

# Drug Utilization Pattern of Non-Steroidal Anti-Inflammatory Drugs in Patients Attending Orthopaedic Department of A Hospital in Kerala

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## Abstract

**Aim :** To study the drug utilization pattern of NSAIDs in the orthopaedic department (OPD) of a tertiary care teaching hospital. **Methods and materials:** The study was conducted in 65 patients under all age group. A standard data collection form was designed for data collection which includes details like commonly prescribed NSAIDs, dosage, concomitant medications etc. The data was collected through hospital information system.

**Results:** About 36.9% of the patients came to OPD with a diagnosis of leg pain. Out of 65 prescriptions only 89% prescriptions containing the gastroprotective agents in which histamine blockers (H2) namely Ranitidine(51.72%) were more prescribed than proton pump inhibitors (PPIs) like Pantoprazole(41.38%) and Rabeprazole (6.9%). The NSAIDs commonly prescribed was Etoricoxib (33.34%). 56.9% of prescriptions were in brand names. 79.7% of NSAIDs were prescribed as monotherapy and 11.1% were in the form of Fixed Drug Combinations (FDC). The average number of drugs per prescription was 3.9. Vitamin supplements (23.08%) and Calcium salts (53.85%) were the most commonly prescribed medications other than NSAIDs.

**Conclusion:** Etoricoxib was most commonly used NSAIDs in the OPD, almost all of the NSAIDs were prescribed as monotherapy in brand name. From our study the drug utilization pattern in our institute seems to be rational even though there were some exceptional.

**Key words:** NSAIDs, , Orthopaedic Department , Prescription Pattern, Selective Cox- 2 inhibitors.

## INTRODUCTION

Pain is an unpleasant sensory and emotional experience related with actual or potential tissue damage or described in terms of such damage [1]. Non-steroidal anti-inflammatory drugs (NSAIDs) are widely used pharmaceutical agents [2]. It is mainly used for the treatment of pain and inflammation [3]. These are the most widely prescribed class of medication dispensed as over the counter drugs. They work by interrupting the cyclo-oxygenase (COX) pathway which involves the transformation of arachidonic acid by the enzyme COX to prostaglandins, Thromboxane A2 (TXA2) and prostacyclin. Anti-inflammatory action takes place by interfering with the potentiative action of other mediators like bradykinin, histamine, serotonin, modulation of T-cell function, stabilization of lysosomal members, inhibition of chemotaxis. COX is present in two isoforms, COX-1 and COX-2. COX-1 involves with the physiological functions such as stomach mucous production, kidney water excretion and platelet formation where as COX- 2 involves in producing prostaglandins for inflammatory response. Acetylsalicylic acid irreversibly inactivates COX-1 and COX2. Even with various clinical uses like analgesics, antipyretics, and anti-inflammatory actions of classical NSAIDs, it has one negative effect, gastro-intestinal (GI) toxicity which occur by inhibiting COX-1 and COX-2 in GIT. For overcoming GI adverse effects of NSAIDs, gastroprotective agents like proton pump inhibitors are mostly prescribed along with them [4]. In particular, NSAIDs have both bleeding and dyspepsia effects. Recent studies revealed cardiovascular adverse effects make use of COX-2 selective inhibitors, which raised concerns among both prescribers and consumers [2].

Analgesic effect of NSAIDs is associated with the peripheral inhibition of prostaglandin production, and it can also occur in the subcortical site due to the inhibition of pain stimuli [5]. The inhibition of interleukin-1 and interleukin-6 induced production of prostaglandin in the hypothalamus which is related to antipyretic effect and also in resetting of thermoregulatory system which can lead to vasodilation [6] [7]. The prescription of the individual patients were collected to assess the therapeutic management plan [8]. The advantageous of correct pattern of prescribing NSAIDs is to elevate the therapeutic benefit and to minimize the adverse drug reactions through periodic evaluations of drug utilization patterns [9]. Drug utilization studies do help in finding a new way to implement the rational drug therapy and areas of improvement

in terms of better, effective and economic treatment with lesser adverse effects [10].

## MATERIALS AND METHODS

### Study design

It was a prospective observational study conducted in a multi speciality tertiary care teaching hospital for a period of 6 months.

### Inclusion criteria

Patients who visited orthopaedic department during the study period and on NSAIDs were included in the study.

### Exclusion criteria

Non co-operative patients, Patients who are not treated with NSAIDs.

### Ethical clearance

The protocol of the study was approved by Institutional Human Ethics Committee (IHEC) of hospital.

### Data collection

The study was conducted by collecting the data from the patient's medical records and through the hospital information system. A standard data collection form was prepared for collecting the necessary informations. The data collection form included informations like age, sex, and co-morbidities, drug name, dose, frequency, dosage form and number of doses administered, concomitant medications, various indications of prescribing, drugs in brand name and generic name, gastroprotective agents, average no of prescriptions, various forms of NSAIDs.

### Statistical analysis & interpretation

The collected data were compiled using Microsoft word, Microsoft excel and were presented in graphical format using pie charts, bar diagram etc. All the statistical analysis carried out for this study was done on SPSS software, version 22.

## RESULTS

### Demographic characteristics

Among 65 patients, 57.6% were females and 43.4% were males. Majority of the patients (44.5%) belonged to the age group of 40-60yrs (Table-1).

### Various indications for prescribing NSAIDs

The indications for prescribing NSAIDs included leg pain (36.9%) followed by back pain (23%), osteoarthritis (16%), rheumatoid arthritis (9.2%) and other conditions like

osteomyelitis (3%) osteoporosis (4.60%), osteochondromatosis (3%).

#### Commonly prescribed NSAIDs

The most commonly prescribed NSAIDs in Orthopaedic department was found to be Etoricoxib (33.34%) followed by Acetaminophen and Tramadol combination (27.45%), Celecoxib (17.64%), Diclofenac sodium (13.72%) and Tramadol (7.85 %) (Fig-1)

#### Various forms of NSAIDs

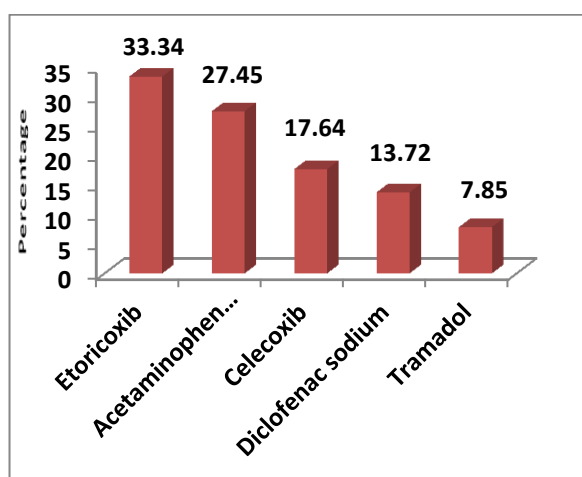
Out of 65 patients, 90.8% patients were on systemic NSAIDs while 9.2% patients on topical formulation. Of these (79.7%) patients were given NSAID as monotherapy and 11.1% patients were given as Fixed Dose Combination (FDC) (Table-2).

**Table1: Demographic characteristics of patients**

Age group (years)	Percentage
0-20	1.5%
20-40	23%
40-60	44.5%
60-80	31%
Sex	Percentage
Male	43%
Female	57%

**Table 2. Various forms of NSAIDs**

Various forms of NSAIDs	Percentage
Systemic NSAIDs	90.8%
	a) Monotherapy-79.7%
	b) Fixed Dose Combinations (FDC)-11.1%
Topical Formulation	9.2%



**Fig 1: Commonly prescribed NSAIDs**

**Table 3. Adverse drug reactions observed**

Adverse drug reactions	Percentage
Nausea	7.69
Satiety	4.61
Diarrhea	3.07

**Table 4. Mode of prescribing NSAIDs**

Mode of prescribing NSAIDs	Percentage of drugs
NSAIDs given in Brand name	56.9%
NSAIDs given in Generic name	43.1%

#### Co-prescription of gastroprotective agents

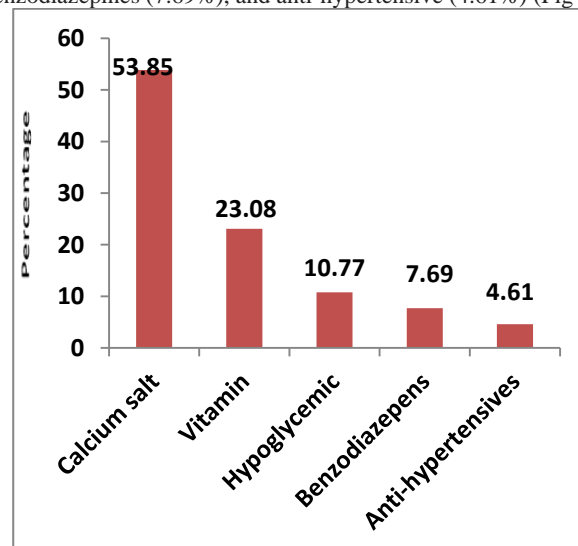
Out of 65 prescriptions, 89% of the patient's prescription contain gastro protective agents. H2 receptor blocker, Ranitidine (51.72%) was most commonly prescribed along with NSAIDs for gastro protection followed by proton pump inhibitors, Pantoprazole (41.38%), and Rabeprazole (6.9%).

#### Various co-morbidities observed in patients

Majority of the patients came to OPD had diabetes mellitus as a co-morbidity (15.3%) followed by neurologic complaints (12.3%) and hypertension (10.7%). Elevated cholesterol levels (1.5%), Urinary tract infections (1.5%) and mental problems (1.5%) were also rarely observed.

#### Concomitant medications other than NSAIDs

Calcium salts (53.85%) were found to be more prescribed in orthopaedic department other than NSAIDs followed by vitamin supplements (23.08%), hypoglycemic agents (10.77%), benzodiazepines (7.69%), and anti-hypertensive (4.61%) (Fig- 2).



**Fig 2: Concomitant medications other than NSAID**

#### Adverse drug reactions observed

Out of 65 patients, only 10 patients (15.4%) developed adverse drug reactions due to NSAIDs. 5 (7.69%) patients had experienced nausea, 3 (4.61%) patients had Satiety and diarrhoea developed in 2 (3.07%) patients. Causality is assessed by Naranjo causality assessment scale. 80% of patients had probable ADR and 20% of the patient had possible ADR. (Table- 3).

#### Mode of prescribing NSAIDs.

In our study, almost all of the drugs were prescribed in brand names (56.9%) and 43.1% of the drugs were prescribed in generic name (Table- 4).

#### Number of drugs per prescription

Out of 65 prescriptions, a total of 258 drugs were used, so the average number of drugs per prescription was found to be 3.9. (Table- 5)

**Table 5: Number of drug per prescription**

Total number of prescription	65
Total number of drugs used	258
Average number of drugs per prescription	3.9

#### DISCUSSION

Currently, the evaluation of drug utilization pattern is very powerful tool for clinical, economic and educational purposes which can provide feedback to the prescribers and also to develop alertness about the rational use of medications. Drug utilization studies provides useful insights into the current prescribing practices[11]. This study shows the positive impact in identification and resolution of drugs and their adverse effects[12].

In this study out of 65 patients, 57.6% patients were females and 43.4% were males. Majority of the patients visited in the orthopaedic OPD is females, it may be due to the fact that arthritis and its complications are more prevalent in females. Most of the patients came to OPD had a diagnosis of leg pain and back pain in our study. Shankar PR et al, in his study reported that lower back ache and spondylosis were the most frequent reason for visiting OPD [13]. In the present study, the commonly prescribed NSAIDs was Etoricoxib (33.34%). But as per Jyothi R et al, commonly prescribed NSAIDs were Aceclofenac (43%) followed by Etodolac (25%) [9]. The average (mean) number of drugs per prescription is an essential parameter [1]. According to WHO, the average number of drug per prescription should be 2.0 [14]. Our study reveals that the average number of drugs per prescription was found to be 3.9. However the other study by R Asha Latha also confirm almost similar results [15]. Ideally the number of drugs per prescription should be low so that incidence of drug interactions and adverse effects would also be low [10]. Although PPIs are more effective than H<sub>2</sub> blockers for treatment and prevention of GI toxicity associated with NSAIDs, H<sub>2</sub> blockers were more commonly co-prescribed as gastroprotective agents in our study, it may be due to the reason that H<sub>2</sub> blockers are relatively safe, inexpensive, and more likely to be covered by insurance organizations, while PPIs have the higher co-pays or might not be covered. This was similar to other study by Majid zeinali [16]. Only 15.4% patients developed an ADR due to NSAIDs in our study. Nausea was the most common reported ADR. The lesser percentage of ADR in our study may be due to that most of the prescription contains gastroprotective agents. In our study monotherapy of NSAIDs was encouraged than Fixed Dose Combinations (FDC). FDC in our study was around only 11.1%. While in Nagla A in her study observed that the fixed dose combination was more (40%) than monotherapy. There is a tendency on the part of prescribers to write FDC as it ensures better patient compliance but at the same time chances of adverse drug effects are also more. Most of the NSAIDs in our study were prescribed in brand names rather than generic name. While WHO guideline is to prescribe drugs by generic names is 100% [10]. The prescribing error in medicines with different generic names and similar brand names can be reduced by generic prescribing [14].

Concomitant medications used other than NSAIDs were calcium salts, Vitamin supplements, Hypoglycemic, Benzodiazepines, and Antihypertensives. Calcium salt and vitamin supplements are used for nutritional supplements for better health.

#### Limitation

Major limitation of our study was it is a single centre study for a shorter duration so the results cannot be generalised.

#### CONCLUSION

The prescribing pattern in our institute seems to be rational, certain changes are still left to be made which would lead to even better prescribing pattern in the future. Proper awareness among the prescribers seems to be necessary for promoting generic prescribing.

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