# Depression in Ankylosing Spondylitis Patients: An Analysis of Its Occurrence

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## Abstract

**Background:** Depressive symptoms or depressive disorders have been reported to be more frequent in chronic inflammatory disorders. However, depression in Ankylosing Spondylitis (AS) was not well studied in our setting, where many patients with AS are attending for management. The study aimed to determine depression among the patients of AS.

**Materials and methods:** Thirty-two AS patients who fulfilled the American Society of Ankylosing Spondylitis criteria were included in this cross-sectional study. Depression was measured by a 5-point Likert scale, developed according to the cultural context of Bangladesh, and disease activity was measured by the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) scale.

**Results:** The mean age of the patients was 36.56 (±12.02) years with a male-to-female ratio of 7:1. Mean disease duration was 7.5 (±7.67) years. Eighteen (56.3%) patients had depression (2 (11.1%), 7 (38.9%), 5 (27.8%) and 4 (22.2%) patients, respectively, had a minimal, mild, moderate, and severe form of depression. Depression score had a significant positive correlation with BASDAI score ($r=0.566$, $p<0.001$) and disease duration ($r=0.369$, $p=0.025$).

**Conclusion:** Depressive symptoms were common in patients with AS. So, healthcare professionals should screen AS patients for depression and manage them accordingly.

**Key words:** Ankylosing spondylitis; BASDAI; Depression.

## Introduction

AS is a chronic inflammatory disease mainly involving the sacroiliac joints and the axial skeleton.[1] Mental disorders, including rheumatic diseases, are highly prevalent in patients with chronic inflammatory states.[2] The possible hypotheses are that functional limitations and poor health-related quality of life could induce the emergence of depressive symptoms or a common neuro-immunobiological mechanism could underlie the development of arthritis and depression.[3] However, both depressive and anxiety symptoms remained under-treated in the vast majority of affected patients.[2]

Depression can affect pain perception and the general clinical course of the disease. Other factors leading to depression are the degree of physical disability, disease activity, and disease duration.[4] Moreover, depression is a significant risk factor for suicide. Approximately 4-5% of all depressed patients will commit suicide.[5] In this regard, relationships between disease status and psychological status in AS patients is needed to inform clinical assessment and management and inform the selection and monitoring of AS patients for specialized therapy.

For the adequate provision of health care, knowledge of disease prevalence is paramount. However, only a few studies evaluate depression in AS patients.[5-9] The study population and the hospital settings of those studies were utterly different from ours, so it was challenging to generalize those findings. In this context, the present study was conducted to evaluate the frequency and severity of depression of AS patients who attended a tertiary hospital in Bangladesh and to explore the correlation between depression and disease severity.

## Materials and methods

We conducted a cross-sectional study in Chittagong Medical College Hospital, from October 2017 to March 2018. Patients were selected from the outpatient Department and Rheumatology clinic of the Department of Medicine and Department of Physical Medicine and Rehabilitation. Study protocol was approved by the Ethical and Review Committee of Chittagong Medical College. Written informed consent was obtained from the patients.

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Inclusion criteria was a known cases of AS diagnosed by a specialist or newly diagnosed cases based on the American Society of Ankylosing Spondylitis (ASAS) Criteria for Classification of Spondyloarthritis and age more than 18 years.[10] Patients were excluded if they had concomitant chronic illness that was likely to induce depressive symptoms, undifferentiated spondyloarthritis and other types of spondylo-arthritides like reactive arthritis, psoriatic arthritis, enteropathic arthritis and juvenile-onset spondyloarthritis.

A structured interviewer-administered questionnaire was used to collect data. The questionnaire included a scale to measure depressive symptoms which was developed by Uddin and his colleague according to the cultural context of Bangladesh.[11] The scale consists of 30 items or statements with an answer options for each item of the scale was according to 5-point likert scale, such as not at all applicable, not applicable, moderately applicable, somewhat applicable, and fully applicable. Not at all applicable was scored 1, not applicable was scored 2, moderately applicable was scored 3, somewhat applicable was scored 4, and fully applicable was scored 5. The highest score was 150, and the lowest score was 30. A higher score indicated higher depression, and a lower score indicated a low level of depression. The severity of depression was categorized as <94= Not depressed, 94–100 = Minimal depression, 101–114 = Mild depression, 115–123 = Moderate depression and 124–150 = Severe depression.

Disease severity was assessed by BASDAI scale. It is a 10 cm visual analog scales used to answer six questions about the five significant symptoms of AS: fatigue, spinal pain, joint pain/swelling, areas of localized tenderness and morning stiffness. The higher the BASDAI score, the more severe the patients' disability due to their AS. A score of 4 or greater suggests suboptimal control of the disease.[12]

Data were entered into Microsoft Excel data sheet to generate a master sheet. After completion of the data entry, the master sheet was fed into Statistical package for social science (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp) for processing and analysis.Continuous variables were statistically described as mean and standard deviation or median and range. Categorical variables were expressed as count and percentages and were compared using chi-square or Fisher's exact test, whichever was applicable. Means were compared using Student's t-test for two groups. The person correlation coefficient was measured to determine the correlation between depression score and disease severity score. Statistical significance and confidence interval was set at $p<0.05$ and 95%, respectively.

## Results

During the study period, 32 patients of AS were enrolled in the study. Table I shows that, most of the patients (78.1%) were below 50 years of age. Male to female ratio was 7:1. More than half (53.1%) of the patients had educational qualification up to primary and only 4 (12.5%) patients were educated graduate and above level. Mean (±SD) duration of the disease was 7.5 (±7.67) years and range from 0.1-30 years. Mean BASDAI scale score was 5.9 with a SD of ±2.63 and range from 1-9. Most of patients (87.5%) had suboptimal control of disease indicated by a score of 4 (Table I).

**Table I** Sociodemographic and clinical characteristics of the patients (n=32)

| Variables | Frequency | Percent |
|---|---|---|
| **Age in years** | | |
| < 50 years | 25 | 78.1 |
| ≥ 50 years | 7 | 21.9 |
| Mean (±SD) | 36.56 (±12.02) | |
| **Sex** | | |
| Male | 28 | 87.5 |
| Female | 4 | 12.5 |
| **Education** | | |
| Up to primary | 17 | 53.1 |
| Up to HSC | 11 | 34.4 |
| Graduate & above | 4 | 12.5 |
| **Monthly family income in taka** | | |
| >17000 | 10 | 31.3 |
| 12000-17000 | 4 | 12.5 |
| 7000-12000 | 10 | 31.3 |
| <7000 | 8 | 25.0 |
| **Disease duration in years** | | |
| Mean (±SD) | 7.5 (±7.67) | |
| Median (Range) | 5 (0.1-30) | |
| **Disease severity by BASDAI score** | | |
| **Category** | | |
| Score <4 | 4 | 12.5 |
| Score ≥ 4 | 28 | 87.5 |
| Mean (±SD) | 5.9 (±2.63) | |
| **Median (Range)** | 6.5 (1-9) | |

Data were expressed as frequency and percentage if not mentioned otherwise. BASDAI: Bath AS Disease Activity Index, SD: Standard Deviation.

Out of 32 AS patients, 18 (56.3%) had depression and rest of the 14 (43.8%) patients had no depression. Patients who had depression, majority had either mild depression or moderate depression (Figure 1).

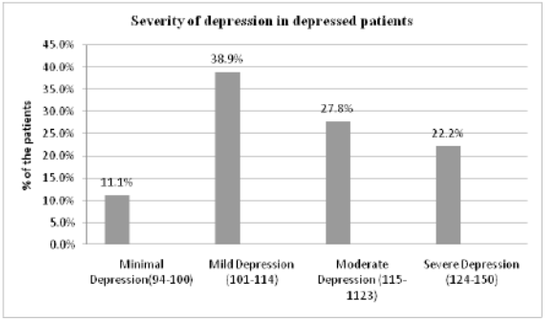


**Figure 1** Severity of depression among depressed patient (n=18)

Table II shows that, age, sex and educational level of the patients had no significant association with the depression status of the participants (p>0.05). Patients with higher monthly family income were significantly less depressed than their counterpart (p<0.05).

**Table II** Association between the sociodemographic characteristics and depression status

| Variables | Depression status | | p value |
|---|---|---|---|
| | Absent (n=14) | Present (n=18) | |
| **Age** | | | |
| <50 years | 11 (78.6) | 14 (77.8) | 0.957** |
| 50 years | 3 (21.4) | 4 (22.2) | |
| **Sex** | | | |
| Male | 11 (78.6) | 17 (94.4) | 0.294** |
| Female | 3 (21.4) | 1 (5.6) | |
| **Education** | | | |
| Below SSC | 7 (50.0) | 10 (55.6) | 0.755* |
| SSC & above | 7 (50.0) | 8 (44.4) | |
| **Monthly family income** | | | |
| ≥12000 tk | 9 (64.3) | 5 (27.8) | |
| <12000 tk | 5 (35.7) | 13 (72.2) | 0.039* |

*Chi-square test, **Fisher's exact test.

In the study, a significant (p<0.001) positive correlation (r=.565) between depression score and disease severity score was found (Figure 2). As the depression score increased, the disease severity also increased among the study population.

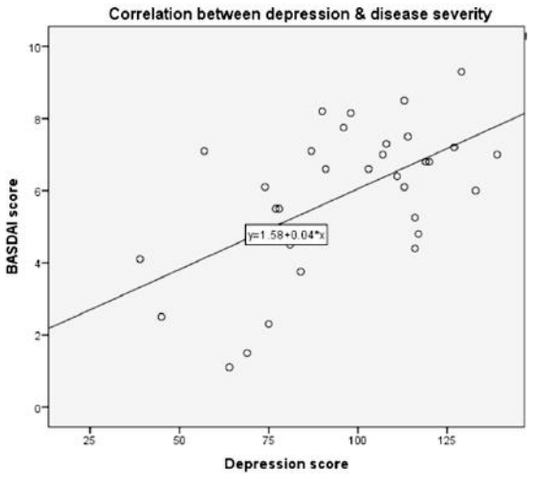


**Figure 2** Correlation between disease severity and depression by Pearson correlation

There was a significant (p=0.025) positive correlation (r=.369) between the duration of AS and the depression score of the AS patients (Figure 3).

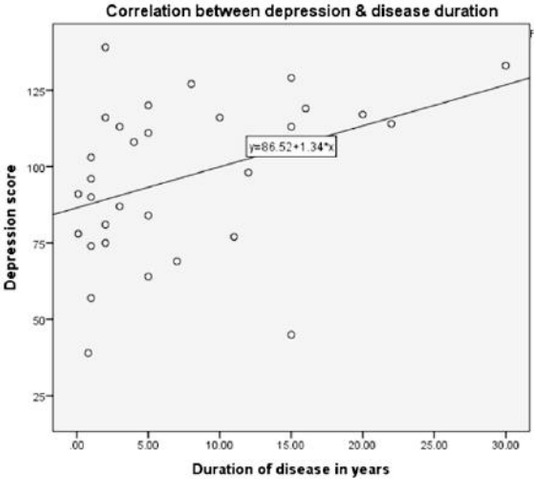


**Figure 3** Correlation between the duration of AS and the depression score of the study population (n=32)

## Discussion

The present study demonstrateda high prevalence (56.3%) of depressive symptoms in AS, consonant with previous investigations carried out in patients with similar inflammatory diseases like RA.[13,14] The depression prevalence estimates among AS patients ranged from 4.9–55.5% in different studies.[9] The majority of the AS patients with

depressive symptoms had either mild depression or moderate depression in the present study, which agreed with the study of Hyphantis et al. where the prevalence of clinically significant depressive symptoms was 14.8 % in AS patients.[15] It should be remembered that the samples investigated here come from a teaching, public, tertiary hospital in Bangladesh, which tends to care for the most severe cases. In addition, the method for measuring depressive symptoms used in many studies might be attributable to the high prevalence of these features commonly found in AS. However, we tried to control for this methodological effect in the present study.[9] Different from other investigations, the depression questionnaire used here was specifically designed to screen for psychiatric symptoms in patients with physical diseases and is developed according to the cultural context of Bangladesh. So, the chance of including somatic symptoms related to false-positive responses was eliminated.

As with most complex biological systems, the relationship between depression and AS is multifactorial: in some cases, depression is likely mediated by the socioeconomic results of AS. In other cases, depression may be due to disability from AS and the systemic inflammation from the proinflammatory cytokine milieu of AS. Regardless of the initiating factors, the contributory effect of AS's socioeconomic, functional, and biological consequences can perpetuate depressive symptoms.[15]

Analyzing the variables related to depressive symptoms in AS patients was another objective of the current study. The results demonstrated that depressive symptoms were associated with low economic conditions, high disease activity, and longer disease duration. Moreover, higher BASDAI scores in patients with depressive symptoms may suggest that depressive manifestations were due to disability related to AS in the studied patients. High functional disability levels resulting from AS and a possible neuro-immunobiological mechanism could explain the high frequency of depressive symptoms found in AS. It was already expected that depressive symptoms in AS would be related to high disease activity, measured with the BASDAI. In more active AS, the cytokine release is increased with higher inflammation, which leads to functional disability. The most relevant aspect of depression in AS is the cluster of this complex biological phenomenon.[6]

Depression symptoms prevalence were similar in male and female AS patients in our study. Barlow et al. found that women reported more depression than men.[23] It was probable that a type II error occurred here in our study due to insufficient samples in male and female groups to detect the gender differences.

**Limitation**

This study has some methodological limitations that must be considered while considering the findings. The sample size was small, and it was a single-centre study. Due to the cross-sectional design, it was not the scope of this study to determine the temporal association between AS and depressive symptoms.

**Conclusion**

In conclusion, the result showed that approximately half of the AS patients reported depression to some extent, and 12.5% of patients had severe depression. Disease severity and duration had a significant positive correlation with depression score and monthly family income had a significant negative correlation with depression score. No significant association was detected between depression status and the age, sex and educational level of the patients.

**Recommendation**

Depression is a treatable condition. Quality of life of AS patients is greatly compromised by coexisting depression. So, healthcare professionals should be alert to the possibility of these conditions. Additionally, further study to explore association of AS with mental conditions is needed to improve our understanding of the mechanisms underlying mental illness.

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**Contribution of authors**

ASMOF- Conception, acquisation of data, drafting & final approval.

SKK- Design, interpretation of data, critical revision & final approval.

HI- Data analysis, interpretation of data, drafting & final approval.

MAI- Interpretation of data, critical revision & final approval.

## Disclosure

The authors declared no conflicts of interest.

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