

# Utilization Pattern of NSAIDs and Gastroprotective Agents: A Prospective Analysis in Patients with Musculoskeletal Pain in A Tertiary Care Hospital

RESMI DOUGLAS, RENEEGA GANGADHAR, ANNAPURNA Y

## ABSTRACT

**Introduction:** Non steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly prescribed medications for musculoskeletal conditions. Gastroprotective agents are co-prescribed in patients using NSAIDs for long time as they are associated with gastrointestinal complications. To promote rational drug use, it is important to assess drug use pattern using the World Health Organization (WHO) drug use indicators.

**Aim:** To determine the pattern of utilization of NSAIDs and gastroprotective agents in patients with musculoskeletal pain in Physical Medicine and Orthopedics Departments using WHO prescribing indicators.

**Materials and Methods:** 108 case records of inpatients with musculoskeletal pain, satisfying the inclusion criteria, were analyzed prospectively for pattern of use of NSAIDs and gastroprotective agents. The data collected was analyzed for prescribing indicators, complementary indicators and other factors influencing the pattern of NSAIDs use. Descriptive statistics was used.

**Results:** The average number of drugs prescribed per encounter was three. Percentage of drugs prescribed by generic name was 1.5% and percentage of encounters in which an injection was prescribed was 57.4%. Percentage of drugs prescribed from essential drug list (EDL) was 75.5%. Cost of drugs was affordable compared to per capita income. Diclofenac was the most commonly used NSAID. NSAIDs use was more common in women. The co-prescribed gastroprotectives were either H2 blockers (65.7%), PPIs (17.6%) or both (16.7%).

**Conclusion:** On the basis of the finding of this study, the prescribing practices for injection and generic prescribing show deviation from the standard recommended by WHO. Overuse of injections and negligible generic prescribing need to be regulated closely. On the other hand, polypharmacy, prescribing from EDL and cost of therapy were not found to be a problem in this study. Such utilization studies will make the clinicians aware of the need for prescribing rationally.

**Keywords:** COX-2 selective inhibitors, Diclofenac, H2 blockers, Prescribing pattern, WHO prescribing indicators

## INTRODUCTION

NSAIDs are among the most commonly prescribed medications for inflammatory, arthritis and musculoskeletal conditions. Their use increases with age [1]. However, the therapeutic effectiveness of NSAIDs is associated with gastrointestinal complications, ranging from mild dyspepsia to life threatening ulcer complications such as perforation and haemorrhage [2]. In the elderly, an estimated 29% of fatal peptic ulcer complications may be due to NSAIDs [3].

So gastroprotective agents like H2 blockers or proton pump inhibitors should be co-prescribed in patients using these NSAIDs for long time.

Cyclooxygenase- 2 (COX-2) selective inhibitors have been demonstrated to reduce the risk of gastrointestinal mucosal injury and clinical consequences in patients with rheumatoid arthritis or osteoarthritis. These agents have the potential to produce prothrombotic effects and myocardial infarction compared with traditional NSAIDs. These concerns have

raised questions about the appropriateness of NSAID drug use in patients with differing degrees of gastrointestinal and cardiovascular risk [4].

The study of prescribing pattern helps to monitor, evaluate and if necessary suggest modifications in the prescribing practices of medical practitioners, so as to make medical care rational and cost effective. Realizing the enormous potential of drug utilization studies, in promotion of rational drug therapy, World Health Organization has formulated certain guidelines for the evaluation of drug use indicators [5,6]. As per WHO, rational use of medicine requires that the patient receives the right medication in the right dose for the adequate period at the lowest cost. Studies of prescribing pattern in India have been reported at both hospital and community levels [7-10]. However a literature search yielded no studies regarding the pattern of prescription of NSAIDs and gastroprotective agents in patients with musculoskeletal pain in India. So in this context, it was thought worthwhile to assess drug prescribing patterns.

## AIM

To determine pattern of use of non steroidal anti-inflammatory drugs and gastroprotective agents in patients with musculoskeletal pain using WHO prescribing indicators.

## OBJECTIVES

Primary objective was to assess prescribing pattern of NSAIDs and gastroprotectives using WHO prescribing indicators.

### • The prescribing indicators that were measured included

- Average number of drugs per encounter.
- Percentage of drugs prescribed by generic name.
- Percentage of encounters in which an injection was prescribed.
- Percentage of drugs prescribed from essential drug list.

### • Secondary objective was to measure complementary indicators like

- Average drug cost per encounter.
- Percentage of drug costs spent on injections.

## MATERIALS AND METHODS

It was an observational study carried out in Physical Medicine and Orthopedics Departments at a tertiary care hospital in South Kerala during the period October 2008 to March 2009. 108 Case records of patients suffering from musculoskeletal pain were evaluated.

## Case Definition and Inclusion Criteria

Musculoskeletal pain as per ICD 9 CM code included. Low backache, rheumatoid arthritis, osteoarthritis, cervical spondylosis, lumbago, tenosynovitis, periarthritis shoulder, tennis elbow, Perthe's disease, avascular necrosis, sciatica, myalgia and joint pain. Adult patients aged above 18 years satisfying ICD 9 CM code and willing to give consent were included. Patients who had Gastro-oesophageal reflux disease (GERD), peptic ulcer, patients with cardiovascular diseases and pregnant women were excluded.

## Study Procedure

Study was initiated after obtaining approval from Institutional Ethics Committee. Prescribing indicator forms were used to record the information from the case records. The data collected were analyzed prospectively for demographic characteristics and WHO prescribing indicators.

### I) The prescribing indicators that were measured included

- The average number of drugs prescribed per encounter was calculated by dividing the total number of different drug products prescribed by the number of encounters surveyed.
- Percentage of drugs prescribed by generic name was calculated by dividing the number of drugs prescribed by generic name by total number of drugs prescribed, multiplied by 100.
- Percentage of encounters with an injection prescribed was calculated by dividing the number of patient encounters in which an injection was prescribed by the total number of encounters surveyed, multiplied by 100.
- Percentage of drugs prescribed from an essential drug list (EDL) was calculated by dividing number of products prescribed from EDL by the total number of drugs prescribed, multiplied by 100.

### II) Complementary indicators that were measured included

- Average drug cost per encounter was calculated by dividing the total cost of all drugs prescribed by the number of encounters surveyed.
- Percentage of drug costs spent on injections was calculated by dividing the cost of injections prescribed by total drug cost, multiplied by 100.

### III) Other factors influencing the pattern of NSAIDs use were also evaluated

- Pattern of NSAIDs use as per demographic profile.
- Pattern of commonly used NSAIDs.

- c) To identify most frequently treated musculoskeletal pain.
- d) Relationship between the prescribed medicine and illness frequently treated.
- e) The percentage of co-prescription of gastroprotective agents with NSAIDs versus COX-2 inhibitors.
- f) Percentage of prescriptions with adverse drug reactions and Drug interactions noted from the case records.
- g) Direct treatment cost.

Average cost of NSAIDs for one person per day of stay at hospital was calculated by dividing total cost during stay in hospital by the number of days of stay at hospital.

CIMS-102 2008 July –September edition was used for calculating cost in Indian rupees.

## STATISTICAL ANALYSIS

Descriptive statistics was used for data analysis. In the statistical analysis, frequencies, averages/means, standard deviations and percentages were obtained.

## RESULTS

108 case records of inpatients were evaluated prospectively in the physical and Orthopedics Department of a tertiary care hospital in south Kerala from October 2008 to March 2009.

### Prescribing Indicators

The average number of drugs per encounter was 3. Percentage of drugs prescribed by generic name was 1.5% and percentage of encounters in which an injection was prescribed was 57.4%. Percentage of drugs prescribed from essential drug list was 75.5% [Table/Fig-1].

### Complementary indicators

Average drug cost per encounter was Rs.169.46 and percentage of drug costs spent on injection was 56.34%.

Prescribing indicators assessed	Average/ percent (%)	WHO standard
Average number of drugs per encounter	3%	2-3
Percentage of drugs prescribed by generic	1.5%	100
Percentage of encounters with injections	57.4%	16-20
Percentage of drugs prescribed from essential drug list	75.5%	80-100

[Table/Fig-1]: Summary of prescribing indicators.

### Direct Treatment Cost

Average cost of NSAIDs for one person/day of stay in hospital was Rs.7.64.

Average cost of NSAID with H2-blockers according to prescribed daily dose was Rs. 114.34. Average cost of NSAID with PPI was Rs. 247.38.

### The baseline demographic characteristics and pattern of NSAID use

The use of NSAIDs was maximum in the age group 50-59 years with mean age users for conventional NSAIDs being 48.2 and Cox-2 inhibitors 42.5. NSAIDs use was more in females (n=63, 58.3%).

### Patterns of Treatment with NSAID

Of the 108 case records analysed, 94 patients (87%) received single NSAID and Diclofenac use as single drug was most common (n=75,69.4%) Paracetamol with Tramadol was the commonly encountered fixed dose combination (n=20, 18.5%). All the patients were prescribed gastroprotective drugs. [Table/Fig-2,3].

Ranitidine was the only H2 blocker prescribed. Among the PPI, Omeprazole was most commonly prescribed (64.8%) followed by Pantoprazole (29.7%) and Rabeprazole (5.4%). The most frequently treated illness was osteoarthritis

NSAIDs	Frequency	Percentage (%)
Diclofenac	75	69.4
Ibuprofen	1	0.9
Indomethacin	8	7.4
Piroxicam	1	0.9
Paracetamol	5	4.6
Lornoxicam	11	10.2
Etoricoxib	7	6.5
Aceclofenac	4	3.7
Naproxen	1	0.9
Paracetamol +Tramadol	20	18.5
Diclofenac +Paracetamol	3	2.8
Aceclofenac + Paracetamol	6	5.6

[Table/Fig-2]: Frequency in utilization of NSAIDs.

\*Note: Increased frequency in utilisation of NSAIDs is due to simultaneous intake of more than 1 NSAID by the patients (other than FDC).

Gastro protective agents	Frequency	Percentage (%)
PPI (only)	19	17.6
H2 Blockers (only)	71	65.7
PPI &H2 blockers	18	16.7

[Table/Fig-3]: Frequency of co-prescription of PPI, H2 blockers or both with NSAIDs.

Diagnosis	Frequency	Percentage (%)
Osteoarthritis	39	36.1
Rheumatoid Arthritis	14	13.0
Low Backache (LBA)	27	25.0
Intervertebral Disc Prolapse (lvdp)	10	9.3
Avascular Necrosis (AVN)	5	4.6
Joint Pain	3	2.8
Tenosynovitis	10	9.3
Total	108	100

**[Table/Fig-4]:** Illness most frequently treated.

(n=39,36.1%) [Table/Fig-4]. Adverse drug reactions and drug interactions with NSAIDs use were not recorded.

## DISCUSSION

Average number of drugs per prescription is an important index of prescription audit. In the present study, the average number of drugs per prescription, 3 is acceptable compared to the WHO standard. In a similar study performed by Gupta M et al.,[11] in a North Indian Tertiary care hospital the average number of drugs per encounter was 2.5, which was also in the acceptable range [5]. Hence, there was no evidence of polypharmacy. It also means that the prescribers have appropriate training in therapeutics.

The percentage of drugs prescribed by generic name 1.51%, is not similar with the WHO standard (100%). Only Paracetamol was prescribed by generic name (1.51%). All other drugs were prescribed by trade name. Generic prescribing is desirable to promote rational use of drugs and to minimize cost of therapy and dispensing errors.

The percentage of encounters in which an injection was prescribed was 57.4%, which is higher than the standard (16%-20%) Possible reasons for the high use of injections could be 1) injectable forms produce faster onset of action and 2) most of the patients had to undergo arthroplasty and other surgical procedures.

The percentage of drugs prescribed from the essential drug list was 75.5%, which is almost identical with the WHO standard (100%) and this ensures the use of well-established and cost effective drugs.

For rational prescribing, it is important to determine cost of treatment with drug use pattern. Average drug cost per encounter was Rs. 169.46 (US \$ 3.7) India has per capita income of US \$40 [11]. Hence, US \$ 3.7 is quite affordable since these drugs have to be consumed for a long period.

56.34% of total drug cost was spent on injections. Average cost of NSAID for one person per day stay in hospital was Rs. 7.64. Average cost of NSAIDs with H2 blocker was Rs.

114.34 and NSAIDs with PPI was Rs. 247.38 which was more costlier. Proton pump inhibitors were more effective than H2 blockers in preventing gastrointestinal adverse effects of NSAIDs. In this study increased prescription of H2 blockers might be due to their lower cost.

Out of the 108 patients screened, 63 (58.3%) were females and 45 patients (41.7%) were males. The prevalence of NSAID use increased with age (26.9% in patients aged 50-59 years). There was not much difference between mean age of conventional NSAID users (48.2yrs) and COX-2 inhibitors (42.5yrs). According to the questionnaire based study conducted by Italian general population to evaluate prevalence and pattern of NSAID use, the older age groups (>65 years) showed increased NSAID use [12]. NSAID use was significantly higher in women as in our study.

Single NSAID use was more common than fixed dose combination. Diclofenac (n=75,69.4%) was most commonly prescribed as tablets and injections (37.3%). Suppository was administered only to 2 patients (1.8%). Paracetamol with Tramadol was the most commonly used fixed dose combination (n=20,18.5%). The most common NSAIDs prescribed in a drug utilisation study in a North Indian tertiary care hospital by Gupta M et al.,[11] demonstrated that Rofecoxib was the most commonly prescribed NSAID (30.4%) and Ibuprofen + Paracetamol was the most commonly used fixed dose combination.

All the prescriptions contained gastroprotective agents. H2 blocker, Ranitidine was most commonly co-prescribed (71%) compared with proton pump inhibitors (19.1%). Amongst the PPI, Omeprazole was most commonly co-prescribed (64.8%). The most common gastroprotective agents used with NSAIDs in the study by Raghavendra B et al.,[12] were proton pump inhibitors (81.2%). H2 blockers were rarely used and Misoprostol was not at all used. No adverse reactions noted.

The most common indication for NSAIDs was osteoarthritis (36.1%) followed by low back ache (25%), rheumatoid arthritis (13%), intervertebral disc prolapse and tenosynovitis (9.3% each). Fracture was the condition for which NSAIDs were most commonly prescribed followed by osteoarthritis, cervical spondylosis, backache and sprain in a study by Gupta M et al., [11].

## LIMITATIONS

Some of the limitations of the study were small sample size and short duration of study. There was no follow-up of the patients as data was collected from case records. The usual adverse effects of NSAIDs were not obtained from the case records. Patient information was inadequate in most of the case records.

## CONCLUSION

On the basis of the finding of this study, the prescribing practices for injections and generic prescribing show deviation from the standard recommended by WHO. Overuse of injections need to be regulated and proper training in rational prescribing is essential as there is no tendency for generic prescribing. Most of the drugs were prescribed from EDL and there was no poly pharmacy. Average cost of drugs was affordable compared to per capita income.

However, physicians have to be aware about the chronic use of NSAIDs in the elderly as well as high frequency of self medication. It is also essential to encourage and promote generic prescribing to reduce the cost of therapy. Baseline data gathered by this study can be used by researchers to improve prescribing practice at tertiary care hospital in South Kerala.

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### AUTHOR(S):

1. Dr. Resmi Douglas
2. Dr. Reneega Gangadhar
3. Dr. Annapurna Y

### PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Pharmacology, Govt Medical College Trivandrum, India.
2. Professor, Department of Pharmacology, Sree Mookambika Institute of Medical Sciences, Kulasekharam, India.

3. Associate Professor, Department of Pharmacology, Govt Medical College Trivandrum, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Resmi Douglas,  
Daivakripa, Amarivila, Nellivila P O, Trivandrum, India.  
E-mail: drbvrkumarcardiologist@gmail.co

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