

Research Article

The Practice of Multimodal Analgesia Technique for Patients Undergoing Surgery under General Anaesthesia in Debre Markos Compressive Specialized Hospital Debre Markos, East Gojjam, Ethiopia, 2022. A Cross-Sectional Study

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Keywords

- Anaesthesia
- Multimodal analgesia
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Abstract

Background: Practice guidelines for preoperative pain management recommend that multimodal analgesic therapy should be used for postsurgical patients. This method uses different analgesic agents, which may target different components of pain transmission to improve post-operative analgesia and decrease reliance on opiate-based medication. The practice of Multimodal analgesia includes the combined use of neuraxial blockage regional anesthesia and systemic medications and has been shown to reduce opioid use and side effects in surgical patients. However, the proportion of patients who receive this evidence-based approach is unknown. To assess the practice of multimodal analgesia among patients undergoing surgery under general anesthesia at Debre Markos Compressive Specialized Hospital, Northwest Ethiopia, 2022.

Methods: After obtaining ethical approval a hospital-based cross-sectional study was conducted from February 22 to May 10, 2022, in Debre Markos Compressive specialized hospital. Data was collected, prospectively using questionnaires from anesthetists, nurses in the recovery room, and anesthesia record sheets. Patients were considered to have multimodal analgesia if they received two or more analgesics. Descriptive statistics were performed to identify the practice of multimodal analgesia.

Results: A total of 200 participated in our study. We observed the practice of multimodal analgesia in patients who had undergone surgery under general anesthesia in the study period was 47%. Opioid is the most widely administered analgesia. It was given to 81.5% of patients. The practice of multimodal analgesia in emergency surgery was found to be 61.7%. During the study period, multimodal analgesia was more practiced among Bsc anesthetists and it was found to be 42.5%. The practice of multimodal analgesia in PACU was found to be 9%.

Conclusion and Recommendation: The practice of multimodal analgesia for surgical patients in Debre Markos Specialized Compressive Hospital is underutilized. Anesthesia professionals should use a multimodal approach for preoperative pain management for all surgical patients. The Department of Anesthesia should develop a guideline for the treatment of perioperative pain.

ABBREVIATIONS AND ACRONYMS

BP: Blood Pressure; CBE: Community Based Education; Cox 2: Cyclooxygenase 2; DMU: Debre Markos University; DMCSH: Debre Markos Compressive Specialized Hospital; GA: General Anaesthesia; ICU: Intensive Care Unit; LA: Local Anaesthetics; NMDA: N-Methyl D-Aspartate; PACU: Post Anaesthesia Care Unit; PCA: Patient Controlled Analgesia; POP: Post Operation

Pain; POPM: Post Operation Pain Management; RA: Regional Anaesthesia; SA: Spinal Anaesthesia

INTRODUCTION

Pain is defined by the Taxonomy Committee of the International Association for the Study of Pain (IASP) as “An unpleasant sensory and emotional experience associated with

actual or potential tissue damage or described in terms of such damage". Pain is a subjective feeling and is whatever the sufferer perceives, and is therefore, one of the main causes of unplanned hospital stays. Since pain affects patient outcomes ways to reduce it are essential [1]. Multimodal analgesia is the use of multiple anti-pain medications and multiple techniques and refers to the combination of any two or more modalities that work at different pathways to control pain and decrease adverse effects. This can include using an opioid also called narcotics, or non-opioid with a different technique or using an opioid and non-opioid together using the same or different route or a combination of any of these [2].

Multimodal analgesia, a concept first articulated by Koehler and Dahl, is now the foundation of the management of perioperative pain. Principal pharmacologic elements of multimodal analgesia may include the combination of RA, opioid analgesics, and non-opioid systemic analgesics (Acetaminophen and NSAIDs). The premise behind multimodal analgesia is the apparent synergy between agents in interfering with pain pathways [3]. The American Society of Anaesthesiologists Task Force on Acute Pain Management recommends that whenever possible, anaesthesiologists should use multimodal pain management therapy. A dosing regimen should be administered to optimize efficacy while minimizing the risk of adverse events. The choice of medication, dose, route, and duration of therapy should be individualized [4]. Practice guidelines for perioperative pain management recommend that multimodal analgesic therapy should be used for all surgical patients. However, the proportion of patients who receive an evidence-based approach is currently unknown [5].

Due to the patient's compliance with rehabilitation, movement, and deep breathing, they begin to heal quicker because the body no longer has to try to heal from multiple and painful complications of surgery. Given these reasons, researchers show that the administration of multimodal analgesia before, during, and after surgery is beneficial to the patient by reducing narcotic use, increasing pain management, and thereby allowing the patient to begin healing [6]. Such practice is useful since it greatly reduces unplanned hospital stays and associated economic waste, especially in a country like ours where a patient's prolonged stay in hospital hurts the economy of the family of patients and our country as a whole. The result of the study will contribute its part in the development of the hospital's practice guidelines for perioperative pain management [7]. Inadequate pain control is one of the problems in patients who undergo surgery under general anesthesia in DMCSH. This research aims to assess the practice of multimodal analgesia for patients undergoing surgery under general anesthesia. The result of this research aims to provide information on the practice of multimodal analgesia as pain management among surgical patients and might contribute its part in the development of the hospital's practice guidelines for preoperative pain management. The findings will undoubtedly contribute to improving the quality of the use of multimodal analgesia in pain management.

METHODS AND MATERIALS

Study Area and Period

A hospital-based prospective cross-sectional study was conducted at DMCSH in East Gojjam zone, North West Ethiopia, Amhara, Debre Markos, Ethiopia, from February 22 to May 10, 2022.

Population: Source population: All patients undergoing surgery at DMCSH from February 22 to May 10, 2022. Study population: Surgical patients who will undergo operation under GA from February 22 to May 10, 2022.

Inclusion criteria: All patients undergoing operation including emergency and elective operations under general anesthesia during the study period.

Exclusion criteria: Patients receiving only RA.

Sample Size and Sampling Technique

$$n = \frac{(Z\alpha)^2 P(1-P) / d^2}{2}$$

$$\frac{(1.96)^2 0.5(1-0.5)}{(0.05)^2} = 384$$

$$n = 384$$

Where n-The minimum sample size required p -Practice of multimodal technique estimated (50%) since no published research done in Debre markos compressive hospital. d-The margin of sampling error tolerated (5%).

$Z\alpha/2$ - Confidence interval at 95%

Using finite population correction factor

$$n = n_0(N) / (n_0 + N - 1)$$

$$n = 384(1090) / (384 + (1090 - 1))$$

$$n = 285$$

Where n_0 -sample size without considering the finite population correction factor. N-Total number of patients considered to have surgery in DMCSH within the study period. The study units were selected using simple random sampling technique.

Independent variables: Age, Sex, Educational status of an anaesthetists, Duration surgery, Type of surgery and Hour stay in PACU.

Dependent variable: Multimodal analgesia practice.

OPERATIONAL DEFINITIONS

A. Anesthesia- a partial or complete loss of feeling or sensation, with or without loss of consciousness, primarily for surgery or other medical procedures.

B. General anesthesia- a drug-induced loss of consciousness during which patients are not able to be aroused, even by painful stimulation.

C. Regional anesthesia- anesthesia where an anesthetic is administered by injection to deaden a part of the body such as an arm or leg.

D. Anesthetists- one who administers an anesthetic. In many parts of the world, and particularly in Britain, this term applies to both nurses and doctors.

E. Anesthetic- a drug that produces anesthesia administered by inhalation (breathing) or intravenously (injection or through an IV).

The absence of a normal sense of pain without loss of consciousness.

Data Collection Tool and Technique

Data was collected using a structured questionnaire and reviewing the intraoperative anesthesia record of the patient. The questionnaire was developed in English version by revising literature from previous similar studies. An official letter was given to the concerned body and the purpose of the study was clarified. The data was collected by diploma anesthetists after giving them training on the objectives of the study, from the patient, anesthetist, and anesthesia record sheet from February 22 to May 10, 2022 [8].

Data Quality Control

The quality of data was ensured before, during, and after data collection. During data collection, regular supervision and follow-up were undertaken by supervisors daily with further cross-checks by the principal investigator for completeness and consistency of data. Data cleanup and crosschecking of missing data was done by multiple imputation methods before analysis.

Data Entry Analysis and Processing

Data was entered into SPSS version 20.0 for analysis. The frequency, percentage, and cross-tabulation with different variables were determined.

RESULT

A total of 200 patients were included in the study among them 56% are males and 44% are females. From the study participants, most were adults and these patients are 81% of the total patients and these pediatric and geriatric patients account for 14% and 5% respectively. Among a total of 200 selected patients, only 94 patients received multimodal analgesia. The reasons for the underutilization of this technique could be the unavailability of different drugs with analgesic effects, the availability of equipment required for the procedures and the knowledge of how to use them efficiently, fear of the side effects of drugs, medical condition of patients, economic status

of patients and other factors. The frequency of general surgery was the highest during the study period and was 77.5% among all performed surgeries; on the other hand, urologic surgeries were the least frequently performed surgeries with 1% of all surgical procedures using general anaesthesia (Table 1) (Figure 1).

The practice of multimodal analgesia was found to be 47% for surgical patients. General anesthesia was given for 94% of patients while combined regional block and general anesthesia was given for 2% which were with SA. Opioid is the most widely administered analgesia. It was given to 81.5% of patients who underwent surgery under general anesthesia the study showed no use of Gabapentinoids for analgesia. 9% of regional blocks were performed as a multimodal analgesia approach (Table 2). As shown from the above tables the practice of multimodal analgesia in emergency surgery was found to be 61.7% (Figure 2). The practice of multimodal anaesthesia is more in general surgery while urologic surgery was the least. The practice of multimodal analgesia was low among paediatric patient (Table

Table 1: Percentage of selected surgical procedures performed in Debere Markos compressive specialized hospital from February 22 to May 10, 2022.

	Frequency	Percent
General surgery	141	70.5
Orthopaedic surgery	15	7.5
Obstetrics and Gynaecology surgery	27	13.5
Neurologic surgery	8	4
Urologic surgery	2	1
ENT surgery	7	3.5
Total	200	100.0

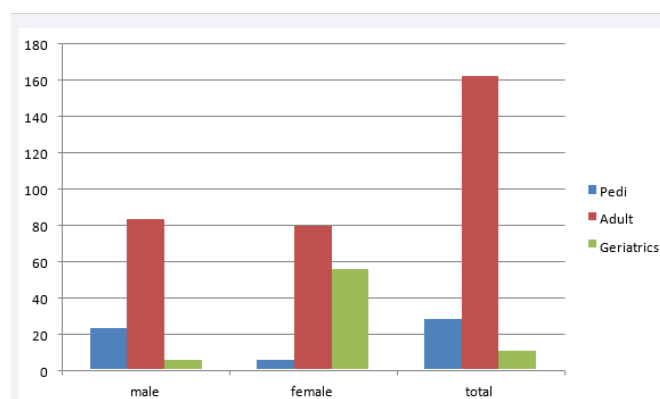


Figure 1 Ages and sex distributions of selected patients who undergone surgery in Debere Markos compressive specialized hospital from February 22 to May 10, 2022.

Table 2: The practice multimodal analgesia among elective and emergency and elective surgical patients in Debere Markos compressive specialized hospital from February 22 to May 10, 2022.

		Use of Multimodal Analgesia	
		YES	NO
Elective	Count	36	38
	Percentage	38.3%	35.3%
Emergency	Count	58	68
	Percentage	61.7%	64.2%
Total percentage		47%	53%

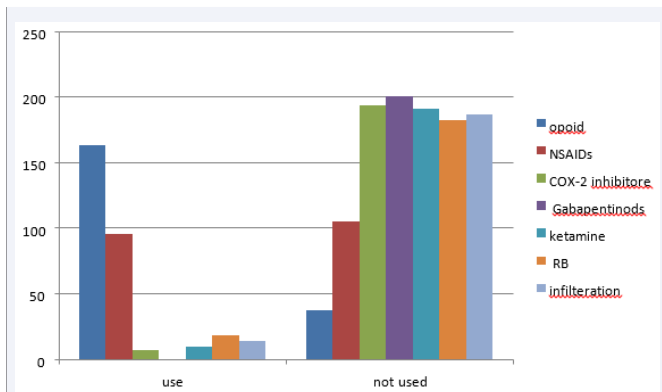


Figure 2 Frequency of practice of opioid, NSAIDs, COX2 inhibitor Gabapentinoids, ketamine, regional blocks and skin infiltration performed for selected surgical patients in Debere Markos compressive specialized hospital from February 22 to May 10, 2022. *RB -Regional Block.

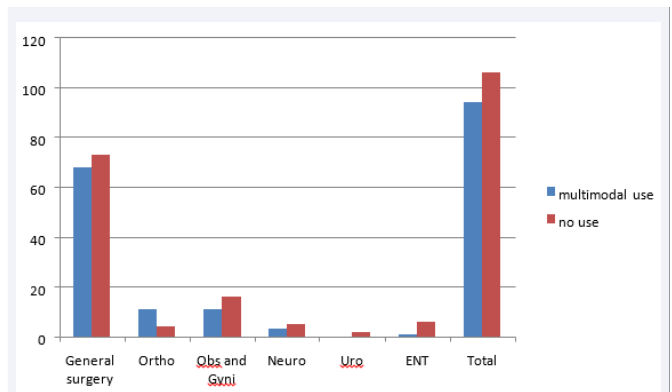


Figure 3 Practice of multimodal analgesia techniques across surgical procedures for selected surgical patients in Debere Markos compressive specialized hospital from February 22 to May 10, 2022.

3) (Figure 3). During the study period multimodal analgesia is more practiced by among Bsc anesthetists and it was found to be 42.5% (Figure 4). Regional block was more done among MSc level anaesthetist (Figure 5) (Table 4). Majority of the study populations did not get any pain management in their stay in PACU. The practice multimodal analgesia in PACU was found to be 9%. The practice of multimodal analgesia was found to be in Patients who stayed > 9 hour in PACU (Figure 6).

DISCUSSION

Among a total of 200 selected patients, only 94 patients received multimodal analgesia. The reasons for the underutilization of this technique could be the unavailability of different drugs with analgesic effects, the availability of equipment required for the procedures and the knowledge of how to use them efficiently, fear of the side effects of drugs, medical condition of patients, economic status of patients and other factors. We also found the usage of multimodal analgesia varies by surgical procedure, the urgency of the procedure, and the age of the patients. The practice of multimodal analgesia was more prevalent in the intraoperative period than in the postoperative period. Nationwide research in the United States of America showed tremendous variations in the utilization of multimodal therapy use not accounted for by patient or hospital characteristics and the mean probability of receiving multimodal analgesia as 90.4%. However, the presence of this practice in different hospitals of Ethiopia is not known yet making it difficult to compare the results of this research [9-12].

One research published in the Journal of the American Society of Anaesthesiologists in 2018 reported that 85.6% of patients among 1,318,168 had received multimodal analgesia for

Table 3: Practice of multimodal analgesia among different age groups in Debere Markos compressive specialized hospital from February 22 to May 10, 2022.

Age	Use of Multimodal	No Use of Multimodal
Pedi	39.3%	60.7%
Adult	48.1%	51.9
Geriatrics	50%	50%
Total	47.0%	53%

Table 4: Pain management in PACU in Debere Markos compressive specialized hospital from February 22 to May 10, 2022.

	Frequency	Percent
NO medication given	79	39.5
NSAIDs	61	30.5
Single Drug Use		
Opioid	36	18
COX 2 inhibitor COX 2inhibitor	3	1.5
Regional Block	3	1.5
Total single drugs use	42	21
Multimodal analgesia	18	9

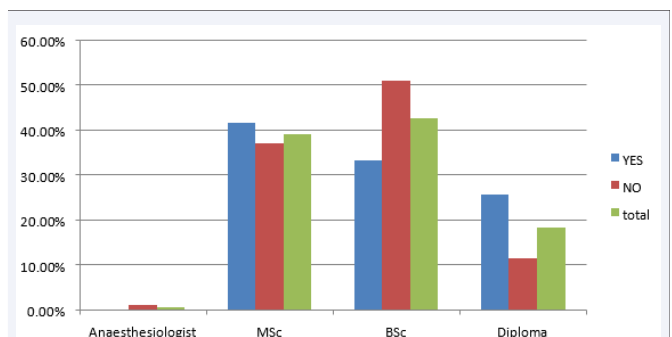


Figure 4 Practice of multimodal anaesthesia among different type of anaesthesia profession in Debere Markos compressive specialized hospital from February 22 to May 10, 2022.

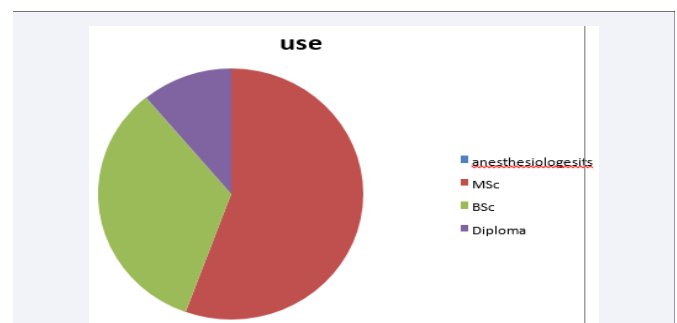


Figure 5 Use block among different level of anaesthetists in Debere Markos compressive specialized hospital from February 22 to May 10, 2022.

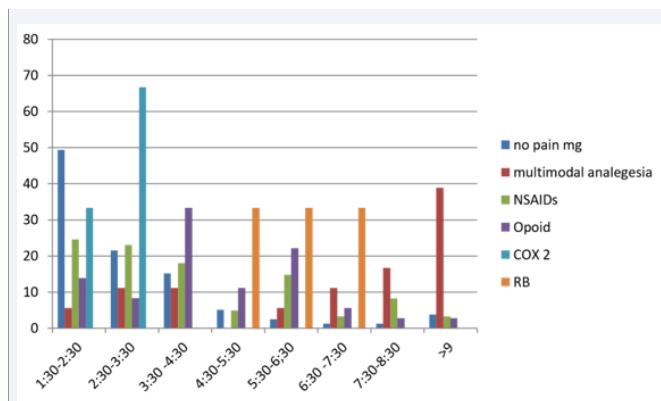


Figure 6 Pain management in PACU based on patient stayed hour in Debero Markos compressive specialized hospital from February 22 to May 10, 2022.

total hip/ knee arthroplasties. Much work needs to be done to improve our way of pain management from which patients will be benefited a lot [13,14]. This study similar to a study done at Jimma University and Addis Ababa University Teaching Hospital, showed that the practice of regional anesthesia in Ethiopia is underutilized due to a shortage of continuous supply of resources and anesthetist knowledge and skill to perform different regional blocks than spinal anesthesia. This also seems one of the cases contributing to the underutilization of a multimodal approach for pain management in DMCSH [15]. The use of multimodal therapy has been recommended by many studies and guidelines for pain management strategy whenever possible but the result of our study has shown that this practice is not yet fully applied. For any given surgical procedure, the practice of multimodal analgesia is possible and appropriate, depending on the surgical site, clinical consideration, and patient preference by using multimodal analgesia protocol. This protocol resulted in improvement in the use of multimodal analgesia pain management in PACU and 48hr postoperatively [16-18].

CONCLUSION AND RECOMMENDATION

The overall practice of multimodal analgesia for surgical patients in DMCSH is underutilized. The practice of multimodal analgesia for surgical patients in DMCSH is underutilized. General anesthesia was the most frequently used during the study period. Opioid was the most utilized analgesic drug in the practice of multimodal analgesia. To use a multimodal approach for perioperative pain management for all surgical patients whenever possible. department of anesthesia should develop a guideline for the treatment of perioperative pain.

DECLARATIONS

Ethics Approval and Consent to Participate

Ethical clearance had been obtained from Debre Marko's University, collage of health science and Medicine ethical clearance review board and informed written consent was obtained from each respondent after illuminating the purpose and procedure of the study.

Availability of Data and Materials

The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

Conflict of Interest: The authors declare that they have no competing interests in this section.

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Authors Contribution

All Authors conceptualized, designed the study, collected, analyzed, and interpreted the data, and also drafted the manuscript. Data analysis, drafting of the manuscript, and advising the whole research paper and also involved in the interpretation of the data and contributed to manuscript preparation. All authors read and approved the final manuscript.

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