Research Article

PHARMACOECONOMIC STUDY OF DMARDS IN THE MANAGEMENT OF RHEUMATOID ARTHRITIS

Shini.V.K[1*], Shameena Aboobacker[1], Sudeepti Pahuja[1], Revikumar.K.G[1], Remesh Bhasi[2]

1. Department of Pharmacy Practice, Amrita School of Pharmacy, Amrita Vishwa Vidyapeetham University, Ponekkara AIMS.P.O, Kochi – 41, Kerala, India
2. Senior Consultant & Head of the Department, Department of Rheumatology, Malabar Institute of Medical Sciences, Govindapuram.P.O, Kozhikode – 673 016, Kerala, India

*Corresponding author's E-mail: shinivk@yahoo.co.uk

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ABSTRACT

Rheumatoid arthritis (RA), being destructive to the joints, imposes considerable disease burden and is associated with major socio-economic implications to the affected population. The treatment cost varies depending on the medicines used, like, a comparatively cheaper Disease Modifying Anti Rheumatic Drug (DMARD) or a costlier biological agent. The main objective of the study was cost effectiveness analysis of various DMARDs used in the management of RA. The design of the study was a prospective, longitudinal and observational study for a period of ten months in a tertiary care referral hospital in Kerala, India. All RA patients attended the Rheumatology OPD with 3 months' follow-up and who met the inclusion criteria was included in the study. Cost effectiveness analysis was done by taking HAQ DI score as a measure of effectiveness. Out of the 266 patients, 16.48 % were males and 83.52 % were females. RA Factor is positive for 91.01 % of patients and negative for 8.99 % of patients. Most patients (69.66 %) were on one DMARD, and a few (30.34 %) were on two DMARDs. The mean value of DAS 28 at baseline visit was 3.36 ± 1.24 and the mean after 3 months' treatment was 2.89 ± 1.09. The mean Disability Indices at baseline and after 90 days were 0.6895 ± 0.488 and 0.3934 ± 0.317 respectively. The Disability Index was highly significant after 90 days than at the baseline ($p < 0.001$). The direct medical cost of treatment of RA per month is ₹ 696.57 ($ 15.92). The most cost effective combination of DMARDs was found to be MTX + HQ. The present study supports that the treatment with DMARDs and low dose corticosteroids can control patient's disease activity with reasonable cost of treatment and at minimum risk for side effects.

Keywords: Rheumatoid Arthritis, Pharmacoeconomics, Cost Effectiveness Analysis, DMARDs, DAS 28.

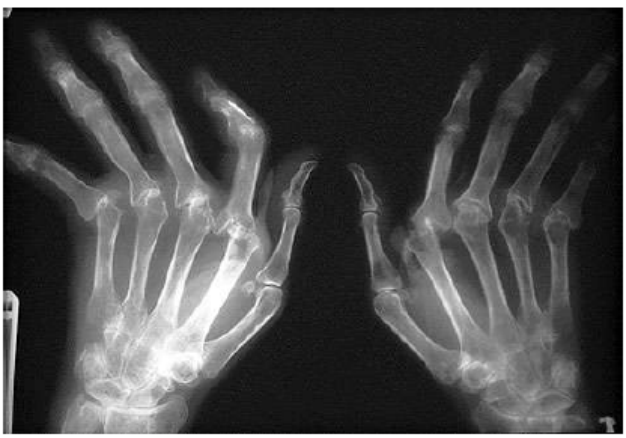
INTRODUCTION

Rheumatoid Arthritis (RA) is a progressive inflammatory disease of the synovial lining of the peripheral joints characterized by symmetrical inflammation leading to potentially deforming polyarthritis and a wide spectrum of extra-articular features. Approximately 1 % of the adult population is affected by RA worldwide. About 0.75 % of adult Indian population is affected by the disease.[1]

The treatment consists of both pharmacological and non-pharmacological approach in RA. The main pharmacological interventions include the traditional Disease Modifying Anti Rheumatic Drugs (DMARDs) and the newer biological agents.

Early symptoms of RA are non-specific and consist of fatigue, malaise, diffuse musculo-skeletal pain and stiffness. Joint pain and loss of function are the most obvious symptoms of RA. Patients usually experience prolonged morning stiffness. The peripheral joints of hand and feet are usually involved first. The metacarpophalangeal joints and proximal interphalangeal joints of hand and metatarsophalangeal joints of the feet are affected, but the distal interphalangeal joints are usually spared. Synovial hypertrophy and effusion cause swelling and the affected joints are warm and tender. Affected joints cannot be fully extended or flexed due to tenosynovitis. Characteristic deformities include ulnar deviation, swan neck and boutonniere deformities (Image 1).

Image 1: The X-ray of hands of a patient with RA showing characteristic rheumatoid deformities like ulnar deviation, swan neck and boutonniere deformities of bone and joints.



Rheumatoid arthritis is associated with major socio-economic implications for the patient. Survival rate among patients with RA are lower than those in general population. Median life expectancy is reduced by 7 years

for men and 3 years for women. The widening in the mortality gap between RA subjects and the general population is mainly in rheumatoid factor positive RA subjects and largely driven by cardiovascular and respiratory deaths.[2]

The American College of Rheumatology (ACR) has provided the classification criteria for RA[3]. The biochemical and serological investigations commonly used to diagnose, and to determine the prognosis of RA include ESR, CRP, Rheumatoid Factor (RF), Anti CCP and Anti Nuclear Antibody (ANA).

The primary objective of treatment is to control joint pain and inflammation, slowing or arresting the progression of joint destruction, improve or maintain functional status, thereby improving quality of life. Treatment of rheumatoid arthritis is a multifaceted approach that includes both pharmacologic and non-pharmacologic therapies. Recent emphasis has been placed on aggressive treatment early in the disease course. The ultimate goal is to achieve complete disease remission, although this goal is seldom achieved. Additional goals of treatment include controlling disease activity and joint pain, maintaining the ability to function in daily activities or work, improving the quality of life, and slowing destructive joint changes.

Rest, occupational therapy, physical therapy, use of assistive devices, weight reduction, and surgery are the most useful types of non-pharmacologic therapy used in patients with rheumatoid arthritis.

A DMARD should be started within the first 3 months of onset of symptoms of rheumatoid arthritis.[4] A number of studies have shown that treatment with DMARD could improve disease activity and delay joint damage [5, 6]. But, studies on economic analysis of DMARDs are limited [7-11]. Moreover, these economic evaluations were conducted in western countries and the results could not be extrapolated to developing countries like India since the health care system in India cannot be compared to those in Western Countries.

NSAIDs or steroids may be used to control symptoms immediately as the effects of DMARDs will be seen only after a long period of time. John Kirwan [et al] conducted a study on adverse effects of glucocorticoids and DMARDs. Their results suggest that low-dose glucocorticoids actually help to postpone the occurrence of adverse effects caused by most standard DMARDs [12]. But, the chance for getting infections is more with steroids compared to DMARDs [13].

Commonly used DMARDs include Methotrexate, Hydroxychloroquine, Sulphasalazine, and Leflunomide. The biologic agents that have also been demonstrated to have disease-modifying activity include the anti-TNF drugs (etanercept, infliximab and adalimumab) and the interleukin receptor antagonist (Anakinra, Tocilizumab etc)

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 a cure for the disease and the use of potentially toxic drugs, quality-of-life assessment and economic evaluation of treatment seem to have an important place in treatment decision making. Since it is a non-curable disease, treatment of RA continues for a prolonged period of time, and it is very important to assess the direct medical cost of treatment of RA to get an idea about the economic burden imposed to the patients due to the disease and to optimize the treatment with respect to cost of treatment and effectiveness. Moreover, the medications used in the treatment of RA are potentially toxic and are liable to produce serious adverse effects. So evaluation of treatment outcome, both beneficial and adverse, will help physician in judicious prescribing of medicines to each patients that will be safe, effective and cost effective.

RA is more prevalent in females than in males. In Countries like India, ladies are less often taking advantage of doing professional activities. So, it is not relevant in taking the indirect costs like absence from duties, early retirements etc.

The main aim of the study is to evaluate the cost effectiveness of DMARDs used in the management of RA. Economic evaluation of RA are very much important in influencing the physician on decision making as the treatment of RA lies at two extremes as far as cost of medicines are concerned. In some settings like in India, where there are financial constraints on health care provisions, economic evaluation of management of diseases is meaningful [14].

Economic evaluation is based on the measurement of three costs, i.e. direct cost, indirect cost and intangible cost. Direct cost includes expenses for visiting the hospital or doctor, cost of diagnostic or monitoring tests, cost of medicines, cost of radiologic examinations and cost of special aids [15]. Indirect costs are due to lost productivity including absence from duties, sick leaves, early retirement etc. Intangible costs are defined as pain and suffering of a patient because of disease and include reduction in physical function, increased psychological distress and reduced social function [16].

The commonly used Pharmacoeconomic methods are: 1. Cost Minimization Analysis (CMA), 2. Cost Benefit Analysis (CBA), 3. Cost Effectiveness Analysis (CEA), 4. Cost Utility Analysis (CUA) and 5. Cost of Illness (COI)[17].

In this study, cost effectiveness analysis of DMARDs is conducted. CEA is the best method to be applied here because cost of treatment can be measured in terms of monitory values like Indian rupees or US dollars and the effectiveness of treatment can be measured in terms of improvement in Health Assessment Questionnaire Disability Index (HAQ DI). The measurement of quality of life using a Health Assessment Questionnaire is very important tool in outcome measurement of RA. Widely

used tools like Short Form 36 (SF 36) are usually designed for the Western world. An Indian version of the health assessment questionnaire namely A validated Indian version of HAQ is used here [18].

Average Cost Effectiveness Ratio (ACER) is calculated by dividing the cost of treatment by its clinical outcome to yield the ratio in terms of rupees or dollar cost per specific clinical outcome gained. It helps to convert the cost and outcome to a single value to allow comparison. It will help the physician in choosing the alternative with least cost per outcome obtained.

MATERIALS AND METHODS

The study was designed and conducted as a Prospective, Non-experimental (Observational) and Longitudinal study. The data collection extended over a period of ten months from Oct 2009 to July 2010. The study was conducted in the out-patient department of Rheumatology in a tertiary care referral hospital in South India. All patients visited the Out-Patient Department of Rheumatology and who satisfied the inclusion criteria were included in the study. The inclusion criteria were 1) Patients diagnosed to have RA according to American Rheumatism Association 1987 revised criteria, irrespective of co-morbidities, 2) age greater than or equal to 20 years and 3) patients with symptoms more than 3 months. Patients excluded from the study were 1) Patients with psychological problem or any other physical/disease condition which would interfere with their ability to attend the interview, 2) Age less than 20 years, 3) Pregnant and lactating women 4) Patients with other auto-immune co-morbidities like SLE, MCTD etc, and 5) patients on biologics.

All patients attended the Rheumatology OPD Unit I during the study period were selected based on the inclusion and exclusion criteria. From this, those patients who attended 3 months' follow-up were selected for the study. Patients could be followed up at two centers and those who attended the study center for follow up were included in the study. This created lot of drop outs due to non availability of follow up.

Every patient was interviewed and the data were collected in the Patient Profile Form. These data include patient's name, age, sex, other demographic data etc.

Treatment outcome, both beneficial and adverse were measured using different tools like Health Assessment Questionnaire Disability Index (HAQ DI), ESR value, occurrence of adverse drug reactions etc. Direct medical cost incurred was also taken in to account. Average Cost Effectiveness Ratio (ACER) was calculated to find out the total cost per month required for unit outcome (in HAQ DI score) gained.

Disability Index (DI) was calculated using Indian Health Assessment Questionnaire method. Here, 12 questions were asked to the patient related to their activities of daily living (ADL). Each question was scored based on the difficulty felt by the patient in doing that particular activity. A score of zero (0) was given if the patient was able to do the activity without any difficulty, a score of one (1) was given if the patient was able to do the activity with some difficulty, a score of two (2) was given if the patient was able to do the activity with much difficulty and a score of three (3) was given if the patient was unable to do the activity due to severe pain, swelling or stiffness of the joints. The total score of all the questions were taken. Disability Index was calculated by dividing the total score by 12. The value of disability index ranges from 0 to 3.

Lower values of ESR and HAQ DI are indicative of improvement of the disease.

Occurrence of Adverse Drug Reactions (ADR) was also recorded. The most commonly used DMARDs include Methotrexate, Leflunomide and Hydroxychloroquine. Sulphasalazine and Azathioprine were also used in some cases if indicated. Steroids, NSAIDs etc were also prescribed for RA patients. Patients were specifically asked for the occurrence of any of the adverse effects of the prescribed medicines. Moreover, laboratory findings of Complete Blood Count (CBC), Random Blood Sugar (RBS), serum creatinine, SGPT etc would also help to find out any ADR.

Direct medical costs incurred to the patient due to the disease are calculated to find out the average cost of treatment per month [17]. Direct medical cost of treatment includes cost of medicines, cost of routine laboratory investigations, radiological examinations, ophthalmology evaluations once in 6 months for patients on hydroxychloroquine and Doctor's consultation charges. All these parameters were taken in to consideration to find out the direct medical cost of treatment of RA per month.

The cost of medicines were taken from the hospital drug formulary, cost of laboratory investigations and radiological examinations were taken from the Hospital Information System (HIS) software of the Hospital. Doctor's consultation charge remained constant throughout the study period.

Statistical Analysis

The data obtained were verified at the end of the study. Demographic and disease characteristics of the patients are presented using descriptive statistics. Direct medical costs were presented as mean and standard deviation per patient per month in Indian rupees and corresponding 2010 US dollars. The Average Cost Effectiveness Ratio (ACER) was calculated by using the following formula:

$$ACER = \frac{\text{Healthcare cost in rupees}}{\text{Clinical Outcome gained } (\Delta \text{ HAQ DI})}$$

For the comparison of Disability Index and ESR at baseline and follow up, paired T – Test was used with the help of

the software SPSS for Windows version 13.0. Statistical significance was considered at p value of < 0.001.

RESULTS AND DISCUSSION

RESULTS

A total of 266 patients were included in this study. Their average age was 49.95 ± 12.65 years. The mean age of onset was found to be 43.66 ± 12.31 years. Female patients constituted 83.46 % (n = 222) of the sample population. The male to female ratio obtained was 1:5. Their average ages were 53.82 ± 14.002 and 49.14 ± 12.234 respectively. Out of the 266 patients studied, 242 patients (90.98 %) were found to be positive for RF (Sero Positive RA) and 24 patients (9.02 %) were found to be negative for RF (Sero Negative RA). Only 118 patients were tested for Anti CCP and out of that, 103 patients (87.29 %) were Anti CCP Positive and 15 patients (12.71 %) were Anti CCP Negative. The baseline ESR of the RA patients was found to be 39.33 ± 27.17. The baseline DAS 28 was found to be 3.37 ± 1.24. The baseline HAQ DI was found to be 0.6895 ± 0.488. Detailed information on demographic data and baseline disease activities are given in Table 1.

Table 1: Demographic characteristics and baseline disease activity of 266 RA patients

Female Gender (%)	222 (83.46)
Mean ± SD age (Years)	49.95 ± 12.65
Mean ± SD disease duration (Years)	6.32
Positive Rheumatoid Factor (%)	242 (90.98)
Positive Anti CCP (%)	102/118 (87.29)
Mean ± SD HAQ DI	0.6895 ± 0.488
Mean ± SD DAS 28	3.37 ± 1.24
Mean ± SD ESR	39.33 ± 27.17
Patients on one DMARD (%)	186 (69.66)
Patients on two DMARDs (%)	80 (30.08)

RA - Rheumatoid Arthritis, Anti CCP - Anti Cyclic Citrullinated Peptide, HAQ DI - Health Assessment Questionnaire Disability Index, DAS 28 - Disease Activity Score in 28 Joints, ESR - Erythrocyte Sedimentation Rate, DMARD - Disease Modifying Anti Rheumatic Drugs.

All patients at the study centre were prescribed with a DMARD and some patients with steroidal and / or non-steroidal anti-inflammatory drugs. Majority of patients in the study population (n = 186, 69.66 %) were on one DMARD. Unless contraindicated, the DMARD of choice was methotrexate. Out of patients on one DMARD, 82.26 % of patients were on methotrexate, none of the patients were on leflunomide alone, 15.05 % of patients were on hydroxychloroquine, 2.15 % of patients were on sulphasalazine and 0.54 % of patients were on azathioprine.

Only 30.08 % (n = 80) patients of the study population were on two DMARD combinations. Most frequently prescribed two DMARD combination was methotrexate and hydroxychloroquine for 51.25 % (n = 41) of patients on two DMARDs. 23 patients (27.50 %) were on a combination of methotrexate and leflunomide. 12.50 % (n = 10) of patients were on a combination of methotrexate and sulphasalazine. Only 8.75 % (n = 7) of patients were on a combination of hydroxychloroquine and sulphasalazine.

Most commonly prescribed (n = 199, 74.53 %) steroid was deflazacort. Non Steroidal Anti Inflammatory Drugs (NSAIDs) are prescribed on an SOS basis to control severe pain. The most commonly prescribed (n = 223, 83.83 %) NSAID was aceclofenac. Steroidal and non steroidal anti inflammatory medicines widely used in RA are well known to produce gastric up set. To avoid this, a gastro protective medicine is usually prescribed. The most commonly used one was Famotidine (n = 203, 76.32 %). A topical anti inflammatory gel is prescribed for most patients (n = 250, 93.98 %) to apply over the tender and swollen joints after hot fomentation. As a side effect of steroids, osteoporosis and osteoarthritis can develop and to prevent this, calcium supplementation (n = 203, 76.32 %), glucosamine sulphate (n = 58, 21.80 %) and ibandronic acid (n = 7, 2.63 %) were prescribed in suspected cases.

The mean Disability Index at the beginning and after 90 days were 0.6895 (S.D = 0.488) and 0.3934 (S.D=0.317) respectively. The paired Sample T – Test showed that the Disability Index after 90 days is highly significant than at the beginning $t(266) = 13.316$, $p < 0.001$

The mean ESR at the beginning and after 90 days were 39.33 (S.D = 27.17) and 35.52 (S.D = 25.858) respectively. The paired Sample T – Test showed that the ESR after 90 days is significant than at the beginning $t(266) = 2.966$, $p < 0.05$.

The patient reported and those detected by routine clinical and laboratory investigations were recorded. Increased levels of transaminases were found with methotrexate (1.12 %) and leflunomide (0.37 %). Methotrexate produced taste differences and headache in 0.37 % of cases. In 0.37 % of cases, methotrexate produced persistent cough. Methyl prednisolone produced facial puffiness, elevated RBS and acidity in 0.37 % of cases. Calcium supplements produced loose stools in 0.37 % of cases (Figure: 1).

The mean direct cost of treatment of rheumatoid arthritis per month is found to be ₹ 696.57 ± 218.39 ($ 15.92 ± 4.99). The direct medical costs can be divided in to three categories. A) Cost of medicines, B) Monitoring costs and C) Consultation and hospital charges. Cost of medicines is again divided into cost of DMARDs, NSAIDs, Steroids and medicines to prevent/treat side effects. It is very clear from the table that the cost of DMARDs to effectively treat rheumatoid arthritis is only around ₹ 155 ($ 3.54) and it is very reasonable in the case of a joint deforming disease like rheumatoid arthritis. The monitoring costs per month per patients are found to be only ₹ 113 ($ 2.58). Table 2 explains various factors contributing the direct medical cost.

Figure 1: Number of adverse drug reactions noticed for various drugs prescribed

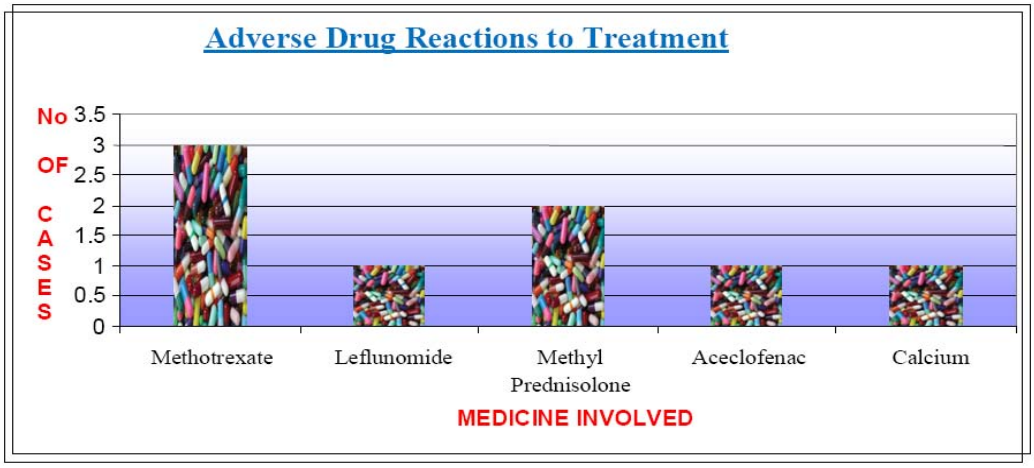


Table 2: Contribution of different parameters in direct medical cost

SL NO	DIRECT COSTS	DESCRIPTION	MEAN AMOUNT (Indian Rupees; ₹)
1	COST OF MEDICINES	DMARDs	154.99
		NSAIDs	11.85
		STEROIDS	99.68
		MEDICINES TO PREVENT/TREAT ADR	254.15
2	MONITORING COSTS	LAB	102.33
		RADIOLOGY	4.96
		OPHTHALMOLOGY	5.63
3	CONSULTATION & HOSPITAL CHARGES	DOCTOR'S CONSULTATION	50

Table 3: Average Cost Effectiveness Ratio of different DMARDs and their combinations

DMARDs	Direct Medical Cost	Mean Δ HAQ DI	ACER
MTX	**578.10**	**0.2349**	**2461.03**
HQ	**746.67**	**0.43**	**1736.44**
SSP	**762.81**	**0.23**	**3316.58**
AZA	**962**	**0.5**	**1924**
MTX + HQ	**879.99**	**0.4322**	**2036.08**
MTX + LEF	**958.32**	**0.2861**	**3349.59**
MTX + SSP	**867.62**	**0.351**	**2471.86**
HQ + SSP	**913.82**	**0.2729**	**3348.56**

MTX – Methotrexate, HQ – Hydroxychloroquine, SSP – Sulphasalazine, AZA – Azathioprine, LEF – Leflunomide, Δ HAQ DI – difference between baseline HAQ DI and follow-up HAQ DI, ACER – Average Cost Effectiveness Ratio

Mean direct medical cost was found to be least for patients receiving methotrexate (₹ 78, US $ 13.21) and highest for azathioprine (₹ 962, US $ 21.99)

Average Cost Effectiveness Ratio (ACER) is a valuable tool in determining the lowest cost option for the outcome gained. ACER will help a physician to determine the DMARD/DMARD combination with least cost for the outcome gained. Table 3 describes the ACER obtained for various DMARDs. Here, among patients on one DMARD, the least ACER (₹ per outcome) was obtained for hydroxychloroquine (1736.44). The highest ACER was for sulphasalazine (3316.58). Among patients on two DMARDs, the lowest ACER was obtained for methotrexate + hydroxychloroquine (2036.08) and the highest ACER was for Methotrexate + Leflunomide (3349.59).

DISCUSSION

Determination of serum rheumatoid factor (RF) is particularly important because patients with sero-positive rheumatoid arthritis require early and aggressive treatment with DMARDs to prevent or minimize destructive joint damages and to achieve long term outcomes[19]. Estimation of serum Anti CCP is an important tool in the diagnosis of Rheumatoid Arthritis since; Anti CCP has got a greater degree of specificity for RA than RA Factor. [20]

DMARDs are the counter stones in 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. However, there is only limited number of studies on economic analysis of DMARDs even in developed countries [7-11]. In India, since there are so many fatal diseases, like AIDS, TB, Cancer, cardio-vascular diseases etc, requiring financial attention, a relatively non-fatal disease like RA will get only poor attention. So, economic analysis on DMARDs will be very helpful for the policy makers to maximize the effectiveness with minimal economic loss.

Majority of patients in the study population (n = 186, 69.66 %) were on one DMARD and the DMARD of choice was methotrexate. Only 30.08 % (n = 80) patients of the study population were on two DMARD combinations. Methotrexate and hydroxychloroquine were combined for majority of patients, here 51.25 % (n = 41). The combination of MTX and HQ was the most popular DMARDs prescribed in the US and Canada [22].

A continuous low dose steroid is found to be effective in controlling the disease activity. Prednisolone, methyl prednisolone and deflazacort are the steroids used in RA. Most commonly prescribed (n = 199, 74.53 %) steroid was deflazacort. Deflazacort is a synthetic steroid with less side effect potential compared to the traditional corticosteroids. Methyl prednisolone injection is used intra-articularly if a single joint is inflamed and intra-muscularly if swollen joint count is more.

Compared with non-selective NSAIDs, the COX-2 selective NSAIDs were found to be equally as efficacious as non-selective NSAIDs [23]. Non Steroidal Anti Inflammatory Drugs (NSAIDs) are prescribed on an SOS basis to control severe pain. The most commonly prescribed (n = 223, 83.83 %) NSAID was aceclofenac.

Steroidal and non steroidal anti inflammatory medicines widely used in RA are well known to produce gastric up set. To avoid this, a gastro protective medicine is usually prescribed. The most commonly used one was Famotidine (n = 203, 76.32 %).

A topical anti inflammatory gel is prescribed for most patients (n = 250, 93.98 %) to apply over the tender and swollen joints after hot fomentation.

As a side effect of steroids, osteoporosis and osteoarthritis can develop and to prevent this, calcium supplementation (n = 203, 76.32 %), glucosamine sulphate (n = 58, 21.80 %) and ibandronic acid (n = 7, 2.63 %) were prescribed in suspected cases.

Rheumatoid arthritis is associated with a high degree of disability. The disability index was calculated by the use of Indian Health Assessment Questionnaire (Indian HAQ) and found that the Disability Index (DI) of the patients at baseline visits was significantly reduced after treatment with DMARDs.

Similarly, the ESR values were also compared at baseline and at follow-up and found that there was a significant reduction in the ESR values also. There were significant reduction in inflammation (as indicated by reduction in ESR values) of patients after 3 months' follow up. Measurement of ESR furnishes a reliable quantitative means for early anticipation of treatment response.

Since the treatment of RA extends for a much longer period of time, the economic impact to the patient due to treatment of RA is very much. The direct medical costs include the cost of medicines, cost of routine laboratory investigations, Doctor's consultation charges, cost of X – ray examinations and Ophthalmology evaluations for patients on hydroxychloroquine.

The mean direct cost of treatment of rheumatoid arthritis per month is found to be ₹ 696.57 ± 218.39 ($ 15.92 ± 4.99). The direct medical costs can be divided in to three categories. A) Cost of medicines, B) Monitoring costs and C) Consultation and hospital charges. Cost of medicines is again divided into cost of DMARDs, NSAIDs, Steroids and medicines to prevent/treat side effects (Table 2). The mean cost of medicines per month per patient was found to be ₹ 520.67 ($ 11.90), monitoring costs constituted ₹ 112.92 ($ 2.58) per month per patient and consultation and hospital charges constituted ₹ 50 ($ 1.14) per patient per month It is very clear from the table that the cost of DMARDs to effectively treat rheumatoid arthritis is only around ₹ 155 ($ 3.54) and it is very reasonable in the case of a joint deforming disease like rheumatoid arthritis.

The cost effectiveness analysis of DMARDs showed that, a combination of MTX and HQ is the most effective and most economic compared to other combinations like MTX + LEF, MTX + SSP or HQ + SSP.

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 a cure for the disease and the use of potentially toxic drugs, quality-of-life assessment and economic analysis seem to have an important place in treatment decision making. Moreover, there are limited studies in this aspect of the disease from South India.

Rheumatoid arthritis being permanently destructive to the joints, early treatment with DMARDs proves better control of disease progression and minimizes joint destruction. DMARDs can be applied as monotherapy or combination therapy depending on the disease activity of the patient. Methotrexate is found to be the most commonly used DMARD in monotherapy and in combination therapy also. Low dose of corticosteroids along with DMARDs have produced better outcomes in rheumatoid arthritis. The most cost effective combination was found to be MTX and HQ.

To conclude, the present study supports that the treatment with DMARDs and low dose corticosteroids can

control patient's disease activity with reasonable cost of treatment and at minimum risk for side effects.

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About Corresponding Author: Mr. Shini. V.K

Mr. Shini. V.K, graduated from Medical College, Kozhikode, India and post graduated in Pharmacy Practice from Amrita School of Pharmacy, Amrita Institute of Medical Sciences & research Centre, Kochi, India. Worked as Clinical Pharmacologist in Malabar Institute of Medical Sciences, Kozhikode and now working as Pharmacist in the Employee's State Insurance Dispensary, Ferok, Kozhikode, India.