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Original Research Article

Analgesia Use Patterns in the Emergency Department of a Tertiary Care Center in Nepal: A Cross-Sectional Observational Study

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ABSTRACT:

Introduction: Pain is a common reason for emergency department (ED) presentation, yet its management remains suboptimal. Evidence on emergency analgesia from Nepal is limited. **Methods**: A cross-sectional observational study was conducted in the ED of a tertiary care centre in Nepal among patients presenting with pain and discharged from the ED. Data were collected prospectively over three months. Analgesia use patterns, including drug type, route, number of drugs, and timing of additional administration, were recorded. Pain severity was assessed using the Numerical Rating Scale. Associations were examined using Chi-square or Fisher's exact tests, with $p < 0.05$ considered significant. **Results**: A total of 300 patients were enrolled. The mean age was 37.90 years (SD 20.80), and 51.67% were male. Moderate pain was most common (240, 80.00%), followed by mild (51, 17.00%) and severe (9, 3.00%) pain. Hyoscine (103, 34.33%) and diclofenac (92, 30.67%) were the most frequently administered analgesics. The intravenous route was most common (130, 43.33%), and a single analgesic was used in 214 patients (71.33%). Abdominal pain under evaluation was the most common diagnosis (137, 45.67%). A total of 190 patients (63.33%) did not require an additional analgesic. Pain severity was significantly associated with drug used, number of drugs, route, and diagnosis (all $p < 0.001$). **Conclusions**: Analgesic use was influenced by pain severity and diagnosis. Standardized pain assessment, reassessment, and documentation are needed to improve emergency pain management in Nepal.

Keywords: Analgesia; Emergency department; Pain management.

INTRODUCTION

Pain is one of the most common reasons for presentation to emergency departments (EDs) across Asia, and timely, appropriate pain relief is a core component of good emergency care. In resource-limited settings, however, acute pain is often inadequately assessed, documented, or treated because of high patient workload, limited staffing, competing clinical priorities, variation in prescribing practices, and inadequate resources.[1-3] Evidence from low- and middle-income countries (LMICs) suggests that patients frequently experience delays in receiving analgesia or receive inadequate pain relief.[2,3]

Contemporary emergency pain management has shifted toward individualized, multimodal analgesia that balances effective pain relief with the risks of opioid-related adverse effects.[4,5] Reviews increasingly highlight non-opioid agents, regional techniques, and alternative approaches alongside standardized assessment and evidence-based protocols.[5,6] International surveys reveal substantial variation in pain-management frameworks across EDs, including documentation practices, availability of condition-specific protocols, staff training, and analgesic selection.[3,6]

Prescribing does not always translate into

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administration. Some prescribed analgesics are not given because patients refuse them or due to other practical barriers.[7,8] Recent studies also report differences in the timing and choice of non-opioid and opioid analgesics in EDs, underscoring the importance of studying actual prescribing and administration practices locally.[7,9] A review emphasized the need for standardized pain assessment, staff training, clear treatment protocols, and multimodal pain management.[10]

The Nepalese context warrants particular attention because evidence on emergency analgesia from Nepal and the broader South Asian region remains limited. Bhandari et al., in a tertiary ED in Dharan, Nepal, reported that intramuscular diclofenac was the predominant analgesic, that pain assessment and documentation were poor, and that the median time from triage to analgesia was 45 minutes.[11] A subsequent study from the same institution found that analgesia was administered to only 70% of enrolled patients, with variation in time to analgesia according to triage acuity.[12] These findings, among others, suggest that analgesic practices in Nepal may differ from those in high-resource countries, but locally relevant data remain scarce.[13,14]

Against this background, this observational study aims to describe analgesia use patterns in the ED of a tertiary care center in Nepal, emphasizing the types and routes of analgesics used, timing of administration, and factors associated with analgesic use. Characterizing current practice can provide locally relevant evidence to identify gaps in pain assessment and treatment and may support the development of standardized, context-appropriate pain-management protocols.

METHODS

A cross-sectional observational study was conducted in the ED of Lumbini Medical College, a tertiary care center in Palpa, Nepal, among patients who presented to the ED with pain and were subsequently discharged from the ED. Data were collected prospectively from May 28 to August 27, 2026 by the researcher, who was present in the ED during the study period.

Ethical approval was obtained from the Institutional Review Committee (IRC) of Lumbini Medical College (IRC approval number: 58/26/V1.R0). Written informed consent was obtained from all patients or their guardians. For minors 12-17 years of age, verbal assent was obtained in addition to written parental or guardian consent.

Patients who presented to the ED with pain and were discharged from the ED were eligible. Patients who received analgesia only in the form of local anesthetics, those with unclear or incomplete medical records, and those with altered mental status or inability to communicate pain severity (e.g., non-Nepali speakers without interpreters, patients with severe cognitive impairment) were excluded.

A convenience (non-probability) sampling technique was used. Eligible patients presenting to the ED during the study period when at least one researcher was present were approached until the required sample size was achieved. The sample size was calculated based on Bhandari et al., who reported a proportion of intramuscular diclofenac use of 0.794.[12] Using $p = 0.8$, a 95% confidence level ($z = 1.96$), and a 5% margin of error, the calculated sample size was: $n = z^2 \times p(1-p)/e^2 = 246$. Adding 10% to account for incomplete records and non-response yielded a minimum sample size of 271. A total of 300 patients were enrolled, exceeding the minimum required sample size.

Data were collected prospectively by the researcher through review of the medical prescription chart and nursing records. Pain severity was assessed at presentation by the treating clinician or researcher using the Numerical Rating Scale (NRS), categorized as mild (1–3), moderate (4–6), or severe (7–10). The ED had no standardized pain-management protocol during the study period; analgesic selection was at the discretion of the treating clinician. Duration of analgesia was defined as the time from first analgesic administration to either the next analgesic dose or discharge from the emergency department, whichever occurred first.

All data were recorded anonymously and entered into Microsoft Excel. Analysis was carried out using PSPP 2.1.1. Descriptive statistics included frequencies, percentages, mean (SD), and median (IQR). Inferential statistics were performed using the Chi-square test and Fisher's exact test were done as appropriate. A p-value of <0.05 was considered statistically significant. As this was an exploratory study with multiple comparisons, no adjustment for multiplicity was applied; findings should be interpreted as hypothesis-generating.

RESULTS

A total of 300 patients presenting to the emergency department with pain were enrolled over the three-month study period. The demographic and clinical characteristics are summarized in **Tables 1 and 2.**

Table 1. *Demographic characteristics (N = 300)*

Variable	Category	n (%)
Age (years)	Mean (SD)	37.90 (20.80)
	Median (IQR)	34.00 (22.75–54.00)
Age Group	Pediatric (<18)	50 (16.67%)
	Adult (18–64)	212 (70.67%)
	Elderly (≥65)	38 (12.67%)
Sex	Male	155 (51.67%)
	Female	145 (48.33%)

Note: Percentages may not sum to 100.00% due to rounding.

Table 2. *Clinical characteristics (N = 300)*

Variable	Category	n (%)
Pain Scale	Moderate	240 (80.00%)
	Mild	51 (17.00%)
	Severe	9 (3.00%)
Drug Used	Hyoscine	103 (34.33%)
	Diclofenac	92 (30.67%)
	Paracetamol	56 (18.67%)
	Ketorolac	42 (14.00%)
	Pethidine	4 (1.33%)
	Tramadol	3 (1.00%)
Route	IV	130 (43.33%)
	IM	85 (28.33%)
	IV, IV	70 (23.33%)
	IM, IM	5 (1.67%)
	IM, IV	5 (1.67%)
	IV, IM	5 (1.67%)
Number of Drugs Used	Single	214 (71.33%)
	Double	86 (28.67%)
Diagnosis	Abdominal pain under evaluation	137 (45.67%)
	Road Traffic Accident	53 (17.67%)
	Cut Injury	32 (10.67%)
	Fracture	26 (8.67%)
	Chest Pain	15 (5.00%)
	Headache	12 (4.00%)
	Gastritis	8 (2.67%)
	Cholelithiasis/Cholecystitis	6 (2.00%)
	Renal/Ureteric Colic	6 (2.00%)
	Back Pain	3 (1.00%)
	Hernia	2 (0.67%)
Duration (hours)	Mean (SD)	4.00 (1.10)
	Median (IQR)	4.00 (3.00–5.00)

Note: Percentages may not sum to 100.00% due to rounding.

The mean age was 37.90 years (SD 20.80), with a median of 34.00 years (IQR 22.75–54.00). Most patients were adults aged 18–64 years (212, 70.67%), followed by pediatric patients below 18 years (50, 16.67%) and elderly patients aged 65 years and above (38, 12.67%). Male patients constituted 51.67% (155) of the study population, while females accounted for 48.33% (145) **(Table 1)**.

Moderate pain was the most common presentation (240, 80.00%), followed by mild pain (51, 17.00%) and severe pain (9, 3.00%). Hyoscine was the most frequently administered analgesic (103, 34.33%), followed by diclofenac (92, 30.67%), paracetamol (56, 18.67%), ketorolac (42, 14.00%), pethidine (4, 1.33%), and tramadol (3, 1.00%). The intravenous route was the most common mode of administration (130, 43.33%), followed by the intramuscular route (85, 28.33%). Combination routes included IV, IV (70, 23.33%) and IM, IM; IM, IV; and IV, IM (5 each, 1.67%). A single analgesic was used in 214 patients (71.33%), while two analgesics were used in 86 patients (28.67%) **(Table 2).**

Abdominal pain under evaluation was the most common diagnosis (137, 45.67%), followed by road traffic accidents (53, 17.67%), cut injuries (32, 10.67%), fractures (26, 8.67%), chest pain (15, 5.00%), headache (12, 4.00%), gastritis (8, 2.67%), cholelithiasis/cholecystitis (6, 2.00%), renal/ureteric colic (6, 2.00%), back pain (3, 1.00%), and hernia (2, 0.67%). The mean duration of analgesia was 4.00 hours (SD 1.10), with a median of 4.00 hours (IQR 3.00–5.00) **(Table 2).**

The time for additional drug administration is presented in Table 3. Among the 110 patients who received an additional drug, 68 (22.67%) received it within 2–4 hours, 22 (7.33%) within 4–6 hours, 10 (3.33%) within 6–8 hours, 9 (3.00%) within less than two hours, and 1 (0.33%) after more than eight hours. Notably, 190 patients (63.33%) did not require an additional drug during their ED stay **(Table 3).**

Table 4 presents the association between pain severity and the analgesic agent used. A statistically significant association was found (Fisher's exact test, $p < 0.001$). Diclofenac was the most frequently used analgesic in patients with mild pain (31, 60.78%), while Hyoscine was predominant in those with moderate pain (95, 39.58%). Among patients with severe pain, diclofenac, ketorolac, paracetamol, and tramadol were each used in 2 patients (22.22%), and Hyoscine was used in one patient (11.11%) (**Table 4**).

The results of Chi-square and Fisher's exact tests examining associations between variables are presented in **Table 5**. Statistically significant

associations were observed between pain scale and drug used ($p < 0.001$), pain scale and number of drugs used ($\chi^2 = 25.14$, df = 2, $p < 0.001$), pain scale and route of administration ($p < 0.001$), pain scale and age group ($p = 0.0137$), pain scale and diagnosis ($p < 0.001$), diagnosis and drug used ($p < 0.001$), diagnosis and number of drugs used ($p = 0.0005$), and route and drug used ($p < 0.001$). No statistically significant association was found between pain scale and sex ($p = 0.1379$), sex and drug used ($p = 0.3351$), sex and number of drugs used ($\chi^2 = 0.24$, df = 1, $p = 0.6213$), age group and drug used ($p = 0.8623$), or age group and number of drugs used ($\chi^2 = 0.66$, df = 2, $p = 0.7209$) **(Table 5).**

***Table 3**. Time for additional drug*

Duration (hrs.)	n (% of 300)	Cumulative %
Less than 2	9 (3.00%)	3.00
2–4	68 (22.67%)	25.67
4–6	22 (7.33%)	33.00
6–8	10 (3.33%)	36.33
More than 8	1 (0.33%)	36.67

DISCUSSION

This observational study assessed analgesic use patterns among patients attending the emergency department of a tertiary care center in Nepal. Moderate pain was the most common presentation (80.00%), and Hyoscine (34.33%) and diclofenac (30.67%) were the most frequently used analgesics. Intravenous administration was the most common route (43.33%). Significant associations were found between pain severity and analgesic choice, number of drugs used, route of administration, and diagnosis. These findings suggest that analgesic prescribing was influenced by both pain severity and the underlying clinical condition.

In our study, 80.00% of patients presented with moderate pain, and abdominal pain under evaluation was the most common diagnosis (45.67%). Bhandari et al. similarly reported abdominal pain as the leading complaint, accounting for 36% of cases.[12] The high proportion of abdominal pain in both studies indicates that abdominal complaints represent an important proportion of emergency department presentations in Nepal.

Hyoscine (34.33%) and diclofenac (30.67%)

***Table 4**. Pain scale vs drug ($p < 0.001$)*

Pain	Hyoscine	Diclofenac	Ketorolac	Paracetamol	Pethidine	Tramadol
Mild (n = 51)	7 (13.73%)	31 (60.78%)	3 (5.88%)	10 (19.61%)	0 (0.00%)	0 (0.00%)
Moderate (n = 240)	95 (39.58%)	59 (24.58%)	37 (15.42%)	44 (18.33%)	4 (1.67%)	1 (0.42%)
Severe (n = 9)	1 (11.11%)	2 (22.22%)	2 (22.22%)	2 (22.22%)	0 (0.00%)	2 (22.22%)

Note: Percentages are row-wise. Fisher's exact test, $p < 0.001$.

***Table 5**. Associations among variables using Chi-square / Fisher's exact tests*

Comparison	Test used	Statistic	df	p-value
Pain Scale × Drug	Fisher's exact	—	—	<0.001
Pain Scale × Number of Drugs	Chi-square	25.14	2	<0.001
Pain Scale × Route	Fisher's exact	—	—	<0.001
Pain Scale × Sex	Fisher's exact	—	—	0.1379
Pain Scale × Age Group	Fisher's exact	—	—	0.0137
Pain Scale × Diagnosis	Fisher's exact	—	—	<0.001
Sex × Drug	Fisher's exact	—	—	0.3351
Sex × Number of Drugs	Chi-square	0.24	1	0.6213
Age Group × Drug	Fisher's exact	—	—	0.8623
Age Group × Number of Drugs	Chi-square	0.66	2	0.7209
Diagnosis × Drug	Fisher's exact	—	—	<0.001
Diagnosis × Number of Drugs	Fisher's exact	—	—	0.0005
Route × Drug	Fisher's exact	—	—	<0.001

were the most frequently administered analgesics in our study. This differs from Bhandari et al., who reported intramuscular diclofenac as the predominant analgesic in approximately 80% of patients.[12] Ghimire et al., in another Nepalese ED, reported ketorolac (27.40%), tramadol (19.70%), and diclofenac (11.40%) as commonly prescribed analgesics.[15] These differences may be explained by variations in patient characteristics, clinical presentations, medicine availability, institutional prescribing practices, and physician preference. The frequent use of Hyoscine in our study may be partly related to the high proportion of patients with abdominal pain, for whom an antispasmodic agent may be appropriate.

Parenteral administration was common, with intravenous administration as the single route in 43.33% of patients and additional IV combinations in 23.33%. This is consistent with previous Nepalese studies. Ghimire et al. reported that 86.80% of analgesics were administered parenterally,[15] while Tuladhar et al. reported intravenous (52%) and intramuscular (37.30%) routes as commonly preferred in trauma patients.[16] The preference for parenteral administration may relate to the need for rapid pain relief in emergency settings.

Most patients (71.33%) received a single analgesic, while 28.67% received two. This was broadly comparable with Bhandari et al., where 83% received a single analgesic.[12] The use of combination analgesics in our study may reflect the use of multimodal analgesia in this setting. However, further studies are needed to determine whether such combinations provide better pain relief and reduce adverse effects.

A total of 63.33% of patients did not receive an additional analgesic during their ED stay. Among all patients, 22.67% received an additional drug within 2–4 hours. This may indicate satisfactory initial pain control in many patients, although the high proportion recorded as "Not given" may also reflect discharge before further analgesia was required. This finding should be interpreted cautiously, particularly because documentation of reassessment and additional treatment remains an important issue in emergency pain management.[11]

Pain severity was significantly associated with analgesic choice, number of drugs, and route of administration (all $p < 0.001$), suggesting that analgesic management was partly guided by pain severity. Diagnosis was also significantly associated with drug selection ($p < 0.001$), which is clinically reasonable because different causes of pain require different treatment approaches. In contrast, sex was not significantly associated with drug used ($p = 0.3351$), number of drugs used ($p = 0.6213$), or pain scale ($p = 0.1379$). Age group was also not significantly associated with drug used ($p = 0.8623$) or number of drugs used ($p = 0.7209$), although it was associated with pain scale ($p = 0.0137$).

The use of opioids was low, with pethidine used in 1.33% and tramadol in 1.00% of patients. This is similar to previous studies from Nepal and may be related to prescribing practices, drug availability, and regulatory factors.[12,15] These findings highlight the need for clear, evidence-based analgesic protocols. International recommendations support the use of validated pain assessment tools together with regular reassessment and documentation.[14]

This study has several limitations. First, it was conducted in a single tertiary care hospital, so findings may not be representative of other settings in Nepal or South Asia. Second, convenience sampling may introduce selection bias, as patients presenting when researchers were not present were not enrolled. Third, the observational design does not allow causal conclusions. Fourth, pain relief after analgesia was not systematically reassessed, limiting assessment of treatment effectiveness. Fifth, patients who received only local anesthetics were excluded, so findings do not reflect pain management for minor procedures. Finally, the three-month study period may not reflect seasonal variations in emergency care.

CONCLUSIONS

This study provides baseline information on analgesic use in the emergency department of a tertiary care center in Nepal. Moderate pain was the most common presentation, and Hyoscine and diclofenac were the most commonly used analgesics, with intravenous administration being the predominant route. Treatment decisions were significantly influenced by pain severity and diagnosis, while sex and age group were not consistently associated with analgesic use.

The findings indicate a need for standardized pain assessment, regular reassessment, and better documentation in emergency care. This study provides locally relevant data that may inform the development of practical pain management guidelines for Nepalese emergency departments. Further multicenter studies are needed to assess pain relief, patient satisfaction, and the effectiveness of standardized analgesic protocols.

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The authors declare that no competing interests exist

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Ethical issues (including plagiarism, data fabrication, and double publication) have been completely observed by the authors.

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