

East African Medical Journal Vol. 102. 11 November 2025

ADEQUACY OF CURRENT ANALGESIA PRACTICES AMONG ADULT PATIENTS UNDERGOING LAPAROTOMY AT MOI TEACHING AND REFERRAL HOSPITAL, ELDORET, KENYA

Dr. Gladys Kezziah Njue, Registrar, Department of Surgery and Anesthesiology, Moi Teaching and Referral Hospital, P.O. Box 3, Eldoret, Kenya, Dr. Kennedy Imbaya, Consultant anesthesiologist, Department of Surgery and Anesthesiology, Moi Teaching and Referral Hospital, P.O. Box 3, Eldoret, Kenya, Dr. Seno Saruni, Directorate of Surgery, Moi Teaching and Referral Hospital, Moi University, School of Medicine, P.O. Box 4606, Eldoret, Kenya and Dr. Obadiah Samoei, Directorate of Anesthesia, Moi Teaching and Referral Hospital, Moi University, School of Medicine, P.O. Box 4606, Eldoret, Kenya

Corresponding author: Dr. Gladys Kezziah Njue, Registrar, Department of Surgery and Anesthesiology, Moi Teaching and Referral Hospital, P.O. Box 3, Eldoret, Kenya, email: kezziahsoni@gmail.com

ADEQUACY OF CURRENT ANALGESIA PRACTICES AMONG ADULT PATIENTS UNDERGOING LAPAROTOMY AT MOI TEACHING AND REFERRAL HOSPITAL, ELDORET, KENYA

G. Njue, K. Imbaya, S. Saruni and O. Samoei

ABSTRACT

Objective: The study sought to determine the adequacy of current analgesia practices used in management of acute post-operative pain among adult patients who undergo laparotomy at Moi Teaching and Referral Hospital, Eldoret, Kenya.

Design: A descriptive study.

Setting: The study was carried out at Moi Teaching and Referral Hospital, a public tertiary hospital in Eldoret, Kenya, which has a total bed capacity of 1000 with 32 beds designated for gynecological patients, 42 for male general surgical patients and 48 for female general surgical cases.

Participants: A total of 241 adult participants were systematically recruited.

Main outcome measures: The dependent variables of interest were pain score, analgesics, analgesia modalities and patients' satisfaction. Independent variables included demographics (sex, age, place of origin) and clinical data (elective/emergency). Data was collected through patients' interviews and review of anesthetic charts and treatment sheets to complete a structured questionnaire. Categorical data was summarized and the findings were presented in figures. For the categorical variables, odds ratios were calculated at a 95% confidence interval and p-values <0.05 were considered statistically significant.

Results: The mean age of participants was 45.4 years with a female predominance at 58.1%. Majority of laparotomies were performed emergently (97.1%), with the most common abdominal procedure being exploratory

laparotomy (41.9%). The proportion of patients with moderate or severe pain at post anesthetic care unit at 24-hour and 48 hours intervals, was 56%, 17% and 6.2%, respectively. Paracetamol plus tramadol was the most used combination at both 24- (31.1%) and 48- (28.9%) hours intervals. The Cochran–Armitage test showed a statistically significant ($P < 0.001$) linear trend in pain score across the assessment periods.

Conclusion: Acute post-operative pain management at Moi Teaching and Referral Hospital, Eldoret, is inadequate, as evidenced by many participants experiencing moderate to severe pain, with limited utilization of opioid based systemic analgesics.

INTRODUCTION

Pain is sensory or emotional distress usually linked to factual or potential tissue damage.¹ The prevalence of moderate to severe post-surgical pain is estimated to be up to 100% in sub-Saharan Africa.² This high prevalence is attributed to the high burden of disease in low middle income countries, with limited resources such as equipment and essential analgesics. Poor prioritization of pain relief at multiple levels (such as government, hospital, and individual patient care levels), stemming from insufficient policies, poor human resource distribution, and perceived attitudes of health care givers on pain, further exacerbate under-treatment of pain.^{3–5}

Undertreatment of pain is associated with physiological and psychological complications which can prolong recovery, lengthen hospitalization and add economic strain to patients and the health care system in general.^{1,6,7} Adequate post-operative pain control is underpinned by proper pain assessment, regular reassessment, and prompt response incorporating multimodal strategies. Visual Analogue Scale is preferred mode of evaluation due to its strong sensitivity and reliability across different population groups and its ease of use. Adequate analgesia is generally considered when the visual analogue score is ≤ 3 .^{8,9}

Laparotomy is a commonly performed major procedure worldwide.^{8,10} It entails an incision through the anterior abdominal wall to gain access to the abdominal organs, with either therapeutic or diagnostic intent. At Moi Teaching and Referral Hospital, the surgical registry shows a total of 836 (52%) laparotomies were performed in 2022 which was a rise from 729 in 2021 and 695 in 2020. The data on the caesarean sections was excluded as the caesarian section is a distinct entity in research and is not comparable to a laparotomy in terms technique, risks, potential outcome, and underlying conditions. Inclusion into the study would potentially introduce a bias and confound the results. With the rising laparotomy rates at Moi Teaching and Referral Hospital, the magnitude of acute postoperative pain and effectiveness of current analgesia practices remain unknown due to limited data. Despite the presence of anesthesiologists and pain management specialists, traditional acute pain service models persist, and the application of the World Health Organization pain ladder varies based on resources and provider preference. This study therefore, aimed to address these gaps and enhance post operative pain care.

Methods

The study was a descriptive study conducted at the department of Obstetrics and

Gynecology (gynecology ward) and the department of Surgery and Anesthesia (post-anesthetic care unit in theatre, male surgical ward, female surgical wards) at Moi Teaching and Referral Hospital, Eldoret, between March and December 2023. The participants were followed up from the post anesthetic care unit to the wards for 2 days post operatively and data collected at three intervals. The gynecological ward has 32 beds, whereas male and female general surgical wards accommodate 42 and 48 beds, respectively. The facility includes 12 operating theatres, 1 primarily designed for obstetrics emergency and 3 predominantly utilized for general emergencies. General emergency surgeries are conducted daily as needed, while elective gynecological surgeries are performed biweekly and elective general surgical procedures are performed three times per week. The choice of post operative analgesia after laparotomy is determined by healthcare provider, typically, primary surgeon, anesthesiologist, anesthesiologist registrar or anesthetist. Other prescribers include surgical registrars, medical officers, intern doctors and clinical officer trainees. Analgesic selection depends on the practitioner's preference, usability, drug and equipment availability and required monitoring in post post-anesthetic care unit or general wards.

The sample size was determined using Fischer's formula assuming a prevalence of 94% based on a similar study conducted by Isaya et al in Tanzania in 2024, yielding a sample size of 241 participants.¹¹ Systematic sampling technique was used with a sampling interval of 3 calculated by dividing the population size by desired sample size.

Participants with documented mental and cognitive disabilities scheduled for laparotomy were excluded from the study as they are unable to reliably recall and self-report pain.^{8,12} Individuals requiring post

operative care in the intensive care unit were also excluded from the study due to the unique nature of acute pain management in this setting which differs from practices in the general wards.^{13,14} Those patients who underwent other concurrent procedures were also eliminated since they fell outside the study's defined scope. Data was collected at three intervals: at post anesthetic care unit, 24 and 48 hours. Given that the post anesthetic care unit is a highly complex environment that presents both medical and ethical challenges, particularly due to patients altered neurological status resulting from anesthesia or underlying comorbidities, only patients with modified Aldrete score of >9 with a Glasgow coma scale of 15, were approached.

Data was collected through patients' interviews, review of anesthetic charts and treatment sheets, to complete a structured questionnaire. The dependent variables of interest were pain score, analgesics, analgesia modalities and patients' satisfaction. Independent variables included demographic and clinical data (elective/emergency). Stata Corp. 2019. Stata Statistical Software: Release 16. College Station, TX: Stata Corp LLC software, was used for data analysis. Categorical data was summarized and findings were presented in figures, corresponding percentages and tables. The Conchran- Armitage test for trend ($p < 0.001$) was used to detect linear trends in pain severity across assessment periods while Chi- Squared test ($p = 0.001$) was used to detect differences in pain control among different analgesic combinations. The study was conducted at 0.05 α level of significance.

Ethical Approval

All pertinent ethical approvals were obtained prior to the onset of the study. Ethical approvals were obtained from the Moi University / Moi Teaching and Referral Hospital institutional research and ethics

committee (formal approval number 0004376) and a research permit obtained from the National Commission for Science, Technology and Innovation - Research license number 866796 prior to the onset of the study. Permission was also obtained from the Moi Teaching and Referral Hospital management prior to commencement of the data collection. Written informed consent was also obtained from the study participants prior to enrollment in the study. Confidentiality was maintained throughout the study and the data de-identified prior to analysis.

Results

A total of 241 participants were recruited for the study with a mean age of 45.4 years. Of these, 58.1% (140) were females while 41.9% (101) were male. The emergency laparotomies accounted for 97.1% (234) while elective laparotomies were performed in 2.9% (7) of the participants. The leading indication for emergency laparotomy was acute abdomen requiring exploration comprising of 41.9% (101) followed by intestinal obstruction at 31.1% (75), and perforated gut with peritonitis at 6.2% (15). Among elective procedures, the most common indications were pelvic mass and ovarian cyst each representing 0.8%.

The most preferred analgesic combination at both 24- and 48-hours interval was tramadol and paracetamol at 31.1% and 28.2% respectively. Paracetamol and morphine regime was used in 26.5% and 11.2% of participants at 24 and 48 hours, respectively. All rescue analgesics were administered as monotherapy at post anesthetic care unit. Surprisingly, no other analgesia modalities such as abdominal wall blocks, incision site infiltration or epidural analgesia were offered to participants during the study period. The Conchran – Armitage test showed a statistically significant ($P < 0.001$) linear trend in pain score across the assessment periods. The Chi-square test ($p = 0.001$) indicated that the tramadol/paracetamol combination provided superior pain control, with only 12.5% of participants experiencing moderate to severe pain, compared to 36% in the morphine/paracetamol group at 24 hours.

Fisher's Exact test ($p=0.336$) indicated that at 48 hours, 7.4% of participants on tramadol/paracetamol reported moderate to severe pain, versus 17.6% on morphine/paracetamol.

The summary is as shown below.

Table 1 below summarizes the socio-demographic characteristics of the enrolled patients.

Table 1: Socio-demographic characteristics of participants

Variable	N=241
Gender	
Female	58.1% (140)
Male	41.9% (101)

Age in years	
<30	51% (123)
30-41	24.1% (58)
42-50	3.3% (8)
51-60	11.6% (28)
>60	10.0% (24)

Table 2 below summarizes the various indications for both elective and emergency laparotomies.

Table 2: Operative characteristics

Variable	Patient characteristics	N-241
Indication for surgery	Electives	2.9% (7)
	Emergency	97.1% (234)
Emergency surgical interventions	Acute abdomen	41.9% (101)
	Intestinal Obstruction	31.1% (75)
	Perforated gut	6.2% (15)
	Blunt abdominal trauma	4.1% (10)
	Sigmoid volvulus	3.7% (9)
	Penetrating abdominal trauma	2.9% (7)
	Appendectomy, appendicular mass	2.5% (6)
	Hysterectomy	1.2% (3)
	Ovarian torsion	1.2% (3)
	Burst abdomen	0.8% (2)
	Incarcerated umbilical hernia	0.8% (2)

	Abdominal pregnancy	0.4% (1)
Elective surgical interventions	Pelvic mass	0.8% (2)
	Ovarian cyst	0.8% (2)
	Ca cervix	0.4% (1)
	Colon mass	0.4% (1)
	Pancreatic pseudo cyst	0.4% (1)

Table 3 below summarizes pain severity at post anesthetic care unit, 24 and 48 hours

Table 3: Pain severity

Pain Score	Post anesthetic care unit (n-241)	At 24 Hours (n-241)	At 48 Hours (n-241)
0 (No pain)	0	0	0.4% (1)
1-3 (Mild)	44% (106)	83% (200)	93.4% (225)
4-6 (Moderate)	42.3% (102)	16.6% (40)	6.2% (15)
7-9 (Severe)	13.7% (33)	0.4% (1)	0
10 (Worst pain possible)	0	0	0

Table 4a and 4b below summarize intraoperative and post-operative analgesic prescription patterns as obtained from both the anesthetic charts and prescription sheets.

Table 4a: Intra and post -operative analgesic prescription pattern

Pharmacological intervention	Intraoperative	Post anesthetic care unit	At 24 hours	At 48 hours
Opioids				
Fentanyl	28.2% (58)	-	-	-
Morphin	36.9% (89)	34.8% (84)	26.6% (64)	11.2% (27)
Tramadol	25.7% (62)	32% (77)	31.1% (75)	28.2% (68)

NSAIDS				
Diclofenac	-	-	0.8% (2)	4.14% (10)
Ketorolac	-	-	0.8% (2)	-
Kettesse	-	30.5% (73)	0.8% (2)	27.3% (65)
Paracetamol	100% (241)	2.9% (7)	99.2 % (239)	48.5% (117)
Others				
Betapyn	-	-	-	0.8% (2)
Zulu	-	-	0.8% (2)	0.8% (2)

Table 4b: Intra and post operative analgesic combinations.

Intra-operative		
Fentanyl + Paracetamol	68 (28.2%)	
Morphine + Paracetamol	89(36.9%)	
Tramadol +Paracetamol	62 (25.7%)	
Fentanyl + Paracetamol + Morphine	22 (9.1%)	
Post operative	24-hour interval	48-hour interval
Morphine + Paracetamol	64 (26.5%)	27 (11.2%)
Tramadol + Paracetamol	75 (31.1%)	68 (28.2%)
Diclofenac + Paracetamol	2 (0.83%)	10 (4.1%)
Ketorolac + Paracetamol	2 (0.83%)	-
Paracetamol only	94 (39%)	67 (27.8%)
Zulu	2 (0.83%)	2 (0.82%)
Betapyn		2 (0.82%)
Kettesse and paracetamol	2 (0.83%)	65 (26.9%)

Table 5: Comparison of pain control at 24 and 48 hours between those using tramadol/paracetamol and morphine paracetamol.

Pain score	Tramadol/Paracetamol	Morphine/Paracetamol	P-value
At 24 hours			0.001^c
No/ Mild pain	56 (87.5%)	48 (64%)	
Moderate/ severe pain	8 (12.5%)	27 (36%)	
At 48 hours			0.336^f
No/Mild pain	25 (92.6%)	56 (82.4%)	
Moderate/Severe	2 (7.4%)	12 (17.6%)	

Discussion

Results indicate that during the initial review at post anesthetic care unit, 56% of patients reported moderate to severe pain, necessitating rescue analgesics. At 24 hours review, (second assessment), 17% of patients reported moderate to severe pain while at 48 hours interval (third assessment), 6.2% of participants reported moderate pain. The Conchran – Armitage test for trend identified a statistically significant ($P < 0.001$) linear trend in pain score across the assessment periods, suggesting a reduction in post-operative pain over time. The current guidelines however recommend titration of analgesics to a target visual analogue scale pain score of <3 at rest and <4 on motion, throughout the acute post operative period.⁸

Tramadol combined with paracetamol was the most frequently used analgesic regimen at both 24- and 48-hours accounting for 31.1% and 28.2% of participants respectively. Other combinations included morphine with paracetamol, as well as dexketoprofen or diclofenac with paracetamol. Statistical analysis using the Chi-square test ($p = 0.001$)

demonstrated that the tramadol/paracetamol combination offered superior pain control at 24 hours. The Fisher's Exact test ($p=0.336$) demonstrated that 7.4% of participants receiving tramadol plus paracetamol regime at 48 hours, reported moderate to severe pain, compared to 17.6% on morphine plus paracetamol. While morphine is generally considered a more potent analgesic than tramadol, these findings may be influenced by factors such as dosage, frequency, mode of administration or drug availability. Currently, limited research exists evaluating the adequacy of various analgesic regimen including considerations on dose, route, frequency, for acute post operative pain. Therefore, further research in this area is warranted.

Limitation

The study was confined to laparotomy at a single hospital setting, limiting the generalizability of findings to the entire population. Further research should explore different surgical procedures at a multicenter setting with a higher sample size as this would enhance transferability.

Conclusion

Post operative pain management at Moi Teaching and Referral Hospital is inadequate, as evidenced by many participants experiencing acute moderate to severe pain post operatively. A narrow range of opioid based systemic analgesics are in current use.

Recommendation

The integration of alternative pharmacological methods including nerve blocks, patient-controlled techniques, neuraxial approaches and pre-emptive analgesia as well as adjuvants therapies such as cognitive behavioral therapy, with the goal of achieving a visual analogue of ≤ 3 at rest and ≤ 4 on motion, during the acute post-operative period.

Further research to evaluate the effectiveness of various analgesic regimens taking into account factors such as dosage, route of administration route, and frequency during the acute post operative period.

Credit authorship contribution statement.

Gladys Njue: Conceptualization, methodology, data collection and analysis, writing original draft with support from Kennedy Imbaya, Seno Saruni and Obadiah Samoei.

Kennedy Imbaya, Seno Saruni, Obadiah Samoei: Supervision

Conflict of interest

The authors have no conflicts of interest to declare

REFERENCES

1. Bessaguet F, Desmoulière A. Pain physiology. *Actualites Pharmaceutiques*. 2023 Oct;62(629):22–6.
2. Ndebea AS, van den Heuvel SAS, Temu R, Kaino MM, van Boekel RLM, Steegers MAH. Prevalence and risk factors for acute postoperative pain after elective orthopedic and general surgery at a tertiary referral hospital in Tanzania. *J Pain Res*. 2020 Nov 19;13:3005–11.
3. Morriss WW, Roques CJ. Pain management in low- and middle-income countries. *BJA Educ*. 2018 Jul 14;18(9):265–70.
4. Thapa P, Bhuvan KC, Lee SWH, Gyawali JADS, Ibrahim MIM, Alrasheedy AA. Managing Pain in Low Resource Settings: Healthcare Professionals' Knowledge, Attitude and Practice Regarding Pain Management in Western Nepal. *J Pain Res*. 2022 Jun 2;15(15):1587–99.
5. Gao L, Mu H, Lin Y, Wen Q, Gao P. Review of the Current Situation of Postoperative Pain and Causes of Inadequate Pain Management in Africa. *J Pain Res*. 2023 May 29;16(16):1767–78.
6. Small C, Laycock H. Acute postoperative pain management. *British Journal of Surgery*. 2020 Jan;107(2):e70–80.
7. Hudspith MJ. Anatomy, physiology and pharmacology of pain. Vol. 20,

- Anaesthesia and Intensive Care Medicine. 2019. p. 419–25.
8. Chou R, Gordon DB, De Leon-Casasola OA, Rosenberg JM, Bickler S, Brennan T, et al. Management of postoperative pain: A clinical practice guideline from the American pain society, the American society of regional anesthesia and pain medicine, and the American society of anesthesiologists' committee on regional anesthesia, executive committee, and administrative council. *Journal of Pain*. 2016;17(2):131–57.
 9. Baamer RM, Iqbal A, Lobo DN, Knaggs RD, Levy NA, Toh LS. Utility of unidimensional and functional pain assessment tools in adult postoperative patients: a systematic review. Vol. 128, *British Journal of Anaesthesia*. 2022. p. 874–88.
 10. Mak M, Hakeem AR, Chitre V. Pre-NELA vs NELA - has anything changed, or is it just an audit exercise? *Ann R Coll Surg Engl*. 2016 Nov;98(8):554–9.
 11. Isaya Munisi, Erick Muhumba, Peter Kibunto, Rebecca Shinja. Adequacy of Postoperative Pain Management among patients undergoing Laparotomy at Bugando Medical Centre, Mwaza, Tanazania. *East African Scholars Journal of Medicine and Surgery*. 2024 Jun;6(6):199–207.
 12. Doody O, Bailey ME. Understanding pain physiology and its application to person with intellectual **disability**. *Journal of Intellectual Disabilities*. 2019 Mar;23(1):5–18.
 13. Nordness MF, Hayhurst CJ, Pandharipande P. Current perspectives on the assessment and management of pain in the intensive care unit. Vol. 14, *Journal of Pain Research*. 2021. p. 1733–44.
 14. Gélinas C, Arbour C, Michaud C, Vaillant F, Desjardins S. Implementation of the critical-care pain observation tool on pain assessment/management nursing practices in an intensive care unit with nonverbal critically ill adults: A before and after study. *Int J Nurs Stud*. 2011 Dec;48(12):1495–504.