

## DRUG UTILIZATION STUDY IN THE ORTHOPEDICS OUTPATIENT DEPARTMENT OF A TERTIARY CARE HOSPITAL IN MAHARASHTRA

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### ABSTRACT

**Objective:** The objective of this study was to analyze the pattern of drug utilization in outpatients of orthopedics department from a tertiary care hospital.

**Material and Methods:** In this retrospective study, prescriptions of randomly selected patients attending orthopedics clinic were screened to analyze number of medicines per prescription and type of medicines prescribed. Number and percentages of prescribed medicines were calculated.

**Results:** In this study, 512 patients (male 260 [50.8%] and females 252 [49.2%]) were included. The total number of prescribed medicines was 1562, accounting for 3.1 medicines per patient. A total number of oral, parenteral, and topical medicines were 1375 (88%), 176 (11.3%), and 11 (0.7%), respectively. Nonsteroidal anti-inflammatory agents (NSAIDs), antacid/anti-ulcerants, and antimicrobial agents were 641 (41%), 371 (23.8%), and 102 (6.5%), respectively. A total of 54 (52.9%), 29 (28.4%), 9 (8.8%), 6 (5.9%), 3 (2.9%), and 1 (1%) patients were prescribed fluoroquinolones, beta-lactam antibiotics, metronidazole, trimethoprim plus sulfamethoxazole, macrolides, and doxycycline, respectively. For 371 (23.8%) patients, anti-ulcerant and antiulcer were prescribed, among which ranitidine was the most common prescription [353 (95.1%)]

**Conclusion:** Number of medicines prescribed per patient in orthopedic clinic was 3.1. NSAIDs and antacid/anti-ulcerants were the most commonly prescribed medicines.

**Keywords:** Orthopedics, Outpatient, Prescription pattern.

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### INTRODUCTION

There are differences in the prescription habits of clinicians while treating patients. Some of the parameters considered while selecting a medicine include age of the patient, gender, diagnosis, disease severity and availability, and cost of the medicine. By analyzing the pattern of prescription and medication usage in a scientific manner [1], drug utilization research may contribute in the promotion of rational pharmacotherapy [2]. Overall prescription analysis may help to improve the quality of health care and patient outcomes [3].

Drug utilization studies can be performed at various levels [1]. For example, patterns of drug utilization may differ based on the clinical setup, i.e., public versus private sector [4]. There are limited data on drug utilization studies in patients attending orthopedics clinic from public tertiary care hospitals.

#### Objective

The objective of this study was to analyze drug utilization pattern in orthopedics outpatient department of a tertiary care hospital.

#### MATERIALS AND METHODS

In this retrospective drug utilization study, prescriptions of patients attending Orthopedics Outpatient Department, Government Medical College and Hospital, Aurangabad, were analyzed. Patients attending hospital from November 2011 to November 2012 were included in the study. Data were collected through Hospital Management Information System (HMIS). Gender of the patient, number of medicines per prescription, number and percentages of analgesics, antimicrobials, and other medicines were calculated. This study was performed in compliance with the protocol. Permission from the Institutional Ethics Committee was taken before starting the

study. Descriptive statistics are presented with mean and standard deviation for continuous variables and numbers and percentages for the categorical variables.

#### RESULTS

Of 6910 patients (male 2909 [42.1%] and female 4001 [57.9%]) registered in the orthopedic outpatient department, a total of 512 patients were randomly selected. Prescriptions of all 512 patients were analyzed, of whom 260 (50.8%) were males and 252 (49.2%) were females. A total number of medicines used were 1562, accounting to 3.1 medicines per patient.

Three types of formulations were prescribed to the patients: Oral, parenteral, and topical. The number of oral, parenteral, and topical prescriptions in the study population was 1375 (88%), 176 (11.3%), and 11 (0.7%), respectively (Fig. 1).

The types of medicines prescribed included nonsteroidal anti-inflammatory agents (NSAIDs) 641 (41%), antacid/anti-ulcerants 371 (23.8%), antimicrobial agents 102 (6.5%), calcium and Vitamin D tablets 84 (5.4%), corticosteroids 14 (0.9%), and others 350 (22.4%) (Fig. 2).

Diclofenac sodium tablets, diclofenac sodium injection, oral paracetamol, and oral ibuprofen were included in 289 (45.1%), 176 (27.5%), 102 (15.9%), and 74 (11.5%) prescriptions, respectively (Fig. 3).

A total of 54 (52.9%), 29 (28.4%), 9 (8.8%), 6 (5.9%), 3 (2.9%), and 1 (1%) patients were prescribed fluoroquinolones, beta-lactam antibiotics, metronidazole, trimethoprim plus sulfamethoxazole, macrolides, and doxycycline, respectively. Ciprofloxacin was the fluoroquinolone prescribed in all patients (n=54; Fig.4). Amoxicillin plus potassium clavulanate was prescribed in 20 (19.6%) patients,

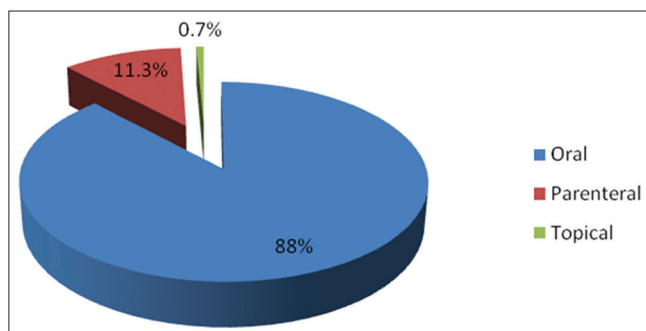


Fig. 1: Types of formulations prescribed in orthopedic outpatients in a tertiary care hospital (n=1562)

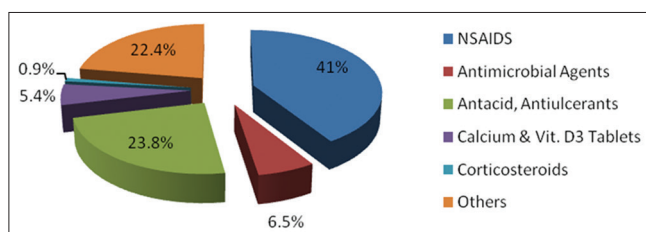


Fig. 2: Types of medicines prescribed in orthopedic outpatients in a tertiary care hospital (n=1562)

whereas ampicillin and amoxicillin were prescribed in 6 (5.9%) and 3 (2.9%) patients, respectively. Roxithromycin 2 (1.96%) and azithromycin 1 (0.98%) were the two macrolides prescribed.

Of 371 (23.8%) patients who were prescribed anti-ulcerant and antacids, ranitidine was prescribed in 353 (95.1%), whereas remaining 18 (4.9%) patients were prescribed antacids.

Calcium/calcium plus vitamin D supplements were prescribed in 84 (5.4%). Of 84 patients, calcium lactate plus vitamin D was prescribed to 81 (96.4%) patients, whereas to other three (3.6%) patients, only calcium lactate was prescribed.

Of 14 (0.9%) prescriptions containing corticosteroids, topical betamethasone and oral prednisolone 5 mg were present in 11 (78.6%) and 3 (21.4%), respectively.

Among the others 350 (22.4%) medicines, polyvitamin and ferrous sulfate plus folic acid were prescribed to 318 (90.9%) and 32 (9.1%) patients, respectively.

## DISCUSSION

In this retrospective study, we analyzed the prescriptions of patients attending outpatient departments of a tertiary care hospital. NSAIDs are commonly prescribed and valuable medications for the management of musculoskeletal disorders associated with pain and inflammation [5-7]. In our study, NSAIDs were the most commonly prescribed class of medicines. Our results are in accordance with a study from a teaching hospital in Western Nepal [8].

Oral formulations were the most commonly prescribed form of medicines. Outpatient-based nature of the study may explain this observation. Diclofenac sodium is one of the most prescribed NSAIDs in the treatment of musculoskeletal diseases [9]. In our study too, diclofenac sodium was the most commonly prescribed NSAID. A study from orthopedic outpatient showed diclofenac and meloxicam to be the most commonly prescribed agents [8]. Other studies from orthopedic inpatient department have also shown diclofenac to be the most commonly prescribed analgesic [10,11]. Diclofenac is also a commonly prescribed analgesic for post-operative pain relief [12,13].

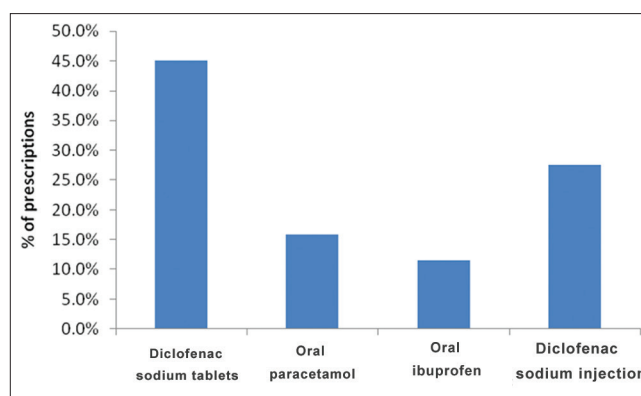


Fig. 3: Analgesics prescribed in orthopedic outpatients in a tertiary care hospital (n=614)

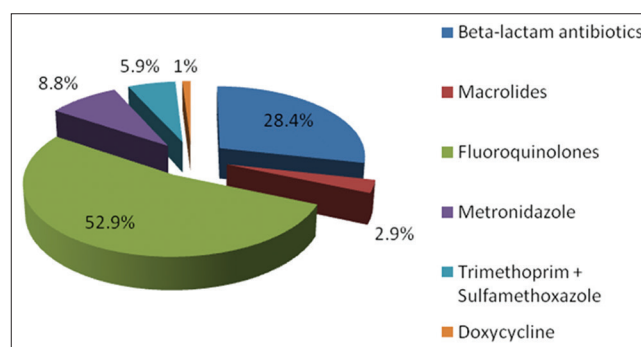


Fig. 4: Types of antimicrobials prescribed in orthopedic outpatients in a tertiary care hospital (n=102)

In our study, other two analgesics prescribed were paracetamol and ibuprofen.

The association of NSAIDs with upper gastrointestinal complications is well known [14-16]. Clinicians use several strategies to prevent NSAID-associated gastrointestinal injury. The options include the use of selective COX-2 inhibitors, use of selective COX-2 inhibitors plus proton-pump inhibitors (PPIs), and use of non-selective NSAIDs plus PPIs [15]. Other agents having gastroprotective ability, e.g. minimizing acid production or neutralizing acid are also used along with NSAIDs [14,17,18]. According to a study from Japan, most orthopedists prescribe some medicine to prevent NSAID-induced ulcers [19].

In our study, anti-ulcerant/antacid was the second most commonly prescribed class of medicines. However, prescriptions of anti-ulcerant/antacid were less compared to those of NSAIDs. This indicates that anti-ulcerant/antacids are used in selected patients receiving NSAIDs, based on the presence of other risk factors. Use of PPIs and histamine 2 receptor blockers differs based on the study settings. In one study, PPI represented the most commonly prescribed class of medicines to prevent NSAID-related gastrointestinal adverse events [6], whereas in another study, histamine 2 receptor blockers were commonly prescribed [20]. Although PPIs are more effective than H2 receptor blockers in reducing the risk of upper gastrointestinal ulcers [14], in our study, ranitidine was most commonly used anti-ulcerant agent. Availability of the medicines in the hospital could be one of the influencing factors for the prescription.

Moreover, evidence suggests that premedication with ranitidine is more effective than PPIs in reducing the volume of gastric secretions and increasing gastric pH [21]. This is one of the reasons for common use of ranitidine as a pre-anesthetic medication.

With an objective of providing pain relief without systemic adverse events, topical NSAIDs are also used for the treatment of acute

musculoskeletal conditions [22]. In our study, percentage of topical preparations was very less. Indication- and age-wise analysis of prescriptions may provide more insights about the selection of one formulation over the other based on the route of administration.

Fluoroquinolone was the most commonly prescribed class of antimicrobials in our study. Ciprofloxacin, a fluoroquinolone with broad spectrum of activity [23], was the choice of agent among this class, used in all patients. Ciprofloxacin has proven antimicrobial activity and efficacy in community-acquired and nosocomial infections. Its pharmacokinetic parameters suggest higher plasma level and increased tissue penetration [23,24]. It is also one of the common antimicrobial agents for the treatment of skin and soft tissue infections in type 2 diabetes patients [25]. A study involving admitted patients in an orthopedic department of tertiary care teaching hospital in Northern India reported common prescriptions with three antimicrobial agents [26]. However, in our study, we did not include hospitalized patients. In a retrospective survey, orthopedic surgeons were one of the specialties for the prescriptions of corticosteroids [3]. In our study, prescriptions containing corticosteroids were very few.

Our study highlights the use of medications for the patients presenting the orthopedic outpatient departments with different conditions. We did not record the age of the patients and indications for the given prescriptions. These two limitations resulted in an inability to perform indication-wise and age-wise analysis of drug usage in the study population. Furthermore, as the data were collected through HMIS, information about other medicines could not be collected. Further studies to identify the factors involved in the prescription of anti-ulcerant/antacids in patients receiving NSAIDs are required.

## CONCLUSION

In outpatient department of orthopedics from a tertiary care hospital, mean number of medicines prescribed per patient was 3.1. NSAIDs and antiacid/anti-ulcerants were the most commonly prescribed medicines. Diclofenac sodium and ranitidine were the most commonly prescribed analgesic and anti-ulcer agents, respectively, in our study.

## CONFLICTS OF INTEREST

None.

## AUTHOR'S CONTRIBUTION

Dr. Madhuri Kulkarni conceptualized the study and collected data. Dr. Anant Patil conducted statistical analysis and prepared the manuscript.

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