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DRUG UTILISATION PATTERN OF ANALGESICS AMONG POST-OPERATIVE PATIENTS IN TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

A Drug Utilization Evaluation (DUE) study was conducted to assess analgesic prescribing patterns and measure postoperative pain intensity using the Visual Analogue Scale (VAS). This prospective observational study was carried out among in-patients of General Surgery, Orthopedics, and Obstetrics & Gynecology departments in a tertiary care teaching hospital. Pain scores were evaluated at fixed time intervals, and data were analyzed using JASP 0.18 software, with ANOVA applied to identify significant differences in mean pain scores among groups.

A total of 245 postoperative patients were included, comprising 69 males and 176 females. Among them, 125 were from Obstetrics & Gynecology, 63 from General Surgery, and 57 from Orthopedics. The most frequently prescribed analgesics were injectable combinations of Paracetamol and Tramadol, administered on the day of surgery and continued through the third postoperative day. Patients were divided into three groups based on analgesics received: Paracetamol (Group A), Diclofenac (Group B), and Tramadol (Group C). Pain assessment at 0 hours showed no significant difference between groups ($p = 0.275$), while a significant reduction in mean pain scores was observed at 6 hours, with Group C (Tramadol) reporting the lowest scores.

The study concludes that a combination of opioid (Tramadol) and non-opioid (Paracetamol) analgesics was commonly utilized for postoperative pain management. This approach demonstrated effective pain relief, indicating that multimodal analgesia can enhance recovery, minimize hospital stay, and reduce the likelihood of adverse effects when appropriately administered.

KEYWORDS: Analgesics, drug utilization evaluation, VAS, pain, postoperative.

INTRODUCTION

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, and it remains a significant global health issue. Effective pain management is essential for improving patient outcomes, particularly in the postoperative setting. The World Health Organization (WHO) emphasizes that access to pain relief is a fundamental human right, underscoring the importance of addressing this issue on a global scale.

Postoperative pain is one of the most common and significant clinical challenges, with 20–80% of patients reporting pain after surgery. When poorly managed, pain can lead to serious physical and psychological consequences, including delayed recovery, increased healthcare costs, and higher mortality rates. These challenges are especially pronounced in low- and middle-income countries, where limited resources, a shortage of trained healthcare professionals, and inadequate access to medications contribute to substandard postoperative care and prolonged patient suffering.

Accurate pain assessment is critical for effective management. Several tools are used to quantify pain, including the Visual Analogue Scale (VAS), Numerical Rating Scale (NRS), and Verbal Rating Scale (VRS). Among these, the VAS is particularly recognized for its effectiveness in assessing acute postoperative pain, providing a simple yet reliable measure of a patient's pain intensity.

Drug Utilization Evaluation (DUE) plays a vital role in optimizing pain management. DUE involves systematic, criteria-based assessments to ensure that medications are used rationally—meaning the right drug is given at the right dose, at the right time, and at the right cost. These evaluations help identify irrational prescribing practices, improve therapeutic outcomes, and address disparities in global healthcare delivery.

In terms of pharmacological options, opioid analgesics such as morphine, fentanyl, and tramadol are the cornerstone for managing moderate to severe postoperative pain. Non-opioid analgesics, including nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen, diclofenac, and acetaminophen (paracetamol), are often used in combination with opioids to reduce the required opioid dose and minimize associated side effects. NSAIDs work by inhibiting prostaglandin production, thereby reducing inflammation and pain. Administering NSAIDs before surgery—a strategy known as preemptive analgesia—can also help lower postoperative pain intensity. Additionally, selective COX-2 inhibitors such as celecoxib, etoricoxib, and parecoxib offer effective pain relief with fewer gastrointestinal side effects compared to traditional NSAIDs, as they specifically target the COX-2 enzyme involved in surgical inflammation.

Innovative techniques like Patient-Controlled Analgesia (PCA) and Acute Pain Services (APS) are transforming the landscape of pain management. These approaches empower patients to take an active role in controlling their pain, leading to more personalized and effective care with reduced risk of complications.

In conclusion, Drug Utilization Evaluation is essential in postoperative settings to ensure rational drug use, enhance patient outcomes, and tackle the global challenges of pain management. Continuous monitoring, education, and the adoption of new technologies are crucial for improving the efficacy and safety of pain treatments worldwide.

METHODOLOGY

STUDY SITE: Chigateri District Hospital (tertiary care teaching hospital) Davangere, Karnataka.

STUDY DURATION: The study was conducted for a period of 6 months.

STUDY DESIGN: Prospective and Observational Study, questionnaire-based study.

PROPOSED SAMPLE SIZE: The study was conducted on 245 patients in a tertiary care teaching hospital.

STUDY CRITERIA: The study was carried out by considering the following inclusion and exclusioncriteria.

INCLUSION CRITERIA

- Patients of either gender.
- Post-operative patients admitted in general surgery, orthopaedic and, obstetrics and gynaecology departments.
- Patients aged above 18 years.

EXCLUSION CRITERIA

- Outpatient.
- Patients having missing or insufficient data.

STUDY PROCEDURE

- A prospective observational study was conducted over six months among inpatients admitted to the General Surgery, Orthopaedics, and Obstetrics & Gynaecology departments of Chigateri District Hospital, Davangere. The study was approved by the Institutional Ethical Committee of SCS College of Pharmacy. A specifically designed data collection form was used to gather comprehensive information, including patients' demographic details, medical and personal history, comorbid conditions, and the medications prescribed. Additionally, patients were provided with a patient information leaflet and assessed using a standardized pain scale to measure their pain levels.

RESULTS

5.1: DISTRIBUTION BASED ON PATIENT'S GENDER

The present study analysed the data records of 245 patients. The collected data showed that 69(28.2%) male patients and 176(71.8%) female patients were the gender distribution of the sample population.

Gender	No. of patients(n=245)	Percentage (%)
Male	69	28.2%
Female	176	71.8%
TOTAL	245	100

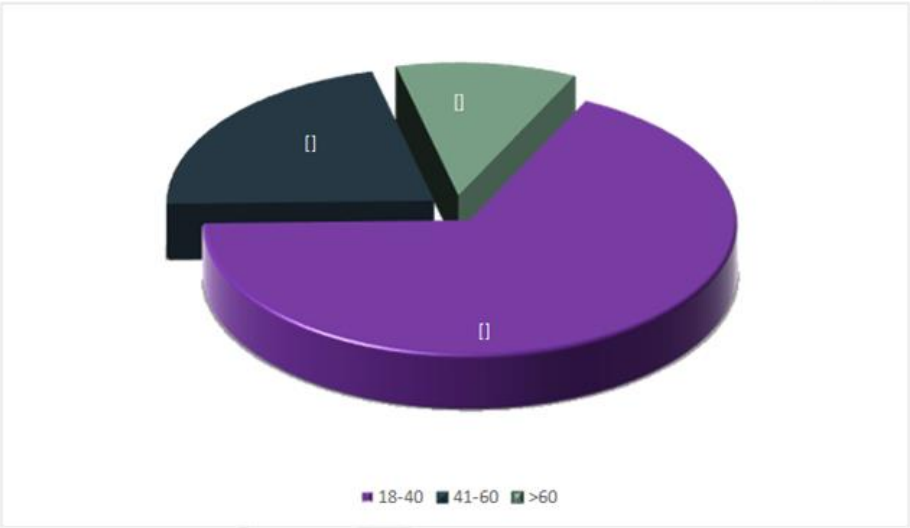
5.2: DISTRIBUTION BASED ON PATIENT'S AGE

The mean age of the 245 patients was 37.89. The majority of the patients belonged to the age group 18-40(67.4%), followed by 41-60(21.6%) and >60(11%).

5.3: DISTRIBUTION BASED ON DEPARTMENT

Considering all the inclusion and exclusion criteria, the majority of the patients were from Obstetrics and gynaecology 125(51%), followed by general surgery 63(25.7%) and orthopedics 57(23.3%), making obstetrics and gynaecology a key contributor to the overall analysis.

Department	No. of patients(n=245)	Percentage (%)
General surgery	63	25.7%
Orthopedics	57	23.3%
Obstetrics & Gynaecology	125	51%
TOTAL	245	100

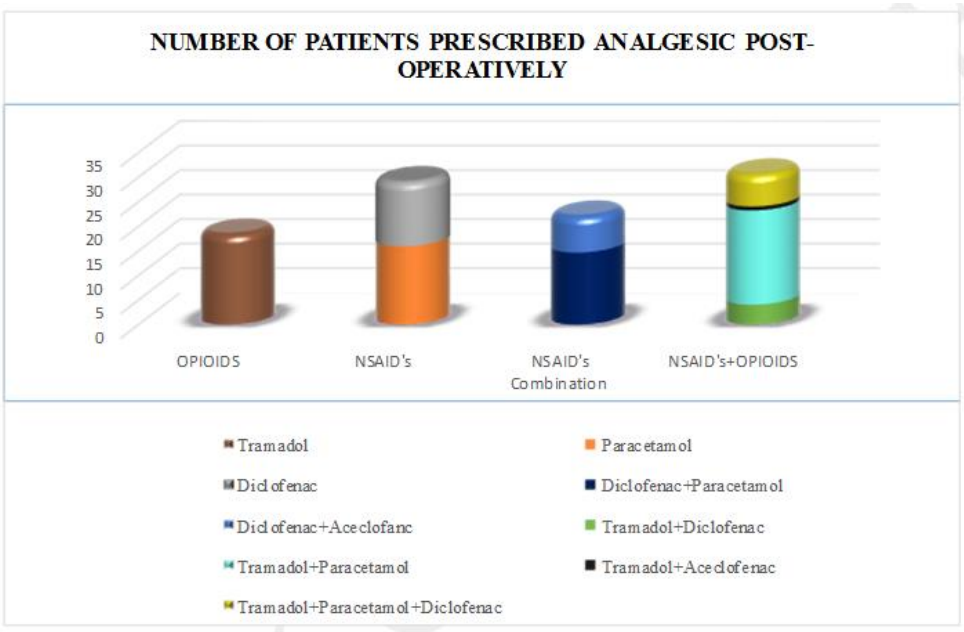


5.4: DISTRIBUTION BASED ON TYPES OF OPERATIVE PROCEDURES

There were 14 types of operative procedures that were recorded. The most common operative procedure performed was Caesarean section in 111 (45.3%) patients followed by CRIF/ORIF in 50 (20.40%), Appendectomy in 23 (9.38%), Cholecystectomy in 14 (5.70%), Hysterectomy in 11 (4.48%), Exploratory laparotomy in 10 (4.08%), Hernioplasty in 9 (3.70%), Thyroidectomy in 6 (2.44%), Arthroplasty in 4 (1.70%), Patellectomy in 2 (0.81%), Excision biopsy in 2 (0.81%), Cystectomy in 1 (0.4%), Gastrojejunostomy in 1(0.4%), and External fixation in 1(0.4%)patients.

Type of operative procedure	No. of patients (n=245)	Percentage (%)
LSCS*	111	45.30%
Hysterectomy	11	4.48%
Cystectomy	1	0.4%
Appendectomy	23	9.38%
Hernioplasty	9	3.70%

Cholecystectomy	14	5.70%
Thyroidectomy	6	2.44%
Exploratory laparotomy	10	4.08%
Gastrojejunostomy	1	0.4%
Excision biopsy	2	0.81%
CRIF/ORIF*	50	20.40%
Arthroplasty	4	1.70%
Patellectomy	2	0.81%
External fixation	1	0.4%
total	245	100



5.5: NUMBER OF PATIENTS PRESCRIBED ANALGESIC POST-OPERATIVELY

patient were prescribed post-operatively, 45 were opioid analgesics 71 patients were prescribed NSAIDS, 75 patients were prescribed opioid and NSAID's combination and 54 were prescribed NSAID's combinations.

5.6: PATTERN OF ANALGESIC USAGE ON DAY 0 OF SURGERY

All the patients were prescribed injectable analgesics (parenteral) on the day of surgery. (day 0).

Drugs	Route of administration		Total	Percentage
	Oral	Parenteral		
Paracetamol	-	35	35	14.28%
Diclofenac	-	31	31	12.65%
Tramadol	-	46	46	18.77%
Paracetamol+Diclofenac	-	45	45	18.4%

Tramadol+Diclofenac	-	17	17	6.93%
Tramadol+Paracetamol	-	55	55	22.44%
Aceclofenac+Diclofenac	-	-	-	-
Tramadol+Diclofenac+Paracetamol	-	16	16	6.53%
TOTAL	-	245	245	100

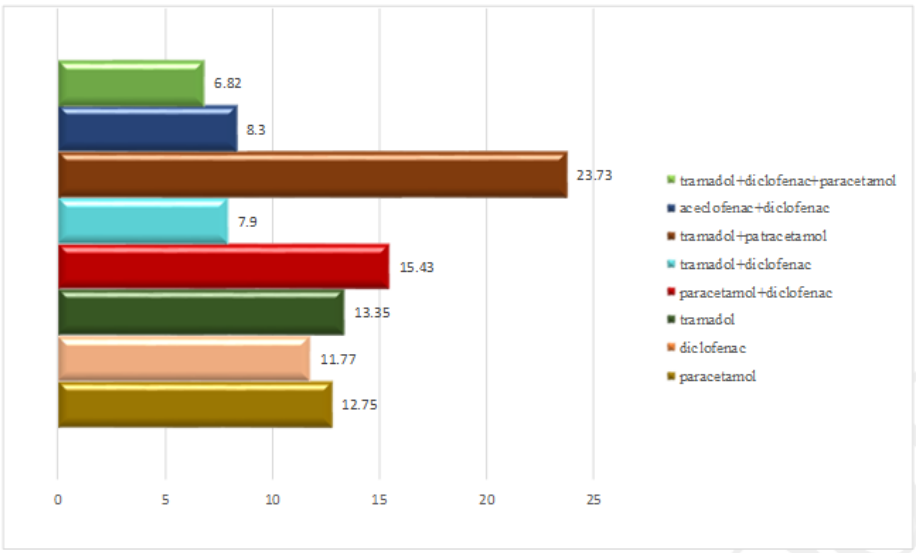
5.7: PATTERN OF ANALGESIC USAGE ON THE FIRST POST-OPERATIVE DAY (DAY 1)

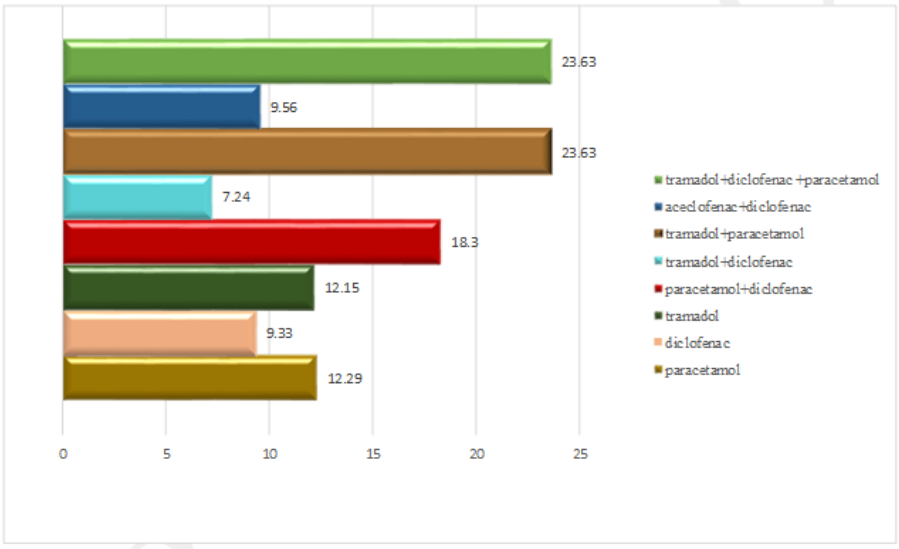
On the first post-operative day (Day 1), Paracetamol + Tramadol was the most commonly prescribed among the injectable analgesics (27.20%), followed by Paracetamol + Diclofenac (20.97%), Tramadol (13.52%), Paracetamol (12.8%), Diclofenac (9.57%), Tramadol + Diclofenac + Paracetamol (8.35%) and Tramadol + Diclofenac (7.59%).

Drugs	**Route of administration**		**Total**	**Percentage**
	Oral	**Parenteral**		
Paracetamol	-	84	84	12.8%
Diclofenac	-	63	63	9.57%
Tramadol	-	89	89	13.52%
Paracetamol+Diclofenac	-	138	138	20.97%
Tramadol+Diclofenac	-	50	50	7.59%
Tramadol+Paracetamol	-	179	179	27.20%
Aceclofenac+Diclofenac	-	-	-	-
Tramadol+Diclofenac+Paracetamol	-	55	55	8.35%
TOTAL	-	658	658	100

5.8: PATTERN OF ANALGESIC USAGE ON THE 2ND POST-OPERATIVE DAY (DAY2)

A total of 732 analgesics were prescribed on 2nd post-operative day (DAY2). Tramadol+Paracetamol (23.63%) was the most frequently prescribed proceeded by Paracetamol+Diclofenac(18.3%), Paracetamol(12.29%), Tramadol(12.15%), Aceclofenac+ Diclofenac(9.56%), Diclofenac(9.33%), Tramadol+Diclofenac+Paracetamol(8.5%), and Tramadol+Diclofenac(7.24%).





5.9: PATTERN OF ANALGESIC USAGE ON THE 3rd POST-OPERATIVE DAY (DAY3)

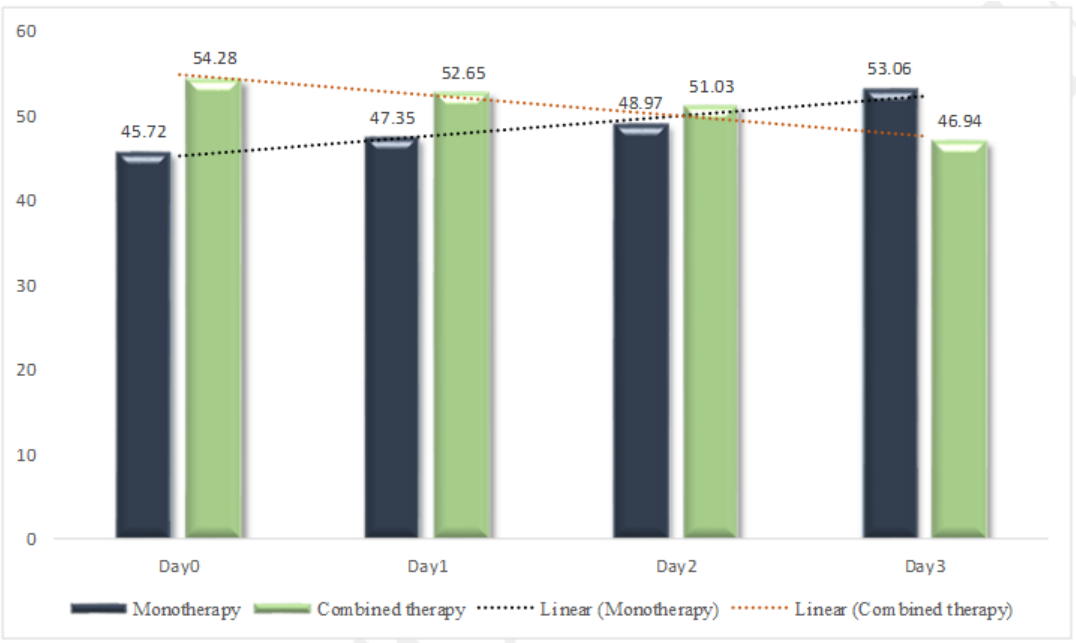
A total of 674 analgesics were prescribed on the 3rd post-operative day (DAY2. Tramadol+Paracetamol (23.73%) was the most frequently prescribed proceeded by Paracetamol+Diclofenac(15.43%), Tramadol(13.35%), Paracetamol(12.75%), Diclofenac(11.72%), Aceclofenac+Diclofenac(8.30%), Tramadol+Diclofenac(7.9%),and Tramadol+Diclofenac+Paracetamol(6.82%).

5.10: PATTERN OF ANALGESICS USED REGARDING ROUTE OF ADMINISTRATION

All the patients were prescribed injectable analgesics (Parenteral) on Day 0 and also on Day 1. A total of 52(7.10%) oral analgesics and 680(92.9%) parenteral were prescribed on Day 2.

On Day 3, 108 (16.02%) and 566(83.98%) oral and parenteral analgesics were prescribed respectively.

Route of administration	DAY 0		DAY1		DAY2		DAY3	
	No. of analgesic	%	No. of analgesic	%	No. of analgesic	%	No. of analgesic	%
Oral	0	0	0	0	52	7.10	108	16.02
Parenteral	245	100	658	100	680	92.9	566	83.98
Total	245	100	658	100	732	100	674	100



5.11: MONOTHERAPY OR COMBINED THERAPY

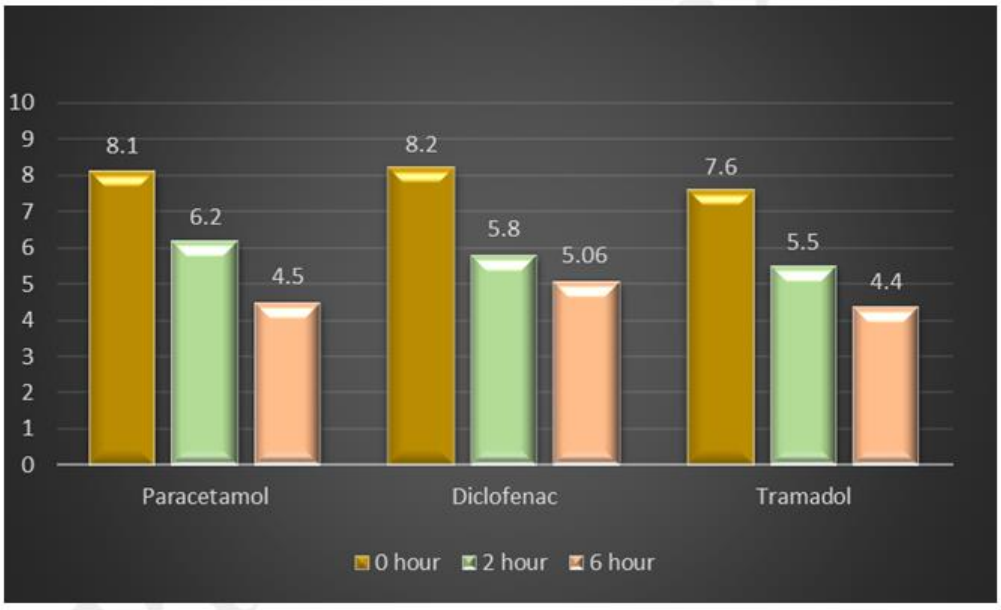
On the day of surgery, monotherapy was prescribed for 112 (45.72%) patients and 133(54.28%) patients received combination therapy followed by 116(47.35%) monotherapy and 129(52.65%) combined therapy on 1st post-operative day, 120(48.97%) monotherapy and 125(51.03%) combined therapy on 2nd post-operative day, and 130(53.06%) monotherapy and 115(46.94%) combined therapy on 3rd post-operative day. On the 1st, 2nd, and 3rd post-operative days monotherapy usage was increased up to 53.06% in the meantime combination therapy was decreased to 46.94%.

5.12: MEAN PAIN SCORE USING VAS SCALE AT SPECIFIC TIME INTERVALS

To study the preferred analgesic pattern based on the Visual Analog Scale (VAS), patients treated with a 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 the Visual Analogue Scale (VAS). The data represents the effectiveness of pain relief from paracetamol, Diclofenac and Tramadol at different time intervals (0 hours, 2 hours and 6 hours of post-operation).

Repeated measure ANOVA and post hoc tests showed that the overall difference in mean pain scores on the VAS scale measured at 0-hour post operatively was not significant between the groups with a p-value of 0.275. At 2 hours, the mean pain scores of Groups A, B and C have reduced with Group B showing a more significant reduction. At the 6-hour mean pain score continued to decrease across all the groups, with Group A and Group C appearing to be more significant than Group B, with Group C showing the lowest pain score of 4.41 as shown in Table no.5.12.1 and Table no.5.12.2.



DISCUSSION

Postoperative pain is a significant aspect of the surgical experience for most patients, with many continuing to experience moderate to severe pain after surgery. Effective pain control is essential in the care of surgical patients, as inadequate management not only causes unnecessary suffering but may also lead to increased morbidity or mortality. Therefore, proper pain management is a critical concern for both healthcare professionals and society. This prospective observational study, conducted over six months in the departments of obstetrics and gynaecology, orthopedics, and general surgery at a tertiary care teaching hospital, aimed to evaluate the drugs used in pain management, determine the number and

pattern of pharmacological treatments, and assess the effectiveness of pain control using the Visual Analogue Scale (VAS).

A total of 245 patient charts were reviewed, with 69 males (28.2%) and 176 females (71.8%), a distribution similar to that reported by I.M. Massad et al. The majority of patients (67.4%) were aged between 18 and 40 years, consistent with findings by Hiral Golakiya et al. Among the cases, obstetrics and gynaecology accounted for the highest proportion (51%), followed by general surgery (25.7%) and orthopedics (23.3%), aligning with results from Daradi Das et al. The most common surgical procedures were lower segment cesarean section (LSCS) at 45.3% and closed/open reduction with internal fixation (CRIF/ORIF) at 20.4%, similar to findings by Mohna M. Toro et al.

A total of 390 analgesics were prescribed, averaging 1.59 analgesics per patient postoperatively. Of these, 75 patients received a combination of opioids and NSAIDs, while 71 were prescribed NSAIDs alone, contrasting with the findings of Prakruti P. Patel et al. The most frequently prescribed analgesic combination was Paracetamol + Tramadol, used consistently on the day of surgery and the first three postoperative days, in line with the study by Sumana Sen et al. Opioid analgesics are particularly effective in addressing both the sensory and affective components of pain, while non-opioid drugs are more effective for inflammation-related sensory pain.

All patients received injectable (parenteral) analgesics on Day 0 and Day 1, consistent with Daradi Das et al., while both oral and parenteral forms were administered on Days 2 and 3. A gradual increase in monotherapy prescriptions was observed over the postoperative period, mirroring the trend reported by Chandrakanth T et al. Although the overall difference in mean VAS pain scores at 0 hours postoperatively was not statistically significant ($p = 0.275$), even small reductions in pain can be clinically meaningful, contributing to patient comfort and satisfaction. At six hours postoperatively, mean pain scores continued to decline across all groups, with Groups A and C showing more significant reductions than Group B, a finding that contrasts with previous studies.

CONCLUSION

This is a prospective observational study which throws some light regarding the prescribing trend for analgesics, the combination used and their route of administration. From the study it was observed that majority of the patients were admitted to Obstetrics & gynaecology

department followed by General Surgery and Orthopaedics. In the study 14 types of operative procedures were recorded. The most common operative procedure performed was Caesarean section followed by CRIF/ORIF. The most commonly prescribed analgesic for post-operative patients is the combination therapy of Paracetamol and Tramadol and the most prescribed monotherapy is Tramadol. Drug utilisation studies when done periodically, can improve the quality of life of the patient as well as help in the modulation of analgesic therapy. By assessing the VAS using ANOVA and post hoc test, it showed that the overall difference in mean pain scores on VAS scale measured at 0 hr, 2 hr and 6 hr are clinically significant even if the p value of the mean pain score between the groups is not statistically significant. Current acute pain management focuses on the importance of achieving pain relief to decrease post-operative complications, rather than dealing with the fear of opioid-related life-threatening side effects.

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AUTHOR'S CONTRIBUTION

All the authors have contributed equally.

CONFLICT OF INTEREST

All authors declare that there are no conflicts of interest.

ETHICS DECLARATION

The Institutional Ethics Committee at SCS College of Pharmacy approved the protocol. All residents in the hospital provided informed consent.

CONSENT FOR PUBLICATION

All authors have consented to the publication of their work.

COMPETING INTERESTS

The authors hereby declare that they did not obtain any financial support from any source for the writing, or publication of this article.

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