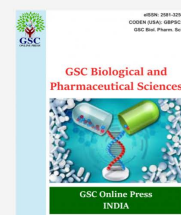




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COMPARATIVE STUDY ON PHARMACOVIGILANCE AND PHARMACOECONOMIC EVALUATION OF CONVENTIONAL AND BIOLOGICAL DMARD THERAPY IN RHEUMATOID ARTHRITIS

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ABSTRACT

Rheumatoid arthritis (RA) is a chronic inflammatory autoimmune disease requiring long-term treatment. Conventional disease-modifying antirheumatic drugs remain the foundation of therapy, whereas biological DMARDs are important for patients requiring treatment escalation. Their safety monitoring and economic burden are important in clinical practice. Objective: To evaluate the pharmacovigilance profile, treatment pattern and drug-cost burden associated with conventional and biological DMARD therapy in patients with RA. Methods: A comparative observational evaluation was performed using data from 30 patients with RA. Demographic characteristics, symptoms, laboratory investigations, treatment patterns, documented adverse drug reactions (ADRs), ADR management, WHO-UMC causality and drug costs were analyzed descriptively. Results: The study population included 21 females (70.0%) and 9 males (30.0%), with most patients aged 40–59 years. Methotrexate monotherapy was the most common treatment (46.7%), while adalimumab monotherapy was recorded in 6.7%. Three valid documented ADRs were identified (10.0%): an adalimumab-related injection-site reaction, methotrexate-associated nausea and leflunomide-associated skin rash. Two ADRs were mild, one was moderate, all recovered, and all were classified as probable by WHO-UMC assessment. Total recorded drug expenditure was ₹88,570, with a mean of ₹2,952.33 and median of ₹835 per patient; costs ranged from ₹195 to ₹18,800. Conclusion: Conventional DMARDs, particularly methotrexate, predominated and appeared economically accessible in this cohort, whereas higher-cost therapy contributed to substantial expenditure variability. The low number of documented ADRs does not permit a definitive comparative safety conclusion between DMARD categories. Larger studies with standardized direct group-wise cost and safety comparisons are required.

Keywords: Rheumatoid Arthritis; Dmards; Pharmacovigilance; Adverse Drug Reactions; Pharmacoeconomics; Methotrexate; Biological Therapy.

1 INTRODUCTION

Rheumatoid arthritis is a chronic inflammatory autoimmune disease characterized primarily by persistent synovitis, joint pain, swelling, stiffness and progressive structural damage. In addition to joint manifestations, patients may experience fatigue and functional limitations that affect daily activities. Long-term disease control therefore requires treatment strategies that balance clinical benefit, safety, monitoring requirements and affordability.

Disease-modifying antirheumatic drugs are central to RA management. Conventional synthetic DMARDs, particularly methotrexate, are commonly used as foundational therapy. Other conventional agents include hydroxychloroquine, sulfasalazine and leflunomide. Biological DMARDs, including tumor necrosis factor inhibitors and other targeted biological agents, are generally used when disease control remains inadequate or when clinical circumstances justify escalation. These treatments can provide important therapeutic benefit but require careful monitoring for adverse effects and may impose substantially greater financial costs.

Pharmacovigilance is concerned with the detection, assessment, understanding and prevention of adverse drug effects and other drug-related problems. In patients receiving DMARDs, systematic ADR assessment is particularly relevant because treatment is often prolonged and may involve infection risk, laboratory abnormalities, gastrointestinal effects, injection- or infusion-related reactions and other drug-specific toxicities. The economic evaluation of therapy is equally important because medicine costs may influence access, adherence and long-term treatment decisions.

The present study evaluated the demographic and clinical characteristics of patients with RA, their DMARD treatment patterns, documented ADRs and drug-related expenditure. The intended comparison was between conventional and biological DMARD therapy; however, interpretation is based on the recorded cohort and the available descriptive data.

Objectives

- To evaluate the pharmacovigilance profile of conventional and biological DMARD therapy in patients with RA.
- To identify and describe documented ADRs, their severity, causality, management and outcomes.
- To assess the pharmacotherapy pattern among patients receiving RA treatment.
- To evaluate recorded drug expenditure and the distribution of treatment costs
- To examine the overall balance between treatment safety and affordability within the study cohort.

2 MATERIALS AND METHODS

2.1 Study design and population

The study was designed as a comparative observational evaluation of patients diagnosed with RA and receiving conventional or biological DMARD therapy. A total of 30 patients were included in the available dataset. Patient demographic information, clinical history, symptoms, relevant laboratory investigations, medication details, ADR information and drug-cost data were collected from the available patient records and study data forms.

2.2 Eligibility

The study included patients diagnosed with RA who were receiving conventional or biological DMARD therapy and whose available records were suitable for evaluation. Patients with incomplete information that prevented assessment of the relevant study objectives were intended to be excluded according to the study protocol. The source document also specified informed consent and institutional ethical approval as protocol requirements; however, final approval identifiers and institutional details were not available in the supplied manuscript and should be inserted before journal submission.

2.3 Pharmacovigilance and pharmacoeconomic assessment

Documented ADRs were assessed according to the available information on suspected drug, reaction, onset, management, severity, causality and outcome. Causality was recorded using the WHO-UMC system. Drug expenditure was summarized using total cost, mean, median, minimum, maximum and cost categories. The available results were primarily descriptive; no validated disease-activity outcome or direct statistical group comparison between conventional and biological therapy was available in the supplied dataset.

2.4 Statistical analysis

Categorical variables were summarized as frequencies and percentages. Drug costs were summarized using total expenditure, mean, median and range. Because of the small sample size and limited number of patients receiving biological therapy, the findings were interpreted descriptively.

3 RESULTS

3.1 Demographic and clinical characteristics

Of the 30 patients, 21 (70.0%) were female and 9 (30.0%) were male. Most participants were middle-aged: 11 (36.7%) were aged 40–49 years and 10 (33.3%) were aged 50–59 years. A family history of RA was recorded in 4 patients (13.3%). Smoking and alcohol consumption were each reported by 3 patients (10.0%).

Table 1: Demographic and clinical characteristics

Characteristic	n (%)
Female	21 (70.0)
Male	9 (30.0)
Age <40 years	4 (13.3)
Age 40–49 years	11 (36.7)
Age 50–59 years	10 (33.3)
Age 60–69 years	4 (13.3)
Age ≥70 years	1 (3.3)
Family history of RA	4 (13.3)
Smoking	3 (10.0)
Alcohol consumption	3 (10.0)

3.2 Clinical presentation and investigations

Joint pain was recorded in all 30 patients (100.0%). Joint swelling was reported in 28 patients (93.3%), morning stiffness in 21 (70.0%) and fatigue in 18 (60.0%). In the narrative dataset, RF was abnormal in 18 patients (60.0%), ESR was increased in 18 (60.0%), CRP was increased in 14 (46.7%) and anti-CCP was documented in 7 patients (23.3%). AST/ALT abnormality and increased serum creatinine were each reported in 1 patient (3.3%), while increased WBC was reported in 2 patients (6.7%).

Table 2: Clinical presentation and investigations

Symptoms	n (%)
Joint pain	30 (100.0)
Joint swelling	28 (93.3)
Morning stiffness	21 (70.0)
Fatigue	18 (60.0)

3.3 Pharmacotherapy pattern

Methotrexate monotherapy was the most frequently recorded regimen, used in 14 patients (46.7%). Hydroxychloroquine monotherapy was used in 5 (16.7%), adalimumab monotherapy in 2 (6.7%), sulfasalazine monotherapy in 1 (3.3%) and combination therapy in 6 patients (20.0%). Two patients had no RA drug recorded in the summarized treatment dataset.

Table 3: Pharmacotherapy pattern

Treatment pattern	n (%)
Methotrexate monotherapy	14 (46.7)
Hydroxychloroquine monotherapy	5 (16.7)
Adalimumab monotherapy	2 (6.7)
Sulfasalazine monotherapy	1 (3.3)
Combination therapy	6 (20.0)
No RA drug recorded	2 (6.7)

3.4 Adverse drug reaction profile

Three patients (10.0%) had valid documented ADRs. The reactions were injection-site erythema, pain and itching associated with adalimumab; mild nausea associated with methotrexate; and skin rash associated with leflunomide. Two reactions were mild and one was moderate. No severe ADR was documented. All three patients recovered, and all reactions were classified as probable according to WHO–UMC causality assessment.

Table 4: Adverse drug reaction profile

Suspected drug	Documented ADR	Severity	Management / outcome	WHO–UMC
Adalimumab	Injection-site erythema, pain and itching	Mild	Local measures, observation and counselling; recovered	Probable
Methotrexate	Mild nausea	Mild	Supportive measures and folic acid; drug continued; recovered	Probable
Leflunomide	Skin rash	Moderate	Suspected drug discontinued; recovered	Probable

3.5 Drug-cost analysis

Table 5: Drug-cost analysis

Cost parameter	Result
Total drug cost	₹88,570
Mean cost per patient	₹2,952.33
Median cost per patient	₹835
Minimum cost	₹195
Maximum cost	₹18,800
Cost category (₹)	n (%)
<500	6 (20.0)
500–999	12 (40.0)
1,000–4,999	8 (26.7)
≥5,000	(13.3)

The total recorded drug expenditure for the 30 patients was ₹88,570. The mean drug cost per patient was ₹2,952.33, whereas the median was ₹835. Costs ranged from ₹195 to ₹18,800, indicating substantial variability. The most common cost category was ₹500–₹999, representing 12 patients (40.0%).

4 DISCUSSION

This study describes the pharmacovigilance and pharmacoeconomic characteristics of 30 patients with RA receiving DMARD therapy. The cohort showed a predominance of female patients and a concentration in middle age. Joint pain and swelling were the most common clinical features. These observations are consistent with the expected clinical burden of inflammatory RA and support the need for long-term treatment and monitoring.

Methotrexate was the most commonly recorded therapy, accounting for 46.7% of patients as monotherapy. This pattern supports the continued central role of conventional DMARD therapy in routine RA management. Hydroxychloroquine, sulfasalazine and combination therapy were also represented, whereas adalimumab monotherapy was used in a small number of patients. Current treatment recommendations continue to position conventional therapy, particularly methotrexate, as a key component of RA management, with biological therapy considered according to response and clinical circumstances.

Only three valid documented ADRs were identified. The observed frequency was 10.0%, with two mild reactions and one moderate reaction. The adalimumab-related injection-site reaction and methotrexate-related nausea were managed conservatively and treatment was continued, whereas leflunomide was discontinued after the skin rash. All patients recovered and all reactions were classified as probable by WHO-UMC assessment. These findings emphasize the practical value of early ADR recognition, structured documentation and individualized management.

The economic findings showed marked heterogeneity in recorded drug expenditure. Although the median cost was ₹835 per patient, the maximum cost was ₹18,800, which increased the mean to ₹2,952.33. This distribution suggests that most patients had relatively moderate drug costs while a smaller number incurred substantially higher expenditure. Higher costs may be associated with expensive treatment regimens, including biological therapy, although the supplied dataset does not provide a complete group-wise cost breakdown and therefore cannot quantify the cost difference between conventional and biological DMARDs directly.

The study has important limitations. The sample size was small, only two patients were explicitly recorded as receiving adalimumab monotherapy, and the supplied dataset did not contain a complete standardized direct comparison of conventional and biological groups. No validated disease-activity measure or formal cost-effectiveness outcome was available. The study should therefore be interpreted as a descriptive evaluation rather than definitive evidence of comparative safety or economic superiority. In addition, ADR estimates may be influenced by the quality and completeness of clinical documentation.

5 CONCLUSION

In this cohort of 30 patients with rheumatoid arthritis, conventional DMARD therapy, particularly methotrexate, was the predominant treatment approach. Three valid documented ADRs were identified, all of which were managed successfully and classified as probable by WHO-UMC assessment. Drug expenditure varied widely, with a low median cost but substantially higher expenditure in a small number of patients.

The findings support the importance of integrating pharmacovigilance, treatment monitoring and economic considerations into RA management. However, the available data do not permit a definitive conclusion that conventional or biological DMARDs are universally safer or more cost-effective. Larger multicentre studies with balanced treatment groups, standardized disease-activity outcomes, comprehensive direct and indirect costs, and formal cost-effectiveness analyses are needed.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

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