

## A study of drug utilization pattern in the management of osteoarthritis in the orthopaedic department of a tertiary care hospital

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### Abstract

**Introduction:** Osteoarthritis (OA) is a major cause of chronic pain and lower extremity disability among the elderly due to its predilection for lower extremity joints such as the knee and hip. The treatment of pain and inflammation is an important area of therapeutics. Over the past two decades, non steroidal anti-inflammatory drugs (NSAIDs) have played a central role in these indications. NSAIDs constitute the largest single group of drugs used worldwide, constituting more than 20% of all drug prescriptions. In India over 400 formulations of NSAIDs are marketed, resulting in wide spread exposure of patients to this class of drugs and its adverse effects. For all these reasons, studies that evaluate the pattern, extent and frequency of NSAID prescriptions are valuable. Periodic evaluation of drug utilization studies provides the information for suitable modifications in the prescription of drugs in order to increase the therapeutic benefit and decrease the adverse effect associated with drug

**Materials and Methods:** A prospective, observational study was conducted on newly diagnosed as well as old treated patients with osteoarthritis from orthopaedic outpatient department in a tertiary care teaching hospital. A total of 428 were enrolled after screened for the inclusion and exclusion criteria. Data was recorded in a specially designed proforma which include information regarding the demographic profile of the patients and about the pattern of drugs prescribed.

**Results:** Four hundred and twenty-eight patients with the diagnosis of Osteoarthritis visited the orthopedic outpatient department during the period of six months in which the data was collected. Prescriptions of all 428 patients were analyzed

Osteoarthritis was found to be more common in males (56.07%) compared to that of females (43.92%). Results also revealed that, OA was more prevalent in middle age group of 51-65 years (45.32%), with knee joint (66.58%) being most commonly effected, majority of patient were treated with Combination therapy (80.80%) over Monotherapy (19.19%).

Most of patients were treated as first line with NSAIDS (79.75%) and Paracetamol (20.10%), was under prescribed. Aceclofenac (32.85%) was the most common NSAID used followed by Diclofenac sodium (25.49%).

Gastroprotective agents were used in 12.28% along with Non-selective NSAIDS to prevent gastrointestinal adverse effects, out of which Ranitidine (53.47%) was most preferred, followed by Pantoprazole (16.66%). Various other drugs were also used as adjunct therapies that includes, Calcium and Vitamin D3, symptomatic slow acting drugs for OA (SYSADOA) which included diacerin and glucosamine sulfate as combination in (10.15%) of patients.

**Conclusions:** Our study showed Osteoarthritis most common among males affecting knee joint in middle age group, Paracetamol and SYSADOA being under prescribed and NSAIDS are the most frequently used drugs in OA. National drug policy is needed to rationalize the drug use and bring awareness among the prescribing doctors

**Keywords:** Osteoarthritis, NSAIDS, Paracetamol, Diclofenac sodium, Prescription pattern analysis, Tertiary care hospital.

### Introduction

This prospective study was carried out to analyze the prescribing pattern of drugs in the treatment of OA and to provide constructive feedback to prescribing clinicians. Periodic evaluation of drug utilization studies provides the information for suitable modifications in the prescription of drugs in order to increase the therapeutic benefit and decrease the adverse effect associated with drug. Main aim of drug utilization studies is to facilitate the rational use of drugs in populations.

The treatment of pain and inflammation is an important area of therapeutics. Over the past two decades, non steroidal anti-inflammatory drugs (NSAIDs) have played a central role in these indications. NSAIDs constitute the largest single group of drugs used worldwide, constituting more than 20% of all drug prescriptions.<sup>1</sup> In India over 400 formulations of NSAIDs are marketed, resulting in wide spread exposure of patients to this class of drugs and its adverse effects<sup>2</sup> For all these reasons, studies that evaluate

the pattern, extent and frequency of NSAID prescriptions are valuable.<sup>3</sup>

Osteoarthritis (OA) is more common in both developed and developing countries as a major cause of chronic pain and lower extremity disability among the elderly which effects lower extremity joints such as the knee and hip.<sup>5,6</sup>

Osteoarthritis is a progressive degenerative disorder of multi-factorial etiology characterized by destruction of articular cartilage, subchondral sclerosis associated with synovial changes.<sup>4</sup>

The symptoms of osteoarthritis are mainly due to cartilage destruction and presents with swelling and pain in the joints even at rest. The cartilage destruction is evident on X-ray as joint space narrowing manifesting as severe pain with limitations of movement and stiffness of affected joints.

Age is the strongest predictor for the development of Osteoarthritis; obesity, trauma and physically demanding occupations and activities also increase the risk for OA.<sup>7</sup> The management of Osteoarthritis is largely palliative

focusing on symptomatic relief most commonly targeting pain. Therefore, pain relief is a key role in the treatment of Osteoarthritis.<sup>8</sup>

The main objectives in the management of Osteoarthritis is to reduce pain and associated symptoms and even stop the progression of structural changes.<sup>9</sup>

Management of OA starts with the simple approaches like weight loss (in obesity), exercise, lifestyle modifications, use of simple analgesics and topical agents.<sup>10</sup>

Therapeutic measures consist of nonpharmacological (e.g. patient education and physical therapy), pharmacological (e.g. the use of analgesics, nonsteroidal anti-inflammatory drugs (NSAIDs), and symptomatic slow-acting drugs in osteoarthritis (SYSADOA) and ultimately surgical treatments (orthopaedic surgery including joint replacement).<sup>11</sup>

Among the pharmacological treatments, NSAIDs are the most widely prescribed drugs for OA, despite the fact that they provide only symptomatic relief and don't prevent progression of the disease.<sup>12</sup>

Long-term use of NSAIDs leads to gastrointestinal bleeding and ulceration, vascular adverse events and other complications.<sup>13</sup> NSAIDs have also been applied topically to reduce gastrointestinal adverse reactions by minimizing systemic toxicity.<sup>14</sup>

Due to the serious adverse effects seen with long-term use of NSAIDs, paracetamol due to its better gastrointestinal safety profile is recommended as the initial drug of choice for symptomatic relief in OA.<sup>15,16</sup>

NSAIDs should be considered only in patients unresponsive to paracetamol.<sup>17</sup> Also the COX-II inhibitors after their introduction became an alternative to traditional NSAIDs in patients exhibiting risk for upper gastrointestinal bleeding and peptic ulcer.<sup>18</sup>

There is a need for safe and effective alternative treatments which would provide both symptomatic improvement and disease modifying effects in OA.

Second-line drugs like symptomatic slow acting drugs for OA (SYSADOA) which includes glucosamine sulfate, glucosamine hydrochloride, chondroitin sulfate, hyaluronic acid and diacerein are frequently used as many clinical trials have proven their safety and efficacy for symptom relief and possible structure-modifying effects.<sup>19,20</sup>

These drugs improve patient symptoms and also reduce cartilage degradation and have decreased occurrence of gastrointestinal adverse events when compared to NSAIDs.<sup>21</sup>

There are a very few studies which describe drug

utilization in osteoarthritis despite the considerable high socio-economic impact of OA in our country.

## Materials and Methods

### Study Procedure

After obtaining Institutional Human Ethics Committee Approval, Study was conducted in the orthopaedic Department of Raichur Institute of Medical Sciences Raichur.

Patients diagnosed with osteoarthritis with or without co-morbidities were enrolled in the study considering the inclusion and exclusion criteria. Informed consent was taken from patient at the time of enrolment in to the study.

### Study Design

It was a prospective observational study.

### Study Period

The study was conducted for a period of 6 months

### Sample Size

428 prescription duplicates of osteoarthritis patients were used for analysis of data.

### Inclusion Criteria

1. Age above 18 years of age.
2. Both males & females.
3. Patients treated for osteoarthritis that is managed conservatively.
4. Patients who are willing to participate in the study

### Exclusion Criteria

1. Patients below 18 years of age.
2. Patients who are not willing to participate in the study.
3. Patients with past H/O gastrointestinal diseases.
4. Patients with past H/O renal disease, cardiovascular and liver diseases

### Data Collection

The data was collected using structured data entry form and was evaluated for parameters such as patient's demographics, types of NSAIDs prescribed, route of administration, and average number of NSAIDs per prescription, monotherapy and combination therapy, concurrent drugs prescribed and ADRs associated with prescribed NSAIDs.

## Results

### Demographic Profile

**Table 1:** Details of gender distribution in osteoarthritis

Gender distribution	No of patient	Percentage
Male	240	56.07%
Female	188	43.92%
Total	428	100

### Gender

OA was more common in male patients, Out of 428 patients, (56.07%) patients were males and (43.92%) patients were females as shown in Table 1.

**Table 2:** Details of age distribution of osteoarthritis patient

Age distribution (yrs)	No. of patient	Percentage
20-35	44	10.28%
36-50	161	37.61%
51-65	194	45.32%
66-80	29	6.77%
Total	428	100

### Age

In this study the results revealed that, OA was more prevalent in the age group of 51-65 years (45.32%) as shown in Table 2.

**Table 3:** Joints Involved

Joints involved	No. of patient	Percentage
KNEE	285	66.58%
HIP	93	21.72%
SPINE	50	11.68%

### Distribution of Osteoarthritis patients

As Shown in Table- 3, maximum number of patients had Osteoarthritis (OA) of knee 285 (66.85%) followed by OA Hip 93(21.72%) followed by OA of spine 50(11.68%).

**Table 4:** Details of class of drug prescribed in osteo arthritis

Class of drug prescribed	No. of drugs prescribed (n= 1172)	Percentage
Nsaids	521	44.45%
Analgesics	301	25.68%
Corticosteroids	87	07.42%
Antacids	144	12.28%
Adjuvants	119	10.15%
Total	1172	100

### Details of class of drugs Prescribed

The results revealed that NSAIDs were the choice of drugs prescribed in 521(44.45%) prescriptions followed by Simple analgesic in 301(25.68%), corticosteroids 87(07.42%), antacids 144(12.28%) and adjuvants 119(10.15%) as shown in Table 4.

**Table 5:** Approach to treatment in osteoarthritis

Approach to treatment	Total no of drugs	Percentage
Monotherapy	947	80.80%
Combination therapy	225	19.19%
Total	1172	100

### Type of Therapy

The above table shows that the combination therapy (80.80%) was preferred on mono therapy (19.19%). Since OA is a chronic inflammatory condition, usually the patients respond well with combination therapy.

**Table 6:** Details of class of nsaid prescribed in osteoarthritis

Nsaids	Drug	No prescription (n=557)	Percentage
Cox inhibitors	Diclofenac sodium	142	25.49%
	Aceclofenac	183	32.85%
	Indomethacin	62	11.01%
Propionic acid derviatives	Ibuprofen	22	03.94%
Enolic acid derviatives	Piroxicam	36	06.46%
Acetaminophen	Paracetamol	112	20.10%

### Details of Class of Nsaids Prescribed in Osteoarthritis

Among the class of NSAIDS Aceclofenac (32.85%) was most commonly used followed by diclofenac (25.49%), paracetamol (20.10%), indomethacin (11.01%), piroxicam (06.46%), and ibuprofen (03.94%)

**Table 7:** Details of gastro protective agents used

Antacids	No	Percentage
Pantoprazole	24	16.66%
Omeprazole	23	15.97%
Rabiprazole	20	13.88%
Ranitidine	77	53.47%
Total	144	100

### Details of Gastro Protective Agents Used

Among the gastroprotective agent used Ranitidine 77(53.47%) was the drug most commonly used with pantoprazole 24(16.66%), omeprazole 23(15.97%) and rabiprazole 20(13.88%).

### Discussion

In our study, demographic profile showed the osteoarthritis was more common in males (56.07%) than females (43.92%).

Hence, our study revealed that the gender distribution in OA was found to be more in of Males which was in accordance with the study conducted by Mohamed Ahmed *et al.*<sup>8</sup>

In this study, results revealed that, OA was more prevalent in middle age group of 51-65 years (45.32%), which was found to be in accordance with the study conducted by Mohamed Ahmed *et al* and Purushottam Jhanwar.<sup>8, 23</sup>

Among various sites involved in osteoarthritis, knee joint (66.58%) was most commonly affected site in our study which is in accordance with other such studies including Purushottam Jhanwar *et al* and Ullal *et al.*<sup>22,23</sup> This is probably due to excessive use of squatting and cross-leg sitting positions in Indian customs.

In our study it was found that maximum no of patient were treated with combination therapy (80.80%) over monotherapy (19.19%). Since OA is a chronic inflammatory condition, usually the patients respond well with combination therapy. which was found to be in accordance with the study conducted by Mohammed Ahmed *et al.*<sup>8</sup>

However, in our study NSAIDS were prescribed in (79.75%) of patients as first line and paracetamol was under prescribed, with only (20.10)%, which is similar to Ullal *et al*, Purushottam Jhanwar *et al* studies.<sup>22,23</sup> This is because the analgesic efficacy of paracetamol is lower than other NSAIDS in osteoarthritis, as shown by Richard *et al* and also that the symptom-modifying efficacy of paracetamol in OA is suspect, as found in some studies.<sup>25</sup>

In spite of the adverse effects of NSAIDS and their limited disease modifying efficacy, these drugs have been found to be the most preferred. Aceclofenac was the most common NSAID used (32.85%) followed by Diclofenac sodium (25.49%).

Gastroprotective agents were used in 12.28% along with Non-selective NSAIDS to prevent gastrointestinal adverse effects, out of which Ranitidine 53.47% was most

preferred, followed by pantoprazole 24(16.66%), one which was in accordance with the study conducted by Taruna Sharma *et al.*<sup>26</sup> which is in contrast with the study done by Ullal *et al.*<sup>22</sup>

In our study only 10.15% patients received adjuvant treatment with diacerein, glucosamine sulphate, despite these drugs having symptom modifying effects in OA.

The EULAR and OARSI recommendations have favored the use SYSADOA-glucosamine sulphate, diacerein especially in early OA.<sup>15,16</sup>

Olivier Bruyere *et al* study.<sup>24</sup> shows that, chondroitin sulfate, diacerein, glucosamine sulfate (SYSADOA), use has caused reduction in pain, improvement of physical activity with less adverse effects. Their under-prescription is due to low clinical effectiveness and cost effectiveness of these drugs, as they are very costly compared to NSAIDS.

European evidence-based recommendations for the management of knee, hip and hand OA devised by the European League against Rheumatism (EULAR) state that paracetamol "because of its efficacy and safety" paracetamol is the first drug of choice for analgesic effect and, preferred for long term oral analgesic" NSAIDS are to be started only if, the patient is unresponsive to paracetamol.

### Conclusions

Our study showed that osteoarthritis affects males more than females in the age group of 50-65yrs and the knee joint is the most commonly affected joint.

NSAIDS especially Aceclofenac and Diclofenac are the most preferred drugs.

NSAIDS were prescribed with gastroprotective agents of which Ranitidine and Pantoprazole was most preferred.

Paracetamol and SYSADOA were under prescribed.

Combination therapy was preferred over monotherapy

The principal aim of drug utilization research is to facilitate the rational use of drugs in populations. Drug prescribing studies aim to provide feedback to the prescriber and to create awareness among them about rational use of medicines.

In a developing country like India, a National Drug Policy is needed to rationalize the drug use. To achieve this, it is very important to determine drug use pattern and monitor drug use profile over the time and bring for awareness among the Prescribing doctors.

**Conflict of Interest:** None.

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