



Research Article

**PRESCRIBING PATTERNS OF NON STEROIDAL ANTI INFLAMMATORY DRUGS (NSAIDs) IN OUT PATIENT DEPARTMENT OF AN ORTHOPEDIC SPECIALTY HOSPITAL**

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ABSTRACT

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Periodic evaluation of drug utilization patterns need to be done for enable suitable modifications in prescription of drugs to increase the therapeutic benefit and decrease the adverse effects. The study of prescribing patterns seeks to monitor, evaluate and if necessary, suggest modifications in the prescribing behaviour of medical practitioners to make medical care rational and cost effective. The current retrospective study of eight months duration was performed to assess the prescribing pattern of Nonsteroidal anti-inflammatory medications utilized in outpatient department of an orthopedic specialty hospital in resource limited background of Andhra Pradesh, India. In 150 prescriptions of our study, osteoarthritis (40%) was a predominant presenting complaint for which NSAIDs were prescribed, and major population reported was female patients (54.6%). Total number of Nonsteroidal anti-inflammatories found in the 150 prescriptions was 368; prescribed from highest to lowest were aceclofenac (24.73%), diclofenac (21.20%), paracetamol (20.11%), chlorzoxazone (13.31%), ibuprofen (9.78%), Piroxicam (6.35%), and tramadol (4.62%). The type of NSAIDs therapy was found more in FDCs 64%, followed by monotherapy (29.33%) and polytherapy (6.67%), in which 39.58% FDCs constituted aceclofenac + paracetamol. The study showed substantial use of FDC of NSAIDs which is may not achieve desired health outcome in patients, thus their quality of life remains unimproved or results in therapy failure and increased economic burden, has combining two NSAIDs is irrational Thus widespread use of irrational FDCs must be condensed.



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**INTRODUCTION**

Rational drug prescribing can be defined as appropriate drugs prescribed in the right dose, at correct time intervals and for a sufficient duration. Irrational drug use is a common problem in many countries of the world. [1] The assessment of drug utilization is important for clinical, economic and educational purposes. [2] Drug utilization research was defined by WHO in 1977 as the marketing, distribution,

prescription, and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences.<sup>[3]</sup>

Drug utilization studies aim to provide feedback to the prescriber and to create awareness among them about rational use of medicines.<sup>[4]</sup> For the individual patient, the rational use of a drug implies the prescription of a well-documented drug at an optimal dose, together with the correct information, at an affordable price. Without the knowledge of how drugs are being prescribed and used, it is difficult to initiate a discussion on rational drug use or to suggest measures to improve prescribing habits. Information on the past performance of prescribers is the linchpin of any auditing system. Drug utilization research in itself does not necessarily provide answers, but it contributes to rational drug use in important ways.<sup>[5]</sup>

Pain is an ill-defined, disabling accompaniment of many medical conditions. Analgesics are drugs, which possess significant pain relieving properties by acting in the central nervous system or on peripheral pain receptors without significantly affecting consciousness. Analgesics are divided into two groups: Narcotic/Opioid analgesics and Non-narcotic/non-steroidal anti-inflammatory drugs (NSAIDs).<sup>[6]</sup> Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly used medicines in the world. They have a wide variety of indications for use, ranging from treatment of acute pain to more chronic conditions such as rheumatoid arthritis. These agents exert their effect by inhibiting the activity of the enzyme cyclooxygenase, with a resultant reduction in prostaglandin synthesis and an alleviation of the inflammatory response.<sup>[7]</sup>

Selective COX-2 inhibitors were developed with the aim of minimizing gastrointestinal toxicity, while maintaining anti-inflammatory activity.<sup>[8]</sup> However, clinical and experimental data, as well as reviews suggest that the long term use of selective COX-2 inhibitors is associated with an increase in systolic blood pressure and cardiovascular morbidity and mortality due to myocardial infarction.<sup>[9], [10]</sup> Today, there are a variety of NSAIDs available for prescription: traditional non-selective (NSAIDs), and the more selective COX-I inhibitors (Coxibs). The analgesic effects of the different NSAIDs are more or less identical; however, the Coxibs are associated with a lower risk for upper gas-

trointestinal side effects. Thus, the Coxibs after their introduction become an alternative to traditional NSAIDs in patients exhibiting risk for upper gastrointestinal bleeding.

The national pain guidelines provided by the Swedish Council on Technology Assessment in Health Care supports prescription of Coxibs as a cost-effective option in patients with a gastrointestinal risk. There is still a need for individual analysis regarding the risk of side effects including not only the upper but the entire gastrointestinal tract and the cardiovascular system. The long-term use of NSAIDs warrants, however, an in-depth analysis of benefit vs. risk on an individual basis.<sup>[11]</sup>

Despite wide clinical use of classical NSAIDs as analgesics, anti-pyretics, and anti-inflammatory agents their gastrointestinal toxicity (dyspepsia, peptic ulcers and gastrointestinal bleeds) is a major clinical limitation.<sup>[12]</sup> The use of NSAIDs is an important predisposing factor for peptic ulcer disease in the community. Approximately 10-20% of patients who receive long-term NSAID therapy develop asymptomatic peptic ulceration and ulcer-related complications (bleeding and perforation) develop in 1-2% of persons per year.<sup>[13]</sup>

Previous studies have shown that analgesics, including nonsteroidal anti-inflammatory drugs (NSAIDs) are a commonly prescribed group of drugs.<sup>[14], [15]</sup> Studies have shown that use of NSAIDs increases the risk of hospitalization and death from gastrointestinal bleeding and perforation.<sup>[16], [17]</sup> This warrants a cautious use of NSAIDs in high risk individuals who include the elderly, those already receiving gastro-toxic agents and those with a history of gastro-intestinal diseases.<sup>[18]</sup> So, the best alternative in such individuals would be the co-administration of NSAIDs with gastro protective drugs. Misoprostol, an analog of prostaglandin E1, has been specifically approved for the prevention of NSAID-induced ulcers in high-risk patients.<sup>[19], [20]</sup> Proton pump inhibitors too, have been used with outstanding efficacy for this indication.<sup>[21]</sup>

The objective of the present study was to perform drug use evaluation of Non-steroidal anti-inflammatory medications prescribed in an outpatient department of an orthopedic specialty hospital in resource limited background of Andhra Pradesh, India.

## MATERIALS AND METHODS

The current retrospective study of eight months duration performed in an orthopedic specialty hospital in resource limited background of Andhra Pradesh (Anantapuramu, India) distributed in to three phases.

Phase I: (Two months)

- Identification of area of practice
- Design of study
- Define criteria and standards
- Extensive biomedical literature survey
- Designing a profoma
- Designing data collection form
- Developing a patient informed consent form
- Approval and permission from hospital authority
- Approval and registering the study in the Institutional review board

Phase II: (Five months)

- Data collection

Phase III: (One month)

- Analysis and evaluation of collected data's
- Interpretation of results.
- Deriving conclusion
- Limitations if any
- Recommendations

Study Site: Outpatient department of an orthopedic specialty hospital, Anantapuramu, Andhra Pradesh., India

Study Design: Retrospective study

Study Duration: Eight months

Sampling: 150 patients

Study Criteria:

Inclusion criteria: Patients of all ages and both genders reported to orthopedic outpatient department, with presenting complaints of musculoskeletal disorder and rheumatological conditions

Statistical analysis: Descriptive statistics was applied, collected data's are entered and documented in Microsoft excel spread sheet for further interpretations

**Study procedure:** Initially the study was planned by performing an extensive review of biomedical literature, and justifying the need of research was made. The area and design of conducting the research was planned, for which a structured process was followed in obtaining permission from hospital authorities by submitting a profoma of study, the initial acceptance from hospitals was registered in the institutional review board (IRB) of the in-

stitution for ethical approval (RIP-ER/IRB/2016/018). A documentation form was designed to collect the patient information's retrospectively from patient's medical charts which were kept confidential. The information's pertaining to patient's demography, approximate date of diagnosis (in old cases) and definite date of diagnosis (in new cases), presenting complaints, past medical and medication histories, family and social histories, drug allergies and food habits were obtained and documented. Prescriptions of all patients of all ages and both genders reported to orthopedic outpatient department, with presenting complaints of musculoskeletal disorder and rheumatological conditions were screened for NSAIDs. Descriptive statistics was used to explain the data and documented.

## RESULTS

In our retrospective study of eight months duration performed in outpatient of an orthopedic specialty hospital in resource limited background of Andhra Pradesh, involved 150 prescriptions, demographic details of the study population was assessed and reported in Table 1 (Demographic particulars of study population). Osteoarthritis predominant in female population was the chief presenting complaints for prescribing NSAIDs, Table 2 (Presenting conditions for which NSAIDs were prescribed). Total number of (NSAIDs) Non-steroidal anti-inflammatories found in the 150 prescriptions was 368; details of drugs prescribed are reported in Table 3 (Drugs prescribed). In our study, nearly 64% (96) of patients were prescribed with (FDC) fixed dose combination; the use of FDC is reported in Table 4 (Details of FDC). In our study monotherapy accounts for 29%, polytherapy 5% and FDC accounts for 64%, results are reported in Table 5 (Type of therapy).

## DISCUSSION

In our retrospective study of eight months duration, out of 150 prescriptions 82 (54.6) were female and 68 (45.4) were male, which reported female are at higher incidence of reporting to orthopedic outpatient department (Shankar PR et al, 2007).<sup>[22]</sup> The study population distributed within age group of 41 – 50 years was found more 38 (25.3%) where female gender was found more predominant (Kanaganthosh K et al, 2015).<sup>[23]</sup>

**Table 1: Demographic particulars of study population**

Total number of prescriptions		150			
Gender distribution		N		%	
Male		68		45.3	
Female		82		54.6	
Age distribution (Years)		Male	Female	N	%
1-10		4	0	4	2.6
11-20		0	0	0	0
21-30		0	2	2	1.3
31-40		6	15	21	14
41-50		18	20	38	25.3
51-60		14	22	36	24
61-70		13	7	20	13.3
71-80		11	8	19	12.6
81-90		2	8	10	6.6

**Table 2: Presenting conditions for which NSAIDs were prescribed**

S. no	Presenting complaints	Number of Patients	%
1	Trauma	10	6.67
2	Osteoporosis	11	7.33
3	Backache	12	8
4	Fracture	15	10
5	Injury	42	28
6	Osteoarthritis	60	40
Total		150	100

**Table 3: Drugs prescribed**

S. no	Name of Drug	Number of Prescriptions	%
1	Ibuprofen	36	9.78
2	Paracetamol	74	20.11
3	Diclofenac	78	21.20
4	Aceclofenac	91	24.73
5	Piroxicam	23	6.25
6	Tramadol	17	4.62
7	Chlorzoxazone	49	13.31
Total		368	100

**Table 4: Details of FDC**

S. no	F D C	Number of Patients	%
1	Paracetamol + Diclofenac	29	30.21
2	Paracetamol + Aceclofenac	38	39.58
3	Paracetamol + Piroxicam	9	9.37
4	Diclofenac + Paracetamol + Chlorzoxazone	20	20.83
Total		96	100

**Table 5: Types of Therapy**

S. no	Type of therapy	Number of Patients	%
1	Monotherapy	44	29.33
2	Polytherapy	10	6.67
3	FDC	96	64
Total		150	100

In our study, the presenting complaint for which patients are prescribed with NSAIDs was osteoarthritis 60 (40%) (Mohamed Ahmed et al, 2012).<sup>[24]</sup> In our study, the NSAIDs prescribed from highest to lowest were aceclofenac (Kanagasanthosh K et al, 2015),<sup>[23]</sup> (24.73%), diclofenac (21.20%), paracetamol (20.11%), chlorzoxazone (13.31%), ibuprofen (9.78%), Piroxicam (6.35%), and tramadol (4.62%). The type of NSAIDs therapy was found more in FDCs 64%, followed by monotherapy (29.33%) and polytherapy (6.67%), FDC therapy were prescribed more in our study (Bhaskar R et al, 2015),<sup>[3]</sup> in which 39.58% FDCs constituted aceclofenac + paracetamol (Kanagasanthosh K et al, 2015).<sup>[23]</sup>

This study shows substantial use of FDC of NSAIDs. Combining two NSAIDs is irrational as the two drugs act on the same pathway and there is no synergism when two drugs acting on the same enzyme are combined. Thus combining two NSAIDs does not and cannot improve the efficacy of treatment. These irrational FDCs increase chances of adverse drug effects and drug interactions compared with both drugs given individually (Gautam CS et al, 2008)<sup>[25]</sup> Combining opioid analgesics with NSAID is more rational, as the two drugs act on different pathways.

This study shows that aceclofenac was the most frequently prescribed analgesic in outpatient department of an orthopedics specialty hospital in resource limited background of Andhra Pradesh, where the chief presenting complaint of NSAIDs use was osteoarthritis and predominant population was female. The study showed substantial use of FDC of NSAIDs which is may not achieve desired health outcome in patients, thus their quality of life remains unimproved or results in therapy failure and increased economic burden, has combining two NSAIDs is irrational Thus widespread use of irrational FDCs must be condensed

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## REFERENCES

1. Hogerzeil HV. Promoting rational prescribing: an international perspective. *Br J Clin Pharmacol* 1995; 39: 1-6.
2. Uppal R, Nayak P, Sharma PL. Prescribing trends in internal medicine. *Int J Clin Pharm Ther Toxicol* 1984; 22: 373-376.
3. R. Bhaskar, D. R. Veena, L. Padma, P. Anil Kumar, Saba Moosaraza. Prescription pattern of analgesics in orthopedics outpatient department at a tertiary care hospital. *Int J Basic Clin Pharmacol*. 2015 Apr;4(2):250-253.
4. Pradhan SC, Shewade DG, Shashindran CH, Bapna JS. Drug utilization studies. *Natl Med J India* 1988; 1: 185-189.
5. Birkett D, Smet PD, Adjei DO, Trolin I. Introduction to Drug Utilization Research. Geneva: WHO; 2003: 6-9.
6. Sharma HL, Sharma KK. Principles of Pharmacology. 2<sup>nd</sup> New Delhi: Paras Medical Publisher; 2011: 490.
7. Fitzgerald GA, Patrono C. The Coxibs, selective inhibitors of Cyclooxygenase-2. *N Engl J Med* 2001; 345:433-42.
8. Hawkey CJ. COX – 2 inhibitors. *Lancet* 1999; 353:307- 14.
9. Mukherjee D, Nissen SE, Topol EJ. Risk of cardiovascular events associated with selective COX-2 inhibitors. *JAMA* 2001; 286: 954-9.
10. Jain S, Gupta M, Malhotra S, Pandhi P. Effect of Rofecoxib on anti-hypertensive effects of Candesartan in experimental models of hypertension. *Meth Find Exp Clin Pharmacol* 2005; 27:11-6
11. Brattwall M, Turan I and Jakobsson J, *Journal of Pain Research* 2010; 3:131–35.
12. Graumlich JF. Preventing gastrointestinal complications of NSAID's: risk factors, recent advances, and latest strategies. *Postgrad Med* 2001; 109:117-28.
13. McQuaid KR. Drugs used in the treatment of Gastrointestinal Diseases. In: Katzung BG, editor. *Basic and Clinical Pharmacology*, 10th ed. McGraw Hill; 2007:1009-19.

14. Sarkar C, Das B. Prescribing trends in a teaching hospital in western Nepal. *JNGMC* 2002; 2: 4-7.
15. Shankar PR, Partha P, Nagesh S. Prescribing patterns in medical outpatients. *Int J Clin Pract* 2002; 56: 549-551.
16. Greene JM, Winckoff RN. Cost-conscious prescribing of non-steroidal anti-inflammatory drugs for adults with arthritis. *Arch Intern Med* 1992; 152: 1995-2002.
17. Smalley WE, Ray WA, Daugherty JR, Griffin MR. Nonsteroidal anti-inflammatory drugs and the incidence of hospitalization for peptic ulcer disease in elderly persons. *Am J Epidemiol* 1995; 141: 539-545.
18. Raghavendra B, Sanji N, Ullal SD, et al. Trends in Prescribing Gastroprotective Agents with Non-Steroidal Anti-Inflammatory Drugs in an Orthopedic Outpatient Unit of a Tertiary Care Hospital. *J Clin Diagn Res* 2009; 3:1553-6.
19. Hopkinson N, Doherty M. NSAIDS-associated gastropathy- a role for misoprostol? *Br J Rheumatol.* 1990; 29:133-6.
20. Walt RP. Misoprostol for the treatment of peptic ulcer and anti-inflammatory-drug induced gastroduodenal ulceration. *N Engl J Med.* 1992;327:1575-80
21. Ajay Kumar, Chanchal Kumar Dalai, Amit Kumar Ghosh, Madhumita Ray. Drug utilization study of co-administration of nonsteroidal anti-inflammatory drugs and gastro protective agents in an orthopedics outpatients department of a tertiary care hospital in West Bengal. *Int J Basic Clin Pharmacol.* 2013 Apr; 2(2):199-202.
22. Shankar PR, Pai R, Dubey AK, Upadhyay DK. Prescribing patterns in the orthopedics outpatient department in a teaching hospital in Pokhara, western Nepal. *Kathmandu Univ Med J (KUMJ).* 2007;5(1):16-21.
23. Kanagasanthosh. K, Isabella Topno. A study on recent trends of prescribing pattern in orthopedic out-patient department from a tertiary care teaching hospital. *International Journal of Pharmacy & Technology,* April-2015, Vol. 6, Issue No.4, 7549-7559.
24. Mohamed Ahmed, Nahid Ali, Zia Ur Rahman, Md. Misbahullah Khan. A study on prescribing patterns in the management of arthritis in the department of orthopedics. *Der Pharmacia Lettre,* 2012, 4 (1):5-27.
25. Gautam CS, Saha L. Fixed dose drug combinations (FDCs): rational or irrational: a view point. *Br J Clin Pharmacol.* 2008; 65(5):795-6.