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Prevalence of Depression in Patients with Spondyloarthritis and Its Impact on Disease Activity: A Cross-Sectional Study

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ABSTRACT

Spondyloarthritis refers to a chronic inflammatory rheumatic disorder that is characterized by pain, disability, and poor quality of life, potentially predisposing the affected patients to psychological comorbidity, including depression. Depression can hurt disease activity, treatment response, and clinical outcomes, but the burden has not been well acknowledged in clinical practice among patients with spondyloarthritis. **Objective:** To find the prevalence of depression in patients with spondyloarthritis (SpA) and to identify the association of depression with disease activity. **Methods:** A cross-sectional study was carried out in the Department of Rheumatology, Lady Reading Hospital, Peshawar, Pakistan. Adult patients who had verifiable cases of SpA were recruited in the study in six-month consecutive intervals between 1st February and 31st July 2025. Depression status was used to stratify the participants, and pertinent statistical tests were used to evaluate associations of normally and non-normally distributed variables. Independent t-test, Mann-Whitney U, and chi-square tests were used. Any p-value less than 0.050 was taken as statistically significant. **Results:** The prevalence of depressive symptoms in 323 spondyloarthritis patients was 51.1% with mild and moderate depression. Disease activity (BASDAI), inflammatory markers (ESR, CRP), and disease duration of depressed patients were considerably higher than those of non-depressed patients ($p<0.050$). **Conclusions:** Depression is very common among patients living with spondyloarthritis and is characterized by higher disease activity, systemic inflammation, and longer duration of disease, thereby supporting the importance of screening mental health during clinical care.

INTRODUCTION

Spondyloarthritis (SpA) is a collective of chronic inflammatory rheumatic diseases that mainly involve the spine, sacroiliac joints, and peripheral entheses and joints, provoking pain, stiffness, functional impairment, and reduced quality of life [1]. The social disability, inability to work, and progressive disability associated with chronic pain of SpA expose a patient to a higher risk of psychiatric comorbidity, which may affect the clinical outcome and treatment response [2]. Depression is one of the most prevalent and clinically significant comorbidities in chronic inflammatory rheumatic diseases, such as spondyloarthritis, and has a significant impact on the total disease burden [3]. A single center and registry-based reports of 20-35% of axSpA patients and less consistent but equally high rates in PsA, and a more accurately measured burden of depression of screening tools may be underestimated by formal diagnosis of depression on administrative databases [4-6]. The recent longitudinal and treatment-response research shows that baseline depression is linked with weaker response to biologic

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treatments and slower changes in composite disease activity scales, which, in turn, indicates that the presence of unidentified or untreated depressive symptoms may be a modifiable factor contributing to suboptimal effects [7-9]. It is necessary to understand the relative role of these factors in regular clinical populations in order to implement comprehensive care models that incorporate mental health screening and intervention into the practice of rheumatology [10]. A meta-analysis indicated that the overall pooled prevalence of depression in ankylosing spondylitis is approximately 35% (95% CI 28-43); however, with milder symptoms factored in, comorbid depressive symptoms are found in a substantially broader proportion of patients [11]. In Pakistan, the population and clinical research have identified that there is a significant burden of depressive symptoms, and meta-analyses of university student samples indicated a prevalence of about 51%, this depicts a high burden of mental health in the same socio-cultural backgrounds [12].

Although multiple studies are increasingly showing the fact that depression prevalence is quite common in spondyloarthritis and can have an impact on the outcome of the disease, there are several significant gaps in the existing literature. Numerous past investigations have employed heterogeneous screening instruments, inconsistent screening diagnostic limits, or administrative databases that do not reflect the true burden of depressive symptoms. Furthermore, there is less information on low- and middle-income nations, especially South Asia, where psychosocial determinants, disease burden, and availability of mental health services can be very different. Hence, locally generated evidence based on validated screening instruments is necessary to establish the prevalence of depression and its relationship to disease activity among patients with spondyloarthritis. The study aimed to identify the prevalence of depressive symptoms in patients with spondyloarthritis and its association with disease activity.

METHODS

The present study was based on a cross-sectional observational study and carried out in the Department of Rheumatology, Lady Reading Hospital (LRH), Medical Teaching Institute (MTI), Peshawar, for six months, 1st February 2025 to 31st July 2025. The ethical approval was taken with the Institutional Review Board (IRB) of Lady Reading Hospital, Medical Teaching Institute (MTI) (Approval number: 10/LRH/MTI). The present study used Open Epi version 3.01 to calculate a sample size according to the anticipated prevalence of depression of approximately 15% among patients with spondyloarthritis, confidence level of 95%, and margin of error (d) of 5% [13]. The resulting sample size was 323 participants. The final sample was found to be sufficiently precise with a post hoc precision analysis to estimate the prevalence. The study involved non-probability consecutive sampling. The sample was recruited consecutively to include all adult patients with a confirmed diagnosis of spondyloarthritis who visited the rheumatology outpatient department within the study period (18 years and above). Patients were not included in case they had a previously identified psychiatric condition besides depression, were under treatment with antidepressants or antipsychotics, had serious cognitive deficits or communication problems, or were severely ill and incapable of filling out the study questionnaires. Each patient who met the inclusion criteria was approached by trained investigators who explained the objective of the study, procedures, risks, and benefits in the local language and signed the written informed consent before enrollment. The confidentiality was highly ensured by assigning each participant a unique identification code, and all information was kept in secure places where only the research team could access it. The collection of data was done using face-to-face interviews and the reading of medical records. The medical files of the participants were reviewed to extract clinical and laboratory data, including disease duration, type of spondyloarthritis, past and current treatment regimens, laboratory investigations (CBC, ESR, CRP, ALT, creatinine), the presence of HLA-B27, and MRI results. The disease-specific features of spondyloarthritis, such as age of symptom onset, diagnosis time, disease duration, and disease activity measured by the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) [14]. The Patient Health Questionnaire-9 (PHQ-9) was used to measure depressive symptoms during the same visit [15]. It is a validated tool that scores nine symptoms over the past two weeks from 0 (not at all) to 3 (nearly every day), giving a total score of 0–27. Participants scoring ≥5 were classified as having depression, while scores <5 indicated no depression. Depression was defined according to DSM-5 and ICD-10 criteria as persistent low mood, loss of interest, or hopelessness affecting daily activities. Cronbach's alpha was used to determine the internal consistency of the PHQ-9 questionnaire to determine how reliable the instrument is for the study population. In this study population, the PHQ-9 had a good internal consistency, as indicated by a Cronbach's alpha of 0.82.

They were analyzed using the Statistical Package of Social Sciences (SPSS) version 26.0. The Shapiro-Wilk test was used to check the normality of the continuous variables, such as BASDAI scores. The test to determine the homogeneity of variance across groups was the Levene test. Mean ± standard deviation was used to express normally distributed data, and median with interquartile range was used to express non-normally distributed data.

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The frequencies and percentages were used to summarize categorical variables. The chi-square test was used to assess the associations between depression and disease activity (BASDAI) and other categorical variables, and the independent t-test and Mann-Whitney U test were used to compare continuous variables between the depressed and non-depressed groups. The duration of disease was classified into <10 years and ≥10 years to undertake post-stratification analyses. This age was chosen according to the previous literature and clinical importance because patients who have had the disease ≥ 10 years are more susceptible to physical disability, systemic inflammation, and psychological burden. Constant review of the duration of diseases was made as well in order to strengthen the results. To analyze binary, the PHQ-9 score was used to determine depression status. The respondents who scored ≥ 5 (mild, moderate, moderately severe, or severe depressive symptoms) on the PHQ-9 were considered to have depression, and participants who scored <5 were considered not depressed. A post-stratification chi-square test was conducted to take into account possible effect modifiers. The effect sizes were reported as odds ratios (ORs) and 95% confidence intervals (CIs) of variables that were significantly related to depression. Binary logistic regression and cross-tabulation were the methods by which ORs were computed. A p-value ≤0.050 was taken as statistically significant.

RESULTS

The average age of the study population was 38.6 ± 11.4 years. The majority of the patients were married (72%), and almost half were working (46%), with the percentage of nonworkers (28%), housewives (17%), and students (9%) being smaller. A slightly greater number of the participants lived in urban settings (56%), with the rest of the participants living in rural contexts (44%). Further, the symptoms of spondyloarthritis appeared in patients at an average age of 30.2 ± 9.8 years, and the duration of the disease was 8.4 ± 5.6 years on average. Most of the respondents had a diagnosis of axial SpA (68%), with peripheral SpA making up about a third of the cases. HLA-B27 positivity was detected in a bit higher percentage than half of the patients (52%). The MRI imaging revealed 63% had sacroiliitis. It was also reported that 37% of the cohort had comorbid conditions, indicating that these patients have other health burdens (Table 1).

Table 1: Sociodemographic Characteristics of Study Participants and Disease Characteristics of Patients with Spondyloarthritis (n=323)

Variables		n (%) / Mean ± SD
Sociodemographic Characteristics		
Age	Years	38.6 ± 11.4
Gender	Male	197 (61.0%)
	Female	126 (39.0%)
Marital Status	Married	231 (71.5%)
	Unmarried	92 (28.5%)
Occupation	Employed	148 (45.8%)
	Unemployed	89 (27.6%)
	Homemaker	56 (17.3%)
	Student	30 (9.3%)
Residence	Urban	182 (56.3%)
	Rural	141 (43.7%)
Disease Characteristics of Patients with Spondyloarthritis		
Age at Symptom Onset	Years	30.2 ± 9.8
Disease Duration	Years	8.4 ± 5.6
Type of SpA	Axial SpA	221 (68.4%)
	Peripheral SpA	102 (31.6%)
Family History of SpA	Yes	71 (22.0%)
	No	252 (78.0%)
HLA-B27 Status	Positive	168 (52.0%)
	Negative	155 (48.0%)
Others	BASDAI Score	4.9 ± 1.6
	MRI Sacroiliitis Present	204 (63.2%)
	Comorbidities Present	119 (36.8%)

Laboratory tests of the study group indicated that the mean hemoglobin was 12.6 ± 1.8 g/dL, and the mean MCV was 86.9± 6.4 fL with normal red cell indices. All the patients had normal total leukocyte count and platelet counts. Alanine aminotransferase (ALT) indicated slight increases in the liver enzymes in a few participants, with serum creatinine being in the normal range (Table 2).

Table 2: Laboratory Parameters of Study Participants (n=323)

Parameters	Mean ± SD / Median (IQR)
Hemoglobin (g/dL)	12.6 ± 1.8
MCV (fL)	86.9 ± 6.4
TLC ($\times 10^9$/L)	7.9 ± 2.1
Platelets ($\times 10^9$/L)	294 ± 78
ALT (IU/L)	34.2 ± 12.6
Serum Creatinine (mg/dL)	0.94 ± 0.21
ESR (mm/hr)	29.6 (18–42)
CRP (mg/L)	11.8 (6–18)

The PHQ-9 assessment of depression indicated that slightly less than 50% of the participants (48.9%) had no signs of depression, with the remaining 51% displaying some levels of depression. This prevalence was found to have a 95% level of confidence between 45.6% and 56.6%. Mild depression was the most prevalent, with 28.5% of the patients having mild depression, and moderate depression in about 14.9% of the cohort. The prevalence of moderately severe (5.9%) and severe (1.8%) depression was lower (Table 3).

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Table 3: Prevalence and Severity of Depression Based on PHQ-9 (n=323)

PHQ-9 Category	Score Range	n (%)
No Depression	0–4	158 (48.9%)
Mild Depression	5–9	92 (28.5%)
Moderate Depression	10–14	48 (14.9%)
Moderately Severe Depression	15–19	19 (5.9%)
Severe Depression	≥20	6 (1.8%)

The disease activity was found to be much higher among the depressed patients than the patients who were not depressed, as indicated by high BASDAI scores. There was also a significant increase in inflammatory markers, like ESR and CRP, in the depressed group, suggesting that there is a correlation between the state of the body and the psychological state and systemic inflammation. These were statistically significant and supported the association between depression and clinical and laboratory disease activity measures in spondyloarthritis (Table 4).

Table 4: Comparison of Disease Activity and Inflammatory Markers According to Depression Status

Variables	Depression Present, (n=165)	No Depression, (n=158)	p-value
BASDAI Score	5.6 ± 1.4	4.1 ± 1.3	<0.001
ESR (mm/hr)	34 (22–47)	25 (16–37)	0.002
CRP (mg/L)	14 (8–20)	9 (5–15)	<0.001
Disease Duration (Years)	9.2 ± 5.9	7.5 ± 5.1	0.013

Females were much more likely to be depressed than males. Depression was more likely to occur in patients whose disease lasted at least 10 years. Depression had a strong correlation with high disease activity (BASDAI >4). Comorbidities were also related to increased odds of depression. Depression was not significantly related to age group, type of spondyloarthritis, HLA-B27, or residence (Table 5).

Table 5: Post-Stratification Analysis of Depression with Selected Variables(n=323)

Variables	Depression Present, n (%)	Depression Absent, n (%)	χ^2	OR (95% CI)	p-value
Gender					
Male	91 (46.2%)	106 (53.8%)	4.55	1.63 (1.03–2.57)	0.032
Female	74 (58.7%)	52 (41.3%)			
Age Group (Years)					
18–30	38 (49.4%)	39 (50.6%)	4.27	—	0.123
31–45	72 (53.3%)	63 (46.7%)			
>45	55 (50.0%)	56 (50.0%)			
Disease Duration					
≥10 Years	63 (62.4%)	38 (37.6%)	6.31	2.05 (1.27–3.32)	0.012
High BASDAI					
>4	119 (65.0%)	64 (35.0%)	32.84	3.47 (2.20–5.49)	<0.001
Type of SpA					
Axial SpA	112 (50.7%)	109 (49.3%)	1.77	—	0.183
Peripheral SpA	53 (52.0%)	49 (48.0%)			
HLA-B27 Status					
Positive	88 (52.4%)	80 (47.6%)	0.87	1.13 (0.73–1.75)	0.352
Negative	77 (49.7%)	78 (50.3%)			
Comorbidities					
Present	74 (62.2%)	45 (37.8%)	9.86	2.23 (1.38–3.61)	0.002
No Comorbidities	91 (43.0%)	121 (57.0%)			
Residence					
Urban	94 (51.6%)	88 (48.4%)	0.57	1.07 (0.69–1.65)	0.451
Rural	71 (50.4%)	70 (49.6%)			

DISCUSSION

Overall, in this cross-sectional study of 323 patients with spondyloarthritis, over half (51.1%) displayed depressive symptoms by PHQ-9 criteria, with mild and moderate depression being the most common. This prevalence estimate is generally consistent with new literature that indicates that depressive symptoms are prevalent in SpA populations, but reported rates have been found to vary depending on screening tools and thresholds. Indicatively, a cross-sectional study that conducted PHQ-9 showed that depression was found in 46.7% of SpA patients, with moderate to severe symptoms in 25 percent of study participants, a significant burden of psychological distress in the group [16]. An extensive meta-analysis has found depression in between 11% and 64% of cohorts, with pooled estimates indicating mild depressive symptoms in around 38% and moderate to severe in 15% of axSpA patients [17]. These results are consistent with our observation that less severe mood disturbances are more common and can be used to put our overall prevalence into perspective, more so that PHQ-9 and a lower cut-off on any depression included a larger range of symptom severity. A different study conducted recently on cytokine associations in axSpA reported almost 49% prevalence of depressive symptoms, with higher levels of BASDAI and ASDAS being found in patients with depressive symptoms, but cytokine levels, including TNF-α and IL-1β, were not found to be positively related to depression [18]. This is consistent with the idea that psychological load in SpA is more directly related to clinical manifestations of diseases and patient experiences of the disease effect than to individual biochemical evidence of inflammation [19]. The results of the present study align with available literature since they showed a much more prominent rate of depressive symptoms in patients with ankylosing spondylitis as compared to healthy controls. The identified connection between chronicity of the disease and low levels of depression could be attributed to a process of adaptive coping with time, whereas gender disparity in the prevalence of the disease indicates that psychological

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evaluation should be gender-sensitive. In general, these findings highlight the need to conduct regular mental health screening as a part of AS management to enhance patient outcomes[20].

The cross-sectional nature would not allow the creation of a causal relationship between depression and disease activity. Second, only one tertiary care center was sampled, which can restrict the applicability of the results to other populations or regions. Third, the PHQ-9, or self-reported questionnaire, was used to measure depression as opposed to a complete clinical psychiatric assessment, which could also bring about reporting bias. Also, the research has not taken into consideration all possible confounders, including socioeconomic status, lifestyle issues, or access to mental health services. Longitudinal and interventional studies should be considered in future research to establish the causal association between depression and disease activity in spondyloarthritis. It is recommended that multicenter studies that comprise a larger and heterogeneous population increase the generalizability of the study findings to other regions and healthcare environments. Moreover, the conducted studies need to consider the full psychiatric assessment, socioeconomic and lifestyle measures, and treatment-specific variables to gain a more detailed insight into possible confounders. Research on the role of psychological interventions and combined multidisciplinary care strategies in shaping disease outcomes could also serve as a source of useful evidence to support clinical management and quality of life in patients with spondyloarthritis.

CONCLUSIONS

Depression among spondyloarthritis patients is very common and is associated with increased disease activity, duration, and comorbidity, especially in females. Regular mental health screening and early intervention are needed to enhance the outcomes and quality of life of patients.

Authors' Contribution

Conceptualization: TL, ZUD
Methodology: TL, ZUD, FR, SRAS
Formal analysis: TL, ZUD, MUK
Writing and Drafting: TL, ZUD, MUK, FR, SRAS, MF
Review and Editing: TL, ZUD, MUK, FR, SRAS, MF, SYMS

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

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