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Original Research Article

A Prospective Observational Study on Post-operative Pain and Analgesic Requirements

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Abstract:

Background: post-operative pain remains inadequately managed in many patients despite advances in anesthesia and analgesic techniques. Poor pain control adversely affects patient comfort, sleep quality, early mobilization, recovery, and satisfaction, highlighting the need to evaluate existing pain management practices.

Objectives: To assess post-operative pain intensity, analgesic requirements, patient satisfaction, and analgesic-related complications in patients undergoing major surgical procedures.

Methods: A prospective observational study was conducted over four months in the Department of Anesthesiology at various tertiary centre in Ranchi, Jharkhand India. One hundred adult patients undergoing major surgeries across various specialties were included. Data were collected from case records and bedside assessments in the post-operative ward. Variables recorded included demographic details, surgical and anesthetic characteristics, analgesic modalities used, pain intensity, sleep quality, patient satisfaction, delays in analgesic administration, and adverse effects. Data were analyzed using descriptive statistics.

Results: A significant proportion of patients experienced moderate to severe post-operative pain at rest and during movement. Poor sleep quality due to pain was reported by more than half of the patients. Transdermal fentanyl patches were the most used adjunctive analgesic modality, while epidural analgesia, regional nerve blocks, and patient-controlled analgesia were underutilized. Only one-third of patients were fully satisfied with pain management, and 16% reported delays in receiving analgesics. Analgesic-related adverse effects, particularly drowsiness and postoperative nausea and vomiting, were frequently observed.

Conclusion: Post-operative pain management was suboptimal. A structured, protocol-based acute pain service emphasizing standardized pain assessment, multimodal analgesia, and timely intervention is required to improve patient outcomes.

Keywords: Acute Pain Service, Analgesic Requirement, Multimodal Analgesia, Post-Operative Pain, Patient Satisfaction.

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Introduction

Surgical operation wounding is a phenomenon that we have to accept and put up with. Pain after surgery is the direct result of neural sensitization among others and the consequent inflammatory response [1]. No matter how far surgical methods, anesthesia and pharmaceutical pain control have advanced, post-operative pain continues to be a global issue, not only affecting a considerable number of patients but also being improperly managed in most cases. Uncontrollable and poorly managed post-operative pain is the main cause of patients' discomfort and distress. Moreover, it is the reason for delayed recovery, hospital stays, and frequent surgeries that are more costly and risky due to complications [2].

Pain after surgery can be understood as a phenomenon that is complex and multi-faceted, which has impacts of various nature on the patient's physical, psychological, and social domains depending on the factors mentioned above [3]. The pain experience is subjective and varies so much among people that it becomes very difficult to assess and manage it properly [4]. Oddly enough, quite the opposite; it is difficult to define and manage pain thus a very delicate part of the surgery is post-operative pain control. However, it is crucial for mobilizing the patient early, better respiratory function, and a weaker stress response, thus overall wider area of patient satisfaction and quality of care [5].

Post-operative pain relief mainly relies on analgesic therapy. A variety of medicinal products are used, with non-opioid analgesics like paracetamol and NSAIDs, opioids, and adjuvant medications [6] all included in the list of those pharmacological agents. The application of multimodal analgesia, which entails the administration of two or more pain relievers with different mechanisms of action, has been greatly endorsed to give better pain relief and at the same time to decrease the incidence of drug-related side effects [7]. The selection, dosing, timing, and blending of analgesics, however, often differ quite a lot depending on the type of surgery, the hospital, and the particular practitioners involved [8].

The assessment of post-operative pain is regularly done by means of validated pain measurement tools, such as the Visual Analog Scale (VAS), Numerical Rating Scale (NRS), or Verbal Rating Scale (VRS) [9]. These tools allow for objective recording of pain intensity and make it possible to relate reported pain levels to the administered analgesic therapy. Pain scores in relation to analgesic requirement are a good source of information regarding the effectiveness of present pain management strategies. [10].

Consequently, the current observation study will assess the degree of post-operative suffering and the related need for painkillers in surgical patients, intending to shift the focus towards better pain management techniques, patient comfort, and faster recovery after surgery.

Methodology

Study Design: This research was projected as a prospective observational study done to assess the pain experienced after surgery and the need for analgesics in patients having major surgical procedures.

Study Setting

A prospective observational study was conducted over four months in the Department of Anesthesiology at various tertiary centre in Ranchi, Jharkhand India

Study Period

Over a span of 4 months, the research was carried out and during this period, eligible patients were prospectively recruited and monitored in the early post-operative stage.

Study Population: The authors included in their study patients who went through major surgeries in different surgical specialties and who were already in the postoperative wards for their recovery at the time the study was conducted.

Sample Size: A total of 100 patients were included in the study after meeting the predefined inclusion criteria.

Selection Criteria

Inclusion Criteria

- Patients aged ≥18 years
- Patients undergoing major surgical procedures under general or regional anesthesia
- Patients admitted to the post-operative ward for observation and pain management
- Patients willing to participate in the study

Exclusion Criteria

- Patients undergoing minor surgical procedures
- Patients with altered sensorium or inability to communicate pain
- Patients requiring mechanical ventilation post-operatively
- Patients with chronic pain disorders or long-term opioid use

Data Collection: Data for the current investigation were collected in a prospective manner from patients' case records and through bedside assessments conducted in the post-operative recovery unit. Demographic information like age and sex, type and duration of surgery, and anesthetic method were among the key parameters logged. The post-operative analgesic regimen was documented, including both routinely given and rescue analgesics, the frequency and type of rescue medications used were also noted. Pain intensity as reported by the patient was assessed also. Pain-related factors were systematically processed in tables to determine whether analgesic management was adequate or not.

Assessment of Pain Management: The current pain management techniques were assessed by correlating the patients' postoperative pain reports with the analgesic regimen prescribed. The evaluation of the existing pain management system was conducted through the identification of:

- Incidence of inadequate pain control
- Delays in analgesic administration
- Need for rescue analgesics
- Variability in analgesic prescribing patterns

Outcome Measures

The primary measure was the adequacy of post-operative pain control. Secondary outcomes included:

- Analgesic requirements in the post-operative period
- Identification of deficiencies in current pain management practices
- Need for modification of existing pain management protocols

Quality Improvement Framework: The investigation suggested the necessity of a policy change for better quality in post-operative pain management areas because of the already mentioned

shortcomings. A comprehensive and structured approach to the execution of these modifications was presented which included the idea of a new Acute Pain Service (APS) team. The implemented model revolved around constant patient evaluation, rule-based painkiller dispensing, and proper supervision in order to enhance the results for the patients.

Statistical Analysis: The influx of data was first put into a structured template and then subjected to analysis through descriptive statistics. Continuous variables, for example, age and length of surgery, were portrayed by mean and standard deviation, while frequencies and percentages were used for categorical variables like gender, surgery type, anesthesia type, and analgesic regimen. Postoperative pain ratings, sleep quality, and patient satisfaction were likewise subjected to descriptive analysis to reveal trends and patterns regarding analgesic sufficiency. The data had been sorted and displayed in tables and graphs for easy visual representation and understanding.

Result

Currently, there is an ongoing prospective observational study that is assessing pain intensity after surgery, analgesic practices, patient satisfaction, and complications among a hundred patients who had major surgical procedures. The outcome of the research focuses on pain management strategies, patients' reported pain at rest and movement, sleep quality, satisfaction, and side effects due to analgesics. The results mark out considerably large areas for pain management, thus bringing forth the necessity for systematic improvement in acute post-operative pain management to be done.

Table 1: Demographic and Surgical Characteristics of the Study Population

Variable	Value
Sample size (n)	**100**
Age (years), mean ± SD	49.45 ± 13.72
Gender (Male: Female)	63:37:00
Duration of surgery (minutes), mean ± SD	246 ± 98
Surgical speciality	
– General surgery	24 (24%)
– Colorectal surgery	22 (22%)
– Hepatobiliary surgery	6 (6%)
– Endocrine surgery	5 (5%)
– Urology	15 (15%)
– Gynecology	18 (18%)
– Surgical oncology	6 (6%)

In Table 1, the dominant age group of the study population is represented by middle-aged adults with a higher ratio of males to females. The surgical interventions mostly lasted for a long time, indicating that they were of substantial nature. The cases of general and colorectal surgeries together accounted for about fifty percent of the total surgeries thus providing a good representation of the most frequently performed major abdominal operations. The variety of surgical disciplines adds to the dissemination of the results in the different fields of surgery.

Table 2: Distribution of Surgical Incision Types

Incision type	Number (%)
Midline	44 (44%)
Subcostal (unilateral)	16 (16%)
Rooftop (bilateral subcostal)	8 (8%)
Paramedian	21 (21%)
Pfannenstiel	11 (11%)

According to Table 2, the incision type that was performed with the highest frequency was midline one and its followed by paramedian and subcostal incisions. These incision types are known to be associated with moderate to severe post-operative pain because of major tissue handling. The high prevalence of such incisions points out the necessity of effective and long-lasting post-operative analgesic strategies. Incision type most probably played a big role in determining the intensity of post-operative pain in this group of patients.

Table 3: Post-operative Analgesic Modalities Used	
Analgesic modality (in addition to routine paracetamol and rescue NSAIDs)	**Number (%)**
Transdermal fentanyl patch	58 (58%)
Epidural infusion	6 (6%)
Regional nerve block (TAP block)	8 (8%)
PCA opioid infusion	0 (0%)
None	28 (28%)

Transdermal fentanyl patches were the leading adjunctive analgesic modality according to Table 3. It was surprising to see that a considerable number of patients were given routine paracetamol and rescue NSAIDs only, and no advanced pain management techniques were applied. Epidural analgesia and regional nerve blocks were not used much, whereas patient-controlled analgesia was not tried in any case. This points to the fact that there was little use made of the personalized and multimodal pain management approaches.

Table 4: Post-operative Pain Scores at Rest	
Pain severity	**Number (%)**
No pain	15 (15%)
Mild pain	56 (56%)
Moderate to severe pain	29 (29%)

As per the data displayed on Table 4, among the patients, while the majority reported mild pain at rest, still one-third indicated moderate to severe pain. The observation of substantial pain even at rest implies that along with substantial no pain more patients were on the wrong side of the poorly controlled pain situation. Thus it can be inferred that the inadequacy of pain control measures didn't only affect patient comfort but also delayed their recovery.

Table 5: Post-operative Sleep Quality	
Sleep quality	**Number (%)**
Good	18 (18%)
Moderate	27 (27%)
Little	43 (43%)
No sleep due to pain	12 (12%)

According to the information presented in Table 5, the majority of the patients had poor sleep quality after the surgery, and more than half of them reported that pain was the main reason for their suffering little or no sleep. Just a tiny proportion of the patients had good sleep. Poor sleep quality is an indicator of inadequate overnight pain control and it is a factor contributing to slower recovery and lower patient satisfaction. The results of this study underline the need for continuous analgesia, particularly during night hours.

Table 6: Patient Satisfaction and Delay in Analgesic Administration	
Variable	**Number (%)**
Satisfied	34 (34%)
Satisfied but requires improvement	44 (44%)
Dissatisfied	22 (22%)
Complaints of delay in receiving analgesics	16 (16%)

In table 6, only one-third of the patients were happy about the pain management but many them either showed their dissatisfaction or said that the pain management needed to be improved. The percentage of patients who said that they experienced delays in getting their painkillers was 16%, which indicates that there are some issues either in the system or workflow. The satisfaction of a patient seems to be dependent on the pain relief being both timely and effective. These results contribute to the necessity of improving pain management policies and expediting the delivery of analgesics.

Table 7: Complications Related to Analgesic Use	
Complication	**Number (%)**
Hypotension requiring intervention	4 (4%)
Drowsiness interfering with mobilization	22 (22%)
PONV requiring treatment	12 (12%)
Respiratory depression	4 (4%)
NSAID-related renal dysfunction	5 (5%)

As indicated in Table 7, the occurrence of adverse effects associated with analgesics was quite common, with drowsiness and postoperative nausea and vomiting being reported the most. These complications obstructed both early mobilization and total recovery. The less frequent but serious adverse effects such as respiratory depression and hypotension were, however, of clinical concern. Nevertheless, these findings highlight the very need for the use of balanced multimodal analgesia together with careful monitoring to prevent any side effects.

Discussion

The contemporary approach to perioperative care makes effective pain management after surgery an indispensable part of it. Poor pain management has a negative impact not only on the patient's physical condition but also on his/her early movement, breathing, sleep, and overall recovery. The current study was conducted in a tertiary hospital as a prospective observational study aiming at evaluating the analgesic practices of the hospital and the pain intensity of postoperative patients. It found the pain management system in place to be significantly inadequate when compared to the standards recognized internationally.

In this trial, a considerable number of patients suffering pain of moderate to severe intensity, mainly in connection with their movements were reported. Approximately 45% of the patients experiencing moderate to severe pain reported it during movement, while 29% stated that the pain was the same even when they were at rest. According to Apfelbaum et al., 2003 [1], dynamic pain is more disabling than pain at rest and is frequently undertreated in daily clinical practice. Pain during movement has a negative effect on early ambulation and physiotherapy, which in turn raises the risk of postoperative pulmonary complications and venous thromboembolism (Kehlet & Dahl, 2003). [2].

This research highlighted pain-related sleep disturbance as one of the most significant problems. Only 18% of the patients had good sleep, while more than 50% suffered from little or no sleep because of pain that persisted. Prior research has shown that there is a solid connection between uncontrolled postoperative pain and poor quality of sleep, which in turn hinders healing, adds fatigue and diminishes patient satisfaction (Wu et al., 2012) [3]. Thus, it seems that the pain control strategies applied overnight in the current system did not suffice.

The assessment of analgesic methods pointed out that there was a heavy dependence on intravenous paracetamol together with rescue NSAIDs, and 28% of the patients were not on any additional analgesic modality at that time. The lack of predefined escalation plans in the event of the failure of routine analgesics signifies a reactive rather than a proactive approach to pain management. Kehlet et al. (1999) stated that the anticipatory, multimodal analgesic planning is essential for the optimal control of postoperative pain, particularly in the case of major abdominal surgery.

Patient-controlled analgesia (PCA), which is usually considered as an effective and patient-centered approach to managing pain, was not applied to any of the patients included in this study. Many different research works have made it clear that PCA is the best choice of analgesia; it cuts down on drug delivery delays, increases patient satisfaction, and (compared with PRN prescriptions) lowers the chance of wrong opioid dosing both over and under (Grass, 2005; Hudcova et al., 2006) [14,15]. Thus, the absence of PCA points out a huge gap between the recommended practices based on scientific evidence and the clinical realities of the study site.

Similarly, the regional analgesic methods were inadequately used. While the application of transdermal fentanyl patches was quite extensive, only a tiny proportion of patients benefited from epidural analgesia or local anesthesia with the help of techniques such as transversus abdominis plane (TAP) blocks. The limited rate of epidural usage might be due to the growing worry about the occurrence of hypotension and other neuraxial side effects, as was also the case in the current research. This situation corresponds to the recent literature that reports a slow but definite move away from the use of epidurals toward the use of peripheral nerve blocks and the ultrasound-guided regional techniques owing to their being safer (Abdallah et al., 2012; Joshi et al., 2016) [16].

Drowsiness, PONV, and respiratory depression were some of the analgesic-related adverse effects observed in remarkably high rates of patients. Gan et al. in their 2014 study also found out similar situation [17], claiming that the patient's recovery and satisfaction were greatly influenced by the occurrence of opioid-related adverse effects. The severe

nature of these complications has made it necessary to resort to balanced multimodal analgesia together with constant observation and dose adjustments.

The patients' opinions revealed the major deficiencies of the system. Almost two-thirds of the respondents were either not satisfied with or regarded pain management as needing improvement. Moreover, 16% of the population mentioned that their receiving analgesics was delayed. As noted by Rawal et al., staffing shortages, high nurse-to-patient ratios, and no standing rescue prescriptions, among others, made for delayed postoperative pain relief. This study can be seen as a reflection of the present study in that regard [18].

A comparison of the pain management system with the basic standards established by the Faculty of Pain Medicine, Royal College of Anaesthetists, showed that the system failed to satisfy several critical requirements such as standardized pain assessment, timely escalation of analgesia, and availability of a dedicated acute pain service (Faculty of Pain Medicine, 2021) [19]. It is clear that these deficiencies are pointers to the necessity for an organized, system-driven quality improvement initiative.

Wendy Hirsch's change implementation framework has been chosen as the model to fill these voids in a very complete way and at the same time as a flexible one. The main focus of the mentioned framework is on the aspects of leadership, training, infrastructure, communication, and continuous monitoring which, according to the authors (Hirsch et al., 2018), are all very important for making any change in healthcare that would last). It has been proved that within similar frameworks very structured approaches have been used to such an extent that postoperative pain and patient satisfaction have improved significantly (Meissner et al., 2015) [20].

Conclusion

This observational study of past patients displays that postoperative pain still has poor control in a considerable number of cases despite the consideration of analgesic options. Patients suffering from moderate to severe pain, having poor quality of sleep and not being satisfied with pain management all show the gaps that exist in the current clinical practice. The limited application of multimodal and advanced analgesia techniques, coupled with the lack of standardized pain assessment tools and delay in the administration of analgesics, were factors behind the bad outcomes. This structured, protocol-based acute pain management service is, therefore, essential to the patients' comfort, recovery, and overall quality of post-operative care as it will be regularly assessing the pain, applying multimodal analgesia, and offering timely intervention.

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