

Anxiety and Depressive Symptoms in Psoriatic Arthritis: Prevalence and Associations With Sleep, Lifestyle, and Inflammatory Markers

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Abstract

Background: Anxiety and depressive symptoms are clinically important but frequently under-recognized comorbidities in psoriatic arthritis (PsA). We aimed to estimate the prevalence of anxiety and depressive symptoms in patients with PsA and to explore their associations with demographic, lifestyle, sleep, treatment-related, and inflammatory characteristics.

Methods: This single-center analytical cross-sectional study included 110 adults receiving treatment for PsA at a specialist rheumatology clinic in Bengaluru, India. Participants completed the Hospital Anxiety and Depression Scale (HADS). Scores of 8-10 and 11-21 on either subscale were classified as borderline and abnormal, respectively; a score of at least 8 was considered screening-positive. Clinical, lifestyle, treatment, baseline erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and self-reported sleep data were obtained from the study dataset. Associations were tested using two-sided Pearson chi-square tests; exploratory paired sleep responses were assessed with the continuity-corrected McNemar chi-square test.

Results: The mean age was 47.4 years (SD 13.7), and 67 participants (60.9%) were women. Twenty-nine participants screened positive for anxiety (26.4%; 95% CI 18.4-35.6), 22 for depression (20.0%; 95% CI 13.0-28.7), and 18 for both (16.4%; 95% CI 10.0-24.6). Baseline sleep disturbance was significantly more frequent among participants with depressive symptoms than among those without depressive symptoms (77.3% vs. 47.7%; Pearson $\chi^2(1)=6.18$; $p=0.013$). Sleep disturbance was also more frequent among participants with anxiety symptoms (69.0% vs 48.1%), although this association did not reach statistical significance (Pearson $\chi^2(1)=3.72$; $p=0.054$). In an exploratory retrospective self-reported comparison, sleep disturbance was reported by 53.6% of participants before treatment and 1.8% after treatment (continuity-corrected McNemar $\chi^2(1)=55.02$; $p<0.001$); this was not a formal prospective follow-up assessment.

Conclusions: Approximately one in four participants screened positive for anxiety and one in five for depression. Depressive symptoms were associated with disturbed sleep, whereas baseline ESR and CRP did not distinguish participants with and without psychological symptoms. Routine screening and multidisciplinary assessment may help identify unmet mental health needs in PsA; longitudinal studies with validated disease activity and sleep measures are required.

Categories: Psychiatry, Rheumatology, Internal Medicine

Keywords: anxiety, depression, hads, inflammatory markers, psoriatic arthritis, sleep disturbance

Introduction

Psoriatic arthritis (PsA) is a heterogeneous immune-mediated inflammatory musculoskeletal disease involving peripheral and axial joints, entheses, digits, skin, and nails [1,2]. Major clinical manifestations include peripheral arthritis, axial disease, enthesitis, dactylitis, and psoriatic skin and nail disease. The Classification Criteria for Psoriatic Arthritis (CASPAR) [1] are commonly used for classification and require inflammatory articular disease together with characteristic features such as psoriasis, psoriatic nail dystrophy, negative rheumatoid factor, dactylitis, or radiographic new bone formation. Beyond structural damage and pain, PsA can affect function, work participation, sleep, social participation, and health-related quality of life [3,4].

Anxiety is characterized by excessive apprehension or worry and may be accompanied by tension, restlessness, difficulty relaxing, autonomic symptoms, and panic-like experiences. Depressive symptoms commonly include persistent low mood, reduced interest or pleasure, reduced energy, sleep disturbance, impaired concentration, and other cognitive or somatic symptoms. In the present study, these symptom

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domains were assessed using a screening instrument rather than a diagnostic psychiatric interview.

Psychological comorbidity is increasingly recognized as part of the overall disease burden. Systematic reviews have reported depression in approximately 9–22% and anxiety in 15–30% of people with PsA, although estimates vary with setting and screening thresholds [5,6]. In a large clinic-based study using the Hospital Anxiety and Depression Scale (HADS), McDonough and colleagues reported anxiety in 36.6% and depression in 22.2% of patients with PsA [7]. Potential contributors include chronic pain, fatigue, visible skin disease, functional limitation, employment and financial stress, disturbed sleep, and inflammatory pathways shared between psoriatic disease and mood disorders [3,7,8].

Psychological symptoms can also alter the interpretation of patient-reported disease activity and may contribute to discordance between subjective disease burden and objective inflammatory measures [9]. Despite this clinical relevance, routine psychological screening is not consistently integrated into rheumatology care. Data examining anxiety and depressive symptoms alongside sleep, lifestyle, treatment, and inflammatory-marker characteristics in Indian PsA cohorts remain limited.

The primary objective of this study was to estimate the prevalence of screening-positive anxiety and depressive symptoms in patients with PsA. The secondary objective was to explore their associations with demographic characteristics, recorded obesity, sleep disturbance, physical inactivity, diet control, medication-cost concerns, and baseline inflammatory markers. A retrospective before-and-after sleep-status comparison was analyzed separately as an exploratory outcome.

Materials And Methods

Study design and setting

A single-center analytical cross-sectional study was conducted at Divisha Arthritis and Medical Centre, Bengaluru, Karnataka, India, between August 2022 and December 2022. The report was prepared in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) principles for observational studies.

Participants

Consecutive eligible adults aged 18 years or older with a clinician-confirmed diagnosis of PsA who were receiving care at the study center and were able to provide informed consent and complete the questionnaire were included. PsA diagnosis was established by the treating rheumatologist on clinical assessment. Formal item-level CASPAR classification scores were not retained in the surviving analytic dataset and were therefore not retrospectively assigned. Patients with alternative non-PsA arthritides or insufficient clinical or questionnaire information were excluded. The final analyzed dataset contained 110 participants. The original screening log was not available for retrospective verification of the number assessed before exclusion. No formal prospective sample-size calculation was available; all eligible participants captured during the study period were included.

Data collection

The author-developed clinical and lifestyle questionnaire was a descriptive data-collection form comprising participant demographic details and 13 clinical and lifestyle questions covering disease duration, prescribed treatment, treatment compliance, mental-health awareness and treatment, PsA-related concerns, physical activity, diet control, family and social support, and medication-cost concerns. The instrument had no subscales or composite score, and responses were analyzed as individual categorical variables. No formal pilot study, expert-panel validation, or psychometric validation of this author-developed form was documented in the available study records. The questionnaire is presented in Appendix 1. As this was a descriptive data-collection form rather than a psychometric scale, no numerical scoring system, subscales, or score-interpretation ranges were applied.

Additional variables retained in the analytic dataset included tobacco and alcohol use, comorbidities, recorded obesity/BMI category, family history, skin, joint, nail, and hair concerns, treatment duration and categories, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and sleep status. BMI was available only as a recorded categorical variable (normal or obese); the original numeric BMI values and cutoff used to derive this classification were not retained in the final analytic dataset.

Baseline ESR and CRP values and their recorded normal/elevated classifications were extracted from the study dataset. The original laboratory-specific reference intervals and exact timing relative to HADS administration were not uniformly retained; therefore, the recorded normal/elevated classifications were used rather than retrospectively imposing new cutoffs.

Sleep assessment

The analytic dataset contained two binary self-reported sleep-status variables labeled “sleep disturbance

before treatment” and “sleep disturbance after treatment,” with responses recorded as “disturbed” or “better” (Appendix 2). These variables were not derived from a validated sleep instrument. The exact wording of the historical sleep question was not preserved in the surviving author-developed questionnaire. The before-and-after responses represented retrospective patient-reported sleep status relative to routine PsA treatment; a standardized reassessment interval and uniform duration of treatment were not recorded. Accordingly, the paired sleep analysis was treated as exploratory and was not interpreted as a prospective treatment-effect assessment.

Assessment of anxiety and depression

Anxiety and depressive symptoms were assessed using the English-language HADS, originally developed by Zigmond and Snaith [10]. No translated version was used. HADS comprises 14 items: seven contributing to the anxiety subscale (HADS-A) and seven to the depression subscale (HADS-D). Each item is scored from 0 to 3, giving each subscale a possible score of 0-21. Scores of 0-7 were considered normal, 8-10 borderline, and 11-21 abnormal. For prevalence and association analyses, a subscale score of ≥8 was considered screening-positive. HADS is a screening instrument and does not establish a psychiatric diagnosis. Permission to use HADS was obtained from Mapi Research Trust, Lyon, France, https://eprovide.mapi-trust.org.

Outcomes

The primary outcomes were the proportions screening positive for anxiety and depressive symptoms. Secondary outcomes were co-occurring anxiety and depression and their associations with sex, recorded obesity category, baseline sleep disturbance, physical inactivity, absence of diet control, medication-cost concerns, and elevated baseline ESR or CRP. The paired retrospective sleep-status variables were analyzed as an exploratory outcome. Although the original study form contained fields intended for serial HADS, ESR, and CRP measurements, complete follow-up values were not available in the final analytic dataset and were therefore not analyzed in the present study.

Statistical analysis

Categorical variables are presented as numbers and percentages, while age is reported as mean and standard deviation. Exact binomial 95% confidence intervals were calculated for key prevalence estimates. Associations between screening status and categorical variables were examined using two-sided Pearson chi-square tests without continuity correction, with one degree of freedom. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated for these exploratory associations. Paired changes in the binary sleep-status variable before and after treatment were assessed using the continuity-corrected McNemar chi-square test. A two-sided p-value <0.05 was considered statistically significant. Analyses were audited using Python 3.13 (Python Software Foundation, Fredericksburg, VA) and SciPy 1.17.0. Because the analyses were exploratory, p-values were not adjusted for multiple comparisons, and no multivariable adjustment was performed.

Ethics

Ethics approval was obtained from the ACE Independent Ethics Committee (approval number: DA010). Participants provided written informed consent before enrollment.

Results

Participant characteristics

The cohort included 110 participants with a mean age of 47.4 years (SD 13.7); 67 (60.9%) were women. Forty-eight participants (43.6%) were homemakers and 44 (40.0%) were employed. The recorded BMI category was obese in 60 participants (54.5%) and normal in 50 (45.5%). Hypertension was recorded in 22 (20.0%) and diabetes mellitus in 18 (16.4%). Baseline ESR was categorized as elevated in 39 (35.5%) and CRP in 61 (55.5%).

Joint issues were recorded in 83 participants (75.5%). The surviving dataset does not distinguish current active joint involvement from historical joint involvement; this variable should therefore not be interpreted as the criterion by which PsA was diagnosed. Additional clinical and treatment characteristics are shown in Table 1.

Table with 2 columns: Characteristic, Value. Rows include Age, years (47.4 ± 13.7), Women (67 (60.9)), Men (43 (39.1)), and Employed (44 (40.0)).

Homemaker	48 (43.6)
Unemployed	6 (5.5)
Retired	12 (10.9)
Recorded BMI category: normal	50 (45.5)
Recorded BMI category: obese	60 (54.5)
Hypertension	22 (20.0)
Diabetes mellitus	18 (16.4)
Thyroid disorder	8 (7.3)
Tobacco use	6 (5.5)
Alcohol use	14 (12.7)
Family history of psoriasis/PsA	29 (26.4)
Skin involvement	61 (55.5)
Joint involvement	83 (75.5)
Nail involvement	19 (17.3)
Hair concerns	34 (30.9)
Disease duration <2 years	40 (36.4)
Disease duration ≥2 years	70 (63.6)
Treatment duration <2 years	74 (67.3)
Treatment duration ≥2 years	36 (32.7)
Conventional synthetic DMARD use	95 (86.4)
TNF inhibitor recorded in treatment field	11 (10.0)
NSAID use	70 (63.6)
Glucocorticoid use	12 (10.9)
Stopped treatment	4 (3.6)
Medication-cost concerns	37 (33.6)
Regular physical activity	65 (59.1)
Diet control	70 (63.6)
Elevated baseline ESR	39 (35.5)
Elevated baseline CRP	61 (55.5)
Baseline sleep disturbance	59 (53.6)

TABLE 1: Demographic, clinical, treatment, and lifestyle characteristics (N=110)

Values are n (%) unless otherwise stated. BMI categories are reported as recorded in the analytic dataset; the original numerical BMI values and classification cutoff were not retained. Joint involvement represents the binary "joint issues" variable recorded on the study form. The surviving dataset does not distinguish current active joint involvement from a history of joint involvement; this variable should therefore not be interpreted as the criterion by which PsA was diagnosed.

BMI: body mass index; DMARD: disease-modifying antirheumatic drug; ESR: erythrocyte sedimentation rate; CRP: C-reactive protein; NSAID: non-steroidal anti-inflammatory drug; PsA: psoriatic arthritis; TNF: tumor necrosis factor

Prevalence of anxiety and depressive symptoms

On HADS-A, 17 participants (15.5%) had borderline scores and 12 (10.9%) had abnormal scores; the combined screening-positive prevalence was 26.4% (29/110). On HADS-D, 12 (10.9%) had borderline scores,

and 10 (9.1%) had abnormal scores; the screening-positive prevalence was 20.0% (22/110). Eighteen participants (16.4%) screened positive on both subscales. Only 13 (11.8%) were recorded as aware of mental health symptoms in PsA, 12 (10.9%) were already receiving mental health treatment, and four (3.6%) planned to seek treatment (Table 2). Among the 12 participants already receiving treatment for anxiety or depression, four screened positive on at least one HADS subscale at the study assessment; three screened positive for anxiety, four for depression, and three for both anxiety and depression. The prevalence of screening-positive anxiety, depressive symptoms, and co-occurring anxiety and depressive symptoms is shown in Figure 1.

Measure	n (%)
HADS-A normal (0-7)	81 (73.6)
HADS-A borderline (8-10)	17 (15.5)
HADS-A abnormal (11-21)	12 (10.9)
HADS-A screening-positive (≥8)	29 (26.4)
HADS-D normal (0-7)	88 (80.0)
HADS-D borderline (8-10)	12 (10.9)
HADS-D abnormal (11-21)	10 (9.1)
HADS-D screening-positive (≥8)	22 (20.0)
Screening-positive on both HADS-A and HADS-D	18 (16.4)
Aware of mental-health symptoms	13 (11.8)
Already receiving mental-health treatment	12 (10.9)
Planning to seek treatment	4 (3.6)

TABLE 2: HADS screening and mental-health awareness
HADS-A: Hospital Anxiety and Depression Scale-Anxiety; HADS-D: Hospital Anxiety and Depression Scale-Depression

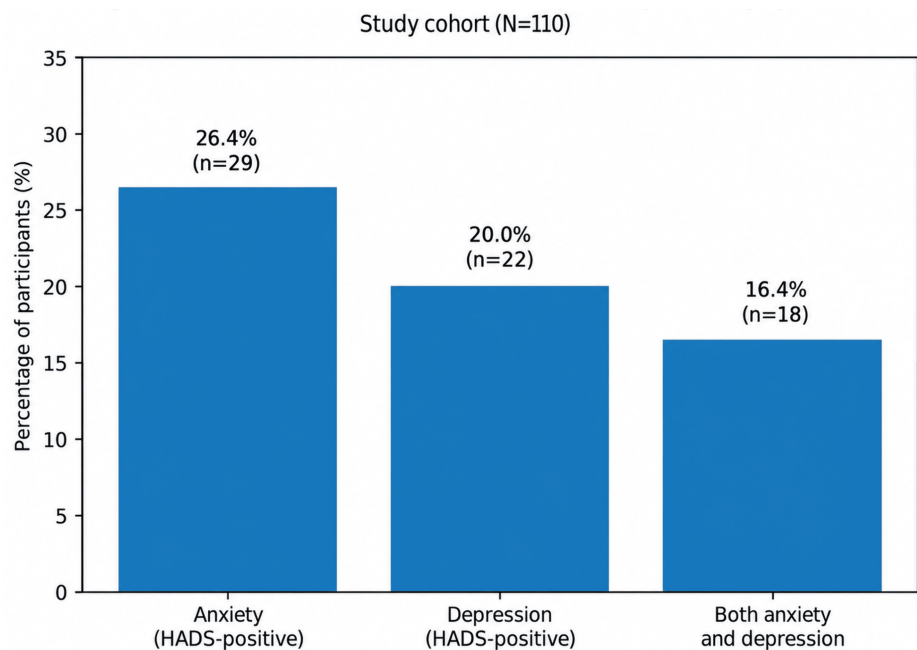


FIGURE 1: Prevalence of HADS-positive anxiety and depressive symptoms in the study cohort

Bar chart showing the prevalence of screening-positive anxiety, screening-positive depressive symptoms, and co-occurring anxiety and depressive symptoms in the study cohort (N=110). Anxiety was present in 26.4% (n=29), depressive symptoms in 20.0% (n=22), and both anxiety and depressive symptoms in 16.4% (n=18).

HADS: Hospital Anxiety and Depression Scale

Exploratory associations with anxiety and depressive symptoms

Baseline sleep disturbance was reported by 17 of 22 participants with depressive symptoms (77.3%) compared with 42 of 88 participants without depressive symptoms (47.7%; Pearson $\chi^2(1)=6.18$; $p=0.013$). Sleep disturbance was also more frequent among participants with anxiety symptoms than among those without anxiety symptoms (69.0% vs 48.1%), although this association did not reach statistical significance (Pearson $\chi^2(1)=3.72$; $p=0.054$). The full set of exploratory associations is presented in Table 3 and Figure 2.

Characteristic	Anxiety + n=29	Anxiety – n=81	OR (95% CI)	χ ² (p- value)	Depression + n=22	Depression – n=88	OR (95% CI)	χ ² (p- value)
Female sex	20/29 (69.0)	47/81 (58.0)	1.61 (0.65– 3.96)	1.07 (0.300)	15/22 (68.2)	52/88 (59.1)	1.48 (0.55– 4.00)	0.61 (0.434)
Recorded obesity	14/29 (48.3)	46/81 (56.8)	0.71 (0.30– 1.66)	0.62 (0.429)	10/22 (45.5)	50/88 (56.8)	0.63 (0.25– 1.62)	0.92 (0.338)
Baseline sleep disturbance	20/29 (69.0)	39/81 (48.1)	2.39 (0.97– 5.88)	3.72 (0.054)	17/22 (77.3)	42/88 (47.7)	3.72 (1.26– 10.98)	6.18 (0.013)
Physical inactivity	15/29 (51.7)	30/81 (37.0)	1.82 (0.77– 4.29)	1.91 (0.167)	12/22 (54.5)	33/88 (37.5)	2.00 (0.78– 5.14)	2.12 (0.146)
No diet control	14/29 (48.3)	26/81 (32.1)	1.97 (0.83– 4.69)	2.42 (0.120)	10/22 (45.5)	30/88 (34.1)	1.61 (0.62– 4.16)	0.98 (0.322)
Medication-cost concerns	10/29 (34.5)	27/81 (33.3)	1.05 (0.43– 2.57)	0.01 (0.910)	9/22 (40.9)	28/88 (31.8)	1.48 (0.57– 3.88)	0.65 (0.420)
Elevated baseline ESR	9/29 (31.0)	30/81 (37.0)	0.77 (0.31– 1.89)	0.34 (0.562)	8/22 (36.4)	31/88 (35.2)	1.05 (0.40– 2.78)	0.01 (0.921)
Elevated baseline CRP	19/29 (65.5)	42/81 (51.9)	1.76 (0.73– 4.26)	1.61 (0.204)	13/22 (59.1)	48/88 (54.5)	1.20 (0.47– 3.11)	0.15 (0.701)

TABLE 3: Exploratory associations of demographic, lifestyle, sleep, and inflammatory factors with HADS-positive anxiety and depressive symptoms

Values are presented as n/N (%). Associations were assessed using two-sided Pearson chi-square tests without continuity correction; df=1 for all comparisons. Odds ratios are presented with 95% confidence intervals.

OR: odds ratio; CI: confidence interval; ESR: erythrocyte sedimentation rate; CRP: C-reactive protein; HADS: Hospital Anxiety and Depression Scale

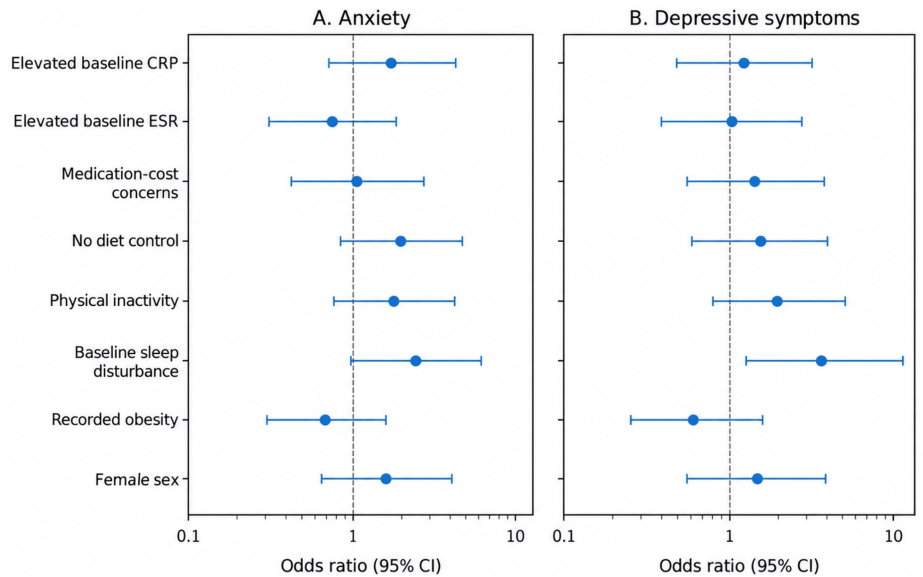


FIGURE 2: Exploratory associations of demographic, lifestyle, sleep, and inflammatory factors with screening-positive anxiety and depressive symptoms

Forest plot showing exploratory odds ratios (ORs) with 95% confidence intervals (CIs) for associations of female sex, recorded obesity, baseline sleep disturbance, physical inactivity, no diet control, medication-cost concerns, elevated baseline erythrocyte sedimentation rate (ESR), and elevated baseline C-reactive protein (CRP) with screening-positive anxiety (panel A) and depressive symptoms (panel B). The vertical reference line indicates OR=1.0. These analyses are exploratory and unadjusted.

Exploratory self-reported change in sleep

Fifty-nine participants (53.6%) reported sleep disturbance before treatment compared with two participants (1.8%) after treatment. Fifty-seven participants changed from disturbed to improved sleep, while none changed from improved to disturbed sleep (continuity-corrected McNemar $\chi^2(1)=55.02$; $p<0.001$). Because sleep was assessed using a retrospective self-reported item rather than a validated longitudinal sleep scale, this finding should be interpreted as exploratory and should not be considered evidence of a causal treatment effect.

The exploratory retrospective before-and-after comparison of self-reported sleep disturbance is shown in Table 4 and Figure 3.

Before-treatment sleep status	After treatment: disturbed	After treatment: better	Total
Disturbed	2	57	59
Better	0	51	51
Total	2	108	110

TABLE 4: Exploratory paired self-reported sleep status before and after treatment

Sleep status was retrospectively self-reported and recorded as a binary variable. Fifty-seven participants changed from disturbed to better sleep, none changed from better to disturbed sleep, and 53 remained in the same category. Continuity-corrected McNemar $\chi^2(1)=55.02$; $p<0.001$. Because no standardized reassessment interval or validated sleep instrument was available, this analysis is exploratory and does not establish a treatment effect.

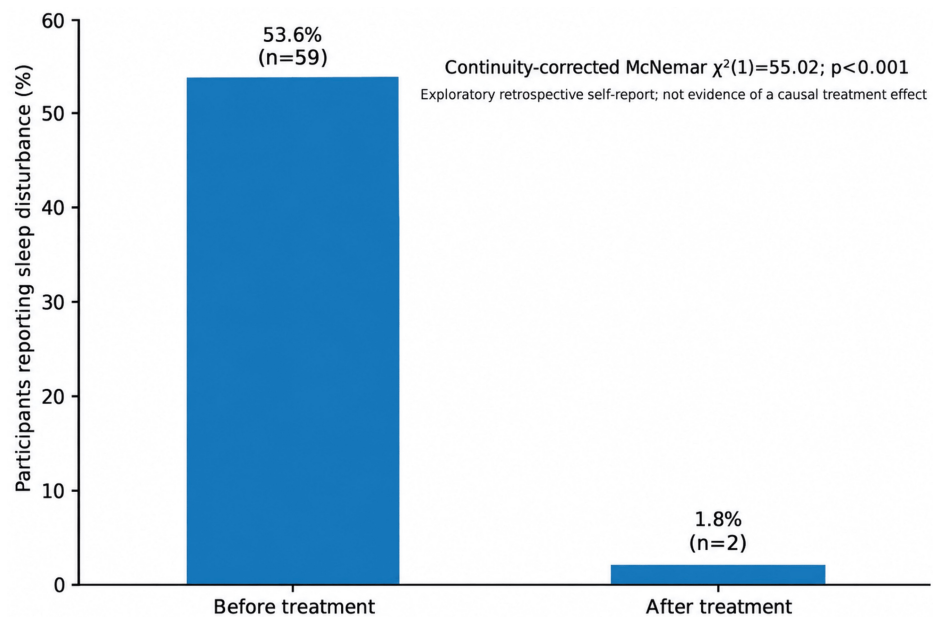


FIGURE 3: Exploratory retrospective self-reported sleep disturbance before and after treatment

Bar chart showing the proportion of participants reporting sleep disturbance before and after treatment in the study cohort (N=110). Sleep disturbance was reported by 53.6% (n=59) before treatment and 1.8% (n=2) after treatment. The paired comparison was analyzed using the continuity-corrected McNemar chi-square test ($\chi^2(1)=55.02$; $p<0.001$). This was an exploratory retrospective self-reported comparison and should not be interpreted as evidence of a causal treatment effect.

Discussion

In this single-center PsA cohort, 26.4% screened positive for anxiety and 20.0% for depression, while 16.4% screened positive for both. These estimates fall within the ranges reported in systematic reviews and are close to the 19-33% anxiety and 11.9-20% depression estimates summarized in a recent overview of systematic reviews [5,6]. The depression prevalence is also similar to that reported in a large HADS-based PsA cohort, although the anxiety prevalence in that study was higher [7]. Differences in patient mix, disease severity, socioeconomic context, and screening thresholds may explain variation between studies. A separate cross-sectional study of 300 patients with psoriasis and/or PsA reported substantial depressive symptom burden alongside impaired quality of life, reinforcing the importance of considering psychological health as part of the overall burden of psoriatic disease [11].

The clearest association in the present analysis was between baseline sleep disturbance and screening-positive depressive symptoms. Participants with baseline sleep disturbance had 3.72 times the odds of screening positive for depressive symptoms compared with those without baseline sleep disturbance (OR 3.72, 95% CI 1.26-10.98). Sleep problems are common in PsA; a 2023 meta-analysis estimated poor sleep quality in 72.9% of patients and identified anxiety, depression, pain, fatigue, function, and inflammatory variables as potential predictors [12,13]. The present study used a simple binary self-reported sleep-status variable rather than a validated sleep instrument. The retrospective before-and-after sleep comparison should therefore be interpreted cautiously and does not demonstrate that PsA treatment caused the observed improvement in sleep.

Neither anxiety nor depression was significantly associated with elevated baseline ESR or CRP. This does not exclude a biological relationship between systemic inflammation and mood disorders. Rather, ESR and CRP are imperfect proxies for the multidimensional burden of PsA, and psychological symptoms often track more closely with pain, fatigue, global health, and other patient-reported measures than with objective inflammatory markers [3,9]. The absence of validated joint counts, PsA-specific disease activity scores, pain and fatigue scales, and skin-severity measures limited more granular analysis.

Physical inactivity and absence of diet control were not significantly associated with anxiety or depression. These binary self-reported measures may not adequately capture intensity, duration, adherence, dietary quality, or change over time. Similarly, the study was not powered for small associations or subgroup analyses. Lifestyle counseling remains appropriate for overall health and function, and physical activity has recognized benefits in PsA [14]; however, these data do not demonstrate an independent association with anxiety or depressive symptoms. The absence of a significant association with obesity also differs from prior

multicenter observations linking obesity with poorer psychological status and disease burden in PsA [15].

From a clinical perspective, these findings support considering psychological symptoms and sleep as part of a comprehensive PsA assessment. Brief screening may identify concerns that are not apparent from inflammatory markers alone; however, HADS screening does not establish a psychiatric diagnosis, and positive results should prompt appropriate clinical assessment and referral when indicated. Psychological and sleep screening should complement, rather than replace, assessment of pain, function, disease activity, treatment exposure, and relevant social factors.

The study has certain limitations. Its cross-sectional design prevents conclusions about directionality or causality. HADS identifies symptoms rather than psychiatric diagnoses. Participants were recruited from a single specialist rheumatology center in Bengaluru, and the findings may therefore not generalize to community populations, other regions of India, different healthcare settings, or patients with different disease severity and treatment access. Several variables were self-reported and coarsely categorized. The author-developed clinical and lifestyle questionnaire did not undergo documented formal psychometric validation. Continuous BMI values and the original BMI cutoff used to classify obesity were not retained in the final analytic dataset. Laboratory-specific ESR and CRP reference intervals and precise timing relative to psychological screening were not uniformly available. The sleep variables were binary retrospective self-reports, lacked a validated sleep scale and standardized follow-up interval, and should not be interpreted as evidence of a treatment effect. The analysis also did not account for potential confounders such as age, pain severity, PsA disease activity, fatigue, and treatment exposure because validated measures and sufficient data for multivariable adjustment were unavailable. Finally, no PsA-specific composite disease activity score was available.

Strengths include the use of a validated psychological screening instrument, consecutive real-world recruitment, and simultaneous assessment of clinical, lifestyle, inflammatory, and sleep-related factors in an Indian PsA cohort. Future multicenter prospective studies should incorporate repeated psychological assessments, validated sleep instruments, standardized PsA disease activity, pain, fatigue, and functional measures, predefined laboratory assessment intervals, and multivariable analyses to identify independent predictors and clarify temporal relationships.

Conclusions

Anxiety and depressive symptoms were common in this cohort of patients with PsA. Depressive symptoms were associated with disturbed sleep, whereas elevated baseline ESR and CRP were not significantly associated with screening-positive anxiety or depressive symptoms. These cross-sectional findings represent associations and should not be interpreted as evidence of causal relationships. Routine HADS-based or equivalent screening, followed by appropriate clinical assessment and referral when indicated, may help identify psychological and sleep-related needs that are not captured by conventional inflammatory markers. Prospective multicenter studies using repeated psychological assessments and validated measures of PsA disease activity, pain, fatigue, function, and sleep are required.

Appendices

Appendix 1

No.	Question / variable	Response options / recording
—	Participant details	Age; gender; occupation; height (cm); weight (kg); BMI
1	Duration of PsA	<2 years; 2–5 years; >5 years
2	Which of the following medicines were prescribed for you?	Steroids; MTX; SSZ; LEF; NSAID; CYA; TOFA; ADA; ETN; IFX; SEC
3	Treatment compliance	(1) Taking medications regularly and feeling better than before; (2) Taking medicines when symptoms worsen; (3) Not taking medicines because of side effects/cost issues; (4) Feeling better even after stopping treatment
4	ESR and CRP variation with treatment	Baseline ESR/CRP; after 1 month; after 3 months; after 6 months; after 12 months
5	Are you dealing with any anxiety or depression issues along with PsA?	Yes; No
6	When were you aware of your mental-health issues?	(1) Mental-health issues after diagnosis of PsA; (2) Mental-health issues before diagnosis of PsA; (3) Not aware of mental-health issues related to PsA
7	What makes you worry about your PsA condition?	Skin issues; joint pain; nail issues; hair loss
8	Are you under any treatment for anxiety or depression?	(1) Yes, prescribed treatment; (2) Yes, but not taking regularly/skips sometimes; (3) Taking treatment other than allopathy; (4) No treatment; (5) No treatment but planning to discuss with doctor/start medication
9	Compliance with medicines for anxiety or depression	(1) Feeling much better with medicines; (2) No improvement; (3) Medication side effects are a major concern
10	Do you perform regular physical exercise/yoga/meditation for physical and mental health?	Yes; No
11	Do you follow diet control recommended by your doctor?	Yes; No
12	How is your relationship with your family/life partner/peers?	(1) Family supportive; (2) Mental-health issues not shared with family/life partner; (3) Difficulties with family/life partner/peers related to mental health; (4) Health condition affecting work/relationships with colleagues
13	Do you have any hardship regarding the cost of medications/consultation?	Yes; No

TABLE 5: Author-developed clinical and lifestyle questionnaire

This author-developed form was used for descriptive clinical and lifestyle data collection and did not have subscales or a composite score. The original study form also contained fields intended for serial ESR/CRP and HADS recording; complete longitudinal values were not available in the final analytic dataset.

Appendix 2

Variable	Recorded response categories
Sleep disturbance before treatment	Disturbed / Better
Sleep disturbance after treatment	Disturbed / Better

TABLE 6: Sleep-status variables retained in the analytic dataset

These binary self-reported variables were present in the final analytic dataset. The exact wording of the historical sleep question and a standardized reassessment interval were not retained. They were therefore used only for exploratory analysis.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. ACE Independent Ethics Committee issued approval DA010. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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