ORIGINAL ARTICLE

ScienZTech

INTERNATIONAL JOURNAL OF DRUG DELIVERY AND NANOTECHNOLOGY

Published by ScienzTech Publication Journal Home Page: www.scienztech.org/ijddn

A Study on Prescription Pattern of Nonsteroidal Anti-Inflammatory Drugs (NSAIDS) in Osteoarthritis Patients at Tertiary Care Teaching Hospital

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Article History:

Received on: 10 Sep 2022
Revised on: 30 Nov 2022
Accepted on: 07 Dec 2022

Keywords:

NSAIDS,
WHO Prescribing Indicators,
Osteoarthritis,
NLEM,
Diclofenac

ABSTRACT

Osteoarthritis is a progressive musculoskeletal disorder characterized by the gradual loss of cartilage in joints which results in bones rubbing together and creating stiffness and pain. The present study aimed at the evaluation of prescription patterns of NSAIDS in Osteoarthritis patients using WHO prescribing indicators. It is an Observational Study which is carried out using 100 patients for 12 months period in the Orthopedic Department of The Oxford Medical College and Research Centre. Patients who are above 18 years of age male and female who visited and were admitted to the Orthopedics department was included. In this study total number of drugs from 100 prescriptions was 392. The percentage of encounters with NSAIDS is found to be 36.4 %. The percentage of drugs prescribed by Generic name is 3.83 % and the Percentage of drugs from NLEM is 20.66% Diclofenac is more prescribed by NLEM. Preferential COX-2 Inhibitors were more preferred over Nonselective COX inhibitors. The study revealed that polypharmacy and prescription writing using brand names were common. Prescription writing in the generic name needs to be promoted and the study suggests that there is immense scope of improvement in prescribing and dispensing to achieve standards of rational prescribing.

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eISSN: 2455-2747

DOI: https://doi.org/10.26452/

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INTRODUCTION

The term ”arthritis” is a broad one used to describe joint inflammation. The prevalence of this joint illness ranges from 22% to 39% in India, making it the second most prevalent rheumatologic condition. Osteoarthritis is described as a Degenerative joint condition (also known as osteoarthrosis). It is characterised by a gradual decline and loss of articular cartilage, which leads to the development of osteophytes, discomfort, mobility restriction, deformity, and eventual impairment. The main symptom is a localised, intense, throbbing pain that is connected to the injured joint. As people age, OA becomes more common and more severe. Age, gender, hormone status, genetics, obesity, occupational or recreational activity, and local environmental factors are some potential risk factors (e.g., injury, overloading of joints, muscle weakness, or joint deformity). Pain management is a primary goal of drug therapy for OA. Because OA frequently affects older people who also have other health issues. Acetaminophen, NSAIDS like aspirin and diclofenac, as well as dietary supplements glucosamine and chondroitin have all been shown to stimulate the synthesis of proteoglycan from articular cartilage in vitro. These medications are typically prescribed to reduce symptoms. Monitoring of prescriptions

can analyse the current trend of prescription patterns, identify the issues, and give feedback to prescribers in order to raise awareness about inappropriate drug usage.

MATERIAL AND METHODS

Study design, study setting, and source of data

In December 2020 we conducted an Observational Study in Orthopedic departments (inpatient and outpatient) of The Oxford Medical College, Hospital and Research Centre to evaluate prescription patterns of NSAIDS in Osteoarthritis patients using WHO prescribing indicators.

Sampling Size and Technique

The study was carried out for 12 months among inpatients and outpatients treated for Osteoarthritis through a collection of data from the patient's medical records.

The sample size of 100 was calculated using the following sample size equations

$$X = Z\,2Pq/D2\;n = NX/\,X + (N-1)$$

Patients who are above 18 years of both genders were recruited into the study.

Methods of Data Analysis

Data Collection

Step 1: Designing the study protocol for obtaining Ethical approval from the Institutional Ethics Committee of The Oxford Medical College and Research Centre, Bangalore

Step 2: Collection of demographics of the patient (Name, Age, Sex, etc.) and the details regarding family history, past medical history, pregnancy details, diagnosis, prescribed drugs, etc through a data entry form.

Step 3: Assessment of Prescription pattern of Nonsteroidal Anti-Inflammatory Drugs (NSAIDS) in Osteoarthritis patients using WHO prescribing indicators which include,

1. Average number of drugs per prescription.
2. Percentage of prescription with an NSAID prescribed.
3. Percentage of Nonsteroidal Anti-Inflammatory Drugs (NSAIDS) prescribed by Generic name.
4. Percentage of Nonsteroidal Anti-Inflammatory Drugs (NSAIDS) prescribed from National 5) List of Essential Medicine (NLEM).

Step 4: To provide the feedback results to clinicians and other relevant groups.

RESULTS

A total of 100 patients were enrolled in this study in accordance to the inclusion criteria from the Orthopedics department of the Oxford Medical College Hospital and Research Centre, Bengaluru.

DEMOGRAPHIC DETAILS OF STUDY POPULATION

Distribution of patients based on their Gender

100 patients diagnosed with osteoarthritis were included in the study. Treatment charts of all the patients were analyzed, out of which n=61 (61%) were females, and n=39 (39%) were males. Table 1 displays the gender distribution of the patients. Figure 1

Table 1: Gender-wise distribution of patients

Gender	Number of Patient	Percentage (%)
Female	61	61%
Male	39	39%
Total	100	100.0

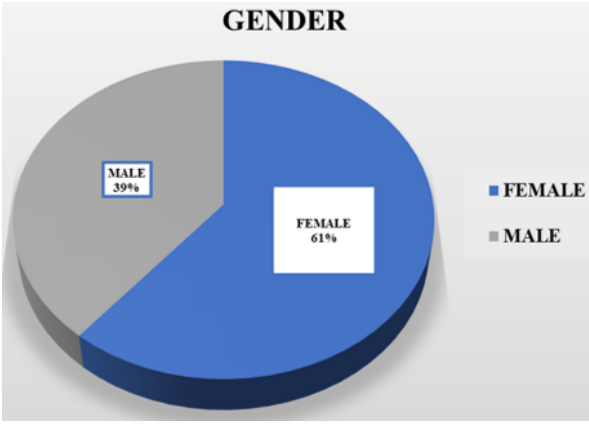

Figure 1: Gender-wise distribution of patients

Distribution of the patients based on their age

The present study results revealed that OA was more prevalent in the age group of 46-60 years, n=37 (37%) and followed by 31-45 years where n =29. The specifics are displayed in Table 2, Figure 2.

Distributions of patients based on occupational status

Out of the total subjects, 34% are House Wife and the occupations of the remaining subjects are Agriculture (26%), Labour (16), Tailor (13%), Driver (11%) etc., respectively. The specifics are displayed in Table 3, Figure 3.

Table 2: Age-wise distribution of the patients

Age Group (Years)	Number of Patients	Percentage (%)
18-30	5	5%
31-45	29	29%
46-60	37	37%
61-75	23	23%
76-90	6	6%
Total	100	100.0

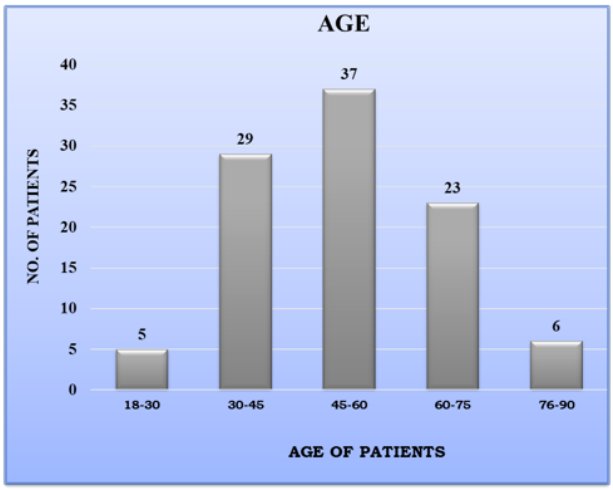

Figure 2: Age-wise distribution of the patients

Table 3: Distributions of patients based on occupational status

Occupation	Number of Patients	Percentage (%)
Agriculture	26	26%
Driver	11	11%
Housewife	34	34%
Labour	16	16%
Tailor	13	13%
Total	100	100.0

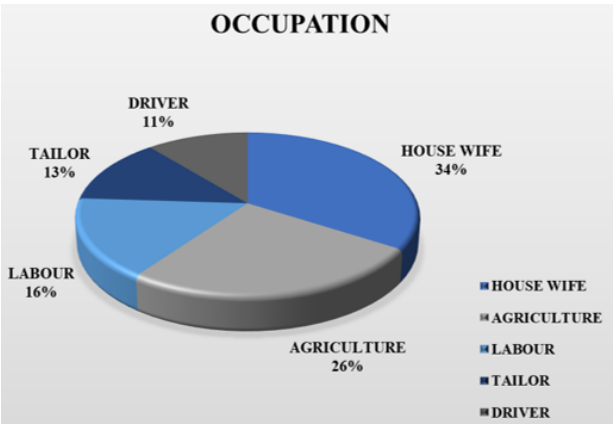

Figure 3: Distributions of patients based on occupational status

Distribution of the patients based on their Past Histories

This study reveals that the past histories of the subjects are more with hypertension compared to the other past histories like DM, menopause, CKD, Asthma. The specifics are displayed in Table 4, Figure 4.

Table 4: Distributions of patients based on their Past Histories

Past Histories	Number of Patients	Percentage (%)
Hypertension	42	42%
Diabetes Mellitus	25	25%
Menopause	15	15%
CKD	8	8%
Asthma	5	5%
NIL	5	5%
Total	100	100.0

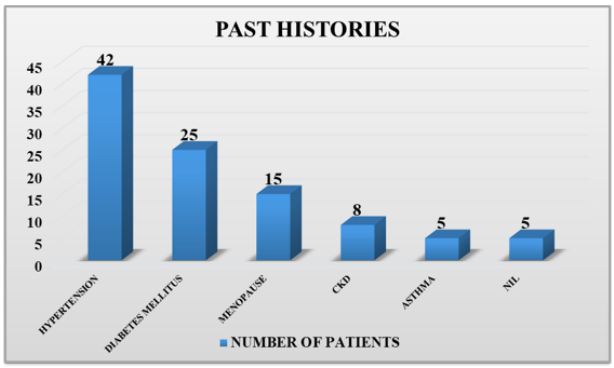

Figure 4: Distributions of patients based on their Past Histories

Analysis of WHO core Prescribing Indicators

A total of 392 drug products were prescribed.

1. Average number of drugs per encounter (C): First total number of prescriptions collected were taken (A=100). Then a total number of drugs prescribed were added during these encounters (B=392). The result was expressed by dividing the total number of drugs by the number of encounters.

Formula: Average number of drugs prescribed: [C = B/A] = 392/100 = 3.92.

2. Percentage of drugs prescribed by generic name (E): The result was calculated by dividing the total number of generic drugs prescribed (D=15) by the total number of drugs prescribed (B=392), and multiplied by 100 to make a percentage (E).

Formula: % of drugs prescribed as generic: [E = (D/B) × 100%] = 15/392×100= 3.83 %.

3. Percentage of encounters with NSAIDs prescribed (G): It was calculated by dividing the total number of patients who received one or more NSAIDs (F=143) by the total number of encounters (A=100) and multiplying by 100 to make a percentage.

Formula: % of NSAIDs prescribed: [G = (F/A) × 100%] = 143/100 ×100 = 143%.

4. Percentage of drugs prescribed from National List of Essential Medicines or formulary (I): The result was calculated by dividing the total number of National List of Essential Medicines prescribed (H=81) by the total number of drugs prescribed (B=392) and multiplied by 100 to make a percentage (I).

Formula: % of drugs prescribed from National List of Essential Medicines: [I = (H/B) × 100%] = 81/392×100 = 20.66%.

Distribution of NSAID

Table 7 and Figure 5 depicts that 45 (31.5%) patient was on NSAIDs with combinations and 98 (68.5%) patient was on NSAIDs without combination. Tables 5 and 6

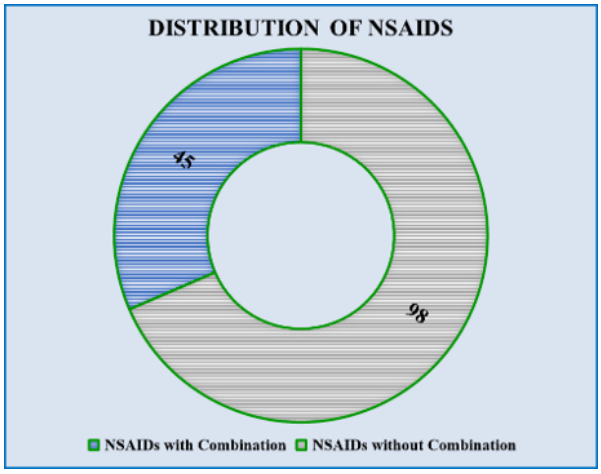

Figure 5: Distributions of NSAID (n=143)

NSAIDS Prescribed

Table 8 and Figure 6 depicts that 22 (15.4%) Patients were prescribed Paracetamol, 48 (33.6%) were on Diclofenac, 46 (32.2%) were on Aceclofenac, 7 (4.9%) were on Ibuprofen, 6 (4.2%) were on Piroxicam, 10 (6.9 %) were on Etodolac, 4 (2.8%) were on Nefopam.

Class of NSAIDs

Of 143 NSAIDs prescribed, 13 (9.1%) were Non-Selective COX Inhibitors, 2 (1.4%) were Selective COX-2 inhibitors, 102 (71.3%) were Preferential COX-2 Inhibitors, 26(18.9%) were Analgesics-Antipyretic with low Anti-inflammatory Action (Table 9; Figure 7)

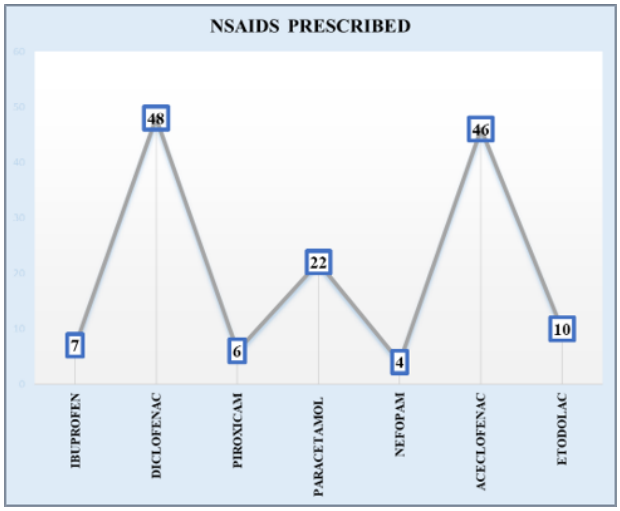

Figure 6: NSAIDs Prescribed (n=143)

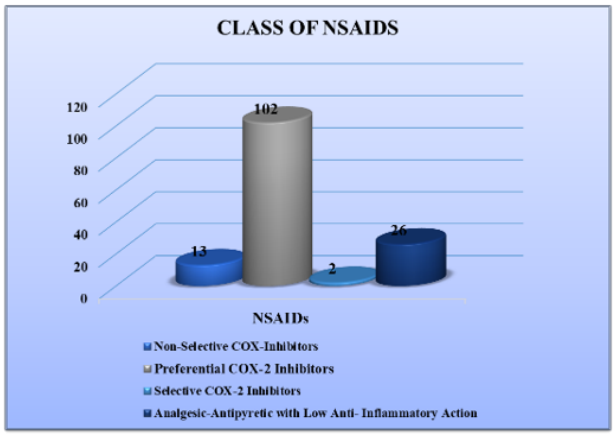

Figure 7: Class of NSAIDs (n=143)

Drugs from NLEM

Table 10 and Figure 8 depicts the list of drugs from NLEM, among which 48 (33.6%) were Diclofenac, 7 (4.9%) were Ibuprofen, 4 (2.8%) were Fentanyl and 22 (15.3%) were Paracetamol.

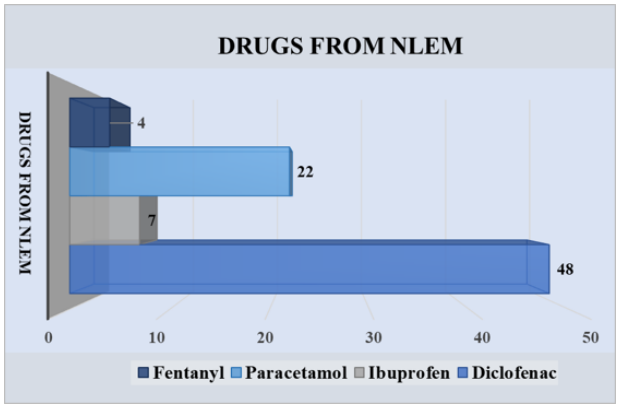

Figure 8: Drugs from NLEM (n=143)

Table 5: The prescribing indicators that were measured include

Prescribing indicators assessed	Total drugs / encounters	Average / percent
The average number of drugs per encounter	392	3.92%
Percentage of encounters with NSAIDs	143	143%
Percentage of drugs prescribed by generic name	15	3.83%
Percentage of drugs from the essential drug list	81	20.66%

Table 6: Pattern of NSAIDs used in Orthopedics OPD

Total number of prescriptions	N=100
Total number of drugs used	392
Total No. of NSAIDs Prescribed	143
Average No. of NSAIDs per Prescriptions	1.43

Table 7: Distributions of NSAID (n=143)

NSAIDs (n=143) (%)	Number of Drugs	Percentage (%)
NSAIDs with Combinations	45	31.5%
NSAIDs without Combinations	98	68.5%

Table 8: NSAIDs Prescribed (n=143)

NSAIDs	Number of Drugs	Percentage (%)
DICLOFENAC	48	33.6%
ACECLOFENAC	46	32.2 %
IBUPROFEN	7	4.9 %
PARACETAMOL	22	15.4 %
ETODOLAC	10	6.9%
PIROXICAM	6	4.2 %
NEFOPAM	4	2.8 %

Table 9: Class of NSAIDs (n=143)

Class	Class (N=143)	Percentage (%)
Non-Selective COX-Inhibitors	13	9.1%
Preferential COX-2 Inhibitors	102	71.3%
Selective COX-2 Inhibitors	2	1.4%
Analgesic-Antipyretic with Low Anti-Inflammatory Action	26	18.9%

Table 10: Drugs from NLEM (n=143)

Medication	No. of Drugs (N=143)	Percentage (%)
PARACETAMOL	22	15.3%
DICLOFENAC	48	33.6 %
IBUPROFEN	7	4.9%
FENTANYL	4	2.8%

DISCUSSION

The study was conducted to analyze the Prescription Pattern of Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) in osteoarthritis patients. Total of 100 patients were enrolled in this study. [1–3]

Considering the gender-wise distribution female predominance was found, [4] Females 61% were mostly affected compared to the Males 39% which is similar to the study conducted by Poornima B *et al.* [5] which shows more Females were affected than Males. The maximum number of patients enrolled both male and female belongs to the age group of 46-60 years 37(37%) and 31-45 years 29 (27.69%) respectively, which is similar to the study conducted by Lokesh V et *al.* [6] that showed the majority number of patients was in 46-60 years 37(37%) patients followed by 31-45 years group patients. The mean age of the study participants in this study was found to be 52.45 years. The past history of the subjects was analyzed and it showed that more patients with OA are affected with hypertension (42%) and 25% were affected with DM compared to the other past histories like menopause (15%) & CKD (8%). And 5% of patients had no other past histories other than OA. This was similar to the study reports of Chintala Srilekha et al. [7] which shows that OA patients was affected more by HTN & DM. In this study, we found that the date of prescription and patient's details name, age, sex, and address were complete in all the prescriptions. In this study total number of drugs from 100 prescriptions was 392 and average number of prescribed drugs was 3.92 and the average number of NSAIDs prescribed per prescription was found to be 1.43 which is similar to the study done by Ingle et al. [8] which shows 3.5 as average number of drugs per prescription. This study shows the percentage of drugs prescribed by generic names is 3.83%. A study conducted by Mohammed A Alshakka et al. [9] shows 18.5% of drugs were prescribed by generic name. Another study conducted by Chinju Anil et al. [10] showed 21.0% of drugs were prescribed in generic name indicating that our study has a lesser number of generic drugs. The percentage of drugs prescribed from the essential drugs list or formulary from the WHO organization model list of essential medicines was 20.66%, whereas in Chennai, conducted by Ingle et al. [8] shows 51.05% and a study conducted by Chinju Anil et al. [10] and Mohammed A Alshakka et al. [9] shows 59.94% and 73.3% of drugs were prescribed from EDL respectively. Out of 100 prescriptions in the orthopedic department, 98 (68.5%) were NSAIDs without combination and 45 (31.5%) were NSAIDs with combinations. Among the use NSAIDs as monotherapy 48 (33.6%) was Diclofenac and 46 (32.2%) was Aceclofenac, 22 (15.4%) was Paracetamol, 7 (4.9%) was Ibuprofen, 6 (4.2%) was Piroxicam, 10 (6.9 %) was Etodolac, 4 (2.8%) was Nefopam. The study conducted by Haseeb Mohammed AR et al. [11] shows a report with the present result that Diclofenac was the most commonly prescribed NSAIDs followed by Aceclofenac. In this study, it is evident that the most preferred class of NSAIDS was Preferential COX-2 Inhibitors 102 (71.3%) followed by Analgesics-Antipyretic with low Anti-inflammatory Action 26(18.9%), Non-Selective COX Inhibitors 13 (9.1%) and Selective COX-2 inhibitors 2 (1.4%).

CONCLUSION

In this study total number of drugs from 100 prescriptions was 392. Percentage of encounters with NSAIDs is found to be 143 %. Percentage of drugs prescribed by Generic name is 3.83 % and the Percentage of drugs from the National list of Essential medicine is found to be 20.66 %. Among the NSAIDS Diclofenac and Aceclofenac was most commonly prescribed. NSAID Monotherapy is more prescribed over NSAIDS with combinations. Preferential COX-2 Inhibitors were more preferred Non-selective COX. Diclofenac is more prescribed from NLEM and our study highlighted the need to maximize the prescribing patterns according to NLEM and to accelerate prescribing patterns by means of generic use where clinical pharmacists could play important role in the selection of drugs and to do an educational intervention on the promotion of rational prescribing drugs like NSAIDS.

ACKNOWLEDGEMENT

We would wish to express our sincere gratitude to the Lord Almighty for his blessings and also the Principal, Guide and Staff, The Oxford College of Pharmacy, Dr.K.G Prakash HOD and Doctors of the Department of Surgery and the Hospital Authorities of The Oxford Medical College and Research Centre, Bangalore for providing the facility to complete our research and for the constant support and cooperation.

Funding Support

The authors declare that they have no funding support for this study.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Cite this article: Lalhmangaihzuali F., Litty George, Madhumitha R., Manvila Munipalli, Muhammed Saleem K.V., Parthasarathy G.. **A Study on Prescription Pattern of Nonsteroidal Anti-Inflammatory Drugs (NSAIDS) in Osteoarthritis Patients at Tertiary Care Teaching Hospital**. Int. J Drug Deliv. 2023; 1(1): 1-7.