Original Article

Prescribing Pattern of Analgesics in Hospitalized Patients in Surgical Unit at Nepalgunj Medical College and Teaching Hospital

Aswani Chaudhary,[1] Deependra Prasad Sarraf,[2] Arvind Kumar Gupta,[3] Digbijay Bikram Khadka[4], Aakash Jayswal[5], Aarati Dhakal[5], Balaram KC[5]

[1]Lecturer, Department of Pharmacology, Nepalgunj Medical College and Teaching Hospital, Banke, Nepal.
[2]Associate professor, Department of Clinical Pharmacology and Therapeutics, B.P. Koirala Institute of Health Sciences, Dharan, Nepal
[3]Professor and Head of the Department, Department of Pharmacology, Nepalgunj Medical College and Teaching Hospital, Banke, Nepal.
[4]Lecturer, Department of Surgery, Nepalgunj Medical College and Teaching Hospital, Banke, Nepal.
[5]MBBS Student, Nepalgunj Medical College and Teaching Hospital, Banke, Nepal.

Corresponding author: Dr. Aswani Chaudhary; Email: chaudharyaswani@gmail.com

ABSTRACT

Background: Drug utilization study plays an important role in the promotion of rational use of medicines. Pain is a multidimensional experience, personalized to each patient. Appropriate use of analgesics in postoperative pain can alleviate the suffering of the patients and also has significant social and economic benefits. The objective was to find out the pattern of analgesic utilization in hospitalized patients in the surgical ward.

Methods: A cross-sectional study was conducted among the hospitalized patients in the surgery ward for two months using a self-designed proforma. The case record forms of the patients were reviewed and the relevant data were collected. Descriptive statistics like mean, frequency, percentage and standard deviation were calculated. Average number of analgesics per patient, percentage of drugs prescribed by generic name, percentage of encounters with an injection prescribed and percentage of drugs prescribed from the National List of Essential Medicines (NLEM) were also calculated using Statistical Package for Social Science version 22.0.

Results: Out of 160 patients, 56.25% were females. Mean age of the patient was 43.32 ± 16.3 years. Cholelithiasis (53.13%) was the most common diagnosis followed by inguinal hernia (12, 7.5%). Average number of analgesics per patient was 2.4. Sixty-six (41.25%) patients were prescribed two types of analgesics. Ketorolac (39.32%) was the most commonly prescribed analgesic drug followed by Etoricoxib (36.46%). About 61.72% of the analgesics were prescribed in the injection form and 7.29% of the analgesics were from the NLEM.

Conclusion: Ketorolac was used in the majority of patients admitted to the surgery ward and none of the analgesics were prescribed by generic names. The number of analgesics prescribed from NLEM was very less, indicating the need for sensitization about the promotion of rational use of medicines among the healthcare professionals

Key-words: Analgesics, Cholelithiasis, Ketorolac, postoperative pain

ARTICLE INFORMATION	Source of Support: ……	Conflict of Interest: None
Received: 3 January 2022	Accepted: 15 April 2022	Published Online: 30 August 2022

INTRODUCTION

The World Health Organization (WHO) has defined drug utilization study as "the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences". It plays an important role in the promotion of rational use of drugs.[1] Postoperative pain affects the patients' operative outcome, well-being, transition to chronic pain, poor wound healing and insomnia.[2] It has been reported that nearly three-quarters of patients undergoing surgical interventions have acute pain, and that 20% to 80% of postoperative patients experience pain.[3,4] Analgesics are commonly prescribed for the relief of pain in all types of patient care settings and the commonly used analgesics are opioids, non-steroidal anti-inflammatory drugs (NSAIDs), non-opioid central nervous analgesia, local anesthesia, and others.[5,6] Appropriate use of analgesics can alleviate the suffering of the patients and also has significant social and economic benefits.[7] According to the WHO analgesic ladder, paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs) are used prior to weak opioids (e.g., codeine and tramadol). If weak opioids do not provide adequate pain relief, strong opioids such as morphine, oxycodone, and fentanyl are indicated.[8] In the last three decades, analgesic utilization has increased steadily in both developed and developing countries.[9]

Being an essential component of health care delivery, rational use of medicines produces the desired effect of improving patients' ailments. However, their irrational use leads to prolongation of the illness, development of adverse effects, unnecessary expense and wastage of healthcare resources as well. Thus, it is imperative to have safe and appropriate use of analgesics in hospitalized patients. Ensuring rational drug use requires ongoing evaluation of drug prescribing, dispensing, and use by patients.[10] The utilization pattern of analgesics might be affected by differences in pain experience among patients and behavior of the prescribers which is affected by peer norms, lack of drug information, workload, and availability of financial incentives.[11-14] Most of the studies on analgesic utilization are conducted in non-surgical wards[15] or in the entire hospital[16,17] or are retrospective study[18]. There is a need of periodic evaluation of analgesic use pattern to ensure rational prescription in the hospitalized patients.[1] Therefore, the present study was conducted to find out the pattern of analgesic utilization in hospitalized patients in the surgical ward.

MATERIALS AND METHODS

A cross-sectional study was conducted by the department of pharmacology in collaboration with the surgery department among the hospitalized patients in the surgery ward at Nepalgunj Medical College and Teaching Hospital (NGMCTH), Kohalpur, Banke, Nepal between February to March, 2022. Kohalpur Teaching Hospital of NGMCTH has 750 beds and provides primary, secondary and tertiary care to patients in the mid-western region of Nepal and its surgical wards 1 and 3 have 36 beds with 80% occupancy. Patients aged >18 years of either gender admitted to the surgical unit and taking at least one analgesic drug were enrolled. The patients unable to communicate, unconscious/mentally retarded, suffering from psychiatric diseases and those who did not give consent to participate were excluded. We used the formula $n=Z^2*P*Q/L^2$ to calculate the sample size, based on a 95% confidence interval and margin of error of 5% and prevalence of 91.4% postoperative pain in a study by Woldehaimanot et al.[19] Thus, the estimated minimum sample size required was 160 patients. Systematic random sampling method (patients admitted to the even-numbered beds) was used to select the study participants.

A self-designed case record proforma was used to collect the demographic details and prescription data of enrolled patients. The proforma was pilot tested in 10% of the patients for verifying its reliability and validity and it was modified accordingly. The ethical approval was obtained from the Institutional Review Committee (Ref no. 500/078/079). The study objectives were explained to the participants and written informed consent was taken. The principal investigator visited the surgical unit ward daily and with the help of the case record form, the socio-demographic data and the analgesics prescribed during patients' hospital stay were recorded after reviewing their case sheets. Personal identifying information were not collected to maintain the confidentiality of the participants. The data used for pilot testing were not used for final data analysis.

Data were entered in Microsoft Office Excel 2010 and descriptive statistics like mean, frequency,

percentage and standard deviation (SD) were calculated using Statistical Package for Social Science version 22.0. The WHO prescribing indicators like average number of analgesics per patient, percentage of drugs prescribed by generic name, percentage of encounters with an injection prescribed and percentage of drugs prescribed from the National List of Essential Medicines (NLEM) were calculated.[20] The data were presented as table and graphs.

RESULTS

A total of 160 patients participated in the study out of which 90 (56.25%) were females, and 56 (35%) were in the age group of 31-45 years. Mean age of the patient was 43.32 ± 16.3 years. About 55 (34.38%) patients were from Banke district followed by Bardiya (18.75%) and Dang (8.75%). Out of 160, 53 (33.13%) patients were farmers (**Table 1**). Twenty eight (17.5%) had at least one comorbidity, and hypertension (16, 57.14%) was the most common one followed by Type 2 diabetes mellitus (5, 17.86%) and chronic obstructive pulmonary disease (4, 14.29%).

Table 1: Socio-demographic characteristics of the patients (n=160)

Variables		Frequency	Percentage
Gender	Male	70	43.75
	Female	90	56.25
Age category (in years)	18-30	44	27.50
	31-45	56	35.00
	46-60	33	20.63
	>60	27	16.88
Marital status	Married	151	94.38
	Unmarried	9	5.63
Residence (District)	Banke	55	34.38
	Bardiya	30	18.75
	Dang	14	8.75
	Kailali	10	6.25
	Rukum	9	5.63
	Salyan	8	5.00
	Others	34	21.25
Education	Illiterate	38	23.75
	Primary	68	42.50
	Secondary	38	23.75
	Higher secondary	4	2.50
	Bachelor level	12	7.50
Occupation	Business	4	2.50
	Farmer	53	33.13
	Homemaker	79	49.38
	Students	17	10.63
	Government Job	4	2.50
	Unskilled Job	3	1.88

Cholelithiasis (85, 53.13%) was the most common diagnosis followed by inguinal hernia (12, 7.5%) and intestinal obstruction (8, 5%) (**Figure 1**).

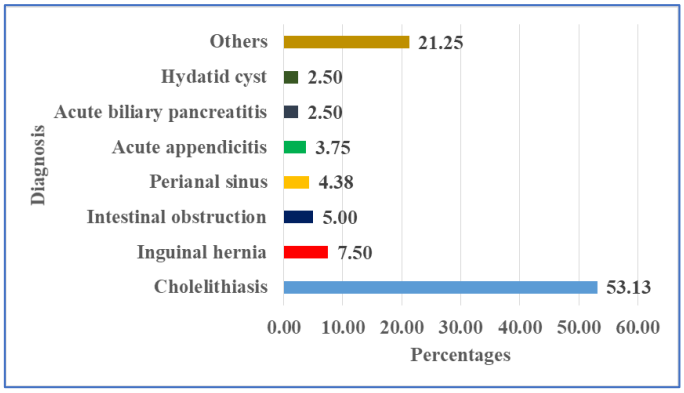

Figure 1: Diagnosis of the patients (n=160)

Most of the patients stayed in the surgical ward for 2 days (31.88%) followed by 3 days (27.5%). Mean hospital stay was 3.73 days (**Figure 2**).

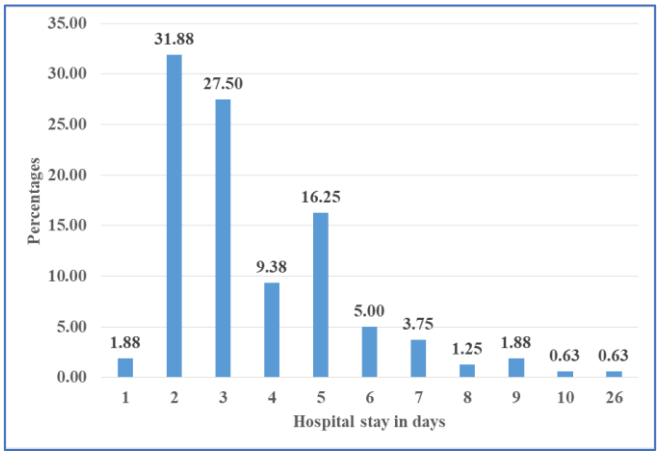

Figure 2: Duration of hospital stay in the surgical ward (n=160)

A total of 384 analgesics were prescribed in 160 patients resulting in average number of analgesics per patient to be 2.4. Sixty-six (41.25%) patients were prescribed two types of analgesics (**Figure 3**). Ketorolac (39.32%) was the most commonly prescribed analgesic drug followed by Etoricoxib (36.46%) (**Figure 4**). Out of 384 analgesics, 237 (61.72%) were prescribed in the injection form. Only 28 (7.29%) analgesics were from the National List of Essential Medicines.

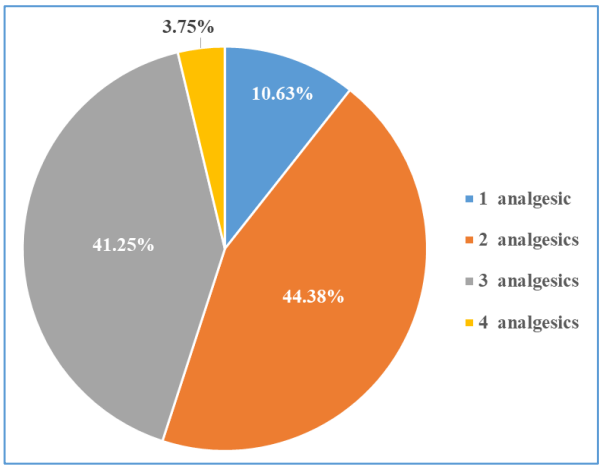

Figure 3: Numbers of analgesics prescribed to the patients (n=160)

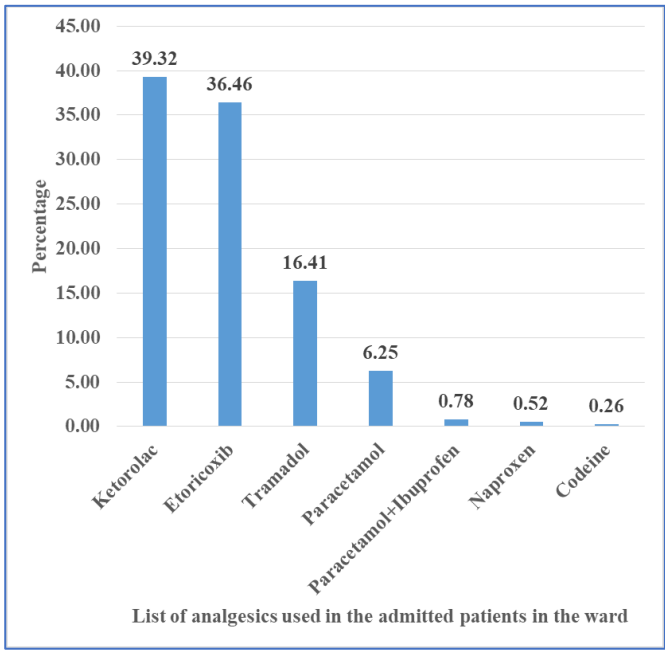

Figure 4: List of analgesics prescribed to the patients admitted in the ward (n=384)

DISCUSSION

The periodic evaluation of drug utilization in patient helps prescribers to sensitize about the importance of rational use of drugs that ultimately would reinforce healthy practices and also create awareness. The present study gives an idea of the overall pattern of analgesic drug use in the patients admitted in surgical unit of a tertiary teaching hospital. Female patients were more than males in our study which was similar to a report by Barawade et al.[21] It might be due to more cases of cholelithiasis in our study and it is also more common in females.[22] The difference might be due to estrogen which increases biliary cholesterol secretion causing cholesterol supersaturation of bile.[23] Mean hospital stay was 3.73 days in our study whereas it was 11.36 days in a study by Parulekar et al.[24] These difference might be due to presence of various co-morbidities and severity of the diseases. Average number of analgesics per patient was 2.4 in the present study. In contrast to this, a lower value (1.26) was reported in an Indian study.[24] We should keep the numbers of analgesics minimum in patients due to adverse effects on kidney, stomach and liver.

Two types of analgesics were prescribed in majority (41.25%) of the patients in our study. A higher percentage of patients (52.77%) were prescribed two analgesics in another study.[21] This might be due the severity of the pain. Need of rescue analgesic in severe pain might also lead to the use of more types of analgesics in hospitalized patients. Our study also showed that NSAIDs were more preferred over opioid analgesics. Similar findings were also reported in other studies.[15,21] It is better to use NSAIDs in mild to moderate pain as opioid analgesics have many adverse effects. However, in severe pain, opioid analgesics have superior efficacy.

It was interesting to find that Ketorolac (39.32%) was the most commonly prescribed analgesic in our study. In contrast to this, Diclofenac (45.68%) was the most commonly prescribed analgesic in a study by Shivaleela et al and Tramadol (25.26%) by Sen et al.[17,21] These difference might be due to various patients factors like age, comorbidities, type of surgery, cost and local guidelines. Ketorolac is a safe and effective analgesic agent for the short-term management of acute postoperative pain and has an opioid-sparing agent in vulnerable patient. However, proper patient selection will optimize patient safety and pain management outcomes during use of analgesics.[25] There were 63 (16.43%) encounters of Tramadol which was the only opioid analgesic prescribed in the patients in the present study. It is prescribed to supplement NSAIDs when NSAIDs alone could not control the pain.

Majority of analgesics (61.72%) were prescribed in the injection form in the present study which was lower than Parulekar et al. (81.09%).[24] The percentage of drugs prescribed from the National List of Essential Medicines (NLEM) was 7.29%, which was much lower than the standard value (100%).[26] A higher percentage of the analgesics were prescribed from national list of essential drug in a study by Sen et al

(81.94%) and Parulekar et al. (90.64%).[17,24] The reason behind this could be the lack of knowledge and awareness of the essential drug list. None of the drugs were prescribed by generic name in our study. Many countries are promoting prescription of generic medicines for their added benefits over branded drugs, such as reduced price, therapeutic equivalence and convenience to the patients. Generic prescribing should be promoted to assure access of the patients to cost-effective therapy and to reduce the overall economic burden.[27]

The present study has some limitations. The sample size and duration were smaller. As it was conducted at a single center and in a single ward, the findings might not be generalized to other wards and other centers. The severity of the post-operative pain and analgesic used during the perioperative period were not assessed. Exact degree of pain relief and its association with the number and type of analgesics were not assessed. Utilization of analgesic in terms of defined daily dose/100 bed-days could not be calculated.

CONCLUSION

Ketorolac was used in the majority of patients admitted to the surgery ward and none of the analgesics were prescribed by generic names. In addition, the number of analgesics prescribed from the NLEM was very less, indicating the need for sensitization of the importance of NLEM among healthcare professionals for the promotion of rational use of medicines. The study findings have helped to offer insight into the current practice of analgesic utilization in the surgical ward and it could guide us to improve upon it in the future by sticking to the guidelines for rational prescription. Generic prescription needs to be promoted by the stakeholders and policy makers. There is need of various strategies such as face-to-face periodic training programs on rational prescribing, establishing drug and therapeutic committee, drug information centers and drug bulletins to promote rational prescribing practices. Further studies involving different departments including sub-specialty should be explored to sustain the findings.

REFERENCES

1. Introduction to Drug Utilization Research. World Health Organization, Norway, 2003. [Full Text]
2. Breivik H. Postoperative pain management: why is it difficult to show that it improves outcome? Eur J Anaesthesiol. 1998; 15(6):748-51. [DOI] [PubMed]
3. Gan TJ. Poorly controlled postoperative pain: prevalence, consequences, and prevention. J Pain Res. 2017;10:2287-2298. [DOI] [Full Text] [PubMed]
4. Meissner W, Huygen F, Neugebauer EAM, Osterbrink J, Benhamou D, Betteridge N, et al. Management of acute pain in the postoperative setting: the importance of quality indicators. Curr Med Res Opin. 2018;34(1):187-196. [DOI] [PubMed] [Full Text]
5. Mcgettigan P, Henry D. Use of non-steroidal anti-inflammatory drugs that elevate cardiovascular risk: an examination of sales and essential medicines lists in low-, middle-, and high-income countries. PLoS Med. 2013;10(2):e1001388. [DOI] [PubMed] [Full Text]
6. Barkin RL. The pharmacology of topical analgesics. J Postgrad Med. 2013;125(1):7–18. [DOI] [PubMed] [Full Text]
7. McCarberg BH, Nicholson BD, Todd KH, Palmer T, Penles L. The impact of pain on quality of life and the unmet needs of pain management: results from pain sufferers and physicians participating in an Internet survey. Am J Ther. 2008;15(4):312–20. [DOI] [PubMed]
8. Carlson CL. Effectiveness of the World Health Organization cancer pain relief guidelines: an integrative review. J Pain Res. 2016;9:515–534. [DOI] [PubMed] [Full Text]
9. Jacob L, Kostev K. Prevalence of pain medication prescriptions in France, Germany, and the UK - a cross-sectional study including 4,270,142 patients. Postgrad Med. 2018;130(1):32–36. [DOI] [PubMed]
10. Bachhav SS, Kshirsagar NA. Systematic review of drug utilization studies & the use of the drug classification system in the WHO-SEARO Region. Indian J Med Res. 2015;142:120–129. [DOI] [PubMed] [Full Text]
11. Soleymani F, Godman B, Yarimanesh P, Kebriaeezadeh A. Prescribing patterns of physicians working in both the direct and indirect treatment sectors in Iran; findings and implications. J Pharm Health Serv Res. 2019; 10(4):407–413. [DOI]
12. Zeng W, Finlayson AE, Shankar S, de Bruyn W, Godman B. Prescribing efficiency of proton pump inhibitors in China: influence and future directions. BMC Health Serv Res. 2015;15:11. [DOI] [PubMed] [Full Text]
13. Papaioannou M, Skapinakis P, Damigos D, Mavreas V, Broumas G, Palgimesi A. The role of catastrophizing in the prediction of postoperative pain. Pain Med. 2009; 10:1452–1459. [DOI] [PubMed] [Full Text]
14. Schreiber KL, Zinboonyahgoon N, Xu X, Spivey T, King T, Dominici L, et al. Preoperative psychosocial and psychophysical phenotypes as predictors of acute pain outcomes after breast surgery. J Pain. 2019;20:540–556. [DOI] [PubMed] [Full Text]

15. Sharma BD, Sitaula J. Assessment of postoperative pain and analgesic use in patients undergoing orthopedic surgery. Journal of Chitwan Medical College. 2021;11(3):53–57. [Full Text]
16. Tegegne A, Gashaw W, Kidane D. Prescribing pattern of analgesic drugs at borumeda hospital, North East, Amhara, Ethiopia. Pain Studies and Treatment. 2017;5:37-43. [DOI] [Full Text]
17. Sen S, Bathini P. Auditing analgesic use in post-operative setting in a teaching hospital. J Clin Diagn Res. 2015;9(4):FC01-4. [DOI] [PubMed] [Full Text]
18. Rauniar GP. Nagarani MA, Das BP, Agrawal CS. Analgesic utilization in postoperative care at a tertiary care teaching hospital in Nepal. JNMA. 2003;42:148-150. [DOI] [Full Text]
19. Woldehaimanot TE, Eshetie TC, Kerie MW. Postoperative pain management among surgically treated patients in an Ethiopian hospital. PLoS One. 2014;9(7):e102835. [DOI] [PubMed] [Full Text]
20. National list of essential medicines, 6th revised edition, 2021. Department of Drug Administration, Ministry of Health and Population, Government of Nepal. [Full Text]
21. Shivaleela Barawade, Santosh Gursale. A study of drug utilization pattern of analgesics in postoperative patients of tertiary care hospital. MedPulse International Journal of Pharmacology. 2017;1(2):28-32. [DOI] [Full Text]
22. Pradhan SB, Joshi MR, Vaidya A. Prevalence of different types of gallstone in the patients with cholelithiasis at Kathmandu Medical College, Nepal. Kathmandu Univ Med J (KUMJ). 2009;7(27):268-71. [DOI] [PubMed] [Full Text]
23. Novacek G. Gender and gallstone disease. Wien Med Wochenschr. 2006;156(19-20):527-33. [DOI] [PubMed]
24. Parulekar VV, Badar VA. Observing drug utilization trends of analgesics in indoor surgical patients in tertiary care teaching hospital. Asian J Pharm Clin Res. 2020;13(5):47-50. [DOI] [Full Text]
25. Maslin B, Lipana L, Roth B, Kodumudi G, Vadivelu N. Safety Considerations in the Use of Ketorolac for Postoperative Pain. Curr Drug Saf. 2017;12(1):67-73. [DOI] [PubMed]
26. Desalegn AA. Assessment of drug use pattern using WHO prescribing indicators at Hawassa University Teaching and Referral Hospital, south Ethiopia: a cross-sectional study. BMC Health Serv Res. 2013;13:170. [DOI] [Full Text]
27. Shrestha R, Shrestha S, Sapkota B, Thapa S, Ansari M, Khatiwada AP, et al. Generic medicine and generic prescribing in Nepal: an implication for policymakers. J Multidiscip Healthc. 2022;15:365-373. [DOI] [PubMed] [Full Text]