

## Assessment of the Pattern of Analgesic use Among Post-Operative Patients in A Tertiary Care Hospital: A Prospective Study

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### Abstract

**Aim:** Study of drug utilization pattern of analgesics among post-operative patients in a tertiary care hospital.

**Methods:** This prospective, observational study was conducted in Department of Pharmacology Darbhanga Medical College, Laheriasarai, Darbhanga, Bihar, India for 1 year (1 Sep 2020- 31 Aug 2021). Patients aged >18 years who underwent operative procedure in Departments of Orthopedics, General Surgery and Obstetrics & Gynecology and who were willing to participate in the study were included after taking informed consent in a pre-designed consent form. The data regarding analgesics prescribed during day 0, 1st, 2nd & 3rd post-operative days, their dose, route of administration, mono/combined therapy were collected from case sheets.

**Results:** All the patients were prescribed with injectable analgesics (Parenteral) on the day of surgery (Day 0) and also on 1st post-operative day (day1). Diclofenac was the most commonly prescribed among the injectable analgesics (49%), followed by Paracetamol (30%), Tramadol (17%) and Pentazocin (4%). On 3rd post-operative day (Day 3), number of patients prescribed with different oral analgesics has increased to 83(83%). Combination of Aceclofenac + Paracetamol (34%) was again the commonly prescribed oral analgesic followed by Paracetamol as a single drug and Tramadol + Paracetamol (13%) combination. Repeated measure ANOVA and post hoc tests showed that the overall difference in mean pain scores on VAS scale measured at 0hr post operatively were not significant between the groups with a p-value of 0.541. However Mean pain scores measured at 2 hours and 6 hours were significantly higher in Group A compared to Group B and C (VAS scale p value 0.001 and 0.041) which shows that maximum reduction in the mean pain scores in group C at 2 hrs and group B at 6 hrs respectively.

**Conclusion:** The post operative cases can be managed with conventional NSAIDs and non NSAIDs like Tramadol to little extent. These are relatively safe drugs for short course therapy (<10days), with minimal side effects. Single analgesic was used parenterally in maximum

number of cases in the early post-operative period. The prescription of drugs in brand name could be changed to Generic name.

**Keywords:** Drug utilization pattern, Analgesics, Post-operative pain, Visual analog scale.

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## Introduction

According to World Health Organization (WHO) drug utilization study is about marketing, distribution, prescription and use of medicine during a society, with special emphasis on the resulting medical, social, and economic consequences. A DUR (drug utilization review) program is an intervention within the sort of licensed, structured, and ongoing system for improving the standard of drug use within a given health care institution.[1]

Prescription pattern analysis is a part of drug utilization study; it improves the standard of prescription, reduces the adverse effects of drugs and enhances the rational use of medicine.[2] Irrational prescribing has become a worldwide issue from which developing countries are directly affected. Special knowledge and experiences are required for the utilization of certain drugs[3]

Pain is an unpleasant sensation occurring in varying degrees of severity as a consequence of injury, disease, or affective disorder. Poor pain control is unethical, clinically unsound and economically wasteful. The recent initiative of including pain as fifth sign in health care has emphasized pain assessment is equally important thereto of temperature, pulse, vital sign, and rate of respiration. Pain is usually subjective[4] Pain is the main reason now-days that patients address healthcare services. The concept of pain relief as a person's right has gained more and more ground at a worldwide level to assist overcome the barriers against efficient pain management. Confronted with this trend, health professionals must

have the knowledge regarding analgesics to assure an efficient and not the least safe pain treatment[5]

An analgesic or painkiller is any member of the group of drugs used to achieve analgesia, relief from pain[6] When choosing analgesics, the severity and response to other medication determines the selection of agent; the World Health Organization pain ladder specifies mild analgesics as its initiative. Analgesic drugs act in various ways on the peripheral and central nervous system. A variety of so-called "analgesic adjuncts" have proven efficacy for managing chronic pain[7]

Analgesics are mainly classified into opioid and non- opioid analgesics. Opioid analgesics include Tramadol, Hydrocodone, Tapentadol etc. Non-opioid analgesics include non-steroidal anti-inflammatory drugs (NSAIDs) and paracetamol (acetaminophen). NSAIDs are further divided into non-selective traditional NSAIDs (tNSAIDs) and selective cyclooxygenase (COX)-2 inhibitors[8] Analgesic choice is additionally determined by the sort of pain: For neuropathic pain, traditional analgesics are less effective, and there's often benefit from classes of medicine that aren't normally considered analgesics, like tricyclic antidepressants and anticonvulsants.

## Material and Methods

This prospective, observational study was conducted in Department of Pharmacology Darbhanga Medical College, Laheriasarai, Darbhanga, Bihar, India for 1 year (1 Sep 2020- 31 Aug 2021). Data was collected

from the case-records of the in-patients admitted for undergoing any surgical procedure in the Departments of Orthopedics, General Surgery and Obstetrics & Gynecology. Ethical clearance was obtained from the Institutional Ethical Committee. Patients aged >18 years who underwent operative procedure in Departments of Orthopedics, General Surgery and Obstetrics & Gynecology and who were willing to participate in the study were included after taking informed consent in a pre-designed consent form. The data regarding analgesics prescribed during day 0, 1<sup>st</sup>, 2<sup>nd</sup> & 3<sup>rd</sup> post-operative days, their dose, route of administration, mono/combined therapy were collected from case sheets.

### Post-operative period

To study the preferred analgesic pattern based on Visual Analog Scale (VAS), patients treated with single drug (monotherapy) on the day of surgery (Day 0), either Paracetamol intravenous infusion, Diclofenac intravenous as a bolus or intramuscular or Tramadol intravenous infusion or intramuscular route were divided into three groups - Group A, Group B and Group C respectively. Assessment of pain was done by using Visual Analogue Scale (VAS). The time of arrival in the

postoperative ward was defined as zero hour postoperatively and the scores were recorded at 0 hrs, 2 hrs, 6 hrs and 12 hrs of the post-operative period with the help of a post-graduate from the department of Anaesthesia to obtain the preferred analgesic pattern.

### Results

100 patients were selected from the post-operative wards of Orthopedics (35, 35%), General Surgery (30, 30%) and Obstetrics & Gynaecology departments (34, 35%). All the patients were prescribed with injectable analgesics (Parenteral) on the day of surgery (Day 0) and also on 1<sup>st</sup> post-operative day (day1). Diclofenac was the most commonly prescribed among the injectable analgesics (49%), followed by Paracetamol (30%), Tramadol (17%) and Pentazocin (4%).

Total of 45 (45%) patients were prescribed with different oral analgesics on 2<sup>nd</sup> post-operative day (Day 2). Combination of Aceclofenac + Paracetamol (17%) was the commonly prescribed oral analgesic followed by Paracetamol as a single drug and Tramadol + Paracetamol (10%) combination. The least prescribed oral analgesic was combination of Diclofenac + Paracetamol (8%)

**Table 1: Pattern of analgesic usage on the day of surgery (Day 0)**

Drugs	Route of administration		Total	Percentage (%)
	Oral	Parenteral		
Paracetamol	-	30	30	30
Diclofenac	-	49	49	49
Tramadol	-	7	7	17
Pentazocin	-	4	4	4
Aceclofenac	-	-	-	-
Aceclofenac + Paracetamol	-	-	-	-
Tramadol + paracetamol	-	-	-	-
Diclofenac + Paracetamol	-	-	-	-
Total	-	100	100	100

**Table 2: Pattern of analgesic usage on 1<sup>st</sup> post-operative day (Day 1)**

Drugs	Route of administration		Total	Percentage (%)
	Oral	Parenteral		
Paracetamol	-	28	28	28
Diclofenac	-	52	52	52
Tramadol	-	17	17	17
Pentazocin	-	3	3	3
Aceclofenac	-	-	-	-
Aceclofenac + Paracetamol	-	-	-	-
Tramadol + paracetamol	-	-	-	-
Diclofenac + Paracetamol	-	-	-	-
Total	-	100	100	100

**Table 3: Pattern of analgesic usage on 2<sup>nd</sup> post-operative day (Day 2)**

Drugs	Route of administration		Total	Percentage (%)
	Oral	Parenteral		
Paracetamol	7	19	26	26
Diclofenac	-	24	24	24
Tramadol	-	10	10	10
Pentazocin	-	2	2	2
Aceclofenac	3	-	3	3
Aceclofenac + Paracetamol	17	-	17	17
Tramadol + paracetamol	10	-	10	10
Diclofenac + Paracetamol	8	-	8	8
Total	45	55	100	100

On 3<sup>rd</sup> post-operative day (Day 3), number of patients prescribed with different oral analgesics has increased to 83(83%). Combination of Aceclofenac + Paracetamol (34%) was again the commonly prescribed oral analgesic followed by Paracetamol as a single drug and Tramadol + Paracetamol (13%) combination. The least prescribed oral analgesic was combination of Diclofenac & Paracetamol (5%).

**Table 4: Pattern of analgesic usage on 3<sup>rd</sup> post-operative day (Day 3)**

Drugs	Route of administration		Total	Percentage (%)
	Oral	Parenteral		
Paracetamol	24	3	27	27
Diclofenac	3	10	13	13
Tramadol	-	3	3	3
Pentazocin	-	1	1	1
Aceclofenac	4	-	4	4
Aceclofenac + Paracetamol	34	-	34	34
Tramadol + Paracetamol	13	-	13	13
Diclofenac + Paracetamol	5	-	5	5
Total	83	17	100	100

On the day of surgery monotherapy was prescribed for 20 (20%) patients and 80(80%) patients received combination therapy. On 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> post-operative days monotherapy usage was increased up to 59 percent.

When considering the mode of prescribing of analgesics, the percentages of analgesics prescribed in generic names in the hospital were 12 (12%) which was low compared to the analgesics prescribed with trade name 88(88%).

**Table 5: Pattern of analgesic usage regarding route of administration**

Post-operative period	Oral	Parenteral
Day 0	0	100
Day 1	0	100
Day 2	45	55
Day 3	83	17

**Table 6: Monotherapy or combined therapy**

Analgesics	Day 0		Day 1		Day 2		Day 3	
	No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%
Monotherapy	20	20	19	19	42	42	59	59
Combined therapy	80	80	81	81	58	58	41	41
Total	100	100	100	100	100	100	100	100

**Table 7: Prescriptions with Generic name / Brand name**

Drugs	Number of prescriptions	Percentage
Generic name	12	12
Brand name	88	88
Total	100	100

Repeated measure ANOVA and post hoc tests showed that the overall difference in mean pain scores on VAS scale measured at 0hr post operatively were not significant between the groups with a p-value of 0.541. However Mean pain scores measured at 2 hours and 6 hours were significantly higher in Group A compared to Group B and C (VAS scale p value 0.001 and 0.041) which shows that maximum reduction in the mean pain scores in group C at 2 hrs and group B at 6 hrs respectively.

**Table 8: Mean pain scores using VAS scale at specific time intervals**

Post-op assessment time	Group A	Group B	Group C
0 hr	7.55	5.25	5.6
2 hrs	5.35	4.45	4.2
6 hrs	4.4	3.35	4.1
12 hrs	2.15	2.15	2.9

(Repeated measure ANOVA)

Therefore, both Tramadol & Diclofenac provided a substantial reduction in the pain intensity compared to intravenous Paracetamol infusion upto the first 6 hours postoperatively, but statistically significant difference was not found between all the three groups at 12 hours.

**Table 9: Mean pain scores at 0, 2, 6 and 12 hrs postoperatively**

VAS	Group A	Group B	Group C	p Value
0 hr	7.55	5.25	5.6	0.541
2 hr	5.35	4.45	4.2	0.001
6 hr	4.40	3.35	4.1	0.041
12 hr	2.15	2.15	2.9	0.121

## Discussion

The use of conventional NSAIDs like Diclofenac (49%) and Paracetamol (30%) was seen more in the present study. The most commonly used analgesic was Diclofenac which is in contrast with the study conducted by Dasta JF et al[9] which reported that Morphine was the commonly used analgesic in the post-operative pain management but consistent with the findings of Dashputra AV, Badwaik RT[10]

According to our study the most frequently used non- opioid analgesic was Diclofenac by both intramuscular and intravenous route followed by Paracetamol intravenously. Diclofenac was prescribed both as monotherapy and in combination therapy[11]

According to several studies the adverse effects profile of non-opioid drugs is less than that of opioid drugs.[11] The requirement of opioid analgesic in the early post-operative period can be reduced by using the non-opioid drugs.[10] Findings in this study are comparable with Dashputra AV et al, Chaudhari JS et al and Vallano A et al suggesting that, non-opioid analgesics are the preferred drugs for the treatment of postoperative pain relief[10,14]

Opioids like Tramadol, Pentazocine were prescribed as monotherapy 17% & 3% respectively only on the day of surgery with good pain control. But its use has reduced from 1st postoperative day to 3rd Post-operative day, whereas Diclofenac use remained almost the same throughout the observed period which reduced from 52% on the day of surgery to only 49% on the 3rd day showing its effective pain control.

Moreover, NLEM India, promotes prescription by generic names.[15] In our study a total of 88 prescriptions (88%) were prescribed by brand name and 12 prescriptions (12%) drugs were given by generic name which was similar to the findings observed by Tabish A et al

(84.08%) and Bhansali NB et al (51.43%).[16,17]

## Conclusion

The post operative cases can be managed with conventional NSAIDs and non NSAIDs like Tramadol to little extent. These are relatively safe drugs for short course therapy (<10days), with minimal side effects. Single analgesic was used parenterally in maximum number of cases in the early post-operative period. The prescription of drugs in brand name could be changed to Generic name.

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