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Original Article

Evaluation of Prescription Pattern of Analgesics at Emergency Department of Tertiary Care Hospital: A Descriptive Cross-Sectional Study

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Abstract

Background
Rational use of analgesic drugs is needed for immediate relief of pain. This study was conducted to find out the prescribing pattern of analgesics in the emergency department.

Materials and Methods
A descriptive cross-sectional study among patients attending the emergency department of a tertiary care hospital from March 2022 to February 2023 after approval from the Institutional Review Committee. Demographic profile, indications for analgesics use, route, and frequency of administration were recorded based on the pre-structured questionnaires. Convenient sampling was done. Data were analyzed by using SPSS, version 20.

Results
Prescription patterns of analgesics were analyzed in 325 patients. The mean age was 46.93 ± 17.79 years with a male predominance of 196 (60.6%). Orthopedic problems 99(30.5%) due to trauma were the most common indications followed by medical and surgical indications for analgesic use. Non-steroidal anti-inflammatory drugs were used in 46.6%, opioids in 26.8%, combinations in 23%, and antispasmodics in 3.6%. Commonly prescribed analgesic was ketorolac (27.4%), tramadol (19.7%), and diclofenac (11.4%). The most common combination was ketorolac and tramadol (14.5%). Paracetamol alone was used in 16 (4.9%). A prescription with a generic name was 149 (45.8%). Parenteral use accounted for 86.8%. Co-administration of gastroprotective drugs was used in 93.2%. A fixed-dose combination was used in 1.2%.

Conclusion
Non-steroidal anti-inflammatory drugs are the commonly used analgesics for various indications, including acute pain and fever. The choice of analgesics and their prescription pattern varied depending on indications, medical history, and the presence of co-morbidities. Ketorolac and tramadol were the most commonly prescribed analgesics.

Keywords: *Analgesics, Drug utilization, Emergency unit, Prescriptions*

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Introduction

Pain is one of the common reasons for visiting the emergency department (ED). Pain management in the ED is one of the quality-of-care services and can be used as an indicator for assessing the level of care in ED [1]. The lack of experience and protocols for pain management may result in improper use of analgesics due to various reasons such as failure to assess and document initial pain, lack of pain management guidelines, and inadequate use of analgesia in terms of dosing and frequency [2, 3] .

The primary treatment for pain relief is the administration of systemic analgesic agents such as non-steroidal anti-inflammatory drugs (NSAIDs) or opioids [4]. The choice of treatment regime should be made on an individual basis to relieve pain that has fewer side effects and does not have significant interactions with other drugs [5]. Inadequate treatment of pain will result in increased holding times and crowding, frequent return visits, and increased hospitalization rates in ED [6].

The ED provides an important platform for conducting analgesics utilization patterns as patients present with a wide range of acute pain. Emergency teams should be aware of effective, evidenced-based treatment options available for acute pain management. Therefore, evaluating the drug prescribing indicators and usage patterns in emergency settings has the potential of determining the rationality of analgesic use [7]. The objectives of the study are to assess the main indications for analgesic use, different classes of analgesic drugs, frequency of use, dosing, and route of administration.

Materials and Methods

This is a descriptive cross-sectional study on patients attending the ED of Nobel Medical College Teaching Hospital from March 2022 to February 2023. A total of 325 patients of different subspecialties with ages more than 12 years were enrolled based on the convenient sampling method. Patients of pediatric age groups and those who were not prescribed analgesics were excluded. Demographic profiles of patients and main illnesses attending ED were noted. The main objectives of this study were to describe the number and class of analgesics prescribed for different indications, routes, doses, and frequency of administration.

Ethical approval was obtained from the institutional review committee of Nobel Medical College (NMCTH ref no. 415/2021) before conducting the study. Convenient sampling was done. The sample size was calculated to be 322. The sample size (n) was calculated using formula, $n = Z^2 \times p \times q/e^2$ [$n = (1.96)^2 \times 0.3 \times 0.7/ (0.05)^2 = 322$, Where, Z= 1.96 for a 95% confidence interval, p= Average number of patients admitted in ICU per day = 30 (Educated guess) q= 1-p,e= margin of error = 5%]

Data were entered in Microsoft Excel 2007 and analyzed by IBM Statistical Package for the Social Sciences (SPSS) data editor, version 20. Continuous and categorical variables were presented as a mean, percentage, and standard deviation. The tabular presentation was made for different variables.

Results

Prescription patterns of different analgesics were analyzed in 325 patients. The mean age was 46.93 ± 17.79 years. One hundred and ninety-six patients (60.6%) were male. The age group 41-60 years accounted for the highest number of 147 (45.2%) of patients. The baseline characteristics of patients receiving analgesics in ED are shown below (table 1). Thirty-nine (12%) patients were hypertensive and 32 (9.8%) had a history of diabetes mellitus. Thirteen patients (4%) had renal impairment. Orthopedic problems 99(30.5%) due to road traffic accidents and trauma were the most common indications followed by medical and surgical indications for analgesics use. Total traumatic pain accounted for 115 (35.4%), abdomen pain in 81(24.9%), chest pain in 58 (17.8%), headache in 23 (7.1%), renal colic 14 (5.8%) and angina in 13 (4%).

Table 1: Baseline characteristics of patients receiving analgesics in the Emergency Department (n=325)

Characteristics		Frequency (%)
Age (in years):	<20	24 (7.4)
	20-40	85 (26.2)
	41-60	147 (45.2)
	>60	69 (21.2)
Gender:	Male	196(60.6)
	Female	129 (39.3)
Co-morbidities:		
	Hypertension	39 (12)
	Type 2 diabetes mellitus	32 (9.8)
	Renal impairment	13(4)
	Hypothyroidism	8(2.5)
	COPD	9(2.8)
Indications for analgesics		
	Traumatic pain	115 (35.4)
	Abdomen pain	81(24.9)
	Chest pain	58 (17.8)
	Headache	23 (7.1)
	Renal colic	14 (5.8)
	Angina	13 (4)
	Backache	10 (3.1)
	Throat pain	4 (1.2)
	Toothache	2(0.6)

Prescribing indicators of analgesic drugs are shown below (table 2). Tables 3 and 4 show commonly prescribed parenteral and oral drugs respectively in ED. Among the drugs prescribed, parenteral drugs accounted for 309 (95.07%), and 16(4.9%) were administered orally or through a nasogastric tube. Proton pump inhibitors were used in 303 (93.2%), antiemetics 92(28.3%), and corticosteroids in six (1.8%) of patients. NSAIDs were used in 46.6%, opioids in 26.8%, combinations in 23%, and antispasmodics in 3.6%. Commonly prescribed analgesic was ketorolac (27.4%), tramadol (19.7%), and diclofenac (11.4%). The most common combination was ketorolac and tramadol (14.5%). Paracetamol alone was used in 16 (4.9%). A prescription with a generic name was 149 (45.8%). Co-administration of gastroprotective drugs was used in 93.2%. A fixed-dose combination was used in 1.2%.

Table 2: Prescribing indicators of analgesics in the Emergency Room (n=325).

Indicators	Frequency (%)
Prescription by generic name	149 (45.8 %)
Prescription by brand name	176 (54.2%)
Parenteral analgesics	309(95.07 %)
Intravenous (IV)	282 (86.8%)
Intramuscular (IM)	27(8.3%)
Oral or nasogastric administration	16 (4.9%)
Around-the-clock dosing	273 (84%)
As needed dosing	53 (16%)
Antiulcer drugs	303(93.2%)
Antiemetic drugs	68 (20.92%)
Corticosteroids use	6(1.8%)

Table 3: Commonly prescribed parenteral analgesics in the ED (n=325).

Name	Frequency (%)
Ketorolac	89 (27.4)
Tramadol	64 (19.7)
Ketorolac + Tramadol	47 (14.5)
Diclofenac	37 (11.4)
Ketorolac+ Paracetamol	26 (8.0)
Fentanyl	23 (7.1)
Paracetamol	16 (4.9)
Hyoscine Bromide	10 (3.1)
Tramadol+Paracetamol	5 (1.5)

Table 4: List of Commonly prescribed oral analgesics in ED (n=325).

Name	Frequency n (%)
Tramadol	60 (18.46)
Aceclofenac	54 (16.61)
Naproxyn	22(6.76)
COX inhibitors (Etoricoxib)	18 (5.53)
Ibuprofen+Paracetamol	14(4.30)
Piroxicam	12(3.69)

Discussion

One of the most common reasons for patients to visit the ED is acute pain [8]. Analgesics are commonly used medications to manage various acute pain conditions. However, the choice of analgesics and their prescription may vary depending on the patient's indication, medical history, and co-morbidities. Therefore, it is important to evaluate the utilization pattern of different analgesics in the emergency setting to look for their rationale use. In this study, we described the prescription patterns of analgesics among patients admitted to the emergency department of tertiary care hospital.

The mean age of patients was 46.93 ± 17.79 years with male predominance. This is similar to a study done by Bhandari R et al [3] in eastern Nepal which showed that the majority of patients were of age between 20 to 60 years with males representing 62.5% of the patients. The prescription patterns of analgesics in the ED vary depending on the indications for which they are being used. In our study, trauma related to road traffic accidents, abdominal pain, and chest pain were the most common indications for analgesic use in ED. The most commonly prescribed analgesics were ketorolac, tramadol, diclofenac, and paracetamol. Ketorolac is widely used as an injectable painkiller due to its high potency and its analgesic effect is similar to injectable opioids [9]. The lack of respiratory depression, physical dependence, and durable pain relief are some of the most important advantages of ketorolac over opioids. Moreover, a combination of ketorolac and opioids has synergistic effects and it can reduce the dose of opioids by simultaneous administration [10, 11].

In cases where patients present with more severe pain or inflammation, stronger NSAIDs such as indomethacin or diclofenac have more potent anti-inflammatory effects and are prescribed for shorter duration due to their potential for GI side effects. Another indication for which analgesics are commonly prescribed in ED is fever. In these cases, paracetamol or ibuprofen are typically used due to their effectiveness in reducing fever and their safety profile. Although, paracetamol has limited ability to treat moderate-to-severe pain. Pain as a result of trauma can be severe, and therefore its use may provide ineffective analgesia. Studies have shown that the addition of paracetamol to NSAIDS increases the effect of analgesia compared with other NSAIDs used alone [12]. In our study, paracetamol has been used in 4.9% of patients as a single agent and in 9.5% of patients in combination with other

analgesics indicating its underutilization.

The use of opioids and sedatives plays an important role in easing the patient's comfort and various opioids are effective in the management of acute pain of moderate to severe intensity. However, a balance between the benefits and risks related to its use should be considered before starting this therapy in the ED [13]. In our study, opioids were used in 42.8% of patients either as monotherapy or in combination. Tramadol and fentanyl were the most commonly used opioid agents. Although, morphine administered either parenterally or orally in the ED provides a better analgesia and is considered as the opioid of choice [14]. It was not used in our setting probably due to its unavailability and other better options like fentanyl.

Non-opioid analgesics agents (paracetamol and other NSAIDs) and opioids are frequently administered in combinations in the ED for acute pain management due to their synergistic effects on pain relief [15]. In this study, combination therapy was used in 24% of patients with ketorolac and tramadol being the most common combination used for traumatic pain. However, the prescription of analgesics may also vary depending on the physician's experience and familiarity with the medication and the presence of comorbidities. Elderly patients or those with a history of gastrointestinal bleeding, kidney disease, or cardiovascular diseases may require a lower dose or different analgesics due to their increased risk of adverse effects.

Corticosteroids are used in ED for a variety of indications like severe sepsis, airway diseases, anaphylaxis, etc. Its use is associated with increased infection rates, hospital stays, and mortality. In this study, Hydrocortisone was used only in 1.8% of patients as an adjunct to other analgesics for pain relief. The route of administration of analgesics in the management of pain may have several limitations. The intravenous (IV) route is the most common route of administration in emergency settings and provides rapid relief [16]. However, it can be difficult in some circumstances, like severe trauma, in patients with difficult vein access. In this study, 86.8% of patients with pain received analgesics through the IV route, and only 5% were administered through the oral or nasogastric route.

The percentage of analgesic drugs prescribed by brand name was 54.2 which denote that there is a trend of prescribing in trade names rather than the generic name. A study done in a medical college in Kathmandu Valley revealed that only 16.94% of the medicines were prescribed with generic names [17]. This could be due to a physician's preference for drugs of a particular manufacturer over others as a result of habitual or personal experience. It could also be due to a lack of hospital formulary and inpatient drug distribution systems. The effectiveness of around-the-clock (ATC) dosing of NSAIDs has been demonstrated to achieve appropriate postoperative analgesia [18]. Although, chronic opioid therapy guidelines do not make a specific recommendation regarding either as-needed or ATC dosing. In our study, 84% of the patients were prescribed analgesics on an ATC basis [19].

This study has some limitations. We enrolled a limited number of patients presenting with acute pain of various etiologies. We did not look at the severity of pain scale for the use of various classes of analgesics. Furthermore, we don't have institutional guidelines on the rational use of drugs in pain management. In such conditions, the rationality of drug use cannot be ascertained.

Conclusion

The prescription patterns of analgesics in the ED depend on the indications for which they are being used. Traumatic pain was the most common indication for analgesics use and NSAIDS were the commonly used analgesics. Commonly prescribed analgesics were ketorolac, tramadol, diclofenac, and paracetamol. Parenteral route was the most common route of administration.

Conflict of interest: None

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