



An Observational Study on Prescribing Patterns of Drugs in Osteoarthritis in Orthopedic Patients

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Abstract

Objective: To evaluate the prescribing patterns of drugs in patients with osteoarthritis in an orthopedic setting and to assess the rationality of drug use.

Materials and Methods: A prospective, observational, and cross-sectional study was conducted over a period of six months in a tertiary care hospital. A total 80 patients with osteoarthritis aged 18 years and above were included based on predefined inclusion and exclusion criteria. Data were collected from prescriptions, patient case records, and direct patient interviews. Drug-related information such as type, dosage, frequency, and combination therapy was analyzed using descriptive statistics.

Results: Osteoarthritis was more prevalent in females (66.25%), particularly in the 51–60 years age group. Paracetamol was the most commonly prescribed analgesic. NSAIDs, often combined with proteolytic enzymes, were widely used for anti-inflammatory effects. Proton pump inhibitors, especially rabeprazole, were frequently co-prescribed for gastroprotection. Opioid use was limited, with tramadol being the preferred agent. Vitamins, calcium supplements, and adjuvants such as orthotics and neuropathic pain medications were commonly prescribed.

Conclusion: The study indicates a rational prescribing pattern in orthopedic practice, with preference for safer analgesics, limited use of opioids, and frequent use of gastroprotective agents. Multimodal therapy, including supportive supplements and adjuvants, plays a significant role in the effective management of osteoarthritis and fractures.

Keywords: NIL

Introduction

Bones are complex, living organs composed of multiple tissues including cartilage, fat, connective tissue, blood vessels, nerves, and hematopoietic tissue. The human skeleton consists of 206 bones divided into the axial skeleton (skull, vertebrae, ribs, sternum, and hyoid) and the appendicular skeleton (limbs and pelvis), with the acral skeleton comprising the hands and feet [1]. Bone is a mineralized connective tissue containing four major cell types: osteoblasts,

osteoclasts, osteocytes, and bone lining cells. Osteoblasts are responsible for bone formation through the secretion of osteoid matrix and regulation of mineralization, eventually differentiating into osteocytes or inactive lining cells [2]. Osteoclasts are multinucleated cells derived from monocyte-macrophage lineage that resorb bone through enzymatic and acidic processes, regulated by signaling pathways such as RANK/RANKL/osteoprotegerin

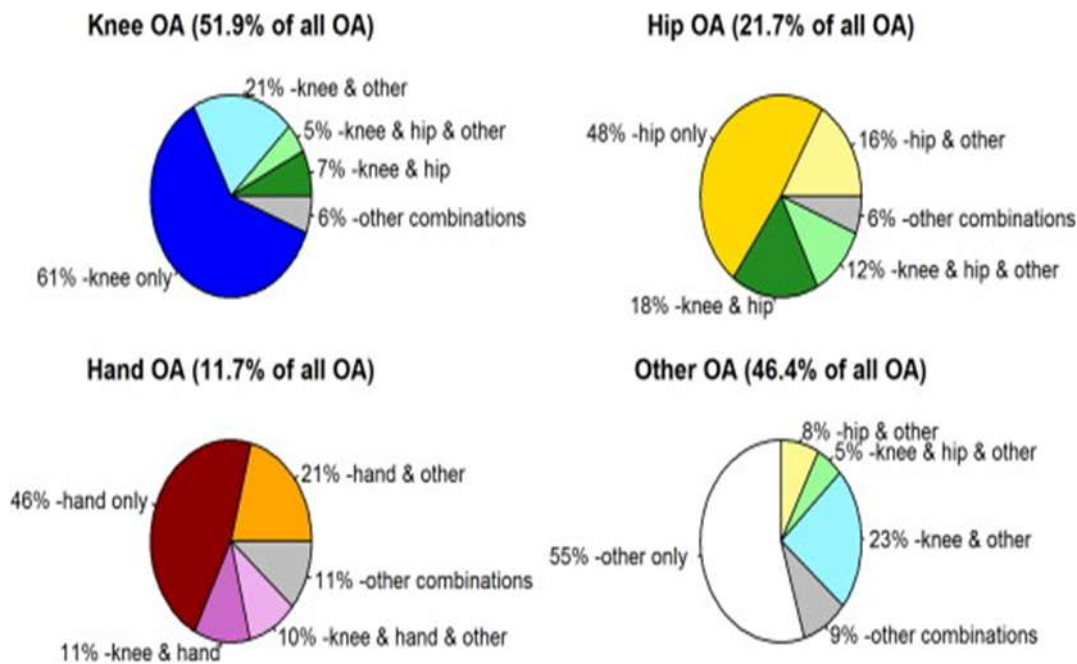
[3]. Osteocytes, the most abundant cells, act as mechanosensors and regulators of bone remodeling, while bone lining cells maintain inactive bone surfaces and facilitate communication between cells. Structurally, bone consists of cortical (compact) bone, which provides strength and protection, and cancellous (spongy) bone, characterized by a trabecular network that reduces weight and distributes mechanical stress. The periosteum, a vascular outer layer, supports growth, repair, and nourishment, while internal structures such as osteons and Haversian systems ensure efficient nutrient delivery. Bone is highly vascularized, receiving blood supply from nutrient, periosteal, metaphyseal, and epiphyseal arteries, which are essential for growth, remodeling, and repair [4].

Bone development begins early in embryogenesis through intramembranous and endochondral

ossification, forming different bone types based on shape and function.[5]. Bone remodeling is a continuous, tightly regulated process involving resorption by osteoclasts and formation by osteoblasts, occurring in four phases: initiation, resorption, formation, and mineralization. This dynamic process ensures maintenance of bone strength and mineral homeostasis. Bones are classified as long, short, or flat, with long bones consisting of diaphysis, metaphysis, and epiphysis, each playing distinct roles in growth and function [6].

Osteoarthritis (OA) is a common degenerative musculoskeletal disorder characterized by progressive cartilage loss, subchondral bone changes, and synovial inflammation. It primarily affects weight-bearing joints such as the knee and hip, with risk factors including age, obesity, gender, joint injury, and genetic predisposition [7].

Figure 1: Epidemiology of osteoarthritis [8]



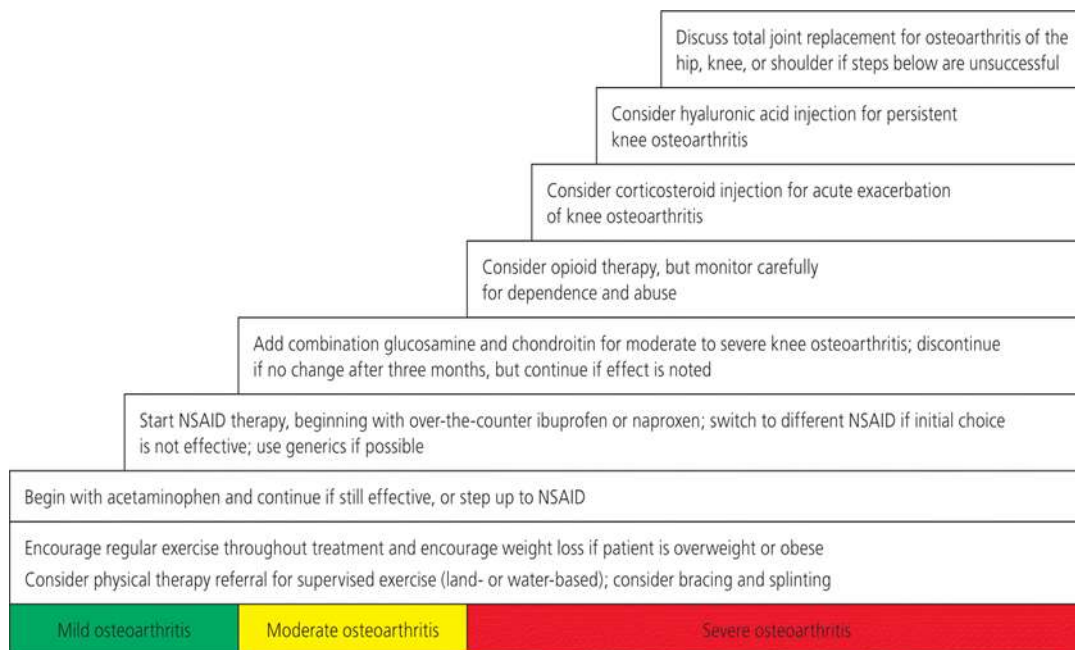
The pathophysiology of OA involves complex interactions between cartilage, subchondral bone, synovium, and adipose tissue. Early stages show increased bone porosity and cartilage degradation, while advanced stages exhibit sclerosis and reduced remodeling [9][10]. Chondrocyte dysfunction plays a central role, with increased apoptosis, altered metabolism, and abnormal differentiation contributing to extracellular matrix breakdown. Inflammatory mediators and adipokines further accelerate disease progression. Clinically, OA presents with joint pain, stiffness, swelling, and reduced mobility, often leading to functional impairment [11]. Diagnosis is based on clinical features and imaging, particularly X-rays showing joint space narrowing, osteophyte formation, and sclerosis, while MRI and ultrasound can detect early soft tissue changes[12].

Figure 2: Radiographic X-ray of the Knee [13] (Jang, S et al.,2021)



Management of OA includes both non-pharmacological and pharmacological approaches. First-line treatment emphasizes patient education, exercise, and weight management to improve joint function and reduce symptoms [14]. Pharmacological therapies include oral and topical NSAIDs, COX-2 inhibitors, intra-articular corticosteroids, and hyaluronic acid injections, which aim to relieve pain and inflammation. In advanced cases, surgical interventions such as total or partial knee replacement and arthroscopy may be required to restore function and quality of life [15][16].

Figure 3: Recommended Stepped Care Approach For The Treatment Of Oa



Materials and methods

Study design: An observational, prospective and cross-sectional study

Study site: Veena medicares Hospital, Kakaji colony, Hanamkonda, Telangana, India.

Study period: 6 months

Subject Eligibility:

Inclusion criteria

1. Patient who are willing to participate in the study
2. Patients undergoing surgery or receiving the treatment for osteoarthritis
3. Prescription containing at least one drug
4. Prescription with brand and generic names
5. Patients of both sexes, aged 18 years and above.
6. Patients with complete medical records including diagnosis, prescription details, and demographic data.
7. Patients treated within a defined study period (6 months).

Exclusion criteria

1. Patients unable to complete follow up assessments
2. Pregnancy or lactating women
3. Patients with incomplete or missing medical or prescription records

Sample size: 80

Source of the study

1. Review of study participants case sheets, prescriptions, lab and diagnostic data
2. Interaction with patients and care takers
3. By conducting patient history interview

Procedure Methodology

An observational, prospective and cross-sectional study was conducted from september 2024 to march 2025 for about duration of 6 months in Warangal region. A total of 80 subjects voluntarily participated, consented to the study protocol, and their legible, complete, and validated prescriptions were selected based on the eligibility criteria. The subjects of above 18 years with valid prescriptions were selected by a simple random sampling technique. The data was collected from prescription containing at least one drug who visited Orthopaedic department after careful consideration of eligibility criteria. Each participant was informed about the objective of a study and the benefits associated with study immediately before sample collection. All relevant and necessary information for the study was collected from the inpatients, outpatient department cards, treatment charts and verbal communication with the patients. Patient related parameters includes age, sex and drug related data such as name of the drug, dosage form, dosing frequency, duration, route of administration and combination therapy. Data was analyzed using descriptive statistics namely total numbers and percentage wherever applicable and expressed in MS-Word and MS-Excel

Results

Osteoarthritis

The patient population in the study included 80 individuals. Of these, 53 were female, making up 66.25% of the total. Male patients accounted for 27 individuals, representing 33.75%. This shows a higher representation of female patients are diagnosed with osteoarthritis.

Table 1: Patient data distribution with respect to their Gender

Patient characteristics	Percentage(%)
GENDER	
Male	33.75
Female	66.25

Table 2: Patient data distribution with respect to their age group.

The age distribution of the 80 patients showed that the majority of the patients with osteoarthritis between 51–60 years, accounting for 35% (28 patients). This was followed by 20 patients (25%) aged 61–70 years. Patients aged 41–50 made up 21.25%, while those in the 30–40 and 71–80 age groups accounted for 10% and 8.75%, respectively.

Age(years)	Percentage (%)
30-40	10
41-50	21.25
51-60	35
61-70	25
71-80	8.75

Table 3: Patient data distribution with respect to their medications prescribed (Antibiotics)

Above table shows that among the 80 patients, the most commonly prescribed antibiotic was Cefuroxime with clavulanic acid, used in 3 cases (3.75%). Cefixime+ofloxacin, ceftriaxone, and each used in 1 patient (1.5%), indicating a varied but limited use of antibiotics across the group.

Antibiotics	Percentage
Cefuroxime+clavulanic acid	3.75
Cefixime+ofloxacin	2.5
Ceftriaxone	2.5
Cefotaxime	1.5
Gentamicin	2.5
Clindamycin	1.5
Vancomycin	1.5

Table 4 : Patient data distribution with respect to their medications prescribed (Analgesics)

Analgesics	Percentage(%)
Paracetamol	36.25
Nefopam hcl + paracetamol	1.25
Tramadol+paracetamol	2.5

In the study population of 80 patients, paracetamol was the most frequently used analgesic, prescribed to 29 patients (36.25%). Tramadol combined with paracetamol was used in 2 cases (2.5%), while nefopam HCl with paracetamol was given to 1 patient (1.25%). This indicates a strong preference for paracetamol either alone or in combination

Table 5 : Patient data distribution with respect to their medications prescribed (Anti inflammatory drugs)

Table 5 shows that among the 80 patients, the most commonly prescribed anti-inflammatory combination was trypsin, chymotrypsin, aceclofenac, and paracetamol, given to 18 patients (22.5%). This was followed by the combination of trypsin, rutoside, bromelain, and diclofenac in 9 patients (11.25%) and diclofenac alone in 8 patients (10%). Other anti-inflammatory agents included trypsin with chymotrypsin and aceclofenac with serratiopeptidase (each 6.25%), naproxen and etodolac (5% each), piroxicam (3.75%), and palmacoxib (2.5%).

Anti inflammatory	Percentage%
Trypsin, chymotrypsin, aceclofenac, paracetamol	22.5
Trypsin, rutoside, bromelain, diclofenac	11.25
Diclofenac	10
Trypsin, chymotrypsin	6.25
Aceclofenac +serratiapetidase	6.25
Naproxen	5
Etodolac	5
Piroxicam	3.75
Palmacoxib	2.5

Table 6 : Patient data distribution with respect to their medications prescribed (Anti emitics)

Out of 80 patients, 14 (17.5%) were administered Domperidone as an antiemetic. Only 1 patient (1.25%) received Ondansetron. Domperidone was the more commonly used antiemetic among the patients in this group

Antiemetics	Percentage%
Domperidone	17.5
Ondonsetron	1.25

Table 7: Patient data distribution with respect to their medications prescribed (Acid blockers)

Table 7 shows that Among the 80 patients, the most commonly prescribed gastroprotective agent, along with NSAIDS are rabeprazole used in 39 patients (48.75%). Esomeprazole was given to 16 patients (20%), while Vonoprazon was used in 3 patients (3.75%). Pantoprazole and Ranitidine were prescribed less frequently, to 1 (1.25%) and 2 (2.5%) patients respectively.

Acid blockers	Percentage(%)
Rabeprazole	48.75
Esomeprazole	20
Pantaprazole	1.25
Ranitidine	2.5
Vonoprazon	3.75

Table 8: Patient data distribution distribution with respect to their medications prescribed (opioids)

Opioids	Percentage%
Tramadol	11.25
Tapentadol	3.55

Table 8 shows that tramadol was prescribed to 9 patients (11.25%), making it the most commonly used opioid in this group. Tapentadol was used in 3 patients (3.55%). Overall, opioid use was limited, with Tramadol being preferred over Tapentadol.

Table 9 : Patient data distribution with respect to their medications prescribed (Vitamins & minerals)

The above table shows that Cholecalciferol was the most frequently prescribed vitamin, given in 24 cases (30%). Calcium supplements were prescribed in 14 cases (17.5%), followed by amino acids and multivitamins in 11 cases (13.75%). Promax was the least commonly prescribed, with 3 prescriptions (3.75%).

Vitamins & minerals	Percentage(%)
Cholecalciferol	30
Calcium supplement	17.5
Amino acids and vitamins	13.75
Promax	3.75

Table 10: Patient data distribution with respect to their medications prescribed (Adjuvants)

Table 12 shows that Among the 80 prescriptions, Orthotics was the most commonly prescribed adjuvant, with 16 prescriptions (20%). Chondroitin sulphate followed closely with 14 prescriptions (17.5%), and Reflex ACE was prescribed in 10 cases (12.5%). Other notable adjuvants included Pregabalin + Nortriptyline in 11 cases (13.75%) and Joint Heal in 6 cases (7.5%), while medications like Alprazolam and Enoxaparin were prescribed less frequently.

Adjuvants	Percentage (%)
Orthotics	20
Chondroitin sulphate	17.5
Reflex ACE	12.5
Pregabalin+nortriptyline	13.75
Joint heal	7.5
Collastar plus	3.75
Boneford CQ	5
Rosiflex XT	5
Mienta plus	5
Melatonin	3.75
Pregabalin + nortriptyline+ methylcobalamin	10
Alprazolam	3.75
Enoxaparin	2.5

Discussion

A prospective observational study analyzed in 80 osteoarthritis cases. Osteoarthritis was more prevalent in females (66.25%) than males (33.75%), consistent with [18]. likely due to post-menopausal estrogen deficiency. Most patients were aged 51–60 years (35%), followed by 61–70 years (25%) and 41–50 years (21.25%). These findings indicate that osteoarthritis increases with age and is most common in middle-aged to elderly individuals [19].

Among 80 osteoarthritis patients, paracetamol was the most commonly prescribed analgesic (36.25%). Combination therapies (nefopam + paracetamol 1.25%, tramadol + paracetamol 2.5%) were used less frequently for severe pain. These findings align with [20] and ACR/OARSI 2019 guidelines recommending paracetamol for mild to moderate pain.

In this study of 80 patients, combination therapies of proteolytic enzymes and NSAIDs were commonly used for anti-inflammatory management. The most frequent combination was trypsin, chymotrypsin, aceclofenac, and paracetamol (22.5%), reflecting multimodal therapy for pain and inflammation. Other enzyme-based combinations, like trypsin-chymotrypsin and trypsin-rutoside-bromelain with diclofenac (11.25%), aimed to enhance efficacy and reduce side effects. Diclofenac monotherapy was prescribed in 10% of cases, with additional regimens including trypsin-chymotrypsin (6.25%), aceclofenac-serratiopeptidase (6.25%), naproxen (5%), and etodolac (5%). Piroxicam (3.75%) and palmacoxib (2.5%) were least used. [21].

In 80 osteoarthritis patients, most receiving NSAIDs or combination analgesics were given gastrointestinal protection. PPIs were the main therapy, with

rabeprazole (48.75%) and esomeprazole (20%) most commonly used. Pantoprazole (1.25%) and ranitidine (2.5%) were used less often, while vonoprazan (3.75%) showed limited early adoption. Overall, ~75% received acid-suppressive therapy, consistent with [22] and evidence favoring PPIs over H2 blockers for ulcer prevention.

In this study of 80 patients, opioid use was limited, with tramadol (11.25%) and tapentadol (3.75%) prescribed, reflecting cautious use due to dependence and side effects. Tramadol was more common, likely due to accessibility, cost, and prescriber familiarity. In contrast, [23] reported oxycodone as the most commonly used opioid in osteoarthritis management.

In 80 prescriptions, diverse adjuvant therapies reflected a multimodal, individualized approach. Orthotics (20%) were most common, followed by chondroitin sulphate (17.5%) for joint support. Neuropathic pain was managed with pregabalin + nortriptyline (13.75%) and with methylcobalamin (10%). Other agents like Reflex ACE (12.5%) and Joint Heal (7.5%) were also frequently used [24]

Conclusion

This study analyzed drug prescribing patterns in 250 orthopedic patients, including 80 with osteoarthritis and 170 with fractures. Osteoarthritis was more prevalent in females, especially postmenopausal, highlighting the hormonal role in disease progression. The majority of OA patients were aged between 51–70 years. Paracetamol was the most prescribed analgesic, followed by NSAIDs often combined with proteolytic enzymes. Gastroprotection, mainly with PPIs like rabeprazole, was widely implemented. Opioid use was minimal, reflecting cautious prescribing due to dependency concerns.

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