A STUDY ON THE PRESCRIBING PATTERN AND COST COMPARISON OF NON-STERoidal ANTI-INFLAMMATORY DRUGS IN A MULTI-SPECIALITY HOSPITAL

*Rangapriya M, Sujitha Jai Karnesh G, Theertha C K, Usha M
Swamy Vivekanandha College of Pharmacy, Namakkal, Tamil Nadu, India

Abstract

Objectives: To study the prescribing pattern and cost comparison of non-steroidal anti-inflammatory drugs in a multi speciality hospital. Methods: A prospective observational study was carried out for the period of six months between February and July 2018. The parameters analyzed were demographics, NSAIDs prescribed, clinical indication, type of therapy, concomitant drugs. Data collected was analyzed by frequency and percentage. Results: Overall frequency of NSAIDs prescription in this study was 29.31%. Diclofenac (43.90%) was the commonest NSAID prescribed. High frequency of co-prescription of gastro protective agents (86%) was noted. Monotherapy has been followed in 188 prescriptions (53.71%) than combination therapy in 75 prescriptions (21.42%). The preferred route of administration was oral in 136 prescriptions (38.85%) followed by parenteral route in 85 prescriptions (24.28%). The majority of the prescriptions contain only 1 NSAID (51.42%) followed by 2 NSAIDs (26.57%). The NSAIDs prescriptions were more predominantly found in the orthopaedics department and the common indication was osteoarthritis in 123 patients (35.14%). Conclusion: The concomitant use of NSAIDs and other medications revealed the possibility of drug interactions, medication error and adverse drug reactions in the patients. Cost comparison of the drugs prescribed recommends the use of generic medications in place of branded drugs as it may decrease the economic burden of the patients.

Keywords: Prescribing pattern, NSAIDs, Gastro protective agents, Cost comparison.

Introduction

Non-steroidal anti-inflammatory drugs are the most widely prescribed drugs to treat various acute and chronic disease conditions. These drugs are used for the management of pain and inflammation with good efficacy and represent most widely prescribed class of medications in the world and are used as over the counter drugs. NSAIDs provide symptomatic relief from pain and swelling in chronic joint diseases such as in rheumatoid arthritis and in more acute inflammatory conditions such as sports injuries, fracture, acute arthritic pains, sprains and other soft tissue injuries. They also provide relief from post-operative, dental, menstrual pain, and from the pain of headache and migraine. There are different NSAIDs formulations available, including tablets, injections and gels.

All drugs grouped in this class have antipyretic, analgesic and anti-inflammatory actions in different measures. In contrast to morphine, they do not depress CNS, physical dependence, have no abuse liability and are weaker analgesics (except

Author for Correspondence:
Rangapriya M
Email: priyanarayan97@gmail.com
for inflammatory pain). They are also called as non-narcotic, non-opioid or aspirin-like analgesics. They act primarily on peripheral pain mechanisms, but also in CNS to increase pain threshold. Sodium salicylate was used for fever and pain and its great success led for the introduction of acetylsalicylic acid (aspirin). Phenacetin and antipyrine were produced at that time. The next major advance was for the development of phenylbutazone which produces anti-inflammatory activity is almost comparable to corticosteroids. The term non-steroidal anti-inflammatory drugs (NSAIDs) were coined to designate such drugs. Indomethacin was introduced in 1963. The propionic acid derivative ibuprofen has been added since then and cyclooxygenase (COX) inhibition is recognised to be their most important mechanism of action. Subsequently some selective COX-2 inhibitors (celecoxib, etc.) have been added. The antipyretic-analgesics are chemically diverse, but most are organic acids. Prescription pattern monitoring studies (PPMS) are used for assessing the prescribing, dispensing and distribution of medicines. The main aim of prescription pattern monitoring scale is to promote rational use of medicines (RUM). Prescribing appropriate drugs in right doses is an integral part by which a physician can influence the patient’s health and well-being. Irrational use of medicines is a major worldwide problem. WHO identified that more than half of all the medicines were prescribed, dispensed or sold inappropriately, and most of the patients fail to take them correctly. Prescription Pattern helps as an auditing tool in developing a more comprehensive medical system having more benefits and less errors.

Drug Related Problems like drug interactions, adverse drug reactions, medication error etc constitutes safety issue among hospitalized patients leading to patient harm and increased healthcare costs. Cost of drug therapy is the major hurdle in effective treatment of disease and compliance towards the drug regimen. There are evidences describing that the prices of prescription medicines affect users, suppliers, and in particular payers in the healthcare system.

Rational use of medicines is that the patient receives medication appropriate to the clinical need, at the proper dose, for the proper duration and at the lowest cost. So for rational prescribing, prescriber should also consider cost while writing prescription along with other criteria of rational use of the drug so that the patient can afford the drug. Improper knowledge about the cost of various brands of different NSAIDs can lead to difficulties in prescribing most cost effective treatment regimen for the patient. The study was aimed to assess the prescribing pattern and cost comparison of non-steroidal anti-inflammatory drugs in a multi-speciality hospital.

Methods
A Prospective, Observational study was conducted in the Vivekanandha Medical Care Hospital, located in Elayampalayam, Tiruchengode, Namakkal for a period of 6 months from February – July 2018. A total of 507 prescriptions were screened and only 353 prescriptions were selected for the study on the basis of following inclusion and exclusion criteria. All the In patients and out patients, both male and female patients of any age group were included in the study. Prescription without NSAIDs drugs and critically ill patients were excluded from the study. Patient case sheets served as the source of information. Naranjo Adverse Drug Reaction Probability Scale was utilized for the analysis.

Data Analysis
The prescriptions were analyzed for the demographic characteristics of the patients, diagnosis, NSAID formulations, dose, route, frequency, duration of administration, concomitant medications, The datum were analyzed for DRPs such as ADRs, DDIs and Mediation errors using Naranjo causality assessment scale and Micromedex software. Variation of NSAIDs costs in different brands were analysed using the internet. The results of the collected data were described in the form of percentage, table and graphs by using MS-Excel 2010.

Results
Gender wise distribution
A total of 353 prescriptions met the inclusion criteria of the study. In those 353 patients, 54% were males (189 patients) and 46% were females (164 patients). An overall gender wise distribution of the study population was given indicates a predominant male population. (Fig. No. 01)
Age wise distribution
Among 353 prescriptions containing NSAIDs, it was widely used in the age group of 60-69 years were 32.86 %, followed by the age group of 50-59 years were 19.83%. Then the remaining 4.24% were in the age group of 20-29 years, 7.93% were in the age group of 30-39 years, 13.03% were in the age group of 40-49 years, 18.69% were in the age group of 70-79 years and 3.39% were in the age group of 80 -89 years. (Fig. No. 02)

Department wise classification
Out of the total 353 prescriptions, the NSAIDs were mostly prescribed in the department of orthopaedics (31.16%), followed by 27.47% were referred in the department General medicine, 8.49% in the department of Cardiology, 13.88% in the department of Ophthalmology, 10.19% in the department of Dental, 3.99% in the department of Emergency, 1.41% in the department of Surgery, 0.56% in the department of Gynaecology, 1.13% in the department of Nephrology and 2.26% in the department of Paediatrics. (Fig. No. 03).

Distribution of NSAIDs prescribed
In the 353 prescriptions, the total number of NSAIDs prescribed were 566. In that, 43.90% of Diclofenac, 36.26% of Paracetamol, 27.76% of Aspirin, 21.81% of Aceclofenac + Paracetamol, 12.74% of Ketorolac, 1.98% of Bromofenac, 0.84% of Naproxen, 3.96% was Etoricoxib, 0.56% of Aceclofenac, 3.11% of Indomethacin, 2.85% of Nepafenac, 4.53% of Flurbiprofen and 3.11% of Indomethacin were prescribed. (Fig. No. 04)

Distribution based on the type of therapy
Out of 353 prescriptions, 191 prescriptions (54.10%) shows monotherapy, 75 prescriptions (21.42%) were having combination therapy and 87 prescriptions (24.42%) received both monotherapy and combination therapy. (Fig. No. 05)

Number of NSAIDs per prescription
Out of 353 prescriptions, (51.84%) 183 prescriptions consist of single NSAID, 26.34% 93 prescriptions consist of 2 NSAIDs, (11.61%) 41 prescriptions consist of 3 NSAIDs, (8.49%) 30 prescriptions consist of 4 NSAIDs and (1.69%) 6 prescriptions consist of 5 NSAIDs. (Fig. No. 06)

Route of administration of NSAIDs prescribed
In total 353 prescriptions, various route of administration of NSAIDs were found. The major route of administration was Oral 39.37% (139), Parenteral 24.07% (85), Parenteral & Oral 23.79% (84), Topical 23.79 % (92), Topical & Parenteral 2.83% (10), Topical & Oral 1.69% (6). (Fig. No. 07)
Fig. No. 03: Department wise classification (n=353)

Fig. No. 04: Distribution of NSAIDs prescribed (n=353)
Distribution based on clinical indication of NSAIDs prescribed

Out of 353 prescriptions, 35.06% (126 prescriptions) were diagnosed with Osteoarthritis, 13.59% (48 prescriptions) were diagnosed with fever, 12.74% (45 prescriptions) were diagnosed with post operative pain after surgery, 2.26% (8 prescriptions) were diagnosed with headache, 10.19% (36 prescriptions) were diagnosed with tooth pain and 25.04% (90 prescriptions) were diagnosed with others. (Fig. No. 08).
Concomitant drugs prescribed

The majority of the prescription contains anti-ulcers (gastro protective agents) (86.01%), and antibiotics (71.64%). Other prescribed drugs such as anti-asthmatics, diuretics, corticosteroids, laxatives, mucolytics, anti-diabetics, anti-anxiety, neurotonics and analgesics.

![Distribution based on the indication for NSAIDs prescribing (n=353)](image)

**Fig. No. 08: Distribution based on the indication for NSAIDs prescribing (n=353)**

![Prescribing pattern of other class of drugs (n=353)](image)

**Fig. No. 09: Prescribing pattern of other class of drugs (n=353)**
Anti-Ulcers prescribed
In this study population, Pantoprazole (46.17%) and Ranitidine (32.27%) were the widely prescribed drugs to treat ulcer. (Fig. No. 10)

Methods of prescribing pattern of NSAIDs
The non-steroidal anti-inflammatory drugs prescribed in the brand names were 53.8% and the NSAIDs prescribed in the generic names were 46.1%. (Fig. No. 11)

Discussion
This study describes the prescribing pattern of NSAIDs in a total 353 prescriptions. The present study showed that number of males 189 (54%) were using NSAIDs than females 164 (46.45%) and this was in accordance with the previous study of Kulkarni Dhananjay et al (2013) that an overall higher prevalence of NSAIDs use among male patients was (32.5%).

Our study shows a higher incidence of NSAIDs use in elderly patients aged between 60 and 69 years (32.86%). This result coincides with the study done by S Kumar et al (2016) shows (22.5%) in the age group of 41-50 years. In the prescribing pattern of NSAIDs, majority of the prescription contains Diclofenac 153 (43.90%) followed by Paracetamol 128 (36.26%) and Aspirin 98 (28%). This finding was in contrast with the study conducted by P. R.R. Vaishnavi et al (2018) shows that paracetamol (27.02%) was the mostly prescribed drug followed by diclofenac (17.84%).

The present study shows that monotherapy has been highly followed in 191 prescriptions (54.10%) and combination therapy in 75 prescriptions (21.42%). This finding was in contrast with the
study conducted by S Kumar et al (2016) shows that 77% of prescriptions consist of monotherapy. Among the total number of drugs prescribed, most of them were prescribed in the oral route in 139 prescriptions (39.37%), followed by parenteral route in 85 prescriptions (24.07%). Similar findings were seen in the study done by Humaira Farheen et al (2016) shows that 68% of NSAIDs prescriptions were prescribed in oral route. The majority of the prescription contains only one NSAID (51.84%) followed by 2 NSAIDs (26.34%) these results coincides the study conducted by Pravinkumar Ingle et al (2015). The NSAIDs prescriptions were more predominantly found in the orthopaedics department. This finding was in accordance with the study conducted by A D Paul et al (2004) and the common indication for NSAIDs prescribed in our study include osteoarthritis in 126 patients (35.69%). Our findings was in accordance with the study conducted by Sam Anbu Sahayam et al (2016) study showed that out of 92 patients, 53 (57.60%) patients were males and 39 (42.4%) patients were females.

In our study we see that NSAIDs were invariably co-prescribed along with anti-ulcer drugs (gastro protective agents) in order to overcome the NSAIDs induced gastrointestinal toxicity in the form of peptic ulcer and gastrointestinal bleeding in 304 prescriptions (86.11%). This result was in accordance with the study conducted by Humaira Farheen et al (2016). In this study proton pump inhibitors were the most commonly prescribed gastroprotective agents followed by H₂ antagonists which shows similar results in the study done by Raghavendra B et al (2009). The other class drugs used concomitantly in this study were antibiotics, anti-platelets, vitamins, anti-histamines, corticosteroids and it shows the similar results in the study conducted by S Kumar et al (2016) were antibiotics and vitamins. Prashker MJ and Meenan RF (1995) examined the total cost of drug to be consist of 3 components i.e. the actual cost of drug, the cost of monitoring patients for side effects of the drugs and the cost of treating the side effects.

Findings of our study shows the general trend observed in NSAIDs prescription pattern where non-selective NSAIDs constitute the major bulk of prescription. The prescribing pattern of NSAID revealed that Diclofenac was the commonly prescribed drug. High prevalence of GPAs co-prescription with PPI such as Pantoprazole was noted and co-prescribing of gastroprotective agents should be necessary to follow international health guidelines regarding patient health safety. The results demonstrated that cost of some NSAIDs brands were relatively high when compared with the generic drug. These expensive drugs will lead to economic burden to poor and middle class people. Treating NSAIDs induced side effects will also increase the financial burden of the people.

**Conclusion**

The concomitant use of NSAIDs and other medications revealed the possibility of drug interactions, medication error and adverse drug reactions in the patients. Cost comparison study recommends the use of generic medications in place of branded drugs as it may decrease the economic burden of the patient. It is therefore recommended that physicians and healthcare professionals should review the drug policies and prescribing habits in order to avoid side effects and high cost of drugs. Further investigations and improvement are required in the areas like unique guidelines in the rational use of drugs. Participation of well trained clinical pharmacist in ward rounds which will reduce the incidence of drug related problems. Limitation of the study is the short duration (six months), hence effect of seasonal variation on NSAIDs prescription pattern could not be determined.

**Reference**


Indexed by - Scientific index, Research bible, Jour–Informatics, Google Scholar, Inno-space.org, Cosmos: Germany