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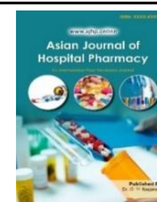

STUDY ON ASSESSMENT OF PAIN MANAGEMENT AND DRUG UTILIZATION PATTERN IN POSTOPERATIVE ORTHOPEDIC SURGERY PATIENTS

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Abstract
Postoperative pain following orthopedic surgery is often severe and inadequately controlled, leading to delayed recovery, prolonged hospitalization, and increased morbidity. Rational analgesic prescribing and drug utilization evaluation are essential to optimize therapeutic outcomes and ensure effective pain control. The intensity and severity of postoperative pain vary depending on patient-related and procedural factors. The Numeric Rating Scale (NRS) is a widely used standardized tool for assessing pain intensity, where patients rate their pain on a scale of 0 to 10, with 0 indicating no pain and 10 representing the worst imaginable pain. This tool provides a simple and reliable method for evaluating pain severity and guiding analgesic therapy. The study aimed to assess the intensity and pattern of postoperative pain among orthopedic surgery patients using standardized pain scales, to identify commonly prescribed analgesics and associated medications used in postoperative pain management, and to evaluate the incidence of adverse drug reactions (ADRs) related to analgesic therapy.
Keywords: *Postoperative pain, orthopedic surgery, drug utilization, multimodal analgesia, Numeric Rating Scale, analgesic therapy.*

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INTRODUCTION

Fractures are disruptions in the continuity of bone resulting from trauma, repetitive stress, or pathological conditions and may vary considerably in their clinical presentation and severity. Management of fractures depends on factors such as fracture type, anatomical location, degree of displacement, patient age, and overall health status. Treatment approaches commonly include closed reduction, a non-surgical technique used to restore bone alignment, and open reduction and internal fixation (ORIF), which involves surgical exposure and stabilization of the fracture using plates, screws, or pins [1,2]. Despite advances in orthopedic surgical techniques, postoperative pain remains a significant clinical challenge and is often inadequately managed, adversely affecting patient recovery and satisfaction [3, 4]. Orthopedic procedures, including fracture fixation and joint replacement surgeries, are associated with substantial postoperative pain and frequently require analgesic therapy, particularly opioids and nonsteroidal anti-inflammatory drugs (NSAIDs) [5,6]. Contemporary pain management guidelines advocate multimodal analgesic strategies to improve pain control while minimizing opioid-related adverse effects; however, variations in prescribing practices and implementation remain common across healthcare settings [7–9]. NSAIDs remain a cornerstone of postoperative pain management owing to their ability to inhibit cyclooxygenase-mediated prostaglandin synthesis, thereby reducing pain and inflammation [10-14]. The Numeric Rating Scale (NRS) is a validated and widely used tool for assessing pain intensity and monitoring treatment outcomes in postoperative patients [15, 16]. Therefore, the present study was

undertaken to evaluate postoperative pain management and drug utilization patterns among orthopedic patients using NRS-based pain assessment.

MATERIALS AND METHODS

Study Design and Setting

A prospective observational study was conducted over a period of six months in the Orthopaedic Department, including orthopaedic wards and postoperative care units, at SVS Medical College Hospital, Telangana, India. The study aimed to evaluate postoperative pain management and analgesic utilization patterns among orthopaedic surgery patients.

Study Population

Patients aged 18–70 years of either gender who underwent orthopaedic surgery and provided written informed consent were enrolled in the study. Eligible participants included postoperative patients admitted to orthopaedic wards or postoperative care units following procedures such as fracture fixation, arthroplasty, implant removal, and wound debridement.

Inclusion and Exclusion Criteria

Patients aged between 18 and 70 years, of either sex, undergoing elective orthopaedic surgery and willing to provide written informed consent were included. Patients undergoing emergency surgeries with incomplete documentation, those with chronic pain disorders or long-term analgesic therapy, severe hepatic, renal, or cardiac diseases, and patients with cognitive impairment affecting pain assessment were excluded from the study.

Study Procedure

Eligible patients were identified from orthopaedic wards and postoperative care units after surgery. Postoperative pain intensity was assessed using the Numerical Rating Scale (NRS), where scores range from 0 (no pain) to 10 (worst imaginable pain). Pain assessments were performed at 6, 12, 24, and 48 hours following surgery. Information regarding prescribed analgesics, including drug name, dose, route of administration, frequency, and duration of therapy, was collected from patient case records and direct patient interviews. Data on adverse drug reactions (ADRs), demographic characteristics, type of surgery, and duration of hospital stay were also documented.

Data Collection and Outcome Measures

The primary outcomes included postoperative pain intensity and analgesic utilization patterns. Secondary outcomes included the incidence of adverse drug reactions and the relationship between pain severity, type of surgical procedure, and analgesic prescribing patterns. All relevant information was recorded in a structured data collection form.

Statistical Analysis

Data were compiled, coded, and analyzed using Statistical Package for the Social Sciences (SPSS) version 24.0 and GraphPad Prism version 9. Continuous variables such as NRS pain scores were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. Associations between categorical variables were analyzed using the Chi-square test. Comparisons of continuous variables were performed using Student's t-test or one-way analysis of variance (ANOVA), as appropriate. A p-value < 0.05 was considered statistically significant [17-20].

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee of SVS Medical College Hospital, Telangana, India (Approval No. IEC/DHR-04/(04-2)/2025). Written informed consent was obtained from all participants before enrolment. Patient confidentiality and anonymity were maintained throughout the study, and no additional interventions beyond routine clinical care were performed.

RESULTS AND DISCUSSIONS

Age Distribution of the Study Population

The age distribution presented in Table 1 indicates that the majority of patients belonged to the 31–40 years age group (28%), followed by the 61–75 years age group (25%). This suggests that orthopedic surgeries are common among both economically productive adults and elderly individuals. The higher incidence among middle-aged patients may be attributed to occupational exposure, road traffic accidents, and physical activities, while elderly patients are more susceptible to fractures due to osteoporosis, reduced bone density, and age-related degenerative changes. The mean age of 45.35 ± 16.66 years further demonstrates that orthopedic conditions affect a broad age spectrum. These findings highlight the need for age-specific preventive and rehabilitative strategies.

Table 01: Distribution of Patients Based on Age

AGE (YEARS)	FREQUENCY	PERCENTAGE
≤20	5	5%
21–30	12	12%
31–40	28	28%
41–50	18	18%

51–60	12	12%
61–75	25	25%
Total	**100**	**100%**

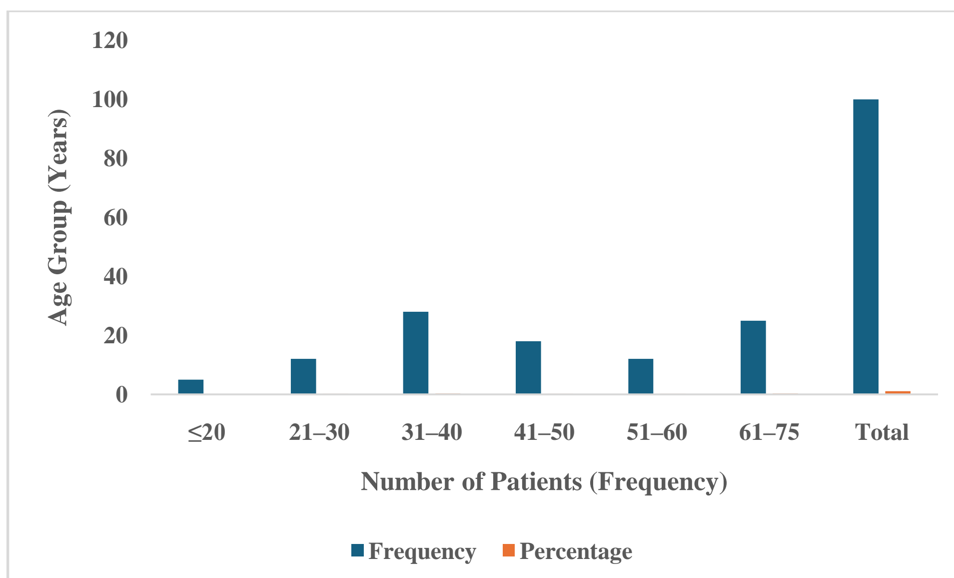

Figure 01: Age distribution of the study population.

Gender Distribution of the Study Population

As shown in Table 2, male patients constituted 60% of the study population, whereas females accounted for 40%. The predominance of males may be associated with greater involvement in outdoor occupations, physical labor, sports activities, and increased exposure to road traffic accidents. Males are generally at a higher risk of traumatic injuries due to their active lifestyle and occupational hazards. The findings are consistent with previous orthopedic studies that reported a higher incidence of fractures among men. Understanding gender-related differences may assist in designing targeted injury prevention programs.

Table 02: Distribution of Patients Based on Gender

Gender	Frequency	Percentage
Male	60	60%
Female	40	40%
Total	**100**	**100%**

Distribution Based on Mechanism of Injury

Table 3 shows that road traffic accidents were the most common cause of injury, accounting for 50% of cases, followed by falls (30%). This indicates that trauma remains a major contributor to orthopedic surgical admissions. The high proportion of road traffic accidents may be related to increasing vehicle density, unsafe driving practices, and inadequate road safety measures. Falls were also a significant cause of injury, particularly among elderly individuals with impaired balance and reduced bone strength. These findings emphasize the importance of public health interventions aimed at improving road safety and preventing fall-related injuries.

Table 03: Distribution of Patients Based on Mechanism of Injury

Mechanism of Injury	Frequency	Percentage
Road Traffic Accident	50	50%
Fall	30	30%
Other Causes	10	10%

Distribution Based on Type of Fracture

The results presented in Table 4 indicate that open and closed fractures constituted the majority of cases (60%), while traumatic fractures accounted for 40%. The predominance of open and closed fractures suggests that a large proportion of patients sustained injuries requiring careful classification and surgical management. Fracture type plays a critical role in determining treatment options, risk of infection, healing time, and prognosis. Open fractures often require immediate intervention and antibiotic prophylaxis, whereas closed fractures may be managed conservatively or surgically depending on severity. Therefore, accurate fracture assessment remains essential for optimizing clinical outcomes.

Table 04: Distribution of Patients Based on Type of Fracture

Type of Fracture	Frequency	Percentage
Traumatic	40	40%
Open/Closed	60	60%
Total	**100**	**100%**

Distribution Based on Location of Fracture

The findings in Table 5 reveal that lower limb fractures were more prevalent (65%) than hip fractures (35%). Lower limb injuries commonly result from high-impact trauma such as road traffic accidents and falls. These fractures significantly affect mobility and often require prolonged hospitalization, rehabilitation, and physiotherapy. Hip fractures, although less common, are associated with substantial morbidity and functional impairment, especially among elderly patients. The high frequency of lower limb fractures highlights the considerable burden of these injuries on orthopedic healthcare services.

Table 05: Distribution of Patients Based on Location of Fracture

Location of Fracture	Frequency	Percentage
Lower Limb	65	65%
Hip	35	35%
Total	**100**	**100%**

Distribution Based on Type of Surgery

As shown in Table 6, elective surgeries accounted for 88% of all orthopedic procedures, whereas total knee replacement and implant removal each contributed 6%. The predominance of elective surgeries indicates that most patients underwent planned surgical interventions after adequate preoperative evaluation. Elective procedures generally allow better perioperative preparation, postoperative monitoring, and pain management compared with emergency surgeries. The absence of emergency surgeries may be due to the study inclusion criteria. These findings reflect the structured nature of orthopedic surgical care in the study setting.

Table 06: Distribution of Patients Based on Type of Surgery

Type of Surgery	Frequency	Percentage
Elective	88	88%
Emergency	0	0%
TKR	6	6%
Implant Removal	6	6%
Total	**100**	**100%**

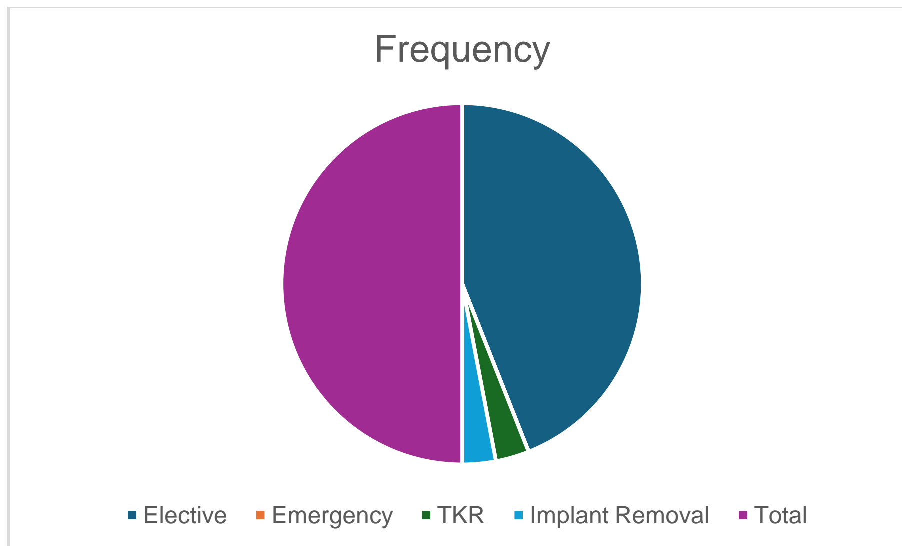

Figure 02: Distribution of patients according to the type of surgery performed

Assessment of Postoperative Pain

As shown in Table 6, elective surgeries accounted for 88% of all orthopedic procedures, whereas total knee replacement and implant removal each contributed 6%. The predominance of elective surgeries indicates that most patients underwent planned surgical interventions after adequate preoperative evaluation. Elective procedures generally allow better perioperative preparation, postoperative monitoring, and pain management compared with emergency surgeries. The absence of emergency surgeries may be due to the study inclusion criteria. These findings reflect the structured nature of orthopedic surgical care in the study setting.

Table 07: Distribution of Patients Based on NRS Score

NRS Score	Frequency	Percentage
0	0	0%
1–3	0	0%
4–6	24	24%
7–10	76	76%
Total	**100**	**100%**

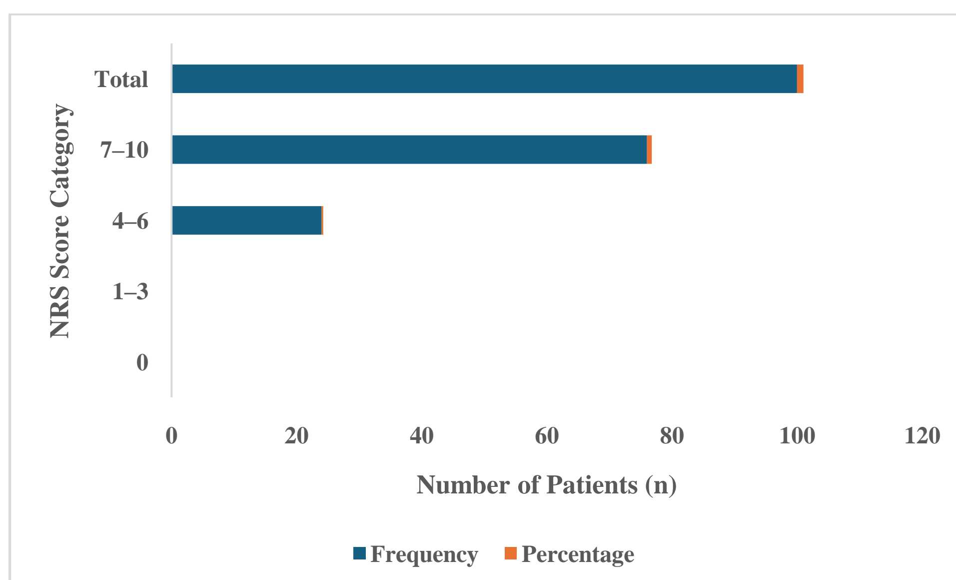

Figure 03: Distribution of patients according to postoperative pain intensity assessed using the Numerical Rating Scale (NRS).

Postoperative Antibiotic Utilization Pattern

Table 8 demonstrates that Cefuroxime + Sulbactam was the most commonly prescribed antibiotic regimen (38%), followed by Ceftriaxone + Sulbactam (32%). The preference for cephalosporin-based combinations may be attributed to their broad-spectrum antimicrobial activity and effectiveness in preventing postoperative infections. Combination therapy with Metronidazole was prescribed when additional anaerobic coverage was required. Appropriate antibiotic prophylaxis plays a crucial role in reducing surgical site infections and improving postoperative outcomes. The prescribing pattern observed in this study reflects adherence to standard orthopedic infection prevention practices Cefuroxime + Sulbactam was the most frequently prescribed postoperative antibiotic (38%), followed by Ceftriaxone + Sulbactam (32%). The preference for cephalosporin-based combinations reflects their broad-spectrum coverage and effectiveness in preventing postoperative infections in orthopedic patients.

Table 08: Distribution of Postoperative Antibiotics Prescribed

Postoperative Antibiotic	Number of Patients	Percentage
Cefuroxime + Sulbactam	38	38%
Ceftriaxone + Sulbactam	32	32%
Ceftriaxone	10	10%
Ceftriaxone + Sulbactam + Metronidazole	12	12%
Meropenem + Metronidazole	8	8%
Total	**100**	**100%**

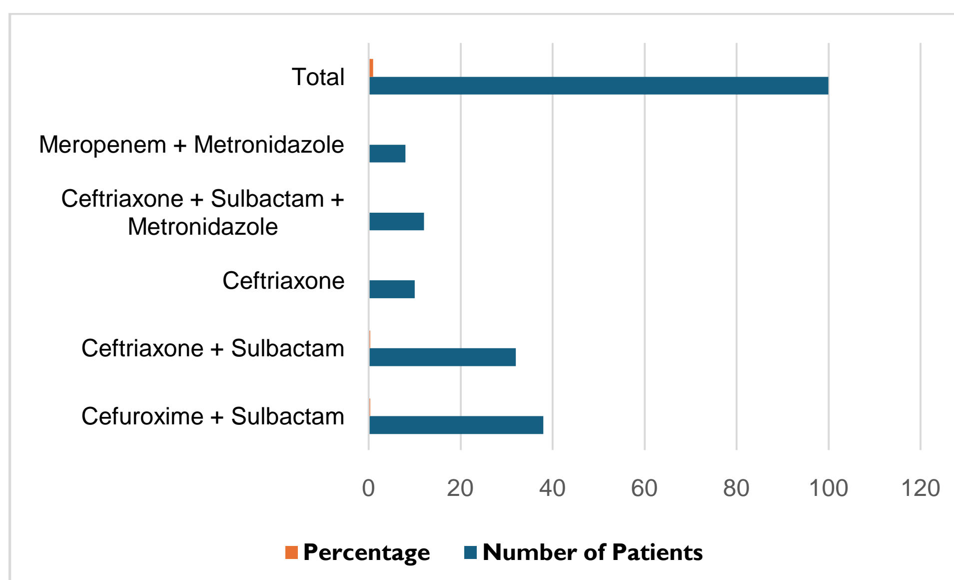

Figure 04: Distribution of Postoperative Antibiotics Prescribed

ANALGESIC UTILIZATION PATTERN IN POSTOPERATIVE ORTHOPEDIC PATIENTS

The analgesic utilization pattern presented in Table 9 shows that Diclofenac sodium was the most frequently prescribed analgesic (45%), followed by Tramadol + Acetaminophen (30%) and Aceclofenac + Paracetamol (28%). The preference for NSAIDs reflects their effectiveness in reducing pain and inflammation associated with orthopedic procedures. Combination therapies were frequently employed to achieve multimodal analgesia and improve pain control. Such approaches target multiple pain pathways simultaneously and may reduce the need for higher doses of individual drugs. Effective analgesic utilization contributes significantly to improved recovery and patient satisfaction.

Table 09: Distribution of Patients Based on Analgesics Prescribed

Analgesics	No. of Patients	Percentage
Diclofenac Sodium	45	45%
Aceclofenac + Paracetamol	28	28%

Tramadol + Acetaminophen	30	30%
Paracetamol Infusion	15	15%
Diclofenac Sodium + Tramadol + Acetaminophen	10	10%
Paracetamol Infusion + Aceclofenac + Paracetamol	18	18%

CORRELATION BETWEEN PAIN SEVERITY AND ANALGESIC UTILIZATION

The relationship between pain severity and analgesic prescribing patterns is presented in Table 10. Patients with moderate pain were primarily managed using NSAID-based therapies such as Diclofenac sodium and Aceclofenac + Paracetamol. In contrast, severe pain required stronger analgesic regimens, including Tramadol + Acetaminophen and multimodal combinations. These findings indicate that analgesic selection was appropriately tailored according to pain intensity. The use of combination therapy in patients with severe pain supports current recommendations for multimodal pain management and demonstrates rational prescribing practices in orthopedic postoperative care.

Table 10: Correlation of Pain Severity (NRS) with Analgesics Prescribed

NRS Score	Pain Severity	Analgesic Prescribed	Frequency	Percentage
0	No Pain	None	0	0%
1–3	Mild Pain	None	0	0%
4–6	Moderate Pain	Diclofenac Sodium	20	20%
		Aceclofenac + Paracetamol	12	12%
7–10	Severe Pain	Tramadol + Acetaminophen	30	30%
		Paracetamol Infusion	15	15%
		Diclofenac Sodium + Tramadol + Acetaminophen	10	10%
		Paracetamol Infusion + Aceclofenac + Paracetamol	13	13%
Total			100	100%

CONCLUSION

The present study provides a comprehensive evaluation of demographic characteristics, fracture patterns, postoperative pain severity, and drug utilization patterns among orthopedic patients. The findings demonstrated a predominance of middle-aged male patients, with road traffic accidents identified as the principal mechanism of injury, most commonly resulting in lower limb fractures. The majority of procedures were elective, reflecting the structured nature of orthopedic surgical management.Postoperative pain assessment revealed a high prevalence of moderate to severe pain, necessitating the implementation of multimodal analgesic strategies. Diclofenac sodium emerged as the most frequently utilized single-agent analgesic, while combination regimens involving tramadol with paracetamol and aceclofenac with paracetamol were commonly employed to enhance analgesic efficacy through synergistic mechanisms. Concurrently, the antibiotic utilization pattern showed a preference for broad-spectrum combination therapy, particularly cefuroxime with sulbactam and ceftriaxone with sulbactam, underscoring the emphasis on effective prophylaxis against surgical site infections in orthopedic practice.Overall, the study underscores the clinical significance of rational pharmacotherapy and individualized pain management in orthopedic postoperative care. The integration of clinical pharmacy services, including medication review, dose optimization, adverse drug reaction monitoring, and antimicrobial stewardship, is essential to ensure therapeutic efficacy, minimize drug-related complications, and promote improved patient outcomes.

RECOMMENDATIONS

The findings of this study support the implementation of standardized multimodal analgesic protocols to improve postoperative pain management in orthopedic patients. Regular pain assessment using the Numerical Rating Scale (NRS) and active involvement of clinical pharmacists may further enhance therapeutic outcomes. Rational antibiotic prescribing through antimicrobial stewardship programs is also recommended to ensure safe and effective postoperative care. Future multicenter studies with larger sample sizes are needed to validate these findings.

LIMITATIONS

The study was limited by its relatively small sample size and single-center design, which may affect the generalizability of the results. The short study duration restricted the assessment of long-term clinical outcomes and adverse drug reactions. Additionally, the observational nature of the study did not permit the establishment of causal relationships between drug utilization patterns and patient outcomes.

FUNDING

Nil

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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AUTHOR CONTRIBUTIONS

Paspula Soumya conceived and designed the study, supervised the research work, and drafted the manuscript. Misbah begum and Farheen Fatima contributed to data collection, analysis, and manuscript preparation. Kuppireddy Asritha and Pasham Vaishnavireviewed and approved the final version of the manuscript.

ETHICAL STATEMENT

The ethical committee clearance was obtained from SVS Medical CollegeHospital before initiating the study. Reference number: IEC/DHR-04/ (04-2)/2025

REFERENCES

1. Park R, Mohiuddin M, Arellano R, Pogatzki-Zahn E, Klar G, Gilron I. Prevalence of postoperative pain after hospital discharge: systematic review and meta-analysis. Pain Rep. 2023;8(3):e1075.
2. Gan TJ. Poorly controlled postoperative pain: prevalence, consequences, and prevention. J Pain Res. 2017;10:2287-2298.
3. Choudhury DK, Bezbaruah BK. Prescribing pattern of analgesics in orthopedic in-patient department at tertiary care hospital in Guwahati, Assam, Northeast India. Int J Basic Clin Pharmacol. 2016;5(3):610-614.
4. Joshi S, Shetty Y, Panchal R, Patankar P, Salgaonkar S, Rawat R, et al. An observational study to evaluate the prescription pattern of analgesics used in the perioperative period in a tertiary care hospital. Perspect Clin Res. 2021;12(3):165-170.
5. Jayawardana S, et al. Global consumption of prescription opioid analgesics 2009–2019: a country-level observational study. EClinicalMedicine. 2021;42:101198.
6. Chou R, Gordon DB, de Leon-Casasola OA, Rosenberg JM, et al. Management of postoperative pain: a clinical practice guideline. J Pain. 2016;17(2):131-157.
7. Paladini A, Rawal N, Coca Martinez M, Trifa M, Montero A, Pergolizzi JV, et al. Advances in the management of acute postsurgical pain: a review. Cureus. 2023;15(8):e42974.
8. Bose JN, Rajavel K, Munusamy R, Ramesh P. Postoperative pain control in orthopedic surgery: a randomized trial comparing regional anesthesia and systemic opioids. Bioinformation. 2024;20(12):1931-1934.
9. Xu J, Liu X, Zhao J, Zhao J, Li H, Ye H, et al. Comprehensive review on personalized pain assessment and multimodal interventions for postoperative recovery optimization. J Pain Res. 2025.
10. Alqaisi OM, Al-Ghabeesh S. Quality of postoperative pain management in orthopedic patients and its impact on sleep quality and patient satisfaction: an integrative review. Cureus. 2024;16:e65872.
11. Cheung CK, Adeola JO, Beutler SS, Urman RD. Postoperative pain management in enhanced recovery pathways. J Pain Res. 2022;15:1-12.
12. Nugent SM, Lovejoy TI, Shull S, Dobscha SK, et al. Numeric Rating Scale for pain assessment: clinical applications and validation. Pain Med. 2021.
13. van Dijk JFM, van Wijck AJM, Schuurmans MJ, et al. Postoperative pain assessment based on numeric ratings is not the same for patients and professionals: a cross-sectional study. Int J Nurs Stud. 2012;49(1):65-71.
14. GBD 2019 Fracture Collaborators. Global burden of fractures and musculoskeletal injuries: updated analysis. Lancet Healthy Longev. 2021;2(9):e580-e592.
15. Veronese N, Maggi S. Epidemiology and prevention of fall-related fractures in older adults. Aging Clin Exp Res. 2022;34(6):1231-1240.
16. Rupp M, Biehl C, Budak M, et al. Epidemiology of fractures in adults: recent global trends. Injury. 2021;52(5):1045-1052.
17. Virmani A, Roy V, Meshram GG, Sural S. Surgical antimicrobial prophylaxis in orthopedic implant surgeries: current perspectives. Indian J Orthop. 2024;58(2):210-218.

18. Paul RW, Szukics PF, Brutico J, et al. Postoperative multimodal pain management and opioid consumption: a systematic review. Arthrosc Sports Med Rehabil. 2022;4(3):e957-e968.
19. Aldanyowi SN. Advances in postoperative pain management strategies following orthopedic surgery. Life. 2023;13(12):2351.
20. Ahmed H, Mazhar F, Gilani A, et al. Antibiotic prophylaxis and antimicrobial stewardship in orthopedic surgery. Cureus. 2025;17(1):e52214.