

PRESCRIPTION PATTERN ANALYSIS OF NON-STEROIDAL ANTI-INFLAMMATORY DRUGS IN TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: The aim of the study was to analyze the prescription pattern of non-steroidal anti-inflammatory drugs (NSAIDs) and to identify the commonly used NSAIDs and their drug-related problems (DRPs).

Methods: A prospective and cross-sectional study on prescription pattern analysis of NSAIDs was conducted for the period of 6 months.

Results: Prescriptions of 150 patients containing at least one NSAIDs were analyzed. About 56% of the prescription were prescribed for males and 44% prescription were female. NSAIDs were more prescribed for below 60-year age group (47%) but were most frequently used by 61-70-year age group (21%). Subjects were regularly prescribed with acetaminophen (95%) and diclofenac (22%). Among all the prescriptions, (19%) of the prescriptions contained NSAIDs in the form of fixed dose combinations (FDCs). About 37% of prescriptions had other analgesic coprescribed along with NSAIDs amid which tramadol was in majority (22%). Prescription was also coprescribed with antibiotic (90%) and gastroprotective agents (GPAs) (97%) that consisted of pantoprazole belonging to the class of proton pump inhibitors which was the persistently prescribed GPA (86%). Due to coprescription, (3%) suspected drug-drug interactions (DDIs) were observed.

Conclusion: The goal of studying prescribing patterns was to monitor, assess, and, if required, advise changes in medical practitioners' prescribing behavior to offer quality medical treatment and reasonable drug use. The prescribing pattern was rational and in accordance with national list of essential medicine (NLEM-2015) but was not in accordance with the World Health Organization (WHO) model list of essential medicines.

Keywords: NSAIDs, Cyclooxygenase enzyme, Prescription pattern, Gastro protective agent, Analgesic, Anti-pyretic, Anti-inflammatory.

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INTRODUCTION

Irrational prescribing and drug usage have become a global problem in the system of health care delivery in recent years [1].

NSAIDs have been a chosen option for majority of patient attending the hospital with pain as a common symptom for most illnesses since their disclosure as pain, anti-inflammatory, and anti-pyretic. They have become the first line treatment for the pain in the past two decades and they have played a key part in pain management [1].

NSAIDs are the most often prescribed medication in the world, contributing for more than 20% of all prescriptions [2].

Over 400 NSAIDs formulation is marketed in India, subjecting patients to this class of medications and their side effect/adverse effect in huge numbers [2].

Major limitations of classical NSAIDs are gastrointestinal toxicity and it is due to inhibition of cyclooxygenase -I (COX I) in gastrointestinal tract. Selective cyclooxygenase -II (COX II) inhibitor is gastrointestinal (GI) friendly drugs. Recent evidence of cardiovascular adverse event associated with the use of COX II inhibitor has generated a feeling of unease among prescribed as well as consumers [3].

According to research, NSAID use has been associated to an increased risk of hospitalization and mortality due to gastrointestinal bleeding and perforation. GI issue affects 1-5% of the patient who were using NSAIDs for more than a year, and they are associated with significantly high cost and death rate. According to the study, approximately 30 million people use NSAIDs on a daily basis all around world, with 40% of those over the age of 60 [4].

METHODS

Study site

This study was conducted in Karnataka Institute of Medical Sciences, Hubballi, Karnataka, India.

Study design

This was a prospective and cross-sectional study.

Study period

The study was conducted for the period of 6 months.

Study subjects

The study included the patients who were from inpatient and outpatient department.

Study criteria

Inclusion Criteria: Inpatient and outpatient department, age group: Above 18 years, male and female subjects, and all patient taking minimum of one NSAIDs were included in the study.

Exclusion Criteria: Pediatrics, pregnant and lactating women, and prescription with topical NSAIDs were excluded from the study.

Sources of Data: Medical case sheets, Treatment chart, laboratory investigation, medical history, medication history, clinical progress chart, and interaction with health-care professionals are the sources of data.

Study procedure

- A prospective and cross-sectional study on prescription pattern analysis of non-steroidal anti-inflammatory drugs was conducted for a period of 6 months.

- The subjects were explained about the study objective, benefits, and risk associated with the study and verbal consent of the subject was obtained. Patients who satisfied the above study criteria were included in the study.
- The patient specific information was retrieved from the patient's medication profile and case profiles. Patients demographic detail (name, age, and sex), medical history, medication history, diagnosis, clinical laboratory data progress, chart, and treatment plan were reviewed on day to day basis till their discharge and were obtained and documented in a patient's data collection form.
- The data were assessed and DRPs were identified and recorded in DRPs documentation form and were resolved to improve patient's health-related outcome. The DRPs included suspected DDI.

Ethical approval

Ethical clearance for this study was obtained from Institutional Ethical Committee KLE College of Pharmacy, Hubballi. Reference number: KLECOPH/IEC/2020-21/07.

RESULTS

A total 150 patient prescriptions were analyzed and included in the study.

Among the 150 prescriptions that were analyzed during our study period, prescriptions for male patients were found to be 84 in number (56%) and female patients were 66 in number (44%) that had at least one NSAID prescribed in their prescription. NSAIDS were more prescribed for below 60-year age group (47%) but were most frequently used by 61–70-year age group (21%). The most commonly prescribed NSAIDs were acetaminophen (95%) followed by diclofenac (22%) and etoricoxib (1%). FDC NSAIDs were also prescribed (19%) (Table 1).

NSAIDs were mainly used as analgesics (83%), followed by anti-pyretic (52%) and anti-inflammatory (3%) (Table 2).

The most commonly prescribed NSAID frequencies were twice daily (51%), followed by thrice daily (43%), whenever necessary [SOS] (21%), immediate dose [STAT] (11%), four times daily (2%), and once daily (1%).

Patients were most commonly prescribed NSAIDs by parenteral route (70%) [IV (67%), IM (3%)] than oral route (57%) (Table 3).

Among 150 patients, 105 patients were prescribed with monotherapy (70%) and the rest (30%) were prescribed with multiple therapy [double therapy – 22%, triple therapy – 7%, and quadruple therapy – 1%] (Table 4).

About 91% of NSAIDs were prescribed by their brand name and the rest were prescribed by their generic name (9%) (Fig. 1).

Among 150 prescriptions, 28 (19%) prescriptions were prescribed with NSAIDs in the form of FDC's. Most commonly prescribed FDC's were acetaminophen + tramadol, acetaminophen + aceclofenac, acetaminophen + aceclofenac + serratiopeptidase (3%). Followed by mefenamic acid + acetaminophen, and aceclofenac + trypsin + rutoside + bromelain (2%) (Table 5).

Totally there were 34 other classes of drugs that were coprescribed along with NSAIDs based on the patient condition. Gastroprotective agents were highly prescribed drugs along with NSAIDs (97%) followed by antibiotics (90%), anti-emetics (41%), antihypertensive and vitamin supplements (36%), hypoglycemics (23%), and corticosteroids (14%) (Table 6).

Out of 150 patients, 55 patients (37%) were coprescribed with other analgesics. Most commonly prescribed other analgesic was tramadol (22%) (Table 7).

Table 1: Individual NSAIDs prescribed

NSAIDS given	Number of prescriptions	% (n=150)
Paracetamol/acetaminophen	142	95
DICLOFENAC	33	22
FDC	28	19
ETORICOXIB	1	1
Total	204	

Table 2: Indication for NSAIDs prescription

Indication for NSAIDS	Number of prescriptions	% (n=150)
Pain	125	83
Fever	78	52
Inflammation	4	3

Table 3: NSAIDs therapy route comparison

Therapy	No. of prescriptions	% (n=150)
Oral therapy	86	57
Parenteral therapy	105	70
Total	191	0

Table 4: Different types of NSAID therapies prescribed

Types of therapy	No. of prescriptions	% (n=150)
Monotherapy	105	70
Double therapy	33	22
Triple therapy	11	7
Quadruple therapy	1	1
Total	150	

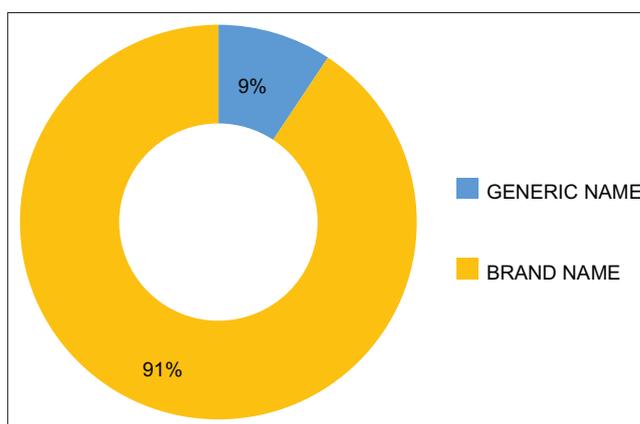


Fig. 1: Comparison between generic versus brand name prescription of NSAIDs

About 97% of patients were prescribed with gastroprotective agents. Out of which the most frequently prescribed GPA class was proton pump inhibitors (96%), followed by H2 blockers (5%), non-systemic gastric acid neutralizers (2%), protectants (2%), and prokinetic (1%) (Table 8).

When NSAIDs were coprescribed with other drugs, suspected drug-drug interactions were observed. The most common suspected drug-drug interaction was between acetaminophen and phenytoin (3%) [severity:

Table 5: Different FDCs of NSAIDs

FDC combinations	No. of prescriptions	% (n=150)
Acetaminophen+Tramadol	5	3
Acetaminophen+Aceclofenac	4	3
Acetaminophen+Aceclofenac +Serratiopeptidase	4	3
Mefenamic acid+Acetaminophen	3	2
Aceclofenac+Trypsin+Rutoside +Bromelain	3	2

Table 6: Other class of drugs coprescribed with NSAIDs

Other class of drugs	No. of prescriptions	% (n=150)
Antibiotics	135	90
Anti-emetics	62	41
Anti-hypertensives	54	36
Vitamins and supplements	54	36
Hypoglycemics	35	23
Corticosteroids	21	14

Table 7: Names of other analgesics coprescribed with NSAIDs

Other analgesics	No. of prescriptions	% (n=150)
Tramadol	33	22
Dexamethasone	4	3
Pregabalin	4	3
Hyoscine butyl bromide	4	3

Table 8: Class of GPAs coprescribed with NSAIDs

Classification of GPA's	No. of prescriptions	% (n=150)
H2 receptor blockers	8	5
PPI	144	96
Protectant S	3	2
Prokinetic	1	1
Non-systemic gastric acid neutralizers	3	2
Total	159	

Table 9: WHO core prescribing indicators

S. No.	WHO Core Drug Prescribing Indicators	Result
1	Avg. No. of NSAIDs per prescription/ encounter	1.36
2	Avg. No. of drugs per Prescription	4.6
3	Percentage of encounters with a NSAIDs prescribed	100%
4	Percentage of encounters with an injection of NSAID Prescribed	70%
5	Percentage of encounters with nonselective NSAID prescribed	0%
6	Percentage of NSAIDs prescribed by generic names	9%
7	Percentage of encounters with selective COX-2 NSAID prescribed	2%
8	Percentage of NSAIDs prescribed from NLEM	85.7%
9	Percentage of encounters with fixed dose combination of NSAIDs prescribed	19%
10	Percentage of encounters with NSAIDs and Gastroprotective agent coprescribed	97%

moderate], followed by acetaminophen and isoniazid (2%) [severity: major], diclofenac and budesonide (2%) [severity: major], and lastly between diclofenac and dexamethasone (1%) [severity: major].

DISCUSSION

In this study, 150 subjects were involved. The subjects were categorized according to their age, gender, class of NSAIDs used, etc.

In a study conducted by Antappan *et al.*, results showed that the majority of the people in their study population were females (81.9%) and remaining were males (18.1%). In our study, majority was male population (56%) and remaining were females (44%) [5].

The prescriptions were categorized into 10 age groups that were 10–20 years, 21–30 years, 31–40 years, 41–50 years, 51–60 years, 61–70 years, 71–80 years, and 81–90 years. NSAIDs were abundantly used by 61–70-year age group patients (21%) and least used by 81–90 years (2%).

In a study conducted by Mohammed AL-Shakka *et al.*, their results showed that clinical indication for using NSAIDs were infective condition and fever while in our study, it was mostly used for pain and fever [6].

From other studies, most prescribed NSAIDs were diclofenac, ibuprofen, meloxicam, and piroxicam. In our study, mostly prescribed NSAIDs were paracetamol (Acetaminophen) followed by diclofenac and etoricoxib [5,7].

In a study conducted by Majid Zeinali *et al.*, results showed that oral administration (77%) was the most widely used route of drug administration while in our study, the common route was parenteral route (70%) [7].

Some studies conducted showed that NSAIDs prescribed by their generic names were 18.5% while in our study, drugs prescribed by their generic name were only 9% [6,8].

From different studies, we found out that FDCs were prescribed more in number (28.37%) compared to our study where FDC was used less in number (19%) [4].

Study conducted by Motgahre *et al.* reported that other class of drugs coprescribed with NSAIDs like multi-vitamins (22.28%) and calcium salts (21.85%) was used high in number compared to our study where anti-biotics were highly prescribed with NSAIDs (90%) followed by anti-emetics (41%) and anti-hypertensives and vitamin supplement (36%) [2].

In a study conducted by Dulal *et al.*, rabeprazole was preferred over pantoprazole in the class of proton pump inhibitors while in our study, pantoprazole was preferred over rabeprazole. The study conducted by Ragavendra *et al.* showed that 32% of prescriptions were coprescribed with GPAs while in our study, the coprescription of GPAs was much higher (97%) [4,9].

In a study done by Mishra *et al.*, it was observed that NSAIDs were more frequently prescribed with PPIs (77.6%) followed by H2 receptor blocker (4.5%), the reason for their use was NSAID associated peptic ulcer and gastrointestinal bleeding. while in our study, PPIs were prescribed higher in number (96%) followed by H2 receptor blocker (5%) [3].

CONCLUSION

The regularity of NSAIDs prescription was fairly high in this tertiary care hospital population along with coprescription of gastroprotective agents. We draw this conclusion from the obtained results that the prescribing pattern was rational and in accordance with NLEM-2015 [10] but was not in accordance with the WHO model list

of essential medicines [11] (Table 9). The commonly prescribed NSAID was acetaminophen belonging to the class of para-amino salicylic acid. When NSAIDs were coprescribed with other drugs, suspected drug-drug interactions were also observed. The most common suspected drug-drug interaction was between acetaminophen and phenytoin (3%) [severity: moderate].

A program must be developed and executed for promotion of rational use of NSAIDs for better health-care outcomes and prevention of drug-related problems/toxicity, for example, patient education through patient counseling sessions that impart enough information for the patient to make informed choices regarding their medications, continuous medical education regarding current trends in NSAIDs usage and their potential risks, and significance of rational and appropriate use. The result and discussion presented in this study provide a baseline data which will be useful in further conduction of drug utilization studies.

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AUTHORS CONTRIBUTION

The author and the coauthors equally contributed to the study design and conception. Material preparation, data collection, data analysis, result interpretation, and drafting of the manuscript were performed by ZebaInamdar, Sarwamangala S. N, Padmavati V., Dr. Varsha I. Dalal, and Dr. Prasad N. Bali. The author and coauthors have read and approved the final manuscript.

CONFLICT OF INTEREST

The author(s) declare no potential conflicts of interest with respect to research, authorship, and/or publication of this article.

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