

## Depression among Rheumatoid Arthritis Patients and its Relationship with Disease Severity

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**Abstract Background:** Rheumatoid arthritis (RA) is a chronic systemic inflammatory autoimmune illness characterized by symmetric peripheral polyarthritis. Studies showed that there is an association between inflammation and depression, so most RA patients are suffering from depression. People with RA are twice as likely to have depression as the general population. Prevalence estimates for depression among RA patients range between 9.5%, 8, and 41.5%. **Objectives:** To study the prevalence of depression among rheumatoid arthritis patients and its relationship with disease severity. **Methodology:** This descriptive cross-sectional study was conducted among patients diagnosed with Rheumatoid arthritis and attending King Khalid Majmaah Hospital (KKMH). for follow-up. Fifty-seven patients were studied. Data was collected using a validated questionnaire and then analyzed using the SPSS Software program. This study protected the confidentiality of participants, and ethical approval was obtained from the King Fahad Medical City Review Board. **Results:** Most of the participants of this study were married females. 59.6% had been diagnosed with RA for less than five years, and Joint deformities were found in 19.3%. Prevalence of depression RA patients participated in this study. Only 12.3% were moderately depressed, so regular assessment of the RA patients is needed. HAQ results showed that 56.1% were categorized as 0 to 1. No significant association was found between the severity of depression and age group, gender, occupational status, diagnosis duration, family history of RA, joint deformities, serology markers, and conventional or biologic DMARDs. **Conclusion:** In this study, the prevalence of depression among the RA studied group was 28.1%. Among them, 12.3% were moderately depressed, and the rest had mild depression, so regular assessment of depression symptoms among the RA patients is needed, and antidepressants should be given if the depression worsens. Health-related quality of life (HAQ) results showed that 56.1% were categorized as 0 to 1. No significant association was found between the severity of RA and the level of depression. More extensive sample size studies. We need to confirm our findings in the future.

**Key Words** Rheumatoid Arthritis, Depression, HAQ, BECK

### 1. Introduction

Symmetric peripheral polyarthritis is the most common form of chronic inflammatory arthritis and is a characteristic of rheumatoid arthritis (RA), a chronic systemic inflammatory autoimmune disorder [1]. Hand, wrist, and knee joints are frequently affected by RA, and as the condition progresses, the joint's lining inflames and damages the joint tissue. This tissue injury can result in deformity, unsteadiness, and chronic or long-lasting pain [2]. Treatment and management of RA can be achieved with medication and self-care techniques [3]. Biological response modifiers (biological) and

disease-modifying anti-rheumatic medications (DMARDs) are two therapies that can help stop joint deformity and delay the course of RA [3].

Depression is a typical occurrence among RA patients. Compared to the general population, depression is more prevalent in RA [4]. Depression is twice as common among RA patients than in the general population [5]. Estimates of the prevalence of depression in RA patients range from 9.5% to 41.5%. [6], [7], and severe depression can also be brought on by rheumatoid arthritis [8].

The impact of receiving a diagnosis of a chronic illness for

which there is no known treatment, pain-depression has been linked to higher pain side effects of medicines are some of the reasons why depression is so common in RA patients [9].

In some instances, RA-related disabilities may be the cause of depression; RA's socioeconomic effects may also mediate depression. Current research indicates a correlation between depression and inflammation, as it has been demonstrated that elevated C-reactive protein (CRP) levels, a marker of inflammation, are linked to a higher risk of psychological distress, the pathophysiology of inflammation, and the onset of anxiety and depression [10]. Using RA as a disease model, several researchers are examining these relationships [11]. For effective treatment, it is crucial to comprehend the molecular elements of depression in RA [11]. Therefore, our research aimed to investigate the prevalence of depression among RA patients from the Majmaah province who attended the rheumatology clinic in King Khalid Majmaah Hospital (KKMH) and determine the association between the severity of rheumatoid arthritis and the level of depression.

## 2. Materials and Methods

### Study Design

This is a descriptive cross-sectional study.

### Study Area:

King Khalid Majmaah Hospital (KKMH) in Majmaah Province is located north of Riyadh Province in Saudi Arabia.

### Study Population:

The study participants are adult Patients diagnosed as having RA attending King Khalid Majmaah Hospital (KKMH) in Majmaah province. The total number of patients was 75, out of which 57 participated in the study.

### Data Collection

A three-part, validated, standardised questionnaire was used to gather the data. In the first section, participants' sociodemographic data is evaluated, and in the second, the severity of rheumatoid arthritis disease is ascertained using the HAQ-DL score (Health Assessment Questionnaire Disability Index) [12]. It is divided into eight sections; activities, reach, grasp, cleanliness, walking, eating, and dressing. For every part, there are two or three questions. Each part has a score ranging from 0 (easy to complete) to 3 (impossible to complete). The lowest score within each section is assigned to it; for example, if a question receives a score of one and another receives a score of two, the section will receive a score of two. Additionally, the minimum score for that section is 2 if an aid or device is used or if assistance from another person is needed. If the section score is already two or higher, nothing is changed [12].

The third section employed the Beck Depression Scale, a set of 21 questions, as a psychological tool to assess depression. The twenty-one questions were scored on a range of 0 to 3. Sixty-three is the maximum score that could be obtained

throughout the entire exam. This indicates that on all twenty-one questions, you circled number three. The lowest possible score on the test would be zero since the lowest possible score on each question is zero. This would entail answering every question with a zero. Depression is assessed using the following criteria: [13]

(1-10) These ups and downs are considered normal, (11-16) Mild mood disturbance, (17-20) Borderline clinical depression, (21-30) Moderate depression, (31-40) Severe depression, (Over 40) Extreme depression [13].

### Data Analysis

Numbers and percentages were used to compute and report descriptive statistics. The Fischer Exact test has been used to examine the relationship between the clinical features of the rheumatic population and the severity of depression. Additionally, the Mann-Whitney Z-test and the Kruskal Wallis H-test have been used to compare the depression scores with the patient's baseline and clinical features. Both the Kolmogorov-Smirnov and the Shapiro-Wilk tests have been used to quantify statistical collinearity. At  $p < 0.05$ , statistical significance was found. Statistical Packages for Software Sciences (SPSS) version 26, Armonk, New York, IBM Corporation, was used to analyse the data.

### Ethical Consideration

This study protected the confidentiality of participants, data was used for research only. Participants filled out informed consent before responding to the questionnaire. Ethical approval was taken from King Fahad Medical City Review Board.

## 3. Results

This study analyzed 57 patients with rheumatoid arthritis (RA). As described in Table 1, 42.1% was more than 50 years old, with females being dominant (82.5%). Most patients were married (96.5%) and of Saudi nationality (96.5%). Approximately 59.6% had been diagnosed with RA for less than five years. A family history of RA constitutes 26.3%. Positive RF was found in 64.9% of the patients. Positive anti-CCP was 77.2%. Most patients (93%) received conventional DMARDs, while 19.3% had targeted biologic DMARDs. Joint deformities were found in 19.3%. Regarding disease activity, approximately 42.1% were considered severe. Depression was found in 28.1% of the studied patients. Mild and moderate depression was noted in 15.8% and 12.3% of patients. In addition, HAQ results showed that 56.1% were categorized as 0 to 1.

When measuring the association between the severity of depression according to the baseline and clinical characteristics of the patients (Table 2), it was found that age group, gender, occupational status, diagnosis duration, family history of RA, RF, anti-CCP, conventional DMARDs, targeted Biologic DMARDs, and joint deformities showed no significant association with the severity of depression ( $p > 0.05$ ).

Study Data	N (%)
Age group	
22 – 35 years	11 (19.3%)
36 – 50 years	22 (38.6%)
>50 years	24 (42.1%)
Gender	
Male	10 (17.5%)
Female	47 (82.5%)
Female: Male ratio	4.7:1
Marital status	
Single	02 (03.5%)
Married	55 (96.5%)
Nationality	
Saudi	55 (96.5%)
Non-Saudi	02 (03.5%)
Diagnosis duration	
<5 years	34 (59.6%)
5 - 10 years	13 (22.8%)
>10 years	10 (17.5%)
Family history of rheumatoid arthritis	
Yes	15 (26.3%)
No	42 (73.7%)
RF	
Positive	37 (64.9%)
Negative	20 (35.1%)
Anti-CCP	
Positive	44 (77.2%)
Negative	13 (22.8%)
Conventional DMARDs	
Yes	53 (93.0%)
No	04 (07.0%)
Biologic DMARDs	
Yes	11 (19.3%)
No	46 (80.7%)
Joint deformities	
Yes	11 (19.3%)
No	46 (80.7%)
DAS 28	
Mild (>2.6 - <=3.2)	02 (03.5%)
Moderate (>3.2 - <=5.1)	31 (54.4%)
Severe (>5.1)	24 (42.1%)
Severity of depression	
Normal	41 (71.9%)
Mild	09 (15.8%)
Moderate	07 (12.3%)
HAQ	
0 – 1	32 (56.1%)
>1 – 2	23 (40.4%)
>2 – 3	02 (03.5%)

Table 1: Demography and clinical characteristics of the rheumatoid arthritis population ( $n = 57$ )

No significant association was found between the Level of depression and disease activity score (Figure 1), and also no association between the Level of depression and the health assessment questionnaire was found, as shown in (Figure 2).

#### 4. Discussion

Most of the participants of this study were females, and this is expected as RA affects mostly women with a female/male ratio of 3:1 [14]. 42% aged more than 50 years old. This result is also expected as the most common age is adults in their sixties. as shown by the Centre for Disease Control (CDC) [15]. Approximately 59.6% had been diagnosed with RA for less than five years, and no patient suffers from severe

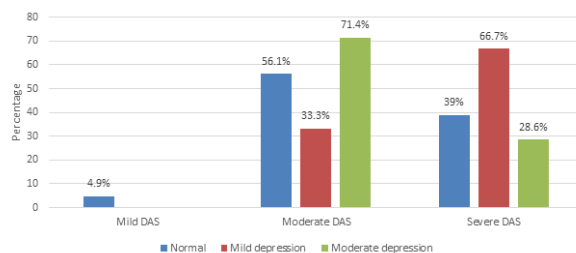


Figure 1: Association between the Level of depression and disease activity score ( $P > 0.05$ )

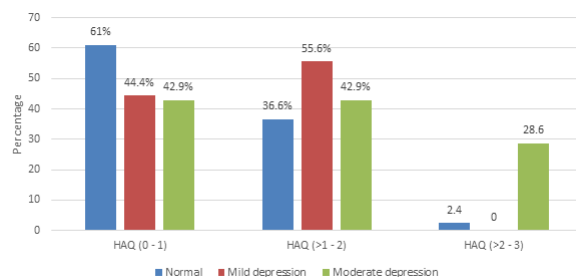


Figure 2: Association between the Level of depression and health assessment questionnaire ( $P > 0.05$ )

symptoms.

In this study, the prevalence of depression among rheumatoid arthritis patients was found to be 28.1%; no one of the participants had severe depression, and most of the patients had moderate and mild levels of depression. This is similar to the results of other studies conducted in KSA. For example, research conducted in Saudi Arabia to assess fatigue and mood disturbance among RA patients showed that 28.7% of RA patients had a mild mood disturbance [16], and nearly similar to research at King Abdulaziz Hospital, Jeddah, which showed that 18% of patients diagnosed with RA experienced depression [17], the prevalence of depression among RA patients in this study is also nearly similar to the results of studies conducted in the middle east and Asia as in Singapore, it was found to be 15% [18] and in Japan, 12.4% [19].

Interestingly, the results of this study show a lower prevalence of depression among patients with RA compared to European countries. Examples of those findings are in Poland, where 76% of rheumatoid arthritis patients were depressed [20].

In Turkey, a study among RA patients found that 70% suffered from depression [21]. These differences in the results may be due to long-standing disease, as in this study, most of the patients had RA for less than five years. Another explanation could be due to confounding factors that could enhance the appearance of depression symptoms, like cold weather, as the study conducted in Iran found that depression was more prevalent where the weather was cold [22].

When measuring the association between the severity of

Factor	Severity of depression			P-value §
	NormalN (%) <sup>(n=41)</sup>	MildN (%) <sup>(n=9)</sup>	ModerateN (%) <sup>(n=7)</sup>	
Age group				
22 – 35 years	08 (19.5%)	01 (11.1%)	02 (28.6%)	0.867
36 – 50 years	17 (41.5%)	03 (33.3%)	02 (28.6%)	
>50 years	16 (39.0%)	05 (55.6%)	03 (42.9%)	
Gender				
Male	07 (17.1%)	0	03 (42.9%)	0.080
Female	34 (82.9%)	09 (100%)	04 (57.1%)	
Diagnosis duration				
<5 years	25 (61.0%)	05 (55.6%)	04 (57.1%)	0.865
5 - 10 years	10 (24.4%)	02 (22.2%)	01 (14.3%)	
>10 years	06 (14.6%)	02 (22.2%)	02 (28.6%)	
Family history of rheumatoid arthritis				
Yes	11 (26.8%)	02 (22.2%)	02 (28.6%)	1.000
No	30 (73.2%)	07 (77.8%)	05 (71.4%)	
RF				
Positive	28 (68.3%)	04 (44.4%)	05 (71.4%)	0.411
Negative	13 (31.7%)	05 (55.6%)	02 (28.6%)	
Anti-CCP				
Positive	30 (73.2%)	07 (77.8%)	07 (100.0%)	0.406
Negative	11 (26.8%)	02 (22.2%)	0	
Conventional Synthetic DMARDs				
Yes	37 (90.2%)	09 (100%)	07 (100%)	1.000
No	04 (09.8%)	0	0	
Targeted biologic DMARDs				
Yes	07 (17.1%)	02 (22.2%)	02 (28.6%)	0.652
No	34 (82.9%)	07 (77.8%)	05 (71.4%)	
Joint deformities				
Yes	07 (17.1%)	03 (33.3%)	01 (14.3%)	0.560
No	34 (82.9%)	06 (66.7%)	06 (85.7%)	

Table 2: Association between Level of depression and Clinical characteristics of rheumatoid arthritis Population ( $n = 57$ )  
Factor Severity of depression  $P$ -value

depression according to the baseline and clinical characteristics of the patients, it was found that age group, gender, occupational status, diagnosis duration, family history of RA, RF, anti-CCP, conventional synthetic DMARDs, targeted biologic DMARDs, and joint deformities had no significant association with the severity of depression (all  $p > 0.05$ ). This study also observed that there was no significant association between the severity of depression and DAS 28 ( $p = 0.510$ ), and the association between the severity of depression and HAQ did not reach statistical significance ( $p=0.372$ ). The most likely explanation for this insignificant association is that most participants are newly affected with rheumatoid arthritis, no complications or deformities are present, and the HAQ score is low among more than half of the patients. This finding is supported by other studies that showed a significant association between depression and severe long-standing RA. An example of those studies is a Systematic review, and Meta-Analyses performed in 72 studies, including 13,189 cases; it found that depression is mainly current in RA and associated with poorer RA issues [23]. Another study is the one conducted in Japan to assess the severity of the RA disease and depression found that depression among

patients with RA was associated with worse HAQ [24].

According to the findings of this research, more research with a larger sample size is recommended. Also, analytical studies and clinical trials are recommended for searching all factors affecting depression among RA patients in KSA.

## 5. Conclusion

In this study, the prevalence of depression among the RA-studied group was 28.1%. Among them, 12.3% were moderately depressed, and the rest are with mild depression, so regular assessment of the RA patients is needed, and antidepressants should be given if the depression worsens. Health-related quality of life HAQ results showed that 56.1% were categorized as 0 to 1, and no significant association was found between the severity of depression and age group, gender, occupational status, diagnosis duration, family history of RA, RF, anti-CCP, conventional synthetic DMARDs, targeted biologic DMARDs, and joint deformities. The association between the disease severity, health-related quality of life, and level of depression was found to be insignificant. Larger sample size studies. We need to confirm our findings in the future.

## Conflict of interest

The authors declare no conflict of interests. All authors read and approved final version of the paper.

## Authors Contribution

All authors contributed equally in this paper.

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