

# Effect of Irregular Treatment on Severity of Osteoporosis in Rheumatoid Arthritis Patients

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## Abstract

**Background:** Rheumatoid arthritis is a chronic systemic inflammatory disorder that is associated with progressive disability and systemic complications. One of these complications is osteoporosis. Patients with severe osteoporosis have one or more fragility fractures in addition to T-score -2.5 or lower. Osteoporosis is more prevalent in rheumatoid arthritis patients who have higher disease activity.

**Objective:** To show the effect of irregular treatment in patients with rheumatoid arthritis on the severity of osteoporosis.

**Patients and Methods:** A cross-sectional study enrolled a total of 40 female patients who had rheumatoid arthritis. The data collected from patients include disease duration, disease activity and patients' compliance to their drugs. They were sent to dual-energy x-ray absorptiometry scan and results were recorded.

**Results:** The mean age was  $45.95 \pm 10.0$  years; 45% of them had rheumatoid arthritis for less than five years; 55% had a low level of disease activity; and 65% of them had received treatment irregularly. Osteoporosis was diagnosed in 60% of them and 41.7% of them had severe osteoporosis. The highest prevalence of osteoporosis among patients with rheumatoid arthritis was seen significantly among older patients, patients with longer duration of rheumatoid arthritis, those with higher activity of rheumatoid arthritis, and those with irregular treatment. More than half of those who received treatment irregularly had severe osteoporosis with a significant association between treatment regularity of rheumatoid arthritis and severity of osteoporosis.

**Conclusion:** Severe osteoporosis occurs in rheumatoid arthritis patients with a history of irregular treatment which occurs either due to patient incompliance or delay in diagnosis.

Osteoporosis is more prevalent in rheumatoid arthritis patients with longer disease duration, older age, higher disease activity and those who received treatment irregularly.

**Keywords:** Rheumatoid arthritis, Osteoporosis, Irregular Treatment

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## Introduction

Rheumatoid arthritis (RA) is a chronic systemic inflammatory disorder that is associated with systemic complications and progressive disability [1].

These complications reflect the need for early diagnosis and starting aggressive treatment directly after diagnosis to prevent complications from the occurrence or prevent their progression if it already occurred [2]. One of these complications is osteoporosis which represents a significant cause of morbidity in patients with RA because of the increased risk of fractures in those patients [3].

Osteoporosis is characterized by decreased bone density and deterioration of bone microarchitecture which predispose patients to fragility fractures [4]. The World Health Organization (WHO) defines osteoporosis as 2.5 standard deviations of bone mineral density below that of young adults (T-score of  $-2.5$  or lower). Patients with severe osteoporosis have one or more fragility fractures in addition to this T-score [5]. Osteoporosis is more prevalent in RA patients who have higher disease activity [6].

This means that better control of disease activity leads to a decrease the risk of occurrence of osteoporosis. This needs the patient to take RA treatment on regular regimens. Some patients do not take the treatment regularly either due to patient

incompliance or due to delay in the diagnosis of disease. The aim of this study is to show the effect of irregular treatment of patients with rheumatoid arthritis on the severity of osteoporosis.

## Patients and Methods

### Study design and population

A cross-sectional study was done at the rheumatology department at Baqubah teaching hospital during the period from June 2020 till March 2021. A total of 40 female patients with RA were included in this study. The inclusion criteria were:

1-The patient should fulfill the 2010 American College of Rheumatology/ European League against Rheumatism classification criteria for rheumatoid arthritis [7].

2-Absence of other risk factors of osteoporosis like asthma or early menopause  
Prior to data collection, signed consent from each of the patients was obtained after explaining the aim of the study and ensuring the privacy of the data.

### Method

The following data were collected from patients:

- 1- Name
- 2- Age
- 3- Disease duration from the point of symptoms occurrence

- 4- Duration from starting symptoms until the diagnosis of the disease
- 5- Drugs used for RA and the compliance of patients to these drugs

Examination of patients was done to determine disease activity using the clinical disease activity index ( CDAI ) [8]. They were sent to dual-energy x-ray absorptiometry (DEXA) scan and results were recorded.

### Statistical analysis

The data analysis was done using Statistical Package for Social Sciences (SPSS) version 26. The data presented as mean, standard deviation and ranges. Categorical data were presented by frequencies and percentages. Chi-square test was used to assess the

association between osteoporosis and certain information, while fisher exact test was used instead when the expected frequency was less than 5. A level of P – value less than 0.05 was considered significant.

### Results

This study included 40 female patients diagnosed with rheumatoid arthritis. The mean age was  $45.95 \pm 10.0$  years; 45% of them had rheumatoid arthritis for less than five years; 55% had a low level of disease activity, and 65% of them had received treatment irregularly.

Osteoporosis was diagnosed in 60% of them and 41.7% of them had severe osteoporosis.

**Table (1):** Distribution of study patients by certain characteristics

Variable	No. (n= 40)	Percentage (%)
<b>Age (Year)</b>		
< 40	12	30.0
40 – 49	10	25.0
≥ 50	18	45.0
<b>Duration of rheumatoid arthritis (Year)</b>		
< 5	18	45.0
5 – 9	10	25.0
≥ 10	12	30.0
<b>Activity of rheumatoid arthritis</b>		
Low	22	55.0
Moderate	8	20.0
High	10	25.0
<b>Treatment regularity of rheumatoid arthritis</b>		
Regular	14	35.0
Irregular	26	65.0
<b>Osteoporosis</b>		
Yes	24	60.0
No	16	40.0
<b>Severity of osteoporosis</b> <span style="float: right;">n= 24</span>		
Severe	10	41.7
Mild	14	58.3

As shown in Table (2), the highest prevalence of osteoporosis among patients with rheumatoid arthritis was seen significantly among older patients ( $P=0.001$ ), patients with a longer duration of rheumatoid arthritis ( $P=0.001$ ), those with high activity of rheumatoid arthritis ( $P=0.011$ ), and those with irregular treatment ( $P=$

$0.001$ ). As shown in Table (3), all patients with rheumatoid arthritis who received treatment regularly had mild osteoporosis, while 52.6% of those who received treatment irregularly had severe osteoporosis with a significant association between treatment regularity of rheumatoid arthritis and severity of osteoporosis ( $P=0.033$ ).

**Table (2):** Association between osteoporosis and certain characteristics of RA patients

Variable	Osteoporosis		Total (%) n= 40	P - value
	Yes (%) n= 24	No (%) n= 16		
<b>Age (Year)</b>				
< 40	2 (16.7)	10 (83.3)	12 (30.0)	<b>0.001</b>
40 – 49	10 (100.0)	0 (0)	10 (25.0)	
≥ 50	12 (66.7)	6 (33.3)	18 (45.0)	
<b>Duration of rheumatoid arthritis (Year)</b>				
< 5	4 (22.2)	14 (77.8)	18 (45.0)	<b>0.001</b>
5 – 9	8 (80.0)	2 (20.0)	10 (25.0)	
≥ 10	12 (100.0)	0 (0)	12 (30.0)	
<b>Activity of rheumatoid arthritis</b>				
Low	10 (45.5)	12 (54.5)	22 (55.0)	<b>0.011</b>
Moderate	4 (50.0)	4 (50.0)	8 (20.0)	
High	10 (100.0)	0 (0)	10 (25.0)	
<b>Treatment regularity of rheumatoid arthritis</b>				
Regular	5 (35.7)	9 (64.3)	14 (35.0)	<b>0.001</b>
Irregular	19 (73.1)	7 (26.9)	26 (65.0)	

**Table (3):** Association between treatment regularity of rheumatoid arthritis and severity of osteoporosis

Treatment regularity of rheumatoid arthritis	Severity of osteoporosis		Total (%) n= 24	P - value
	Severe (%) n= 10	Mild (%) n= 14		
Regular	0 (0)	5 (100.0)	5 (20.8)	<b>0.033</b>
Irregular	10 (52.6)	9 (47.4)	19 (79.2)	

## Discussion

This study revealed that 60 % of patients with rheumatoid arthritis had osteoporosis. This agrees with the results of Lee *et al* [9] which showed that about 50 % of patients with RA in their study had osteoporosis. also agrees with the results of Hauser *et al* [10] which showed that up to 50 % of

postmenopausal females with RA had osteoporosis. The results was disagreed with the the results of Miculs *et al* [11] which showed that the prevalence of osteoporosis in RA patients was 10 %. This difference may be due to those patients included in their study was only those with disease duration less than two years which may affect the

possibility of osteoporosis occurrence, while in our study there was no restriction regarding disease duration.

The results of this study concluded that the highest prevalence of osteoporosis was among those with older age, longer disease duration, higher disease activity, and in patients with a history of irregular usage of treatment which occur either due to patient incompliance or due to delayed diagnosis.

This agrees with the results of Van Staa *et al* [12] which showed that osteoporosis is more prevalent in RA patients with long-standing disease due to the effects of chronic systemic inflammation. It also agreed with the results of Lee *et al* [9] which mentioned that osteoporosis in RA is more prevalent among older patients due to the effect of age which is a known risk factor for osteoporosis. It also agrees with the results of Phuan-Udom *et al* [6] which showed that osteoporosis was more prevalent in RA patients who have higher disease activity.

During our practice, we face a number of cases that do not take effective RA treatment regularly. This occurs either due to patient incompliance or due to delay in diagnosis of the patient. This leads to less control of the systemic effect of the disease and more damage to the bone by this chronic systemic inflammation.

In this study, among those patients with osteoporosis, 41.7 % were sub-grouped as having severe osteoporosis which is defined as osteoporosis plus at least one fragility fracture. As mentioned in the Table (3), 52.6% of those who received treatment irregularly had severe osteoporosis with a significant association between the treatment regularity of rheumatoid arthritis and severe

osteoporosis. This indicates that the most important predictive measure for osteoporosis severity in RA patients is the regularity of treatment.

## Conclusions

Severe osteoporosis occurs in RA patients with a history of irregular treatment which occurs either due to patient incompliance or delay in diagnosis. Osteoporosis is more prevalent in RA patients with longer disease duration, older age, and higher disease activity.

## Recommendations

Inform patients about the importance of taking drugs on a regular basis. A study with a longer duration and the larger sample size is recommended to confirm the results of this study

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**Conflict of interest:** Nil

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