

Original Article

Drug Prescription Pattern in Patients with Rheumatoid Arthritis in a Tertiary Care Teaching Hospital

Rajalakshmi GR^{*1}, Jayeshkumar P², Anusree AT¹, Fathimathul Hanna TK¹, Mubashir Gafoor V¹, Sana C¹ and Ayisha Safa P¹

¹College of Pharmaceutical Sciences, Government Medical College, Kozhikode-673008, Kerala, India

²Department of General Medicine, Government Medical College, Kozhikode-673008, Kerala, India

ARTICLE INFO

Received 01 February 2025

Revised 04 March 2025

Available Online 10 March 2025

Keywords:

Rheumatoid arthritis

DMARD

NSAIDs

Medication use

Tertiary care hospital

Drug prescription pattern

ABSTRACT

Rheumatoid arthritis is a chronic autoimmune disorder that mostly affects joints. RA occurs when the immune system, which normally helps to protect the body from infectious diseases, attacks its own tissue. The disease causes pain, swelling, stiffness and loss of functions of the joint.

Our study “Drug prescription pattern in patients with Rheumatoid arthritis in a tertiary care teaching hospital” (Cross-sectional study) aimed to identify the common medications prescribed for RA and to assess the ADRs associated with Anti- Rheumatoid drugs. This cross- sectional study was conducted in 121 patients who were given DMARD therapy. Patients’ demographic details, category of drugs used in the treatment, assessment of rationality of prescription, type of therapy (mono, dual or polytherapy) and causality assessment of ADRs of DMARDs were (Naranjo Algorithm) recorded. Our study concluded that the most commonly prescribed DMARDs was Methotrexate. According to demographic data out of 121 patients enrolled. Majority of them were females (91.73%, n=111) and only 8.26% n=10 male. Most of the patients belonged to the 41- 50 age group (n=35, 28.92%), only 2 patients belonged to the 11- 20 age group. Most of the RA patients were suffered from co- morbidities (n= 39, 32.2%), and 82 have no co- morbidities (n=82, 67.77%) and we observed that (prescription pattern of DMARDs) majorities of patients were received 2 DMARDs (n= 52, 42.97%) and 13 patients (n= 13, 10.74%) were received polytherapy.

As per monotherapy, Methotrexate was given to majorities of the patients (n= 35, 67.3%) followed by HCQ (n= 13, 25%) Leflunomide (n= 3, 5.76%) and Sulfasalazine (n= 1, 1.9%). In dual therapy, Methotrexate (MTX) and HCQ were given to the majority of patients (n= 31, 55.3%) and in poly therapy MTX and HCQ and Sulfasalazine combinations were given to 9 patients (69.23% n=9).

Other drugs given along with DMARDs are steroids (n= 96, 79.33%), NSAIDs (n= 40 33.05%) and supplementary drugs like folic acid was given to (n= 98, 80.99%) and PPIs were given to (n= 27, 22.3%) of patients. As per Naranjo’s Algorithm, 31 patients (n= 31 25.6%) had experienced ADR and 90 patients (n= 90, 74.3%) had experienced no ADR.

This is an Open Access journal, and articles are distributed under the terms of the [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author[s] and the source.

Introduction

Rheumatoid arthritis (RA) is the most common systemic inflammatory disease characterized by symmetrical joint involvement including rheumatoid nodules, vasculitis, eye inflammation, neurologic dysfunction, cardiopulmonary disease, lymphadenopathy and splenomegaly, can be manifestations of the disease. Although the usual disease course is chronic, some patients will enter a remission spontaneously. Prescription pattern studies are used for assessing the prescribing, dispensing and distribution of medicines. The study will help to facilitate rational use of medicines (RUM). The World Health Organization (WHO) defines Pharmacovigilance (PV) as the science & activities relating to detecting understanding, and prevention of adverse effects or any other drug related problems, The main function of spontaneous reporting is to detect early signs of new, rare and serious ADRS [1].

Rheumatoid arthritis (RA) is a chronic inflammatory ailment that leads to enduring discomfort and impairment. Its main indications comprise symmetrical swelling of joints, notably in the small joints of the hands and feet, alongside systemic effects. Prolonged inflammation often results in substantial joint damage, affecting one's quality of life, and heightens the risk of cardiovascular complications, contributing to a notable mortality rate.

Globally, RA affects approximately 1% of adults, with a significant prevalence of 0.75% in India. The management of RA typically involves exploring various facets related to medication utilization, including the examination of prescribing trends such as disease-modifying antirheumatic drugs (DMARDs), biologic agents, or nonsteroidal anti-inflammatory drugs (NSAIDs).

Furthermore, researchers may investigate factors that influence prescribing decisions, such as patient demographics, disease severity, comorbidities, and healthcare provider preferences. Comprehending prescribing patterns can offer insights into the efficacy and safety of diverse treatment modalities, identifying potential gaps in care, adherence to treatment protocols, and the impact of emerging therapies. Such insights can assist healthcare providers in optimizing treatment strategies to enhance outcomes for RA patients. All the drugs used in the treatment of Rheumatoid Arthritis show significant toxicity and hence it is important to monitor the drugs for ADRs [2]. This study will analyze the prescription pattern and bring out the possible adverse reactions in patients with Rheumatoid Arthritis.

Literature review

Rheumatoid arthritis is a chronic disease that causes inflammation of the synovial linings of joints. RA inflammation can be so severe that it damages joints and other body tissues. There is no cure for RA. Medications used in the treatment of RA include nonsteroidal anti-inflammatory drugs (NSAIDs) and other pain relief drugs and topical, non-biologic disease modifying antirheumatic drugs (DMARDs) like methotrexate, biologic DMARDs, cortico-steroids, and Janus kinase (JAK) inhibitors. Prescription Pattern analysis and ADRs in Rheumatoid arthritis within tertiary care hospitals involves studying the trends and practices related to medication prescription for Rheumatoid Arthritis patients and assessing the occurrence and management of ADRs to these medications within specialized healthcare settings [3,4].

Classification of Anti Rheumatoid Drugs

1. Disease modifying antirheumatic drugs

A) Non biologic agents

e.g.: Methotrexate, Sulfasalazine, Leflunomide, Hydroxychloroquine

B) Biologic agents

e.g.: a) TNF- α inhibitors

Infliximab, Adalimumab

b) IL-1 antagonist

*Corresponding author: Rajalakshmi G R, College of Pharmaceutical Sciences, Government medical College, Kozhikode-673008, Kerala, India.

Anakinra

c) IL-6 inhibitor

Tocilizumab

d) JAK inhibitor

Baricitinib, Tofacitinib

2. Adjuvant drugs:

Corticosteroids: e.g. Prednisolone

3. NSAIDS: e.g.: Diclofenac

“Drug prescription patterns and quality of life in Rheumatoid arthritis patients at a tertiary care teaching hospital in central India: a cross-sectional study” reveals that rheumatoid arthritis affects females more often than males. DMARD combination of methotrexate and Hydroxychloroquine was the most commonly used compared to monotherapy and triple drug therapy. In the study of Rheumatoid Arthritis, Prescription Trends at Tertiary Care Hospitals” most often given drugs were DMARDs, vitamin-D3 and calcium supplements, and analgesics, according to the drug prescription pattern. “Evaluation of prescription practices in rheumatoid arthritis at the rheumatology clinic in a tertiary care teaching hospital in Uttarakhand: A cross-sectional study” conclude that Methotrexate was the most prescribed DMARD, followed by Hydroxychloroquine, Leflunomide, and Adalimumab, Prednisolone, Folic acid, Naproxen, Calcium, and Vitamin D were common adjuvant therapies [5-7]. While “prescribing pattern for rheumatoid arthritis (RA) patients in tertiary teaching care hospitals” revealed that DMARDs, vitamin-D3 and calcium supplements, and analgesics were the most prescribed drugs, mainly from the National List of Essential Medicine 2015. In the study of “Prescription pattern in patients with Rheumatoid arthritis in a teaching tertiary care hospital, it is observed that in patients with rheumatoid arthritis, the most commonly prescribed disease-modifying anti rheumatic drug (DMARD) was methotrexate followed by hydroxychloroquine and sulfasalazine. DMARD combination with 3 drugs was the most common regimen followed by DMARD combination with 2 drugs. Polypharmacy was seen in most of the prescriptions. The Study of “Prescribing pattern and adverse drug effects monitoring of anti-rheumatic drugs in rheumatoid arthritis patients in a tertiary care hospital” concluded that, treatment of Rheumatoid arthritis is mainly based on DMARDs, Glucocorticosteroids and NSAIDs. Occurrence of ADRs is much common, proper monitoring of therapy and timely

modification of drugs and lifestyle can reduce the ADR occurrence [8-10].

Objectives

Primary Objective

- To identify common medication prescribed for rheumatoid arthritis patients.

Secondary Objective

- To assess the ADRs associated with anti-rheumatoid therapy.

Materials And Methods

Study centre: Department of General medicine, Government Medical College Hospital, Kozhikode

Study design: A Cross-sectional study

Study duration: 4 months (20/03/24 to 25/07/24)

Sample size: A total of 121 patients enrolled into the study.

Study approval:

The study protocol was submitted to the Institutional Research committee & Institutional Ethics committee and was approved by the same.

Study population: Patients visiting the outpatient department of rheumatology and those who satisfy the inclusion criteria were enrolled in the study.

Selection Criteria

Inclusion criteria

- Patients diagnosed with RA between age of 18-65
- Patients on treatment for at least 6 months.

Exclusion criteria

- Patient history of drug allergies, intolerances and non-compliance.
- Pregnant and lactating women.

Study Procedure

Study was conducted in the Department of rheumatology in Government Medical College, Calicut. Patients diagnosed with rheumatoid arthritis with or without comorbidities were enrolled into the study considering inclusion and exclusion criteria. Informed consent was taken from the patient at the time of enrolment into the study. The Prescriptions of patients were analysed by the following parameters in a specially designed data collection form.

- Demographic data of the patient
- Category of drugs used in the treatment
- Assessment of rationality of prescriptions
- Type of therapy- Monotherapy or combination therapy
- Causality assessment of ADRs of DMARDs

Statistical Analysis

Statistical analysis was done to find the percentage & mean.

Result

Demographic Data

Age-wise Distribution

Table 1: Demographic data showing the age wise distribution

Age Group	Frequency	Percentage
11-20	2	1.65
21-30	6	4.95
31-40	13	10.74
41-50	35	28.92
51-60	34	28.09
61-70	24	19.83
71-80	7	5.78
Total	121	100

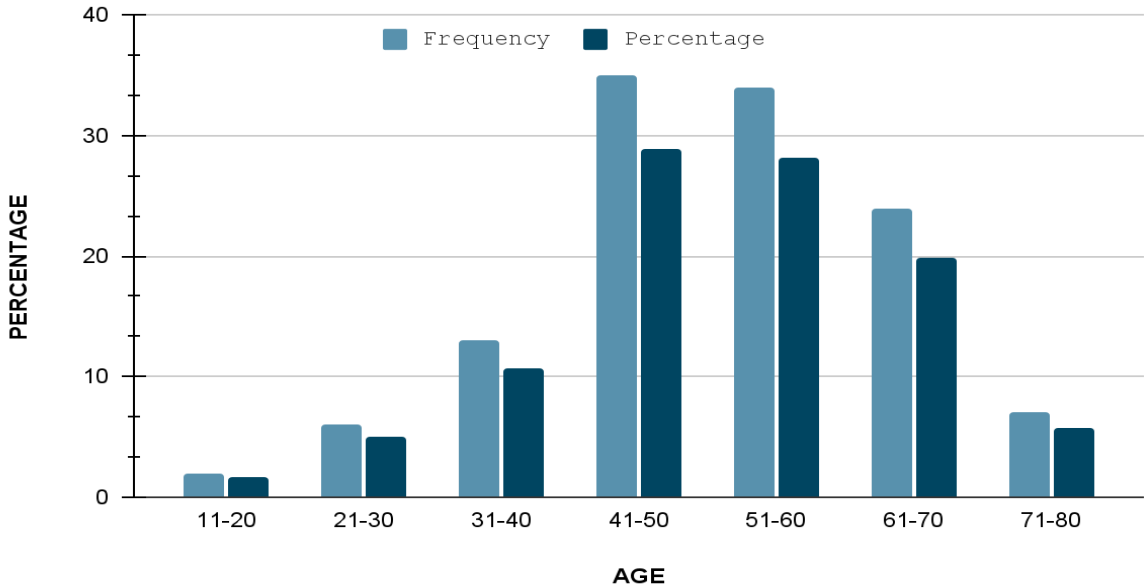


Figure 1: Age wise distribution data

Descriptive Statistics

Table 2: Descriptive statistics of 121 patients enrolled into the study

Age	Sample Size	Minimum Age	Maximum Age	Mean
	121	19	76	51.5

A total of 121 patients were enrolled in to study out of this 35 patients were in the age group between 41 to 50 (28.92%), 34 patients were in the age group between 51 to 60 (28.09%), 24 patients were in the age group between 61 to 70 (19.83 %), 13 patients were in the age group between 31 to 40 (10.74%), 7 patients were in the age group between 71 to 80 (5.78 %), 6 patients were in

the age group between 21 to 30 (4.95%) and 2 patients were in the age group between 11 to 20 (1.65 %). Out of this minimum age of patients with Rheumatoid Arthritis is 19 and maximum age with Rheumatoid Arthritis is 76. Mean age was found to be 51.5.

Gender Wise Distribution

Table 3: Gender wise distribution including frequency and percentage

Gender	Frequency	Percentage
Male	10	8.26
Female	111	91.73
Total	121	99.164

Genderwise distribution

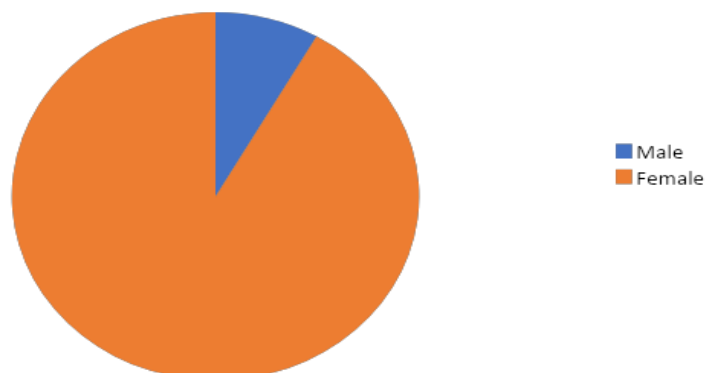


Figure 2: Gender wise distribution pattern

Table 3 and Figure 2 shows Out of 121 patients, Majority of patients were 91.73% (111) female and only 8.26% (10) were male.

Co-Morbidities

Table 4: Comorbid conditions of 121 patients with their percentage of occurrence

S. No.	Comorbid Condition	No. of Patients	Percentage (%)
1	Hypertension	13	10.74
2	Asthma	3	2.47
3	Hypothyroidism	9	7.44
4	Angina	2	1.65
5	Hyperlipaemia	2	1.65
6	Diabetes mellitus	10	8.26
7	None	82	67.77
Total		121	100

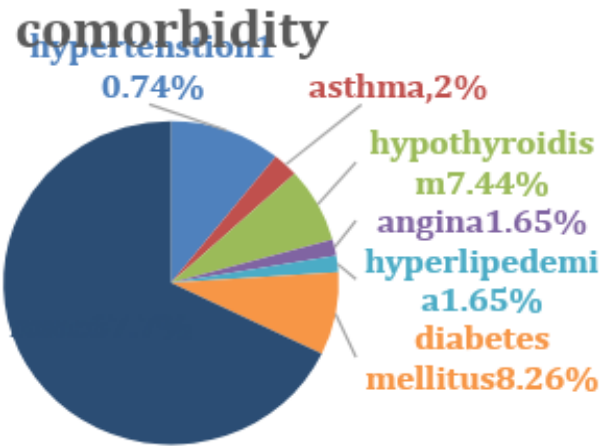


Figure 3: Comorbidities associated with rheumatoid arthritis

Table 4 and Figure 3 shows comorbidities associated with Rheumatoid arthritis. Among 121 patients most commonly seen co-morbidities were Hypertension (10.74%), Diabetes mellitus (8.26%), Hypothyroidism (7.44%), Asthma (2.47%), Angina (1.65%), Hyperlipideamia (1.65%) and n=82 (67.77%) had no comorbidities.

Prescription Pattern of DMARDs

Table 5: Prescription pattern of DMARDs in 121 patients

Type of Therapy	No. of Patients	Percentage
Monotherapy	52	42.99
Dual Therapy	56	46.28
Combination Therapy	13	10.74
Total	121	100

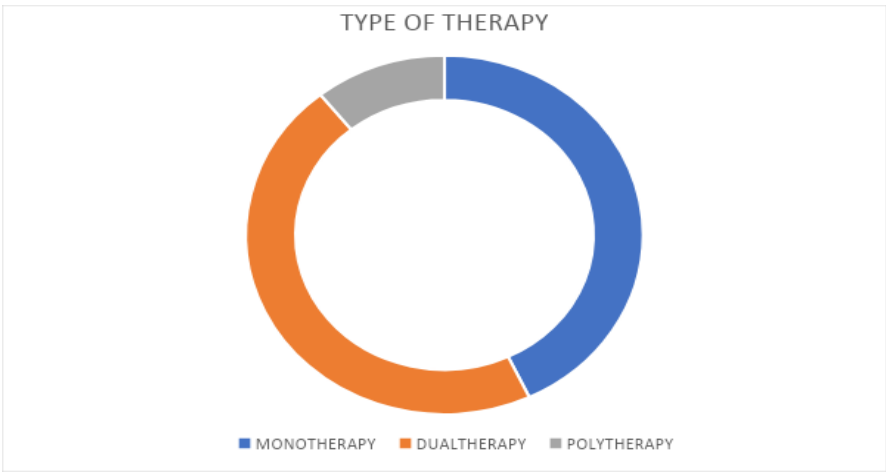


Figure 4: Treatment pattern with DMARDs

Among 121 patients 52 patients (42.97%) were treated with a single DMARD, 56 patients (46.28%) treated with two DMARDs & 13 patients (10.74%) treated with a combination of three DMARDs.

Details of DMARD Monotherapy

Table 6: Description of patients undergoing DMARD monotherapy

DMARD	No. of Patients	Percentage (%)
Methotrexate	35	67.3
Hydroxychloroquine	13	25
Leflunomide	3	5.76
Sulfasalazine	1	1.9
Total	52	100

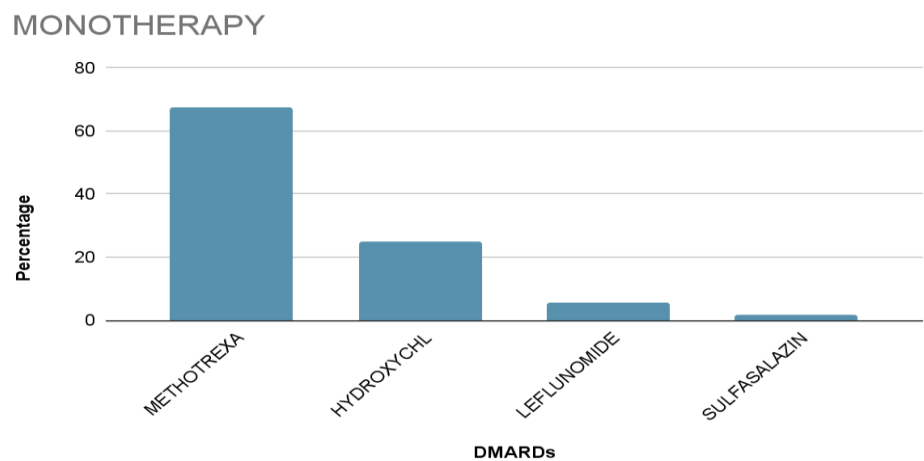


Figure 5: Patients undergoing DMARD monotherapy

The result showed that majority of the patients are treated with Methotrexate (35 patients 67.3%) followed by Hydroxychloroquine (13 patients 25%), Leflunomide (3 patients 5.76%), sulfasalazine (1 patient 1.9%).

Details of DMARD Dual therapy

Table 7: Description of patients undergoing DMARD dual therapy

DMARDS	No. of Patients	Percentage (%)
Methotrexate + Hydroxychloroquine	31	55.3
Methotrexate + Leflunomide	16	28.5
Methotrexate + Sulfasalazine	2	3.5
Hydroxychloroquine + Leflunomide	4	7.1
Hydroxychloroquine + Sulfasalazine	1	1.7
Leflunomide + Sulfasalazine	2	3.5
Total	56	100

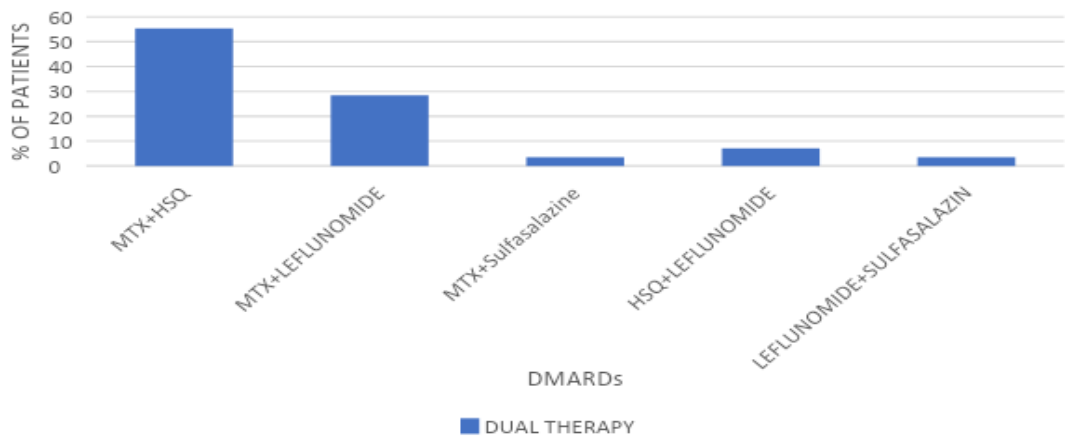


Figure 6: Patients undergoing DMARD dual therapy

In dual therapy of DMARDs 31 patients (55.3%) were treated with Methotrexate +Hydroxychloroquine, followed by Methotrexate +Sulfasalazine 2 patients (3.5%), MTX+ leflunomide 16 patients (28.5%), HSQ+Leflunomide 4 patients (7.1%), HSQ+Sulfasalazine 1 patient (1.7%) & Leflunomide + Sulfasalazine 2 patients (3.5%).

Details of DMARD Polytherapy

Table 8: Description of patients undergoing DMARD polytherapy

DMARDS	No. of Patients	Percentage (%)
Methotrexate + Hydroxychloroquine + Sulfasalazine	9	69.24
Methotrexate + Hydroxychloroquine Leflunomide	4	30.76
Total	13	100

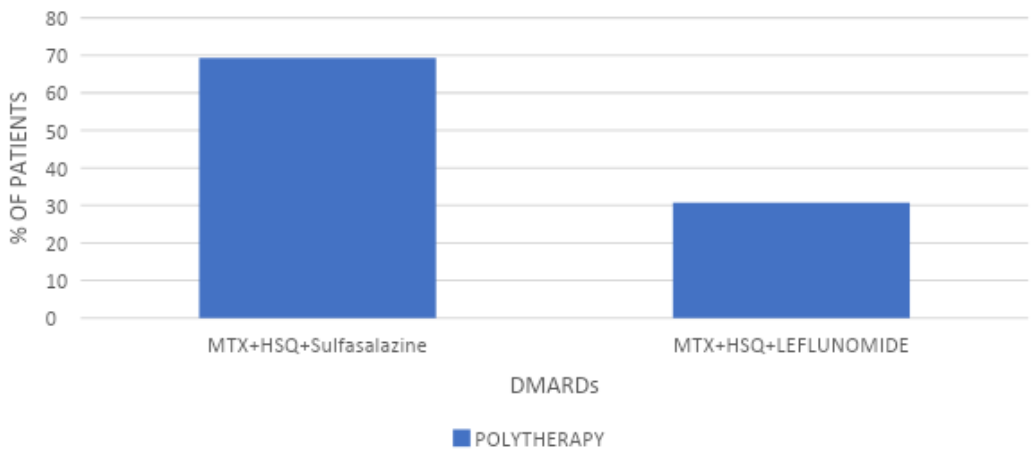


Figure 7: Patients undergoing DMARD polytherapy

Out of 121 patients only 13 patients were received combination of three DMARDS. Nine patients (69.4%) treated with Methotrexate + Hydroxychloroquine + sulfasalazine and 4 patients (30.76%) treated with Methotrexate +Hydroxychloroquine+Leflunomide

Pattern of Use of Non-Protocol Drugs

Pattern of Use of Folic Acid with Methotrexate

Table 9: Pattern of use of folic acid with methotrexate among 121 patients.

S. No	Folic Acid	No. of Patients	Percentage (%)
1	Folic acid	86	71.07
2	None	35	28.9
Total		121	100

METHOTREXATE WITH FOLICACID

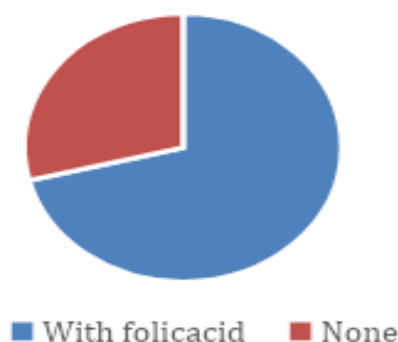


Figure 8: Pattern of use of methotrexate with folic acid

Out of 121 patients 71.07%(n=86) of patients received a combination of both Methotrexate and Folic Acid.

Pattern Of Use of Folic Acid With HCQ

Table 10: Pattern of use of folic acid with HCQ among 121 patients.

S. No	Folic Acid	No. of Patients	Percentage (%)
1	Folic Acid	37	30.57
2	None	84	69.42
Total		121	100

FOLICACID WITH HCQ

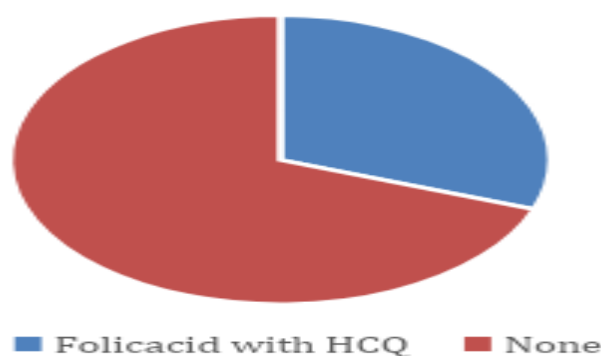


Figure 9: Pattern of use of folic acid with HCQ.

Out of 121 patients 30.57%(n=37) received a combination of folic acid with HCQ.

NSAIDs

Table 11: Details of patients prescribed with NSAIDs

S. No	NSAIDS	No. of Patients	Percentage (%)
1	Etoricoxib	15	12.4
2	Etodolac	4	8.26
3	Meloxicam	8	6.61
4	Diclofenac	3	2.47
5	Paracetamol	3	2.47
6	Aceclofenac	3	2.47
7	Naproxen	1	0.826
8	Aspirin	3	2.47
9	None	81	66.9
Total		121	100

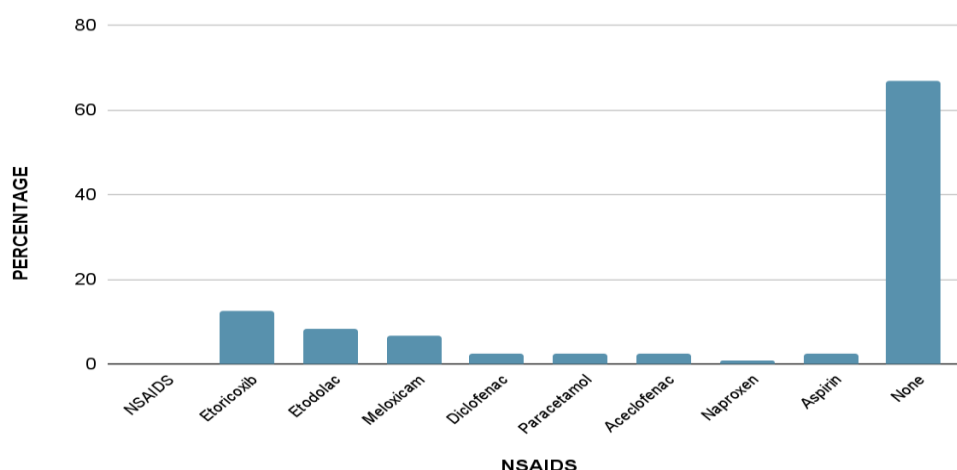


Figure 10: Percentage of patients prescribed with different NSAIDs

33.05% of 121 patients received NSAIDs, Mainly Etoricoxib (12.4%), Etodolac (8.26%). About 6.61% of patients received Meloxicam. Diclofenac (2.47%),

Aceclofenac (2.47%), paracetamol (2.47%), and aspirin (2.47%) are also prescribed. The least prescribed NSAIDs was Naproxen (0.826%).

Steroids

Table 12: Pattern of prescribing steroid in patients with rheumatoid arthritis.

S. No.	Steroids	No. of Patients	Percentage (%)
1	Methylprednisolone	27	22.31
2	Prednisolone	69	57.02
3	None	25	20.66
Total		121	100

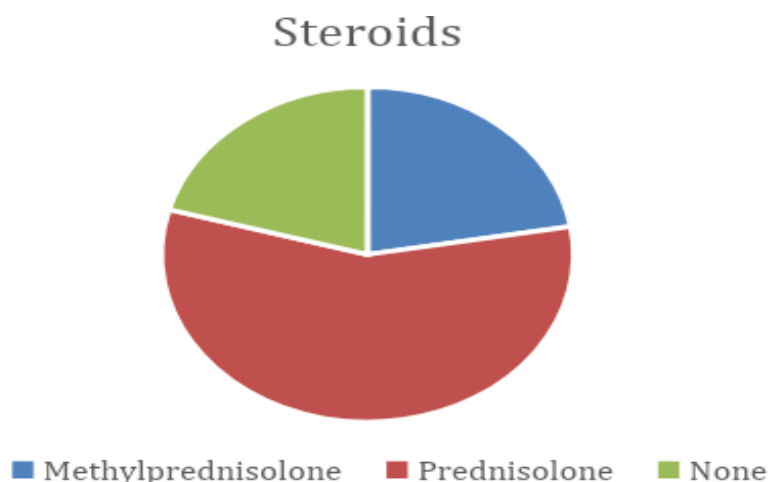


Figure 11: Representation of patients prescribed with steroid.

Out of 121 patients 96 (79.33%) Patients received Steroids. Most prescribed Steroid was Prednisolone (57.02%). Methylprednisolone was received by 22.31% of patients

Hypoglycaemic Agents

Table 13: Prescribing pattern of hypoglycemic agents in patients

S. No	Drugs	No. of Patients	Percentage (%)
1	Teneligliptin	2	1.65
2	Glimepiride	6	4.95
3	Dapagliflozin	1	0.826
4	Sitagliptin	1	0.826
5	Metformin	5	4.1
6	Insulin	2	1.65
7	None	104	85.9
Total		121	100

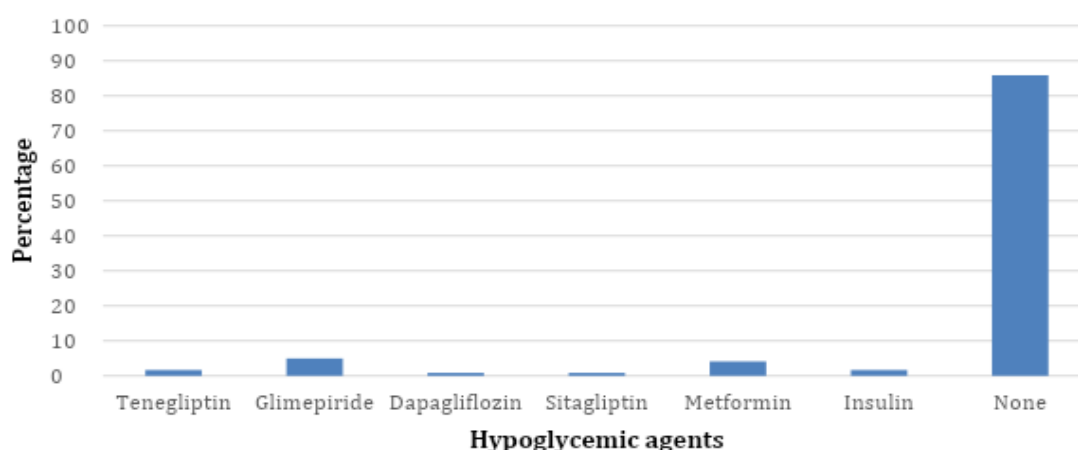


Figure 12: Representation of patients receiving hypoglycemic agents.

About 17 (14.04%) patients received hypoglycemics. The most prescribed Hypoglycemic agents were Glimepiride (4.95%) and Metformin (4.1%).

Teneligliptin and Insulin were received by 1.65% each. The least prescribed Hypoglycemic agent was Dapagliflozin (0.826%) and Sitagliptin (0.826%).

Anti-hypertensive Drugs

Table 14: Prescribing pattern of anti-hypertensive drugs among 121 patients

S. No	Drugs	No. of Patients	Percentage (%)
1	Telmisartan	5	4.1
2	Losartan	2	1.65
3	Metoprolol	1	0.826
4	Spironolactone	1	0.826
5	Candesartan	1	0.826
6	Furosemide	1	0.826
7	None	110	90.90
Total		121	100

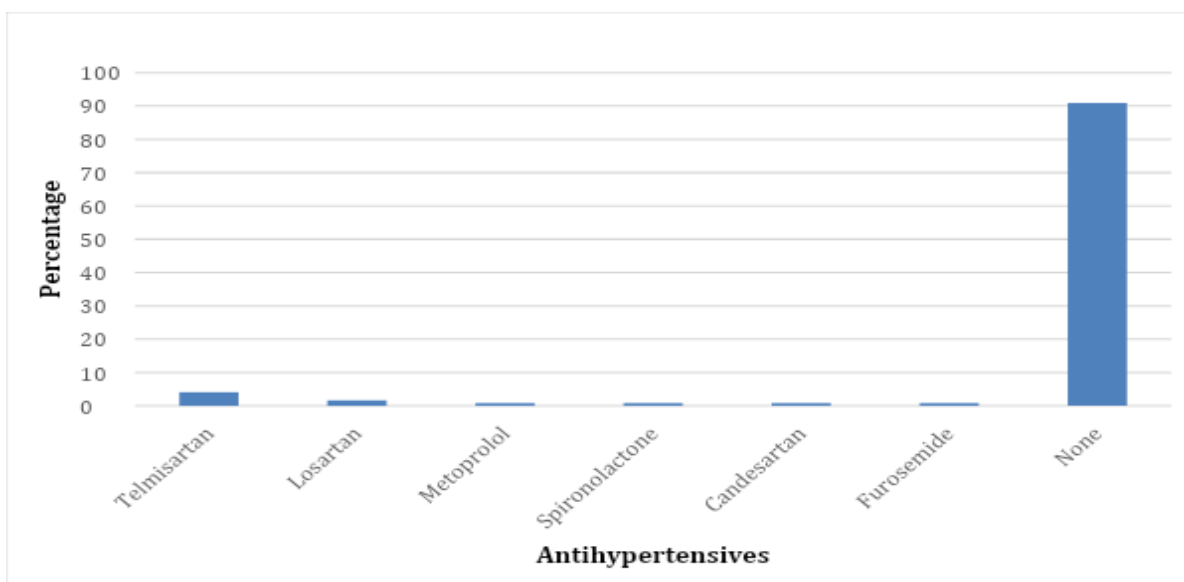


Figure 13: Representation of patients receiving anti-hypertensive drug.

Out of 121 patients 11 (9.09%) received antihypertensives. Most prescribed antihypertensives were Telmisartan (4.1%) and Losartan (1.65%). The

least prescribed antihypertensives were metoprolol (0.826%), Spironolactone (0.826%), Candesartan (0.826%) and furosemide (0.826%).

Other Drugs used

Antidepressants

Table 15: Prescribing pattern of antidepressants among 121 patients

S. No	Drugs	No. of Patients	Percentage (%)
1	Triptyline	1	0.826
2	Amitriptyline	4	3.30
3	Nortriptyline	2	1.65
4	None	114	94.21
Total		121	100

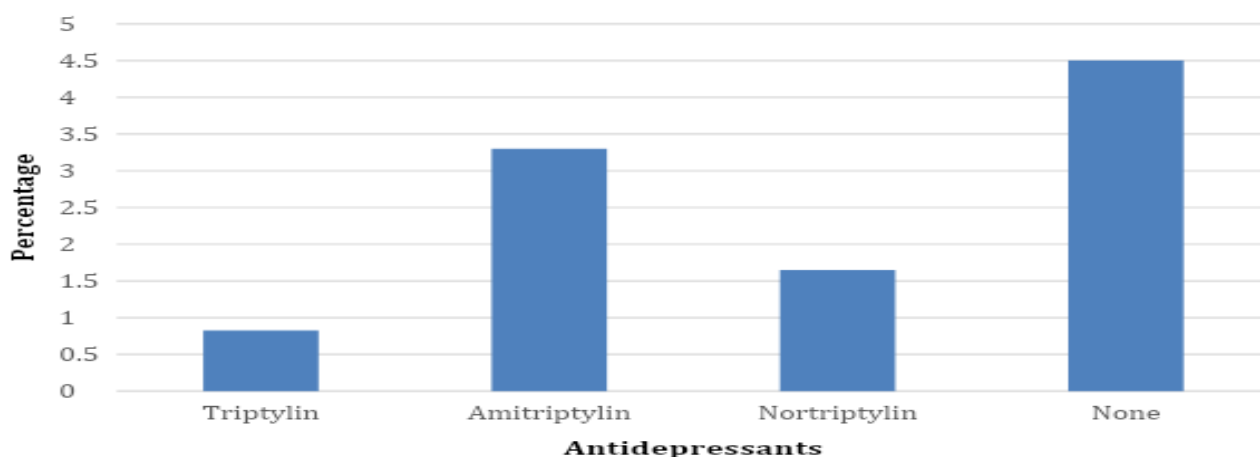


Figure 14: Representation of patients receiving antidepressants.

Out of 121 patients 7 (5.78%) received antidepressants. Most prescribed antidepressants were Amitriptyline (3.3%) and Nortriptyline (1.65%). Least prescribed Antidepressant was Triptyline (0.826%).

Anticonvulsants

Table 16: Prescribing pattern of anticonvulsants among 121 RA patients.

S. No	Drugs	No. of Patients	Percentage (%)
1	Gabapentin	4	3.30
2	Levetiracetam	2	1.65
3	None	115	95.04
Total		121	100



Figure 15: Representation of patients receiving anticonvulsants.

Out of 121 patients 6 (4.95%) received Anticonvulsants. About 3.3 % of patients received Gabapentin. 1.65% of patients received Levetiracetam.

Drugs Acting on GIT

Table 17: Prescribing pattern of drugs acting on GIT among 121 RA patients.

S. No	Drugs	No. of Patients	Percentage (%)
1	Pantoprazole	17	14.01
2	Omeprazole	5	4.1
3	Rabeprazole	5	4.1
4	None	94	77.68
Total		121	100

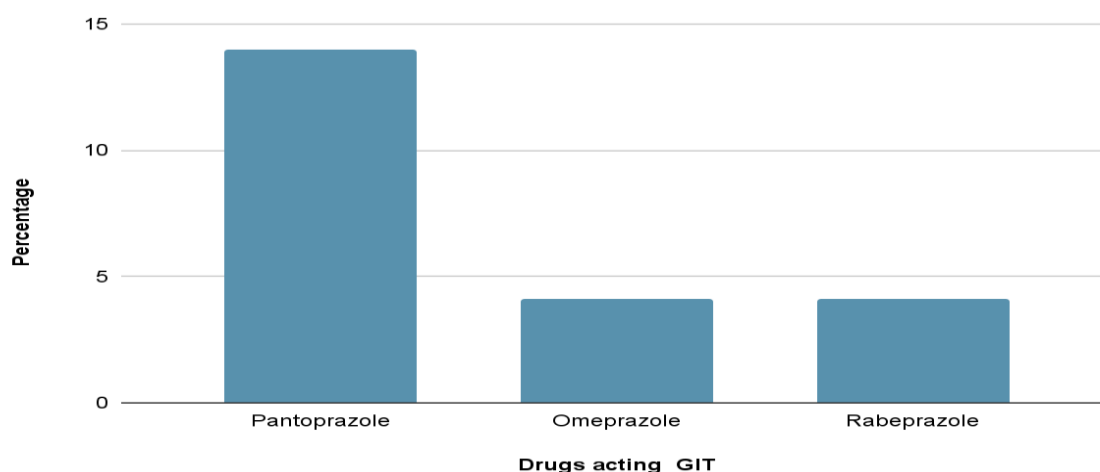


Figure 16: Representation of patients receiving drugs acting on GIT.

22.3 % (n=27) of patients received drugs acting on the Gastrointestinal tract. Most prescribed drug acting on

GIT was pantoprazole (14.01%). Omeprazole (4.1%) and Rabeprazole (4.1%) also prescribed.

Incidence of ADR

Table 18: Incidence of ADR in RA patients.

ADR	No. of Patients	Percentage (%)
None	90	74.3
ADR	31	25.6
TOTAL	121	100

INCIDENCE OF ADR

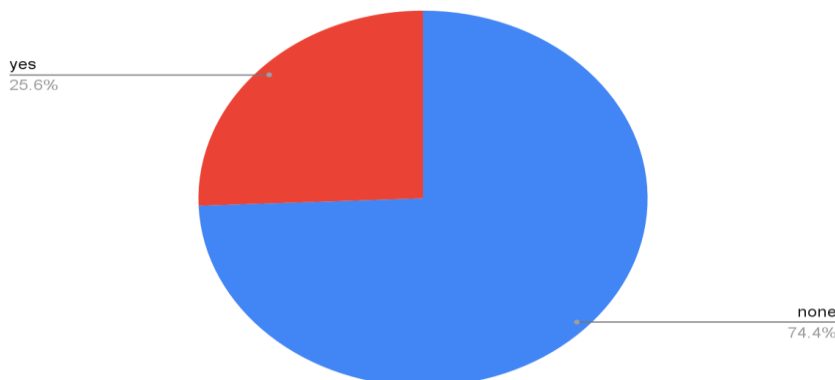


Figure 17: Incidence of ADR in RA patients.

Pattern of ADR

Table 19: Pattern of occurrence of ADR in RA patients

ADR		No. of Patients	Total
GIT	Gastric irritation	12	14
	Ulcer on mouth	1	
	Liver problem	1	
Skin	Itching	1	3
	Rashes	2	
Immune system	Inflammation	7	7
Nervous system	Nausea, Dizziness	3	4
	Headache	1	
CVS	Obesity	1	2
	Bleeding	1	
Reproductive system	Irregular Menstruation	1	1

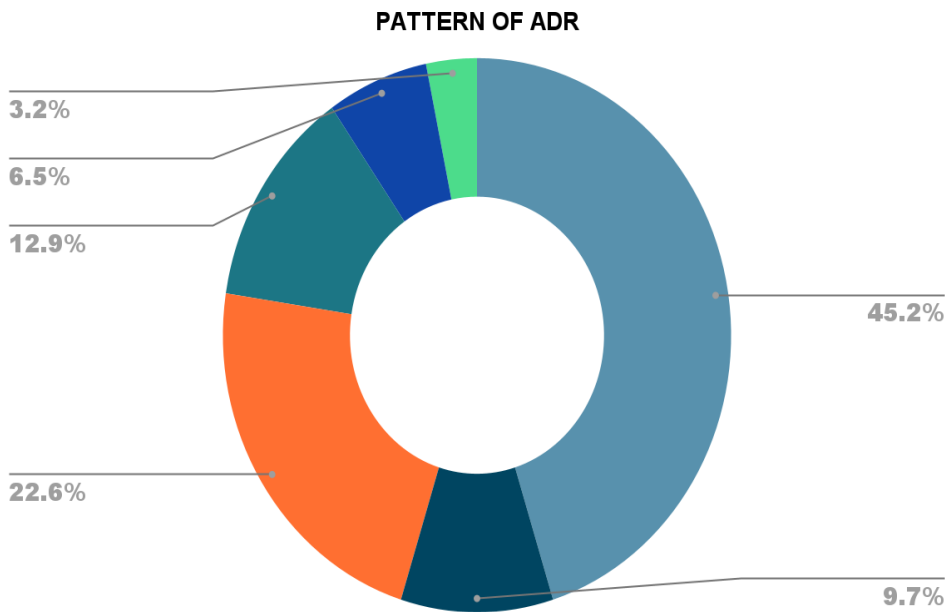


Figure 18: Pattern of ADR in RA patients.

Causality Assessment

Table 20: Causality assessment of ADR in RA patients

ADR	No. of Patients	Percentage (%)
Definite	1	0.826
Probable	13	10.7
Possible	57	47.1
None	50	41.3
Total	121	100

CAUSALITY ASSESSMENT

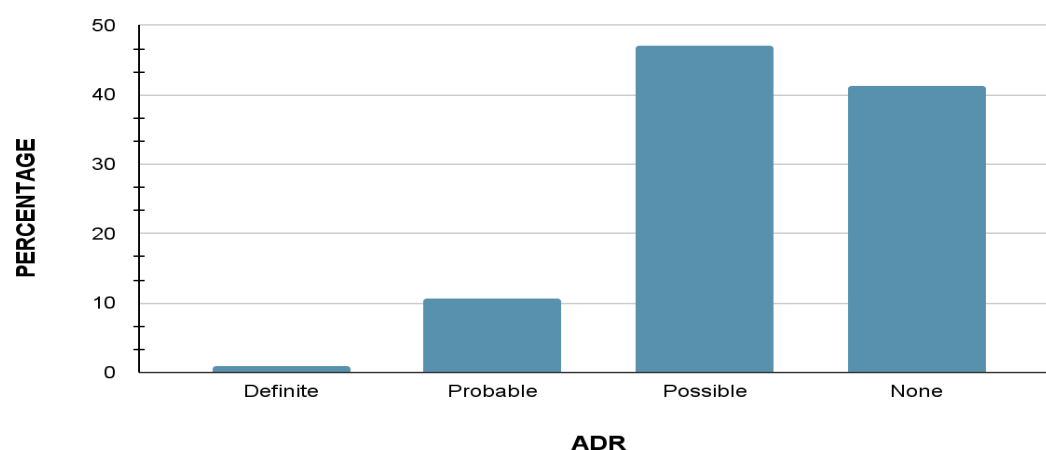


Figure 19: Causality assessment of ADR in RA patients

According to the Naranjo Algorithm 71 ADRs were detected out of 121 patients enrolled in our study 47.1 % ADRs (n=57) were possible, 10.7% ADRs (n=13)

were probable and only one (0.826%) Definite ADR was found.

Prescribing Indicators

Table 21: Details of prescribing indicators associated with RA

Brand/Generic	No. of Drugs	Percentage (%)
Generic	281	50.72
Brand	273	49.27
Total	554	100

prescribing indicators

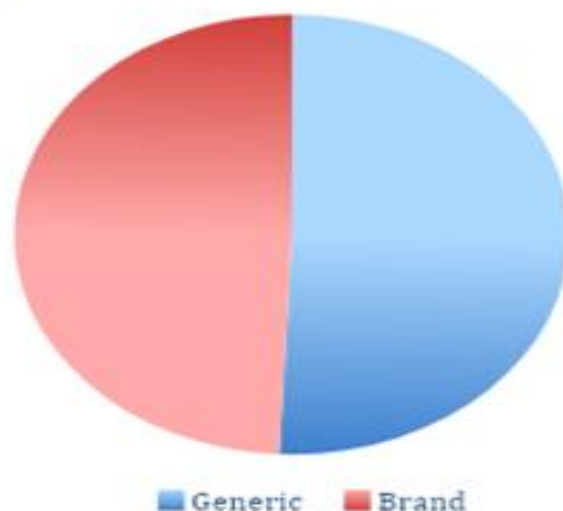


Figure 20: Prescribing indicators Associated with RA

Table 21 and figure 20 show Prescribing indicators Associated with Rheumatoid Arthritis among 121 Patients, as per the data 50.72 % drug prescribed as generic name and 49.27 % drug prescribed as brand Name.

Discussion

The findings of our study “Drug prescription pattern in patients with Rheumatoid arthritis conducted in a tertiary care hospital” gave detailed information of demographic data, pattern of use of medications in the management of rheumatoid arthritis, pattern of ADRs in RA and percentage of drugs prescribed in generic and brand names.

Demographic Data: A total of 121 patients were enrolled in to our study out of this 35 patients were in the age group between 41 to 50 (28.92 %), 34 patients were in the age group between 51 to 60 (28.09%), 24 patients were in the age group between 61 to 70 (19.83 %), 13 patients were in the age group between 31 to 40 (10.74 %), 7 patients were in the age group between 71 to 80 (5.78 %), 6 patients were in the age group between 21 to 30 (4.95%) and 2 patients were in the age group between 11 to 20 (1.65 %). Out of this minimum age of patients with Rheumatoid Arthritis is 19 and maximum age with Rheumatoid Arthritis is 76. Mean age was found to be 51.5. Out of 121 patients, Majority of patients were 90.96% (111) female and only 8.26% (10) were male.

Recent study conducted by Siddiqui et al in “Drug prescription patterns and quality of life in rheumatoid arthritis patients at a tertiary care teaching hospital in

central India” reported that the majority of Rheumatoid Arthritis patients were female and most affected with RA were in the ages 40 to 60. ⁵

Co- morbidities: The co-morbid conditions seen among 121 patients are most commonly seen comorbidities were Hypertension 10.74% (n=13), Diabetes mellitus 8.26%(n=10), Hypothyroidism 7.44%(n=9), Asthma 2.47% (n=3), Angina 1.65% (n=2), Hyperlipidaemia 1.65% (n=2). The majority of the patients had no comorbidity 67.7%(n=82). Due to co-morbid conditions, the number of drugs per prescription and prescription cost were increased [11].

Prescription Pattern of DMARDs: DMARDs are widely used for the management of rheumatoid arthritis. Depending upon the disease activity score either one or more DMARDs must be used early in the course of the disease to prevent destructive damages to the joints affected [12].

Majority of patients in the present study population 46.28% (n=56) were received DMARD dual therapy. Methotrexate and hydroxychloroquine were combined for majority of patients 55.3%(n=31), MTX and Leflunomide for 28.5%(n=16), MTX and sulfasalazine 3.5%(n=2), HCQ and sulfasalazine 1.7% (n=1) and Leflunomide and sulfasalazine 3.5% (n=2). Only 42.9% (n=52) patients of the study population were on DMARD monotherapy. Methotrexate was given for 67.3% (n=35) patients, followed by hydroxychloroquine 25% (n=13), Leflunomide 5.76%(n=3) and sulfasalazine for 1.9% (n=1) patients. Out of 121 patients only 10.7% (n=13) patients received

DMARD polytherapy. MTX+HCQ+Sulfasalazine combination was given for 62.24%(n=9) and MTX+HCQ+Leflunomide for 30.76% (n=4) patients.

The recent study “study of prescription pattern analysis of drugs used in the treatment of Rheumatoid arthritis in a Tertiary care hospital: an observational study conducted by Sushama Naidu V el reported that DMARDs were given as Mono and Combination therapy¹³

Pattern of Use of Non-Protocol Drugs: About 119 patients out of 121 were received non protocol drugs.33.05% of 121 patients received NSAIDs, Mainly Etoricoxib (12.4%), Etodolac (8.26%). About 6.61% of patients received Meloxicam. Diclofenac (2.47%), Aceclofenac (2.47%), paracetamol (2.47%), and aspirin (2.47%) are also prescribed. The least prescribed NSAIDs was Naproxen (0.826%).

The total no of patients received Steroids were 96 (79.3%). Most prescribed Steroid was Prednisolone (71.8%). And the Methylprednisolone were received by 28.1% of patients. 22.3 % (n=27) of patients were received drugs acting on Gastrointestinal tract. Most prescribed drugs acting on GI was pantoprazole (14.01%). Omeprazole (4.1%) and Rabeprazole (4.1%) also prescribed. 14.04 % and 9.09% of patients were received Hypoglycaemics and Antihypertensives respectively. The most prescribed Drugs were Glimepiride (4.95%) and Metformin (4.1%). Teneligliptin and Insulin were received by 1.65% each. The least prescribed drug was Dapagliflozin (0.826%) and Sitagliptin (0.826%). And the Most prescribed antihypertensives were Telmisartan (4.1%) and Losartan (1.65%). The least prescribed antihypertensives were metoprolol (0.826%), Spironolactone (0.826%), Candesartan (0.826%) and furosemide (0.826%). 5.78 % of patients received Antidepressants and 4.95 % of patients received Anticonvulsants. Most prescribed antidepressants were Amitriptyline (3.3%) and Nortriptyline (1.65%). Least prescribed drug was Triptyline (0.826%). About 3.3 % of patients received Gabapentin. 1.65% of patients received Levetiracetam.

71.07 %(n=86) patients received a combination of Folic acid and methotrexate. 30.57%(n=37) of patients received Folic acid with Hydroxychloroquine. Recent study "RA Treatment: What is the safest treatment for Rheumatoid arthritis?" conducted by Matthew Ezerioha reported that there were many non-protocol drugs used with Anti Rheumatoid drugs like steroids, NSAIDs [13].

Incidence of ADR: Recent study conducted by Sangha Ratna Bajracharya et al. Causality assessment of Adverse Drug Reactions using Naranjo probability Scale: a retrospective study shared that According to the NaranjoAlgorithm 71 ADRs were detected out of 121 patients enrolled in our study. 47.1 % ADR (n=57 ADR were possible, 10.7% ADR(n=13) were probable and only one (0.826%) Definite ADR was found.¹⁴

Prescribing Indicators: Table 21 and figure 20 shows percentage of drugs prescribed by generic name 50.72% (281) Percentage of drugs prescribed by brand name 49.27% (273).

Recent study conducted by Johns Hopkins Bloomberg School of public health in “Generic’ Biologic Drugs Appear Comparable to Brand-Name Counterparts’ ’ reported that generic biosimilar drugs have the same effectiveness as branded drugs. Generic drugs should be cost effective alternatives.¹⁵

The study titled "Drug Prescription Pattern in Patients with Rheumatoid Arthritis at a Tertiary Care Hospital" provides comprehensive insights into various aspects related to the management of rheumatoid arthritis (RA)

The study included 121 patients with RA. The age range of the patients was from 19 to 76 years, with a mean age of 51.5 years. The majority of the patients were female (91.74%), comprising 111 out of 121 participants.

Common comorbidities observed among the patients included hypertension (10.74%), diabetes mellitus (8.26%), and hypothyroidism (7.44%). These findings highlight the prevalence of additional health conditions that often accompany RA.

Majority of the patients in the study population 46.2% (n=56) were on DMARD dual therapy Methotrexate and hydroxychloroquine was given for majority 55.3% (n=31) of patients, only 42.9%(n=52) patients were received DMARD monotherapy and Methotrexate was given for majority of patients 67.3%(n=35) and only 13 patients were received three DMARDs (polytherapy). MTX+HCQ+Sulfasalazine was given for 62.24% (n=9) and MTX+HCQ+Leflunomide for 30.76% (n=4) patients.

Among the patients, 119 received non-protocol drugs, with NSAIDs prescribed to 33.05 steroids to 79.33%, and drugs affecting the gastrointestinal tract to 22.31%. Additionally, 14.04% received hypoglycaemics, 9.09% antihypertensives, 5.78% antidepressants, and 4.95% anticonvulsants. A significant portion, 71.07%, received a combination of folic acid and methotrexate, while 30.57% were prescribed folic acid with hydroxychloroquine. According to the Naranjo

Algorithm 71 ADRs were detected out of 121 patients enrolled in our study. 47.1 % ADR (n=57 ADR were possible, 10.7% ADR(n=13) were probable and only one (0.826%) Definite ADR was found.

Prescribing practices showed a balanced approach, with 52.72% (281) of drugs prescribed using generic names and 49.27% (273) using brand names. These findings highlight the complexity of RA treatment regimens, the prevalence of ADRs, and the considerations in medication selection and naming conventions in clinical settings.

Conclusion

Rheumatoid arthritis imposes a considerable disease burden to the affected population. Patients with RA have substantially lower quality of life than the general population. In the absence of cure for RA and the use of potentially toxic drugs. Prescription pattern analysis studies seem to have an important role in treatment decision making. Moreover, there are limited studies in this aspect of the disease.

The drug use pattern in RA was found to be DMARDs based. Considering the higher incidence of ADRs, Polypharmacy and use of brand names which may increase the total cost of treatment and may decrease the health-related quality of life. Based on our study the following measures may suggested-

- Prescription auditing should be carried out regularly and include Pharmacy professionals for prescription auditing.
- We have conducted a cross-sectional study due to limited time. Cohort studies. should be planned in a larger sample, so that authorities (medical) will get the better insight into the current scenario and can provide ways to optimize the treatment of patients with RA
- If drugs should be prescribed in generic names, it will be helpful for minimizing prescription errors as well as reducing the cost of Medicines.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Ethical Approval

Not applicable.

Data Availability

The raw data supporting the conclusions of this manuscript will be made available on genuine request.

Funding

No funding was received.

References

1. DiPiro JT, Yee GC, Haines ST, et al. DiPiro's Pharmacotherapy: A Pathophysiologic Approach, 12th Edition page no 1459- 1475
2. Jain S, Upadhyaya P, Goyal J, Kumar A, Jain P, Seth V, Moghe VV. A systematic review of prescription pattern monitoring studies and their effectiveness in promoting rational use of medicines. Perspectives in clinical research. 2015 Apr 1;6(2):86-90.
3. Kena Jasani, Pranjal Jain, Dhiren Patel, Sapan Pandya, Devang A Rana, Supriya D Malhotra. Evaluation of drug use pattern and quality of life in patients suffering from rheumatoid arthritis-Across sectional Study, National Journal of Physiology, Pharmacy and Pharmacology 10(2), 168,2020
4. Venkateswaran M, Dhanasekaran M, Rajavelu S. Prescribing pattern and adverse drug effects monitoring of anti-rheumatoid drugs in rheumatoid arthritis patients in a tertiary care hospital.
5. Siddiqui AR, Quazi S, Khan S, Shende TR. Drug prescription patterns and quality of life in rheumatoid arthritis patients at a tertiary care teaching hospital in central India: A cross-sectional study. J Datta Meghe Inst Med Sci Univ 2023; 18:422-6.
6. Ashri A, Kamboj A, Malhotra H (2022) Rheumatoid Arthritis: Prescription Trends at Tertiary Care Hospitals. J Clin Exp Pharmacology. 12:334
7. Mittal G, Bisht M, Pai VS, Handu SS. Evaluation of prescription practices in rheumatoid arthritis at the rheumatology clinic in a tertiary care teaching hospital in Uttarakhand: A cross-sectional study. J Family Med Prim Care 2021; 10:745-51
8. Dutta SB, Beg MA, Bawa S, Kaur A, Vishal S. Prescribing patterns in Rheumatoid Arthritis patients in tertiary care teaching hospital. Int J Basic Clinical pharmacology 2017; 6:1486-90.
9. Dahiya A, Kalra BS, Saini A, Tekur U. Prescription pattern in patients with rheumatoid arthritis in teaching tertiary care hospital. MAMC J Med Sci 2016; 2:33-7.
10. Venkateswaran M, Dhanasekaran M, Rajavelu S. Prescribing pattern and adverse drug effects monitoring of anti-rheumatic drugs in rheumatoid arthritis patients in a tertiary care hospital. IntJ Basic Clin Pharmacology 2019; 8:462
11. Barbara Brody, Early and repeated assessment of co-morbidities, including respiratory disease,

- should form part of the routine care of RA patients 2019
12. Gilani SJ, Bin-Jumah MN, Imam SS, Alshehri S, Jahangir MA, Zafar A. Formulation and optimization of nano lipid based oral delivery systems for arthritis. *Coatings*. 2021 May 6;11(5):548.
 13. Sushama Naidu V, Vibharani, Study of prescription pattern analysis of drugs used in the treatment of Rheumatoid Arthritis in a tertiary care hospital: an observational study *J. Population therapeutics and Clinical Pharmacology* 2024;31:7,
 14. Sangha Ratna Bajacharya, Rakesh Ghimire, Pradip Gyanwali, Anjan Khadka. Causality assessment of Adverse Drug Reactions using Naranjo probability Scale: a retrospective study 2019
 15. Johns Hopkins Bloomberg public school. Generic' Biologic Drugs Appear Comparable to Brand-Name Counterparts. 2016;1:8.

Copyright: ©2025 Rajalakshmi GR. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License [<http://creativecommons.org/licenses/by/4.0/>], which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author[s] and the source, provide a link to the Creative Commons license, and indicate if changes were made.

