



## DRUG UTILIZATION EVALUATION OF ANALGESICS AMONG IN - PATIENTS OF TERTIARY CARE HOSPITAL

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### ABSTRACT

**Introduction:** Analgesic is a drug which selectively reduces or relieves the pain sensation by acting on CNS or peripheral system without altering consciousness. **Objectives:** The fundamental objective of our study is to evaluate the drug use pattern among the inpatient in a tertiary care hospital. **Methodology:** A cross-section study was carried out among 200 in-patients in a tertiary care hospital Bangalore. The patient data were collected from the patient case profile and prescriptions and noted in a data form. The data were analyzed to find out the demographic detail, number of analgesics prescribed per patient, analgesic which are commonly prescribed, co-morbidities of patients, frequency of interaction and patient with discharge medication. Patient with or without co-morbidities state were also included. **Results:** In 200 patients with analgesic, majority number of patient i.e., 57% was males (114) and 86 (43%) were females. The usual co-morbidities were Diabetes, Hypertension in which 30% were with comorbidities and 70% were without comorbidities. The most frequently prescribed analgesic drugs were paracetamol (58%), tramadol (26.5%), diclofenac (23%) followed by aceclofenac (10.5%). The distribution of use analgesic of analgesic was more in orthopedic (38%) and less in general medicine (7%). The duration of analgesic prescribed for less than 3 days was 99 and 4-6 days was 93 and 7-10 was 8 patients. **Conclusions:** The present research studies give important recommended views into overall pattern of analgesic drugs used in inpatient in a tertiary care hospital. The analgesic was prescribed mostly and more frequently was paracetamol (58%) and tramadol was 26.5%. To avoid the unnecessary use of analgesic drugs physician should be encourage decreasing use of generic name which may increase incidence of other health problems.

**KEYWORDS:** Analgesics, Drug utilization evaluation, OTC.

### INTRODUCTION

Drug utilization evaluation (DUE) was defined by the world health organization (WHO) in 1997 as the marketing, distribution, prescription and use of drug in a society with emphasis on the resulting medical, social and economic consequences.<sup>[1]</sup> Predetermined standards are used to assess the quality of medication prescribing before administrative or educational actions are implemented to change patterns of drug usage that do not meet these standards. The effectiveness of these interventions will be measured as part of the program.<sup>[2,3]</sup> Adverse drug responses and noncompliance with medications are common reasons for adult and pediatric hospitalizations.<sup>[4,5,6]</sup> DUE enables us to better understand how and why medicines are used in the way that they are, allowing us to improve drug usage and

health outcomes. DUE has the potential to aid the health-care system in better understanding, interpreting, and administering medications. DUE data could help health-care organizations and hospitals create instructional programs to improve prescribing and drug usage.<sup>[7]</sup>

### QUALITY OF USE

This is evaluated by comparing actual use to national prescription recommendations or local drug formularies, as determined by audits. The choice of drug (compliance with recommended assortment), drug cost (compliance with budgetary recommendations), drug dosage (awareness of inter-individual variations in dose requirements and age-dependence), awareness of drug interactions and adverse drug reactions, and the proportion of patients who are aware or unaware of the

costs and benefits of the treatment are all examples of quality of drug use indices.<sup>[8]</sup>

### DETERMINANTS OF USE

User characteristics (for example, socio demographic parameters and attitudes toward medications), prescriber features (for example, specialty, education, and variables influencing therapeutic decisions), and pharmacological characteristics are among them (eg; -therapeutic properties and affordability).

### OUTCOMES OF USE

These include the health outcomes (benefits and drawbacks) as well as the financial implication.<sup>[8]</sup>

**PAIN:** - Pain is one of the most prevalent complaints, which is a distressing emotional and sensory experience linked to existing or potential tissue injury.<sup>[9,10]</sup>

Pharmacological therapies involve the use of non-opioid and opioid analgesics to reduce the production of pain mediators at the site of tissue damage while also working at higher brain areas to limit the pain's effective components.<sup>[11]</sup>

### ANALGESICS

Analgesics are pain relievers that do not inhibit nerve impulse conduction or change sensory function significantly.<sup>[12]</sup> Non-steroidal anti-inflammatory medications (NSAIDs) are a class of analgesics that are extensively used in clinical practice to treat acute and moderate pain and inflammation.<sup>[13]</sup>

NSAIDs are the most commonly used for the effective management of pain and inflammation, and they are the most widely prescribed class of medication in the world. They are also available over-the-counter. By interfering with the cyclooxygenase (COX) pathway, which involves the enzyme (COX) converting arachidonic acid to prostaglandins, the researchers were able to accomplish their goal. Two isoforms of the COX enzyme exist. COX-1 and COX-2 are two of the most common cytochrome oxidase enzymes.<sup>[14]</sup> The COX-1 enzyme is a constitutive enzyme that regulates physiological processes such stomach mucus production, kidney water excretion, and platelet formation. COX-2, on the other hand, is involved in the production of prostaglandins for the inflammatory response. Despite the widespread use of traditional NSAIDs as analgesics, antipyretics, and anti-inflammatory medicines in clinical practice, their

gastrointestinal toxicity remains a significant therapeutic restriction. This side effect is linked to their ability to suppress COX-1 in the GI tract. Following that, selective CoX-2 inhibitors emerged as potentially gastro-friendly NSAIDs, and it was hypothesised that selective CoX-2 inhibition provides sufficient therapeutic effect.<sup>[15]</sup> These CoX-2 inhibitors appear to be a solution to NSAID-related GI complications at first appearance. Post-marketing experience, on the other hand, revealed a number of negative cardiovascular consequences. Recent evidence of severe cardiovascular events associated with the use of CoX-2 selective inhibitors has raised concerns among prescribers and patients alike.<sup>[16]</sup> Opioid analgesics have a wide range of side effects, such as respiratory depression, nausea, vomiting, and disorientation. Constipation, increased pressure in the biliary tract, urine retention, and hypotension are all symptoms of mental clouding, dysphonia, and pruritus.<sup>[17]</sup> Tramadol is a commonly prescribed opioid analgesic in orthopedics. Tramadol is a mild opioid receptor agonist and a synthetic codeine analogue. The inhibition of norepinephrine and serotonin uptake contributes to the drug's analgesic effect. Tramadol is just as effective as morphine or meperidine for treating mild to moderate pain. Moreover people are using OTC medication more frequently as painkiller. People are nowadays taking OTC analgesic directly from the pharmacy without knowing the side effects and adverse affect of the drugs which may causes severe consequences to the patient.

### MATERIALS AND METHODS

A cross-sectional study was conducted at Saphthagiri Institute of Medical Science and Research Centre, Bangalore-90 for a period of six months. Around 200 patients for whom at least one analgesic is prescribed were included in the study after obtaining their consent in a pre-designed consent form. The Patient case sheet, medication chart and laboratory data were reviewed. The data required for the study has collected by reviewing the prescription list and patient case sheet. The data collected have noted in a self-designed patient data collection form. The statistical analysis of collected data was performed using IBM SPSS version 26 statistical software.

### RESULTS

#### GENDER DISTRIBUTION

Out of 200 cases selected 114 (57%) was found to be males and 86 (43%) females respectively.

**Table 1: Patient distribution on gender.**

GENDER	NO. OF PATIENTS[N=200]	PERCENTAGE OF PATIENT
MALE	114	57%
FEMALE	86	43%

#### PATIENTS AGE WISE CATEGORIZATION

Out of 200 cases, the patients are divided into 6 categories according to their age. The patients are aged

between 41-60 years was found to be the highest (30%) admitted patient and the least (1.5%) patients were found between the age group of 81-100 years.

**Table 2: Age group distribution of study of patients.**

Age groups (years)	Number of patients	Percentage (%)
1-18	10	5%
19-25	16	8%
26-40	57	28.5%
41-60	60	30%
61-80	54	27%
81-100	3	1.5%

#### DEPARTMENT WISE DISTRIBUTION OF ANALGESIC

The majority of patient was admitted to ORTHOPEDIC department which consist of 38% of total patient and least was from gynecology containing 0.5%.

**Table 3: Department wise distribution of patient.**

DEPARTMENT	NO. OF PATIENTS	% OF PATIENTS
Ortho	76	38%
Male Ward	46	23%
Female Ward	32	16%
General Medicine	14	7%
Nephrology	9	4.5%
Surgery	8	4%
Obg	4	2%
Peadriatric	3	1.5%
Psychiatrics	2	1%
Pulmology	2	1%
ICU	1	0.5%
ENT	1	0.5%
Ophthalmology	1	0.5%
Gynecology	1	0.5%

#### PATIENT WITH COMORBIDITIES

The highest number patients containing more than 2 co-morbidity diseases was 24 patients (12%) and the patient with no co-morbidities was 140 patients (70%).

**TABEL 4: Patient distribution with co-morbidities.**

COMORBIDITIES	NO. OF PATIENT	% OF PATIENT
HTN+DM+OTHER	24	12%
DM	14	7 %
HTN	9	4.5%
HYPERTHYROIDSM	2	1%
CVT	1	0.5%
IHD	2	1%
TB	3	1.5%
HYPOTHYROIDSM	3	1.5%
RA	2	1%
NO COMORBIDITIES	140	70%

#### CLASSIFICATON OF PATIENTS BASED ON DRUG THERAPY

In my study, the patients were divided on the basis of mono drug therapy and combine drug therapy.

Out of 200 patients 107(53.5%) were prescribed with mono drug therapy and 93(46.5%) were prescribed with combine drug therapy.

**Table 5: Patient with mono drug therapy and combine drug therapy.**

THERAPY	NUMBER	PERCENTAGE
Monotherapy	107	53.5%
Combine therapy	93	46.5%

### ANALGESIC PRESCRIBED FOR THE STUDY POPULATION

The majority amount of analgesic drug used paracetamol (58%) and least amount of analgesic drug was found to be celecoxib (0.5%).

**Table 6: Analgesics prescribed for study population.**

Drugs	No. Of Patient	% Of Patient
Tramadol	53	26.5%
Paracetamol	116	58%
Pcm+Tramadol	34	17%
Diclofenac	46	23%
Aceclofenac	21	10.5%
PCM+Ibuprofen	3	1.5%
Aspirin	11	5.5%
Ibuprofen	1	0.5%
Piroxicam	1	0.5%
Aceclofenac+PCM	13	6.5%
Etorcoxib	1	0.5%
Meperidine	1	0.5%
Diclofenac+PCM	4	2%
Gabapentin	1	0.5%
Pantophylline	1	0.5%
Naproxen	1	0.5%
Gabapentin+Diclo+PCM	1	0.5%
Celecoxib	1	0.5%

### FREQUENCY OF INTERACTING DRUGS

The highest amount of major analgesic drug interacting was found to be Aceclofenac +diclofenac which was

interacted in 7 patient followed by tramadol + linezoid and alprazolam + tramadol. One drug interaction was found in 16 cases with different drugs.

**Table 7: Frequency of interacting drug.**

INTERACTING DRUGS	FREQUENCY OF INTERACTION
Aceclofenac+Diclofenac	7
Tramadol+Linezoid	5
Alprazolam+Tramadol	2
Diclofenac+Enoxaprin	1
Spirolactome+Diclofenac	1
Amitryptlline+Tramadol	1
Enoxaprin+Aceclofenac	1
Aceclofenac+Budesonide	1
Aspirin+Spirolactome	1
Aspirin+Propanolol	1
Telmisartan+Ibuprofen	1
Telmisartan+Piroxicam	1
Ibuprofen+Piroxicam	1
Diclofenac+Dexamethasone	1
Terbutalline+Tramadol	1
Clarithromycin+Tramadol	1
Oxcarbazepine+Tramadol	1
Nortriptylline+Tramadol	1
Metoprolol+Diclofenac	1

### AGE GROUP OF PATIENTS WITH INTERACTION FREQUENCY

The most frequency of interaction was found in between age group of 21-40 and the least was found to be in age between 81-90.

**Table 8: Age group of patients with interaction frequency.**

AGE GROUP	FREQUENCY OF INTERACTION
1-20	0
21-40	18
41-60	12
61-80	5
81-90	2

**DURATION OF ANALGESIC PRESCRIBED**

The duration of analgesic prescribed for less than 3 days was found to be 99 which is highest in number and least

duration of analgesic was prescribed 7-10 days was 8 patients.

**Table 9: Duration of analgesic prescribed.**

DURATION OF DAYS	FREQUENCY OF ANALGESIC
LESS THAN=3	99
4-6	93
7-10	8

**ANALGESIC AS DISCHARGE MEDICATION**

The analgesic aceclofenac was prescribed more frequently as discharged medication and least was avil tramadol and diclofenac with PCM.

**Table 10 Analgesic as discharge medication.**

ANALGESIC	NO. OF PATIENT
ACETAMINOPHEN	13
TRAMADOL	1
AVIL	1
ACECLOFENAC	15
DICLOFENAC+ACETAMINOPHEN	1
DICLOFENAC	2
ULTRACET	7

**TO ASSESS INDICATION FOR WHICH ANALGESIC ARE PRESCRIBED.**

DRUGS	INDICATION
TRAMADOL	MODERATE TO SEVERE PAIN
ACETAMINOPHEN	PAIN AND FEVER
ACECLOFENAC	PAIN AND FEVER
ASPIRIN	PAIN, FEVER, ANTIPLATELET
IBUPROFEN	FEVER PAIN JIA
DICLOFENAC	ARTHRITIS AND PAIN
PIROXICAM	ARTHRITIS
ETORICOXIB	PAIN AND INFLAMATION
MEPERIDINE	MODERATE TO SEVERE PAIN
GABAPENTIN	POST-OPERATIVE NEUROPATHIC PAIN
PENTOXYPHYLLINE	CLAUDICATION TO REDUCE PAIN
NAPROXEN	ARTHRITIS PAIN
CELECOXIB	ACUTE ARTHRITIS PAIN

**TO CREAT AWARENESS ABOUT THE OTC ANALGESICS AND THEIR SIDE EFFECTS BY LONG TERM USAGE.****AWARENESS**

1. Analgesic drug do not work for all kind of pain.
2. Analgesic drug do not work for all kind of people.
3. Higher dose of analgesic are not more effective.
4. If you have been taking analgesic drugs for more than 3 months and you still have same amount of pain, they are probably not coping to work for you.

5. Make your appointment with doctor and pharmacist to discuss reviewing your medicine and find other way to live well with pain.

**SIDE EFFECTS**

Long term use of analgesic drug causes addiction (opoid analgesic) to the patient.  
Long term usage of analgesic drug makes us dependence up on the drug.

Analgesic drug may causes internal stomach bleeding (eg.aspirin), liver damage (paracetamol), kidney problem (ibuprofen), high blood pressure and stomach ulcer on their long term use.

## DISCUSSION

The study was carried out with the aim to analyses the drug utilization pattern of analgesic drugs among in-patient of tertiary care hospital. A prescription-based study is considered to be are of the most effective methods to asses and evaluate the prescribing attitude of physicians and dispensing practice of good pharmacist.

The result of my study suggest that analgesic is more prevalent in male (57%) than in female (43%) which is similar to the study conducted by Dwijenkumar Chaudhary, Babul kumarBehbarah et al., in which 61.5% male and 38.5% female were prescribed with analgesic drugs.<sup>[18]</sup>

My finding provided that analgesic drugs are mostly prescribed in the age group of 41-60(30%) which is similar to the study conducted by O. joyechandra, joymatioinam, N. debashree and losica et al., in which analgesic drugs were mostly prescribed in the age group of 41-50 years.<sup>[19]</sup>

My study shows the majority of patients were admitted to orthopedic department which is similar to the study conducted by P, Maheshwari, Praveen D, V. Rabichandra in which 46.33% was admitted to the orthopedic department.<sup>[20]</sup>

My study shows that disease condition co-morbidities affect the prevalence of analgesic drug,12% of the patient were suffer from HTN with DM and others followed by 7% suffer from only DM and least was TB, Hyperthyroidism, IHD, RA and 70% of patients didn't have any co-morbidities.

My study shows that 107(53.5%) of the patient were prescribed with mono analgesic drug therapy, followed by 93(46.5%) of the patient were prescribed as combine analgesic drug therapy which similar to the study conducted by Dwijenkumarchoudhary et al., where out of 200 study patient (55.5%) were prescribed with single analgesic.<sup>[18]</sup>

My study shows most commonly prescribed drug is paracetamol (58%) followed by Tramadol (26.5%), (23%) diclofenac, PCM with Tramadol (17%), (10.5%) aceclofenac, aceclofenac with paracetamol was 6.5% ,aspirin (5%) and Other drug (8%) which is similar to the study conducted by Abebaw teenage et al., in which paracetamol 36.9% was most prescribed followed by diclofenac (26.6%) and similar to T. Kumarasingam, et al., where Tramadol (37%) was mostly prescribed.<sup>[21][22]</sup>

In my study analysis (aceclofenac+diclofenac) was most interacting drug of the prescription in 7 patients.

In my study the most frequency of interaction was found in between age group of 21-40(18) followed by 41-60(12) and least was found to be age between 81-90(2).

In my study the duration of analgesic prescribed for less than 3days was found to be 99 which is highest in number and least durations of analgesic was prescribed in 7-8 durations was only 8 patients.

My study shows most commonly prescribed analgesic drug as discharge medication is aceclofenac.

In my study analysis for moderate to severe pain tramadol and meperidine were the most prescribed drug followed by pain and fever acetaminophen and aceclofenac, aspirin for fever and for JIA ibuprofen, for arthritis and pain diclofenac and naproxen, for arthritis piroxicam, for pain and inflammation etoricoxib, for post-operative neuropathic pain gabapentin, for claudication to reduce pain pentoxifylline and for acute arthritis pain celecoxib were prescribed.

## CONCLUSION

In the conclusion of patient result and in the studies, I have found that higher prevalence of analgesic was used in males than female. As a result, male may be more vulnerable to side effect and dependency to analgesic. Some of the gender difference is explained by greater prevalence of pain problems among male than female but there is still a significant difference in use of analgesic which has to be explained.

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