	p=0.667	p=0.632	p=0.791	p=0.388	p=0.221
Yes	69 (52–91)	58.5 (42.5–67)	24 (17–27)	10 (9–10)	8 (6.5–9.5)	10 (5–12.5)	7 (4–9)
No	79 (69–87)	63 (62–67)	26 (23.5–29)	9.5 (9–10)	8.5 (7–9)	11 (10.5–13)	9 (8–10)
Current smoking[1]	p=0.245	p=0.191	p=0.107	p=0.414	p=0.547	p=0.185	p=0.233
Yes	56 (56–56)	40 (40–40)	7 (7–7)	10 (10–10)	9 (9–9)	8 (8–8)	6 (6–6)
No	82 (64–88)	63 (59–68)	26 (24–29)	10 (9–10)	8 (7–9)	11 (10–14)	9 (8–10)
Past smoking[1]	p=0.388	p=0.332	p=0.192	p=0.226	p=0.655	p=0.190	p=0.580
Yes	87 (74–100)	68.5 (62–75)	28 (26–30)	10 (10–10)	8.5 (7–10)	13 (11–15)	9 (8–10)
No	79 (56–86)	62.5 (58–66)	24 (23–29)	9.5 (9–10)	8.5 (7–9)	10.5 (10–12)	8.5 (6–10)
Anxiety[1]	p=0.245	p=0.309	p=0.660	p=0.414	p=0.098	p=0.462	p=0.655
Yes	56 (56–56)	58 (58–58)	24 (24–24)	10 (10–10)	6 (6–6)	10 (10–10)	8 (8–8)
No	82 (64–88)	63 (59–68)	26 (23–29)	10 (9–10)	9 (7–9)	11 (10–14)	9 (6–10)
Sedentary lifestyle[1]	p=0.829	p=0.161	p=0.192	p=0.069	p=0.823	p=0.081	p=0.740
Yes	79 (64–86)	63 (59–68)	26 (24–29)	10 (9–10)	8.5 (7–9)	11 (10–14)	8.5 (8–10)
No	73 (48–98)	44.5 (27–62)	17 (10–24)	8.5 (8–9)	8 (7–9)	5 (0–10)	6 (2–10)
Anti-inflammatory drugs[1]	p=0.388	p=0.590	p=0.384	p=1.000	p=0.823	p=0.827	p=0.580
Yes	69 (64–74)	65 (62–68)	27.5 (26–29)	9.5 (9–10)	8 (7–9)	11 (11–11)	9 (8–10)
No	82 (56–88)	62.5 (58–66)	24 (23–29)	10 (9–10)	8.5 (7–9)	10.5 (10–14)	8.5 (6–10)
Biologic[1]	p=0.477	p=0.637	p=0.475	p=0.891	p=0.903	p=1.000	p=0.469
Anti-IL17	69 (64–74)	65 (62–68)	27.5 (26–29)	9.5 (9–10)	8 (7–9)	11 (11–11)	9 (8–10)
Anti-TNF	82 (56–86)	63 (58–66)	24 (23–29)	10 (9–10)	8 (7–9)	11 (10–14)	8 (6–9)
Antihypertensive[1]	p=0.463	p=0.254	p=0.805	p=0.360	p=0.448	p=0.458	p=0.155
Yes	74 (56–82)	59 (58–62)	24 (24–26)	10 (10–10)	7 (7–9)	10 (10–11)	8 (6–8)
No	82 (64–88)	63 (62–68)	26 (23–29)	9 (9–10)	9 (7–9)	11 (10–14)	9 (8–10)
BASDAI[1]	p=1.000	p=0.077	p=**0.046**	p=0.180	p=0.354	p=0.064	p=0.354
Inactivity or low activity	82 (56–82)	59 (58–63)	24 (24–26)	10 (10–10)	7 (6–9)	10 (10–11)	8 (6–9)
Activity	75 (69–81)	67 (64–70)	29 (27.5–29.5)	9.5 (9–10)	8 (7–9.5)	11.5 (11–13)	8.5 (8–9.5)
DAPSA[2]	p=0.657	p=0.747	p=0.530	p=0.589	p=0.771	p=0.759	p=0.872
Remission	69 (56–82)	51.5 (40–63)	16.5 (7–26)	10 (10–10)	8 (7–9)	9.5 (8–11)	7.5 (6–9)
Low activity	86 (56–98)	62 (58–72)	24 (23–30)	10 (8–10)	9 (7–10)	10 (10–14)	8 (6–10)
Moderate activity	69 (64–74)	65 (62–68)	27.5 (26–29)	9.5 (9–10)	8 (7–9)	11 (11–11)	9 (8–10)
High activity	76 (76–76)	66 (66–66)	29 (29–29)	9 (9–9)	7 (7–7)	12 (12–12)	9 (9–9)

MSQ: Male sexual quotient; IIEF: International Index of Erectile Function; EF: Erectile function;OE: Orgasm and ejaculation; SD: Sexual desire;SSI: Satisfaction in sexual intercourse; GS: Geral satisfaction; BASDAI: Bath Ankylosing Spondylitis Activity Index; DAPSA: Disease Activity Index for Psoriatic Arthritis; anti-TNF: Anti-tumor necrosis factor blockers; Anti-Il-17: Anti-interleukin-17; 1: Mann-Whitney test; 2: Kruskal-Wallis test.

Table 4. Analysis of female questionnaire scores stratified by age

Variables	Age		
	≤48 years	>48 years	p
QSF, median (IIQ)	74 (48–88)	64 (58–74)	0.361
FSFI, median (IIQ)	25.1 (5.6–32.9)	4 (3.6–4.4)	**0.008**
Desire, median (IIQ)	3 (2.4–4.8)	1.2 (1.2–1.8)	**0.011**
Arousal, median (IIQ)	3,5 (0–5.1)	0 (0–0)	**0.034**
Lubrication, median (IIQ)	4.2 (0–6)	0 (0–0)	**0.034**
Orgasm, median (IIQ)	3.8 (0–5.6)	0 (0–0)	**0.034**
Satisfaction, median (IIQ)	4.8 (3.2–5.2)	2.4 (2.4–2.8)	**0.033**
Pain, median (IIQ)	5.6 (0–6)	0 (0–0)	**0.032**

Mann-Whitney test; IIQ: Interquartile range; QSF: Female sexual quotient; FSFI: Female Sexual Function Index.

Table 5. Correlations between DAPSA, PASI and female questionnaire scores

Variables	DAPSA		PASI	
	Correlation coefficient	p	Correlation coefficient	p
QSF	0.15	0.670	-0.05	0.878
FSFI	0.40	0.222	-0.18	0.598
Desire	0.56	0.076	-0.05	0.886
Arousal	0.26	0.434	-0.11	0.748
Lubrication	0.28	0.405	-0.14	0.680
Orgasm	0.29	0.379	-0.17	0.616
Satisfaction	0.13	0.705	-0.19	0.582
Pain	0.28	0.409	-0.17	0.611

DAPSA: Disease Activity Index for psoriatic arthritis; PASI: Psoriasis Area and Severity Index; QSF: Female sexual quotient; FSFI: Female Sexual Function Index.

Table 6. Correlation between disease activity indices and male questionnaire scores

	BASDAI		DAPSA		PASI	
	Correlation coefficient	p	Correlation coefficient	p	Correlation coefficient	p
QSM	-0.14	0.758	-0.10	0.761	0.26	0.420
IIEF	0.39	0.383	0.26	0.409	0.53	0.076
Erectile function	0.51	0.238	0.41	0.185	0.41	0.187
Orgasm and ejaculation	-0.63	0.127	-0.12	0.714	-0.41	0.184
Sexual desire	0.15	0.749	-0.11	0.728	0.07	0.824
Satisfaction in sexual intercourse	0.51	0.247	0.26	0.416	0.32	0.306
General satisfaction	0.22	0.628	0.05	0.885	0.61	**0.037**

BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; DAPSA: Disease Activity Index for psoriatic arthritis; PASI: Psoriasis Area and Severity Index; QSM: Male sexual quotient; IIEF: International Index of erectile function.

The etiology of SD is multifactorial, involving an array of psychosocial and physiological factors [1]. However, despite the high prevalence of SD in the general population and specifically in patients with rheumatic disease, the problem is often neglected in routine clinical care [1, 4, 20]. This may be attributed to the health care setting (hasty consultations, lack of privacy in the office, ineptitude in addressing the topic, lack of interest) and/or to the patient (embarrassment, frustration, religious concerns) [20–24]. In this study we were able to confirm the reported high rate of SD in PsA patients using validated questionnaires (FSFI and IIEF).

In the literature on psoriasis, SD is more prevalent in women than in men [8, 9, 25], but we observed mild and relatively more frequent impairment in the male group with PsA. A cohort study found an increased risk of erectile dysfunction (ED) in men with PsA, but likely underpowered due to the small number of cases [26].

Interestingly, no correlation was observed between joint disease activity and SD scores, even for men with BASDAI scores indicating axial disease activity. However, a more robust conclusion in this respect cannot be drawn due to the small sample size, and we did not use the Assessment of Spondylarthritis International Society Health Index (ASAS-HI) which includes a specific question (item 7) about loss of interest in sex [27]. Similarly to what occurs with rheumatoid arthritis and other chronic inflammatory arthropathies, active joint disease (which causes pain, morning stiffness, arthritis, functional disability and fatigue) is known to reduce interest in the sexual act and compromise sexual performance. Add to this the impact of low self-esteem and unfavorable body image arising from joint deformities and disease duration [21, 23, 28, 29]. Moreover, it has been reported that PsA patients are at greater risk of SD than patients with psoriasis alone [25, 30, 31] and comparisons between PsA and axial spondyloarthritis using a sexuality-specific question from the ASAS-HI have shown that PsA patients experience a greater impact of the disease on their sex life [32].

Interestingly, in our female patients, age and SD were significantly associated, matching the literature [8, 9] and suggesting that impairment of sexual function increases with age, reflecting the accumulation of a range of organic and psycho-affective risk factors [9].

Our patients had mild psoriasis according to the PASI index and a positive correlation was observed between the general satisfaction domain of the IIEF and the degree of skin involvement, suggesting that in men the presence of greater skin involvement was not a preponderant factor in the general satisfaction domain. Reinforcing this finding, Haugeberg et al. [7] examined the prevalence of self-reported problems with sexual activity among PsA patients and studied potential associations with various demographic, musculoskeletal, and dermatological disease variables. The authors concluded that disease duration and musculoskeletal involvement, but not skin psoriasis involvement, were associated with impaired sexual activity.

Mood disorders are frequent in patients with psoriasis and PsA, with shared pathophysiological mechanisms, but this association has not always been related to SD in studies [20, 25, 30, 32]. Systemic arterial hypertension, diabetes mellitus and dyslipidemia (comorbidities particularly prevalent in these patients) also predispose to atherosclerosis and ED [9, 31, 33]. Nevertheless, we found no significant association between these pathologies and the presence of SD in our PsA patients.

Drug treatment for psoriasis and PsA can also influence sexual function, although in this study we observed no significant association between drug treatment and SD. In general, by decreasing the activity of joint and skin disease, pharmacological treatment tends to improve sexual function. This was observed in a study comparing PASI indices to levels of sexual difficulty (question 9 in the Dermatology Life Quality Index) in psoriasis patients at baseline and after 12 weeks of treatment with ustekinumab (a biological DMARD), compared to placebo [10]. Also, anti-inflammatory drug treatments have been associated with better sexual function [8], while ED and reductions in libido have been documented with the use of methotrexate (a conventional synthetic DMARD) [34, 35]. Similar changes in sexual function are reported with the use of glucocorticoids in men due to gonadal dysfunction [36]. Other drugs used to treat comorbidities, such as antidepressants (tricyclics and serotonin reuptake inhibitors), can cause decreased libido and difficulty in reaching orgasm [37].

Our study has some limitations: i) The small size of the sample of patients with clinically inactive skin and peripheral joint disease made statistical analysis more difficult, and due to Covid-19 restrictions, attendance was reduced at our clinic; consequently, fewer patients could be enrolled in the study. However, we stratified the sample by sex and calculated Spearman correlation coefficients to compare disease activity to specific mean scores

to make our findings more robust. ii) The cross-sectional study design did not allow to infer causality between the variables. iii) We did not include questionnaires measuring quality of life and depression since some of the patients were using antidepressants. Finally, iv) no control group was included, nor did we collect information about the hormonal status of the patients or the cumulative dose of corticosteroids; however, most patients were not using corticosteroids or were taking low doses.

Conclusion

In conclusion, our study found a high prevalence of SD in male and female PsA patients, with age having a negative impact on female sexual capacity. More research is needed to confirm these specific findings. Health professionals should probe for sexual dysfunction in this patient population in order to provide early treatment or, if needed, refer patients for specialized care with a view to safeguarding their quality of life and that of their partners.

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