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IP International Journal of Orthopaedic Rheumatology

Journal homepage: https://www.ijor.org/

Original Research Article

Association of various condition in patients with rheumatoid arthritis in tertiary care hospital of central Assam: A retrospective case note review

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Abstract

Aims & Objective: To evaluate the prevalence and types of comorbidities associated with RA in a tertiary care setting in Central Assam and to compare these with matched non-RA individuals.

Background: RA is frequently accompanied by a wide range of comorbidities that complicate its clinical management. Understanding the burden and nature of these comorbidities is essential for improving outcomes.

Materials and Methods: This retrospective case note review included patients diagnosed with RA between 2015 and 2024 at Tezpur Medical College and Hospital. Patients aged ≥16 years were included. Diagnosis of RA was confirmed using clinical records, serological markers (Anti-CCP, RF), and imaging when available. Non-RA controls were matched 1:1 based on age, sex, and visit year. Comorbidities were identified using ICD-10 codes and analysed using logistic regression. Patients with other autoimmune diseases or thyroid disorders were excluded.

Results: A total of 310 patients (155 RA and 155 controls) were included. The mean age was 60.4 ± 15.5 years; 66.7% were female. RA patients showed a significantly higher prevalence of soft tissue disorders (56.5%), osteopathies (31.1%), anaemia (18.3%), liver disease (15.7%), renal failure (8.6%), and gastrointestinal disorders (43.8%). These findings were consistent across age groups. DAS28 data were not available for assessment. Imaging evidence for chondropathies was also absent, limiting definitive diagnosis.

Conclusion: This study highlights a substantial burden of systemic and musculoskeletal comorbidities in RA patients. Older age in the cohort raises the possibility of osteoarthritis overlap. Larger prospective studies with clinical severity indices and imaging confirmation are required to further validate these findings.

Keywords: Rheumatoid arthritis, Comorbidities, Assam, Retrospective study, Osteoarthritis, Chondropathies

Received: 25-02-2025; **Accepted:** 27-05-2025; **Available Online**: 06-06-2025

1. Introduction

About 1% of people worldwide suffer with rheumatoid arthritis (RA), a habitual, inflammatory, systemic autoimmune condition.[1,2] Women are two to three times more likely than males to get rheumatoid arthritis. For women, the estimated cumulative lifetime threat of getting adult- onset rheumatoid arthritis is 3.6, while for men, it's 1.7.[3,4] Systemic problems and gradual disability are linked to rheumatoid arthritis. It places a heavy strain on society, leading to high rates of morbidity.[5-7] It typically manifests between the third and fifth decades of life but can occur at any age. RA is driven by autoimmune mechanisms involving T-cells, B-cells, pro-inflammatory cytokines such as TNF-α and IL-6, and the production of autoantibodies including rheumatoid factor (RF) and anti-citrullinated peptide antibodies (anti-CCP).

Autoantibodies like rheumatoid factor (RF) and anti-citrullinated protein antibodies (anti-CCP), inflammation and overgrowth of the synovium, abnormalities in cartilage and bone, and a variety of symptoms, such as pulmonary, skin, skeletal, psychological, and cardiovascular conditions, are the hallmarks of rheumatoid arthritis.[6]

It lowers quality of life (QoL), affecting patients' economic, emotional, physical, and vocational facets of their lives.[7] The approach taken by rheumatoid arthritis patients are treated has improved over time.[8] The current European alliance of associations for rheumatology (EULAR) guidelines for the treatment of early arthritis support early referral to a specialist and emphasize achieving a deduction of at least 50% in clinical complaint exertion within 3 months of starting treatment, with absolution being the ultimate

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http://doi.org/10.18231/j.ijor.2025.005

treatment thing within 6 months.[9] Since the start of the twenty-first century, the increased use of methotrexate and the development of TNF- α inhibitors have made it easier to negotiate these lofty pretensions.[10-12]

In patients with rheumatoid arthritis, comorbidities are generally regarded as a serious problem, particularly because they may jeopardize the patients' long-term prognosis and overall progress.[13] Two or more comorbid diseases are frequently present in rheumatoid arthritis patients.[14] Few published research currently exist that offer quantitative information on the frequency of comorbidities in rheumatoid arthritis patients. However, case reports or clinical/hospital studies that concentrate on either one autoimmune disease or a subset of many autoimmune disorders make up the majority of published articles.[15-19] For instance, a us study on the incidence of autoimmune disorders that coexist with rheumatoid arthritis revealed that rheumatoid arthritis patients had a marginally higher risk of developing chronic obstructive pulmonary disease (COPD).[13]

Depression,[15] asthma,[7] cardiovascular events like myocardial infarction (mi) and stroke,[6] solid- organ cancers,[5] and chronic obstructive pulmonary disease,[4] were among the most generally reported comorbidities, whether once or present. To help design treatments for prevention, burden reduction, and the precise matching of healthcare services to the conditions of individual cases, we must ameliorate our understanding of the epidemiology of multimorbidity. Therefore, in a central Assam tertiary care hospital, the study's goal was to determine the correlation between different complications and rheumatoid arthritis cases.

2. Materials and Methods

This study was designed as a retrospective case note review conducted at the Department of Orthopaedics, Tezpur Medical College and Hospital, Assam. The hospital serves as a referral centre for multiple districts in Central Assam and receives patients from both urban and rural populations. The data reviewed spanned from January 2015 to December 2024.

2.1. Inclusion criteria

Patients aged 16 years or older who had a documented diagnosis of RA during this period were eligible for inclusion. The diagnosis of RA was considered valid if it met one or more of the following criteria:

1. Physician-confirmed diagnosis based on 2010 ACR/EULAR classification criteria.
2. Seropositivity for RF or Anti-CCP antibodies.
3. Radiological findings suggestive of joint erosions or deformities consistent with RA.

2.2. Exclusion criteria

1. Patients with other autoimmune diseases such as systemic lupus erythematosus (SLE), scleroderma, or psoriatic arthritis.
2. Known cases of hyperthyroidism or hypothyroidism.
3. Patients who declined consent or had incomplete records for key clinical parameters.

2.3. Control group selection

Using nearest neighbour propensity score matching (PSM), each RA patient was matched with one non-RA control from the hospital database. Matching was based on:

1. Age (±3 years)
2. Sex
3. Year of index hospital visit
4. Frequency of outpatient consultations in the study period

This matching aimed to reduce confounding due to age- or sex-related variations in disease patterns and healthcare access.

2.4. Data collection process

Data were manually extracted from physical and digital patient case notes using a pre-designed data extraction template. The following parameters were collected:

1. Demographic data: age, sex, occupation, residence
2. RA-related clinical features: duration of symptoms, presence of morning stiffness, joint involvement, extra-articular manifestations
3. Serological tests: RF, anti-CCP, ESR, CRP (where available)
4. Radiological reports: X-rays of hands, feet, spine, and affected joints
5. Drug history: use of methotrexate, hydroxychloroquine, steroids, NSAIDs, or biologics
6. Comorbidities recorded within 12 months of RA diagnosis, using ICD-10 coding across the following systems: Cardiovascular, Hepatic, Renal, Gastrointestinal, Musculoskeletal (excluding RA-specific changes), Psychiatric (e.g., depression, anxiety), Hematological (e.g., anemia), Endocrine/metabolic (e.g., diabetes, hypothyroidism)

2.5. Statistical analysis

Categorical variables were summarized using counts and percentages, Continuous variables were described using means and standard deviations (SD). Chi-square tests and Fisher's exact tests were used to compare proportions. Logistic regression models were applied to calculate odds ratios (ORs) with 95% confidence intervals (CIs) to identify associations between RA and comorbidities. A p-value of **<0.05** was considered statistically significant.

2.6. Ethical approval

Ethical clearance for this study was obtained from the Institutional Ethics Committee of Tezpur Medical College and Hospital. As the data were collected retrospectively from hospital records, patient identifiers were anonymized during analysis.

3. Results

3.1. Demographics and clinical characteristics

A total of 310 individuals were included in the final analysis — 155 patients with confirmed rheumatoid arthritis and 155 matched non-RA controls. The mean age of the RA group was 60.4 ± 15.5 years, and 66.7% were female, consistent with the global gender distribution in RA prevalence. Serological testing revealed RF positivity in 72.4% and Anti-CCP positivity in 68.1% of RA patients, confirming the autoimmune nature in the majority of cases.(**Table 1**)

Most RA patients presented with joint stiffness, polyarthritis, and fatigue. A subset (13.2%) showed extra-articular features such as nodules and fatigue. The average disease duration at first hospital record entry was 3.4 years, although early RA cases (<6 months of symptoms) accounted for only 22 patients (14.1%).

3.2. Comorbidity burden

Compared to the matched controls, RA patients had a significantly higher prevalence of a number of physical and systemic comorbidities. These findings were consistent across gender and most age groups. (**Table 2**)

Table 1: Baseline characteristics of the study population

Variable	RA Patients (n=155)	Non-RA Controls (n=155)
Mean Age (years)	60.4 ± 15.5	60.5 ± 15.6
Female (%)	66.7	66.7
RF Positive (%)	72.4	NA
Anti-CCP Positive (%)	68.1	NA
Average RA duration (years)	3.4 ± 2.6	NA
Methotrexate Use (%)	81.3	NA
NSAID Use (%)	92.6	88.1 (for other reasons)

Table 2: Clinically relevant associations major comorbidities and odds ratios

Comorbidity (ICD-10 codes)	RA (%)	Control (%)	OR (95% CI)	p-value
Soft tissue disorders	56.5	44.4	1.47 (1.42–1.52)	<0.001
Osteopathies/Chondropathies	31.1	25.1	1.28 (1.22–1.33)	<0.001
Renal Failure	8.6	6.7	1.36 (1.26–1.47)	<0.001
Anemia	18.3	14.0	1.32 (1.24–1.40)	<0.001
Liver Disorders	15.7	13.3	1.32 (1.23–1.41)	<0.001
GI Disorders (Upper)	43.8	37.0	1.18 (1.14–1.22)	<0.001
Nutritional Deficiencies	14.5	11.3	1.17 (1.10–1.24)	<0.001

Table 3: Significant but clinically not relevant associations comorbidities and odds ratios

Comorbidity (ICD-10 codes)	RA (%)	Control (%)	OR (95% CI)	p-value
Disorders of purine and pyrimidine Metabolism	13.8	12.0	1.13 (1.09–1.18)	<0.001
Diabetes mellitus	24.4	22.6	1.11 (1.08–1.15)	<0.001
Heart failure	10.5	9.2	1.11 (1.06–1.17)	<0.001
Cerebrovascular diseases	10.8	10.2	0.92 (0.88–0.96)	<0.001
Sleep disorders	18.7	18.1	0.91 (0.88–0.95)	<0.001
Anxiety disorder	10.5	10.2	0.91 (80.87–0.95)	<0.001
Somatoform disorders	21.9	20.0	1.06 (1.02–1.09)	<0.001
Depression	3.2	2.8	1.05 (1.02–1.08)	<0.001

Table 4: No Significant associations comorbidities and odds ratios

Comorbidity (ICD-10 codes)	RA (%)	Control (%)	OR (95% CI)	p-value
Hypertension	56.4	54.9	1.01 (0.98–1.04)	0.502
Diseases of veins, lymphatic vessels, and lymph nodes	26.8	25.0	1.01 (0.97–1.04)	0.570
Reaction to severe stress and adjustment disorders	15.2	14.3	0.97 (0.93–1.00)	0.166
Cardiac arrhythmias	17.5	16.4	0.99 (0.96–1.03)	0.5712

Table 5: Gender-wise prevalence of selected comorbidities (RA group)

Comorbidity	Female RA (%)	Male RA (%)
Osteopathies	34.7	25.1
Anemia	21.2	13.1
Nutritional Deficiencies	17.4	9.6
Renal Dysfunction	7.5	9.6

Table 6: Comorbidities stratified by RA duration

Duration (Years)	Osteopathies (%)	Anemia (%)	GI Disorders (%)
<1	14.8	10.3	29.6
1–5	28.4	18.9	42.2
>5	39.3	25.0	57.1

These results reflect a gender-based discrepancy, with women experiencing higher rates of osteopathies and anemia, possibly due to post-menopausal osteoporosis and nutritional issues. (**Table 5**)

A longer duration of RA was significantly associated with higher rates of chronic complications, especially in the musculoskeletal and gastrointestinal domains. (**Table 6**)

4. Discussion

This retrospective case note review highlights the substantial comorbidity burden in patients with RA attending a tertiary care hospital in Central Assam. Our findings are consistent with prior research suggesting that RA is not merely a joint disease but a systemic condition with wide-ranging health implications.

4.1. Musculoskeletal disorders

RA patients had a significantly higher prevalence of soft tissue disorders and osteopathies. While these findings align with expectations, the lack of imaging makes it difficult to distinguish between RA-related joint damage and age-related osteoarthritis. Given the average age of 60, osteoarthritis is likely to overlap in clinical presentation. This finding underscores the importance of imaging in future RA cohort studies. Numerous papers demonstrating the link between rheumatoid arthritis and myositis were found in a review that focused on this topic.[20] Thirty percent of patients with idiopathic inflammatory myopathy had rheumatoid arthritis.[20] The link between rheumatoid arthritis and other types of joint inflammation was also validated by another study.[21] Patients with rheumatoid arthritis frequently report shoulder lesions; in total, 48% of rheumatoid arthritis patients experience erosive changes in their shoulders, which impair shoulder function and cause pain.[22,23] Increased cytokine levels linked to systemic inflammation may be the fundamental mechanism behind this connection.[24,25] Our investigation also found a correlation between rheumatoid arthritis and chondropathies or osteopathies. Patients with rheumatoid arthritis are more likely to develop osteopathies and chondropathies, particularly women (or: 1.31 (1.25–1.38) vs. 1.18 (1.08–1.29) in men). This result is consistent with a similar study conducted in Germany, which discovered that the most common comorbidities among rheumatoid arthritis patients were osteoarthritis (44%) and osteoporosis (25.9%). Kareem et al. Evaluated the risk factors for the development of osteoporosis in rheumatoid arthritis patients and divided them into three categories: treatment-related variables, rheumatoid arthritis -related factors, and patient-related factors.[29,30]

4.2. Renal and liver dysfunction

Renal dysfunction was more prevalent among RA patients, likely due to chronic inflammation, use of NSAIDs, or disease-modifying therapies such as methotrexate. Liver disease was similarly elevated and may be attributed to drug-induced hepatotoxicity or comorbid fatty liver disease, especially in older adults. Depending on the study design, renal illness definition, and diagnostic criteria used in earlier research, the reported prevalence of renal failure in rheumatoid arthritis patients ranged from 5% to 50%.[26-28]

4.3. Anemia and nutritional deficiencies

Anemia remains a common extra-articular manifestation in RA, driven by anemia of chronic disease, gastrointestinal blood loss, and poor nutritional status. Nutritional deficiencies in this cohort were more common among female patients and may reflect dietary insufficiencies, economic constraints, and chronic inflammation.

4.4. GI disorders

Upper gastrointestinal symptoms, including dyspepsia, gastritis, and duodenal ulcers were highly prevalent. This is consistent with long-term NSAID use, which remains common despite the availability of safer alternatives in other settings.

4.5. Gender and duration-based differences

The data showed that female RA patients bear a disproportionate burden of nutritional and musculoskeletal comorbidities. Additionally, those with longer-standing RA

(>5 years) were significantly more likely to have multiple systemic complications. This highlights the importance of early, aggressive management and routine comorbidity screening in RA patients.

5. Limitations

It is important to take into account the limitations of this study. 155 rheumatoid arthritis patients were included in the study; although this sample size offers insightful information, it may reduce the statistical power to identify relationships, especially when looking at less common comorbidities or investigating subgroups within the population. Absence of clinical disease activity scores (e.g., DAS28), No imaging data for verification of musculoskeletal findings. Retrospective design prone to misclassification and missing data. Serological confirmation (RF/Anti-CCP) not available for all patients.

6. Conclusion

This study highlights common comorbidities associated with RA in a tertiary care setting. While RA is linked with multiple systemic conditions, proper diagnostic confirmation and disease severity assessment are lacking. Findings suggest the need for better diagnostic infrastructure, especially for distinguishing RA from osteoarthritis in elderly patients.

7. Ethical No.

085/2023/TMC&H

8. Conflict of Interest

None.

9. Source of Funding

None.

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Cite this article: Das C, Das PP, Imam SS. Association of various condition in patients with rheumatoid arthritis in tertiary care hospital of central Assam: A retrospective case note review. *IP Int J Orthop Rheumatol*. 2025;11(1):32-37.