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ORIGINAL ARTICLE

Postoperative Pain Management Strategies and Patient-Reported Outcomes Following Major Surgery in a Resource-Limited Tertiary Care Hospital in Bangladesh

A B M Forkan Ahamed[1*], Marufa Rehnuma Azad[2], Ashiqur Rahman[3], Umme Salma Atia Banu[4]

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*Corresponding Author

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ABSTRACT

Introduction: *Postoperative pain is one of the most common and challenging consequences of major surgery, and inadequate pain control may delay recovery, impair physical function, prolong hospitalization, and lower patient satisfaction. Therefore, the present study was conducted to evaluate postoperative pain management strategies and patient-reported outcomes following major surgery in a resource-limited tertiary care hospital in Bangladesh.* ***Methods & Materials:*** *This prospective observational study was conducted in the Department of Surgery in Mymensingh Medical College Hospital, Mymensingh, Bangladesh, from February 2025 to January 2026. A total of 110 adult patients undergoing major surgical procedures under general or regional anesthesia were enrolled using purposive sampling. Data were entered, checked for completeness, and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0.* ***Result:*** *Multimodal analgesia was the most commonly used postoperative pain management strategy (63.6%), while 34.5% of patients required rescue analgesia. The mean postoperative pain score decreased from 5.8±1.9 at 6 hours to 3.6±1.7 at 24 hours, with the proportion of patients reporting severe pain declining from 29.1% to 10.9%. Overall, 74.5% of patients were satisfied or highly satisfied with pain management, 69.1% achieved early ambulation, 65.5% were able to perform deep breathing and coughing comfortably, and 61.8% reported good sleep quality.* ***Conclusion:*** *The present study found that multimodal analgesia was the most frequently employed postoperative pain management strategy and was associated with generally positive patient-reported outcomes following major surgery. Postoperative pain intensity declined markedly during the first 24 hours after surgery, and the majority of patients expressed satisfaction with their pain management. Despite improvements, moderate to severe pain persisted in a notable proportion of patients.*

Keywords: *Postoperative Pain, Analgesia, Anesthesia*

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1. *Assistant Professor, Department of Anesthesia & Intensive Care, Mymensingh Medical College & Hospital, Mymensingh, Bangladesh (ORCID: 0009-0001-2257-5951)*
2. *Anaesthesiologist, Department of Anesthesia & Intensive Care, Mymensingh Medical College & Hospital, Mymensingh, Bangladesh*
3. *Assistant Professor, Department of Anesthesia & Intensive Care, OSD, Attachment to Mymensingh Medical College & Hospital, Mymensingh, Bangladesh*
4. *Assistant Registrar, Department of Burn and Plastic Surgery Unit, Mymensingh Medical College Hospital, Mymensingh, Bangladesh*

INTRODUCTION

Postoperative pain remains a major barrier to safe and satisfactory recovery after major surgery. Despite advances in surgical techniques and anesthetic practice, postoperative pain continues to be inadequately controlled in many patients worldwide. Gan (2017) reported that more than 80% of surgical patients experience acute postoperative pain, with a substantial proportion reporting moderate-to-severe pain despite receiving analgesic therapy [1]. Inadequately managed postoperative pain is associated with impaired pulmonary function, delayed mobilization, prolonged hospital stay, increased healthcare costs, reduced patient satisfaction, and a greater risk of developing chronic postsurgical pain [1,2]. Effective postoperative pain management has therefore become an essential component of perioperative care. Contemporary pain management emphasizes multimodal analgesia, combining opioids with non-opioid analgesics, regional anesthesia techniques, and non-pharmacological interventions to maximize analgesia while minimizing opioid-related adverse effects [3,4]. Evidence indicates that multimodal analgesia improves pain control, facilitates earlier ambulation, reduces postoperative complications, and enhances recovery after major surgery [4,5]. In recent years, increasing attention has been directed toward patient-reported outcomes (PROs), which provide valuable insight into patients' perceptions of pain intensity, functional recovery, emotional well-being, and satisfaction with analgesic treatment [6]. Unlike clinician-reported measures, PROs directly reflect patients' experiences and are increasingly recognized as important indicators of healthcare quality and patient-centered care [6,7]. The burden of postoperative pain is particularly significant in low- and middle-income countries (LMICs). Limited availability of trained pain specialists, inadequate access to analgesic medications, absence of structured acute pain services, and financial constraints often compromises the quality of postoperative pain management [2,8]. A systematic review

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evaluating postoperative pain management in LMICs highlighted considerable variation in analgesic practices and emphasized the need for context-specific evidence to improve pain care in resource-constrained healthcare systems [8]. Bangladesh faces similar challenges. Government tertiary hospitals manage high surgical volumes with limited resources, making optimal postoperative pain management difficult. Analgesics are routinely administered, but pain assessment is inconsistent, multimodal analgesia is not uniformly applied, and patient reported outcomes are rarely evaluated. Consequently, many patients experience preventable postoperative pain, delayed recovery, and reduced satisfaction with care [2,9]. International guidelines published in recent years recommend individualized pain management protocols, routine pain assessment, opioid-sparing multimodal analgesia, and regular evaluation of patient-reported outcomes to improve perioperative care [5,10]. However, evidence regarding the effectiveness of these strategies in resource-limited tertiary care hospitals in Bangladesh remains scarce. Assessing current postoperative pain management practices together with patient-reported outcomes will provide locally relevant evidence that may help optimize analgesic protocols, improve patient satisfaction, facilitate early recovery, and strengthen perioperative care services. This study therefore aimed to assess current postoperative pain management strategies and patient reported outcomes in a resource limited tertiary care hospital.

METHODS & MATERIALS

This prospective observational study was conducted in the Department of Surgery in Mymensingh Medical College Hospital, Mymensingh, Bangladesh, from February 2025 to January 2026. A total of 110 adult patients undergoing major surgical procedures under general or regional anesthesia were enrolled using purposive sampling. Patients ≥18 years undergoing elective or emergency major surgery who could communicate reliably were included. patients with cognitive impairment, psychiatric illness, chronic opioid use, chronic pain syndromes, communication difficulties, or prolonged postoperative ventilation (>24 hours) were excluded. Baseline demographic and clinical information, including age, sex, type of surgery, and American Society of Anesthesiologists (ASA) physical status, was collected using a structured case record form. Details of postoperative pain management strategies, including the primary analgesic regimen (multimodal or opioid-based), route of analgesic administration, and requirement for rescue analgesia, were documented from patients' medical records and direct observation. Postoperative pain intensity was assessed using the 11-point Numeric Rating Scale (NRS), where 0 indicated no pain, and 10 indicated the worst imaginable pain, at 6 hours and 24 hours following surgery. Pain severity was categorized as mild (NRS 0–3), moderate (NRS 4–6), and severe (NRS 7–10). Patient-reported outcomes were evaluated at 24 hours postoperatively using a structured interviewer-administered questionnaire, including overall satisfaction with pain management, early ambulation within 24 hours, ability to perform deep breathing and coughing comfortably, sleep quality during the first postoperative night. All collected data were entered, checked for completeness, and analysed using Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequency and percentage. Descriptive statistics were used to summarize the study findings, and the results were presented in tables. Ethical approval was obtained from the Institutional Review Board (IRB) of the respective hospital before commencement of the study. Written informed consent was obtained from all participants, and confidentiality of patient information was maintained throughout the study.

RESULTS

The mean age of the study population was 47.8±14.2 years. Most patients belonged to the 40–59 years age group (41.8%), while 58.2% were male. General surgery constituted the largest surgical category (36.4%), followed by orthopaedic surgery (27.3%). Nearly half of the patients (46.4%) were classified as ASA II (*Table I*).

Table I: Baseline Characteristics of the Study Patients (*n*=110)

Characteristics	n	Percentage (%)
Age group (years)		
18–39	34	30.9
40–59	46	41.8
≥60	30	27.3
Mean age (years)	47.8±14.2	
Sex		
Male	64	58.2
Female	46	41.8
Type of surgery		
General surgery	40	36.4
Orthopaedic	30	27.3
Gynaecological	22	20.0
Urological	18	16.3
ASA physical status		
I	40	36.4
II	51	46.4
III	19	17.3

Multimodal analgesia was administered to 63.6% of patients, whereas 36.4% received opioid-based analgesia alone. Intravenous administration was the most frequently used route (67.3%). Rescue analgesia was required in 34.5% of patients during the postoperative period (*Table II*).

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Table II: Postoperative Pain Management Strategies (*n*=110)

Variables	n	Percentage (%)
Primary analgesic regimen		
Multimodal analgesia	70	63.6
Opioid-based analgesia	40	36.4
Route of analgesic administration		
Intravenous	74	67.3
Epidural	14	12.7
Oral	22	20.0
Requirement for rescue analgesia		
Yes	38	34.5
No	72	65.5

At 6 hours after surgery, 54.5% of patients reported moderate pain and 29.1% experienced severe pain, with a mean pain score of 5.8±1.9. By 24 hours, severe pain declined from 29.1% to 10.9% (*Table III)*.

Table III: Patient-Reported Pain Scores Following Surgery (*n*=110)

Pain assessment	n	Percentage (%)
Pain score at 6 hours (NRS)		
Mild (0–3)	18	16.4
Moderate (4–6)	60	54.5
Severe (7–10)	32	29.1
Pain score at 24 hours (NRS)		
Mild (0–3)	56	50.9
Moderate (4–6)	42	38.2
Severe (7–10)	12	10.9
Mean pain score		
6 hours	5.8±1.9	
24 hours	3.6±1.7	

Overall, 74.5% of patients were satisfied or highly satisfied with postoperative pain management, whereas 9.1% reported dissatisfaction. Early ambulation within 24 hours was achieved by 69.1% of patients. Approximately 65.5% were able to perform deep breathing and coughing comfortably, 61.8% reported good sleep quality during the first postoperative night (*Table IV)*.

Table IV: Patient-Reported Outcomes Following Major Surgery (*n*=110)

Outcomes	n	(%)
Overall satisfaction with pain management		
Highly satisfied	34	30.9
Satisfied	48	43.6
Neutral	18	16.4
Dissatisfied	10	9.1
Early ambulation within 24 hours	76	69.1
Able to perform deep breathing/coughing comfortably	72	65.5
Good sleep quality (first night)	68	61.8
Total	110	100.0

DISCUSSION

In this prospective observational study of 110 major surgery patients, the cohort was mainly middle-aged, with a male predominance and a larger share of general and orthopedic procedures. This reflects the typical case mix of a tertiary surgical hospital rather than pain specific factors. In a Bangladeshi tertiary-care cohort of 190 adult elective surgical patients, Kabir et al. also emphasized that postoperative pain outcomes are strongly shaped by the local surgical population and ASA profile, reinforcing the need to interpret results in the context of hospital workload and patient selection [11]. Our pain management profile showed that multimodal analgesia was used in 63.6% of patients, while 36.4% still received opioid-based analgesia alone; rescue analgesia was needed in 34.5%. This indicates that multimodal pain control was common but not universal. Kaye et al. described multimodal analgesia as a core element of enhanced recovery pathways and an opioid-sparing approach that supports faster recovery [12]. Similarly, Kabir et al. found that receiving multimodal analgesics was independently associated with higher satisfaction (AOR 4.30), while prolonged waiting for analgesia reduced satisfaction [11]. These findings suggest that reliance on intravenous and opioid based regimens highlights the need for more standardized multimodal protocols in a resource-limited setting. Pain scores in our cohort improved over time, with the mean NRS falling from 5.8±1.9 at 6 hours to 3.6±1.7 at 24 hours. However, early postoperative pain remained substantial: 54.5% had moderate pain and 29.1% had severe pain at 6 hours, and nearly half still had moderate-to-severe pain at 24 hours. Gan reported that postoperative pain remains poorly controlled in many patients and summarized a Dutch cohort in which 41% had moderate-to-severe pain on the day of surgery, 30% on postoperative day 1, and 19% on day 2 [1]. More recently, Timerga et al. found that more than three-quarters of surgical patients experienced moderate-to-severe pain during the first 72 hours after surgery, confirming that clinically important pain is still

common in the early postoperative period [13]. Bekele et al. likewise reported that 82.2% of adult surgical patients had acute postoperative pain within 24 hours, with 34.24% experiencing moderate-to-severe pain [14]. Compared with these studies, our cohort showed a clear decline by 24 hours, but the residual pain burden remained clinically important. Patient-reported outcomes in our study were encouraging but not optimal. Overall, 74.5% of patients were satisfied or highly satisfied, 69.1% achieved early ambulation within 24 hours, 65.5% could breathe or cough comfortably, 61.8% reported good sleep. Kabir et al. reported the same overall satisfaction figure of 74.5% in a Bangladeshi tertiary hospital and showed that satisfaction improved with multimodal analgesia, effective communication, and faster analgesic delivery [11]. ERAS-focused literature also notes that multimodal and preemptive analgesia facilitates early mobility and functional recovery [12].

LIMITATIONS

The single center design, small sample size, and reliance on self-reported outcomes. Therefore, the findings may not be generalizable to the wider population.

CONCLUSION

The present study demonstrated that multimodal postoperative pain management was the predominant analgesic strategy and was associated with favorable patient-reported outcomes following major surgery in a tertiary care hospital in Bangladesh. Although pain decreased substantially within 24 hours and most patients were satisfied, a considerable proportion continued to experience moderate to severe pain during the early postoperative period.

RECOMMENDATION

Implementation of standardized multimodal analgesia and routine pain assessment is recommended to improve pain control and patient recovery. Further multicenter studies with larger sample sizes are recommended to validate these findings and guide evidence-based postoperative pain management practices.

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CONFLICT OF INTEREST

None declared

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