INCIDENCE AND ASSOCIATED FACTORS OF ACUTE POSTOPERARIVE PAIN IN ADULT ELECTIVE SURGICAL PATIENTS AT TIKUR ANBESSA SPECIALIZED HOSPITAL FROM NOVEMBER TO JANUARY 2023/2024GC:

A PROSPECTIVE CROSS-SECTIONAL STUDY, ADDIS ABABA, ETHIOPIA

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DECLARATION OF THE PRINCIPAL INVESTIGATOR

I, Dr. Eyob Asefa declare that this research is my original paperwork in Incidence and Associated factors of Acute postoperative pain in adult elective surgical patients at Tikur Anbessa Specialized Hospital from November 2023 to January 2024 GC. as partial fulfillment required for specialty certificate in anesthesiology, critical care and pain medicine.

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Abstract:

Background

According to IASP revised definition pain is defined as “An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.”

Countless patients that need surgical intervention are handled by Ethiopia's healthcare facilities a nd their expanding offerings.

In these facilities, managing acute postoperative pain is a serious concern. The prevalence and contributing variables of acute postoperative pain in Ethiopia, notably at Tikur Anbessa Specialized Hospital, are little understood. And there is no published research done with similar topic in Ethiopia as well as in the study area.

Objectives

To assess the prevalence and associated factors of acute postoperative pain after elective surgery among adult patients at Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia, 2023.

Methodology

An institution based cross sectional study design was employed. A single population proportion formula is used to determine the sample size. Total sample size is 219. A structured data collection format was used to collect data from the patients and their records, after taking verbal consent by trained data collectors. The data was entered, polished and analyzed using SPSS version 27. Bivariate and multivariate logistic regressions were used to describe association between independent and dependent variables. P value less than 0.05 was considered statistically significant.

Results

A total of 219 patients were included in our study, among the participants 180 or 82.2% developed acute postoperative pain while 39 or 17.8% did not develop acute postoperative pain. The incidence of moderate to severe pain was found to be 34.24%. Preoperative anxiety, use of

intraoperative analgesics, incision size and duration of surgery were the main factors associated with the incidence of acute postoperative pain.

Conclusion

Our study demonstrated that the overall incidence of postoperative pain was relatively low in the study area. This reflects that the attention given to postoperative pain recognition and management is better when compared to other areas, but there is still significant gap in managing postoperative pain.

Key Words: Acute Postoperative Pain, Ethiopia

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List of Abbreviations and Acronyms

AAU: Addis Ababa University

ACCPM: Anesthesiology, Critical Care and Pain Medicine

AOR: Adjusted Odds Ratio

APS: Acute Pain Service

ASA: American Society of Anesthesiologists

BMI: Body Mass Index

CI: Confidence Interval

CNB: Central Neuraxial Block

COR: Crude Odds Ratio

GA: General Anesthesia

GI: Gastrointestinal

GC: Gregorian Calendar

IASP: International Association for the Study of Pain

NRS: Numeric Rating Scale

NSAIDS: Non-Steroidal Anti-Inflammatory Drugs

OR: Odds Ratio

PACU: Post Anesthesia Care Unit

PCM: Paracetamol

PNB: Peripheral Nerve Blocks

POQ: Pain Outcomes Questionnaire

POQ-R: Pain Outcome Questionnaire- Revised

TASH: Tikur Anbessa Specialized Hospital

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1. Introduction

1.1. Background

According to IASP revised definition pain is defined as “An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage(1).” According to IASP acute pain happens suddenly, starts out sharp or intense, and serves as a warning sign of disease or threat to the body(1). It is caused by injury, surgery, illness, trauma, or painful medical procedures and generally lasts from a few minutes to less than six months(1). Acute pain usually disappears whenever the underlying cause is treated or healed(1).

Worldwide, more than 230 million individuals have surgery each year, and the number is rising. Postoperative pain following surgery is frequent and should be treated as quickly and effectively as possible to minimize suffering, accelerate recovery and rehabilitation, and avoid complications(2). The past generation has seen a major shift in attitudes about postsurgical pain control from fatalistic endurance toward confidence in controlling and enhancing a physiological and psychological process, even as pain continues or transitions to become chronic in some patients(1). Despite far more scientific knowledge in this area, clinical pain treatment following surgery is still far from effective(2). Even less known is the fact that many patients experience chronic pain following surgery, which may be caused, at least in part, by the undertreatment of acute postoperative pain(3). Many patients experience significant pain after surgery(4). The inadequate use of basic and clinical scientific findings in clinical practice is one factor contributing to this undertreatment(1). For instance, pain experienced after surgery is a very particular phenomenon that is not solely caused by an inflammatory process or by a single nerve lesion(1). Even if there is inflammation and neural tissue damage, postoperative pain has a distinct etiology and distinct effects(1). The "real world" treatment plans, however, are still not based on these discoveries(2). Additionally, there is a paucity of analgesics and strategies that target particular components of postoperative pain (such movement-evoked pain), have few side effects, and/or are beneficial(2). To provide therapeutic choices with greater efficacy and lower risk of side effects than those already available, it is vital to obtain new insights into the causes of postoperative pain in experimental and clinical contexts(2).

1.2. Statement of the problem

One of the few clinical subjects for which the International Association for the Study of Pain (IASP) has produced guidelines is the management of acute postoperative pain(1). IASP is one of many national and international authority organizations that have released guidelines over the past 20 years in an effort to improve postoperative pain treatment(1).

They all advocate for the establishment of Acute Pain Services (APS) in hospitals, which would include pain nurses and anesthesiologists qualified to administer peripheral and epidural nerve blocks, supervise patient-controlled analgesia techniques, and modernize low-tech, basic pharmacological management of acute pain(1,2). Most importantly, the APS is in charge of providing ongoing educational programs for everyone involved in providing care for surgical patients(1).

Even thogh pain management is evolved, patients still experience moderate to severe acute pain after undergoing elective surgery, which is a significant public health problem. The availability of financial resources, infrastructure, and medical experts who are properly trained varies greatly across the globe(1,5,6). In underdeveloped countries, a small group of medical specialists operating within the constraints of the available resources may appropriately provide pain management services(7–9). Even when resources are scarce, care should be founded on the knowledge that biological, psychological, and social/environmental factors all affect pain, and that any therapy should be secure and evidence-based(7,10). The goal of treatment, to the greatest extent possible, should be to reduce patient pain while also enhancing physical function and reducing psychological suffering(1,2,4).

Countless patients that need surgical intervention are handled by Ethiopia's healthcare facilities a nd their expanding offerings.

In these facilities, managing acute postoperative pain is a serious concern. Both the primary surgical team and the Pain Service team from the ACCPM department work together to address perioperative pain in Tikur Anbessa Specialized Hospital(11). Opioids and non-opioid analgesics are typically combined in postoperative multimodal analgesia regimens. The common opioids used include Morphine, Tramadol, and Fentanyl. Paracetamol, nonsteroidal anti-inflammatory medicines (NSAIDs), and local anesthetic agents are examples of non-opioid analgesics.

Techniques for regional anesthesia are used when appropriate and to the extent that resources permit(11).

Some of the negative clinical outcomes resulting from ineffective postoperative pain management include deep vein thrombosis, pulmonary embolism, coronary ischemia, myocardial infarction, pneumonia, poor wound healing, insomnia, and demoralization, this all effects economic and medical implications, such as extended lengths of stay, readmissions, and patient dissatisfaction with medical care(4).

Over the past forty years, there has been a revolution in the treatment of severe postoperative pain. The Agency for Healthcare Quality and Research (formerly the Agency for Health Care Policy and Research) of the U.S. Department of Health and Human Services has developed a national clinical practice guideline for the management of acute pain in response to the widespread recognition by clinicians, economists, and health policy experts of the undertreatment of acute pain. This historic document acknowledges past shortcomings in perioperative pain management, emphasizes the value of effective pain management, calls for health care facilities to be held accountable for providing appropriate perioperative analgesia, and states that specialists must be involved when necessary(3).

1.3. Significance of the study

Inadequate management of acute pain following elective surgery is a significant issue that has a detrimental influence on many patient health factors and may raise the chance of developing chronic pain. Control of postoperative pain plays an essential role in facilitating a patient's recovery to normal function and reduces the incidence of adverse physiologic and psychological effects associated with acute, uncontrolled pain. Studies of pain relief practices in Ethiopian hospitals are scanty and possibly not adequately conducted despite that there is high prevalence coupled with repeated management inadequacies

Different studies in Ethiopia have shown a high incidence of moderate to severe pain after different surgical procedures (49.7–92.7%), which is poorly managed(5,6,9,12–14). The prevalence and contributing variables of acute postoperative pain in Ethiopia, notably at Tikur Anbessa Specialized Hospital, are little understood. And there is no published research done with similar topic in Ethiopia as well as in the study area.

This study will be conducted to assess prevalence and associated factors of post-operative pain among adult elective surgical patients at Tikur Anbessa Specialized Hospital and will add evidence on the burden of acute post-operative pain along with its associated factors and encourage the department of ACCPM to perform a quality improvement project on its existing pain service with the support of policies that lead to better post-operative pain treatment from officials and Ministry of Health.

2. Literature Review

It has been repeatedly confirmed by studies in the past 3 to 4 decades that 20 to 80% of patients undergoing surgery suffer from inadequately treated pain and pain is classified as a serious Public health problem both in the developed and in developing countries. Despite this longstanding recognition of postoperative pain as a serious public health problem, and the increased knowledge and resources for treating pain, poorly controlled pain continues to pose a significant challenge to the management of patients in postoperative contexts (15). Postoperative pain appears to be undermanaged despite the adoption of new standards, guidelines, and educational initiatives, according to data from throughout the world(4).

Globally, the prevalence of post-operative pain varies among studies. The American Pain Society suggests a prevalence of more than 80%, with three quarters (75%) reporting moderate to severe pain and less than half reporting good pain relief(8). A random sample of 250 US adults who underwent surgical procedures revealed that 86% of these patients reported moderate-to-severe pain and 80% of patients experienced acute pain after surgery(4). Thomas et al. (1998) in Australia reported better pain control and patient's satisfaction while in Denmark the prevalence of moderate to severe pain was found to be 45.5% at 24 hours with satisfaction rate of 88.4% (Lorentzen et al., 2012). In the United Kingdom one study reported a prevalence of moderate to severe pain and very severe pain to be 29.7% and 10.9% respectively with lower incidence of poor pain relief (at 3.5%) and fair-to-poor pain relief at 19.4%, with the use of injectable analgesia resulted in poorest pain control (67.2%) than patients controlled analgesia (35.8%) and epidural analgesia (20.9%).Despite having an acute pain protocol in place, 41% of patients in a Dutch study of 1490 surgical inpatients reported moderate-to-severe pain on the day of surgery. Postoperative pain is poorly studied in developing countries. Most indicate high prevalence of post-operative pain with unfavorable relief. A study done by Singh et al at India reported a prevalence of 92.5% post-operative pain on the 2nd post-operative day(7).Uganda has the highest prevalence (over 90%) as reported by Mbula (2010). In Tanzania a prevalence of some form of pain was 85.5% and 77.4% at 24 and 48 hours respectively, in a recent study by Masagati & Chilonga (2014)(8). A study done in Nairobi, Kenya reported prevalence of postoperative pain after day care surgery of 55.3% after 24 hours(10).

Early and late in the postoperative phase, various levels of postoperative pain are frequently described in Ethiopia. A study done at University of Gondar comprehensive specialized hospital (UGCSH) reported that 75.8% of patients experienced moderate to severe acute postoperative pain after emergency abdominal surgery in the first 24 postoperative hours(16).A multi-centered prospective observational cohort study conducted at two comprehensive specialized hospitals in Gondar and Debretabor reported overall incidence of moderate to severe postoperative pain within the first 24 h after emergency orthopedics surgery was 70.5%(17). Another study revealed the overall prevalence of moderate to severe postoperative pain after a cesarean section was 85.5% within the first 24 postoperative hours(12). Another study done in University of Gondar Comprehensive Specialized Hospital (UGCSH) revealed that the overall incidence of moderate to severe postoperative pain after elective surgery within the first 24 postoperative hours was 69.5%(18). A study done at Hawassa University Comprehensive Specialized Hospital, Hawassa, Ethiopia, reported the magnitude of moderate to severe post-operative pain after a cesarean section to be 89.8%(19). An institutional-based prospective longitudinal study included 265 postoperative patients from the surgical wards of Gambella General Hospital reported the incidence of postoperative pain was 69%, 74%, and 77.0% at 2 h, 12 h, and 24 h, respectively(20). A study done at Tibebe Ghion Specialized Hospital Orthopedic Ward, Bahir Dar, reported 75% and 72.9% patients have moderate to severe pain at 12 and 24hours of surgery respectively(21). A study done at Gandhi memorial women and child care hospital, Addis Ababa, reported that Moderate to severe acute postoperative pain after cesarean section was 76.2% in the first 24 hours postoperatively(22). A study done at Debre Tabor compressive specialized hospital, Debre Tabor, Ethiopia reported the percentage of moderate to severe post-operative pain (Numeric Rating Scale: 4 and above) was between 37.7% within 1 h and 76.7% at 6 h of post-operative period(23). Another study conducted in the 3 surgical wards of Jimma University specialized hospital JUSH reported the incidence of Postoperative pain to be 91.4%(15). A study done among adult Patients who underwent major surgical procedures in Public Hospitals of Addis Ababa, Ethiopia, revealed that the overall incidence of moderate to severe pain was 85.5%(24).

In contrast a study conducted at Saint Paul's Hospital Millennium Medical College (SPHMMC) reported that 49.7% patients were found to have moderate to severe pain at first Postoperative day(13).

Age less than 60, history of preoperative anxiety, preoperative patient expectation about postoperative pain, preoperative use of analgesics, general anesthesia, incision length >10cm, drug type and route of administration, emergency surgery, duration of surgery and surgery to the abdomen and lower limbs were identified as independent risk factors for post-operative pain severity(25,18).

As part of effective management of post-operative pain, experts recommends use of multimodal strategies including preoperative, intra operative, and postoperative interventions, thorough evaluation of patients, involvement of all parties and individualized, the so called “patient-centered therapies”(4).

2.1.1. Conceptual framework

Figure 1: Conceptual framework of associated factors of acute postoperative pain 6, 8, 9, 11,17.

3. Objectives of the study

3.1. General objectives

To assess the incidence and associated factors of acute postoperative pain after elective surgery among adult patients at Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia, 2023.

3.2. Specific objectives

To determine the Prevalence of acute postoperative pain after elective surgery among adult patients at Tikur Anbessa specialized Hospital.

To identify factors associated with acute postoperative pain after elective surgery among adult patients at Tikur Anbesa specialized Hospital.

4. Methodology

4.1. Study area and period:

The study was conducted from November 2023 to January 2024 at Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia. Addis Ababa is the capital city as well as the largest city in Ethiopia, with estimated population of 5,228,000 in 2022. Tikur Anbessa Specialized Hospital is the largest referral hospital in the country, with 700 beds, is an institution where specialized clinical services that are not available in other public or private institutions are rendered to the whole nation. It is also the main teaching hospital for both clinical and preclinical training of most disciplines. Tikur Anbessa Specialized Hospital has 200 doctors, 379 nurses and 115 other health professionals dedicated to providing health care services. The various departments, faculties and residents under specialty training in the School of Medicine provide patient care in the hospital. The hospital also has 950 permanent and contract administrative staff to support the hospital activities.

4.2. Study design:

An institution based cross sectional study design was employed.

4.3. Source population:

All adult surgical patients who underwent elective surgery at Tikur Anbessa Specialized Hospital.

4.4. Study population:

All selected adult surgical patients who underwent elective surgery at Tikur Anbessa Specialized Hospital and stayed in the hospital for at least 24hrs from November 2023 to January 2024 and who will fulfill the inclusion criteria.

4.5. Eligibility criteria:

4.5.1. Inclusion criteria:

All adult elective surgical patients who underwent surgical procedure at Tikur Anbessa Specialized Hospital after procedure and able to give verbal, informed consent. And Patients who are admitted for at least 24hrs postoperatively.

4.5.2. Exclusion criteria:

Patients who are not alert enough to respond and Patients who are unable to speak. And patients suffering from chronic pain prior to the procedure.

4.6. Sample size determination:

This is a single population proportion formula to determine the sample size. In a previous study done in Public Hospitals of Addis Ababa, incidence of moderate to severe pain was 85.5%.

N= $\frac{(Z_{\alpha/2})^2 \times P(1-P)}{(d)^2}$ is used to estimate the sample size of clients to be interviewed

Where N: is maximum sample size

Zα/2: is standard score value for 95% confidence level which is equal to 1.96

P: is expected prevalence or proportion

D: is the margin of error

= (1.96)2 x 0.85 x (1-0.85) = 198, considering 10% non-respondent rate;

(0.05)2

Total sample size is N= 219

4.7. Sampling technique:

Participants in the study were chosen using a total enumeration (purposive) sampling strategy.

4.8. Study variables:

4.8.1. Dependent variable:

Incidence of acute postoperative pain.

4.8.2. Independent variables:

- Sex
- Age
- BMI
- History of previous surgery
- Preoperative pain

- Preoperative information of postoperative pain management
- Preoperative anxiety
- ASA class
- Preoperative analgesics
- Type of surgery
- Mode of anesthesia
- Mode of Analgesia
- Duration of surgery
- Length of incision

4.9. Operational definitions:

ASA Physical status: a grading system used preoperatively to compare the severity of preexisting comorbidities in patients coming to surgery

• **ASAI:** A normal healthy patient

• **ASAII:** A patient with mild systemic disease that results in no functional impairments

• **ASAIII:** A patient with severe systemic disease that results in functional limitations

• **ASAIV:** A patient with severe systemic disease that is a constant threat to life

• **ASAV:** A moribund patient who is not expected to survive with or without the operation

• **ASAVI:** A brain-dead patient whose organs are being removed with the intention of transplanting them into another patient(26).

Pain Intensity based on the Numerical Rating Scale (NRS)

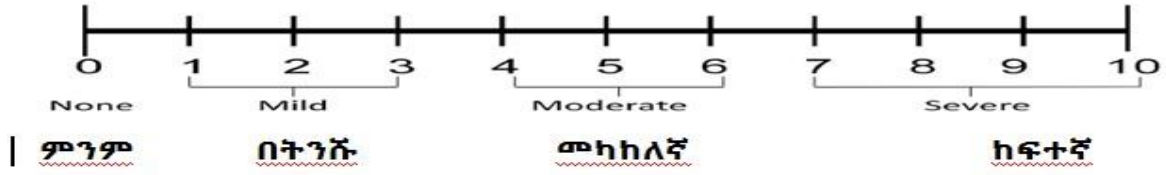
• **No pain:** A score of 0 on a scale of 0 to 10

• **Mild pain:** Scores between 1-3 on a scale of 0 to 10

• **Moderate pain:** Scores between 4-6 on a scale of 0 to 10

• **Severe pain:** Scores between 7-10 on a scale of 0 to 10

The Numeric Rating Scale (NRS)



Preoperative pain: preoperative pain associated with the surgical illness or injury, measured using a 10-point Numerical Rating Scale.

Acute Postoperative pain: the presence of pain in the postoperative period was defined as a patient as having pain and any pain score other than zero in the first 24 hours.

Pain relief percentage scale

- **No relief:** 0%
- **Poor relief:** 10%-30%
- **Fair relief:** 40%-60%
- **Good relief:** 70%-90%
- **Complete relief:** 100%

4.10. Data collection procedures and data collectors:

A structured data collection format was used to collect data from the patients and their records, after taking verbal consent by trained data collectors.

4.11. Data processing and analysis:

The collected data was first entered into epi-info version 7 and then transferred into SPSS version 27. Simple descriptive statistics with measures of association were implemented for data analysis using version 27 SPSS software and results are presented using tables, graphs and pie charts.

4.12. Data quality assurance:

The completeness and consistency of the data was supervised by the principal investigator during the data collection process.

4.13. Ethical considerations:

Prior to data collection ethical clearance was obtained from ethical review committee of Addis Ababa University, College of Public Health. Verbal informed consent was obtained from the study participants before data is collected. Information obtained from the data was only used for the purpose of this research and confidentiality was kept for all participants.

4.14. Dissemination plan:

The result of the study will be submitted to AAU School of Medicine, department of Anesthesiology and critical care, AAU school of pharmacy, Addis Ababa health bureau and FMOH.

5. Results

5.1. Socio-demographic data:

A total of two hundred nineteen patients were included in this study. Their age ranged from 18 to 85 with a mean age of 40.6. And majority of the patients were female accounting 56.6% while the rest 43.4% were male.

Table-1: Socio-demographic characteristics of study participants who underwent elective surgical procedures in AAU, TASH (n=219)

Variables	Response	Frequency	Percent
Age	18-45	150	68.5
	46-60	34	15.5
	61-85	35	16.0
Sex	F	124	56.6
	M	95	43.4
BMI	13-18.4	8	3.7
	18.5-24.9	158	72.1
	25-29.9	51	23.3
	30-34.9	2	0.9

Majority of the patients 72.1% had normal BMI (18.5-24.9), 3.7% were underweight, 23.3% were overweight and 0.9% were obese.

5.2. Preoperative Factors data:

Of the total of 219 patients, 98 or 44.7% had preoperative pain while 121 or 55.3% did not have preoperative pain. Among those who had preoperative pain 65 or 29.8% had mild pain, 26 or 11.9% had moderate pain and 7 or 3.2% had severe pain. And 82 or 83.7% took analgesics preoperatively while 16 or 16.3% did not take analgesics preoperatively. Majority of the participants were ASA 1 and ASA 2 constituting 85 or 38.8% and 127 or 58% respectively,

while the rest 7 or 3.2% were ASA 3 patients. One hundred fifty-nine or 72.6% had no history of previous surgery, while 60 or 27.4% had history of previous surgery. One hundred ninety-four or 88.6% did not receive preoperative information about postoperative pain management, while only 25 or 11.4% did.

Table-2: Preoperative factors

Variable	Response	Frequency	Percent
Did you have preoperative Pain?	Yes	98	44.7
	No	121	55.3
If yes, level of preoperative pain on NRS	1-3	65	29.8
	4-6	26	11.9
	7-10	7	3.2
Did you take Analgesics preoperatively?	Yes	82	83.7
	No	16	16.3
ASA PS	1	85	38.8
	2	127	58.0
	3	7	3.2
Do you have history of previous surgery?	Yes	60	27.4
	No	159	72.6
Did you have preoperative information about	Yes	25	11.4
Postoperative pain management?	No	194	88.6
Did you have preoperative Anxiety?	Yes	108	49.3
	No	111	50.7
If yes, did you take anxiolytics?	Yes	8	7.4
	No	100	92.6

Out of the 219 total, 108 or 49.3% had preoperative anxiety, while 111 or 50.7% did not. Among those who had preoperative anxiety only 8 or 7.4% received anxiolytics, while the rest 100 or 92.6% did not.

5.3. Intraoperative factors data:

From 219 participants, 35 or 16% underwent obstetric surgeries and 1 or 0.5% underwent cardiac surgery and the rest fell into ten different surgical disciplines. Majority of the procedures 84 or 38.4% were completed within two to three hours, while 19 or 8.7% lasted for more than four hours.

Table 3: Intraoperative factors

Variable	Response	Frequency	Percent
Type of Surgery	Cardiac	1	0.5
	Chest	15	6.8
	Endocrine	10	4.6
	ENT	25	11.4
	GI	31	14.2
	Gynecology	11	5.0
	Maxillofacial	10	4.6
	Neurosurgery	12	5.5
	Obstetrics	35	16.0
	Orthopedics	31	14.2
	Urology	29	13.2
	Vascular	9	4.1
Incision size	<10cm	173	79
	>10cm	46	21
Duration of Surgery	<1hr	68	31.1
	1-2hr	48	21.9
	2-3hr	84	38.4
	>4hrs	19	8.7
Duration of Anesthesia	<1hr	62	28.3
	1-2hr	42	19.2
	2-3hr	82	37.4
	>4hrs	33	15.1

Participants with incision length <10cm were 173 or 79%, while participants with incision length >10cm were 46 or 21%. Duration of Anesthesia for majority of the procedures 82 or 37.4 was between two to three hours, while 33 or 15.1% lasted for more than four hours.

Out of the total 219 participants, 54.3% received GA, 42.5% received CNBs and the rest received sedation with or without local anesthesia and PNBs.

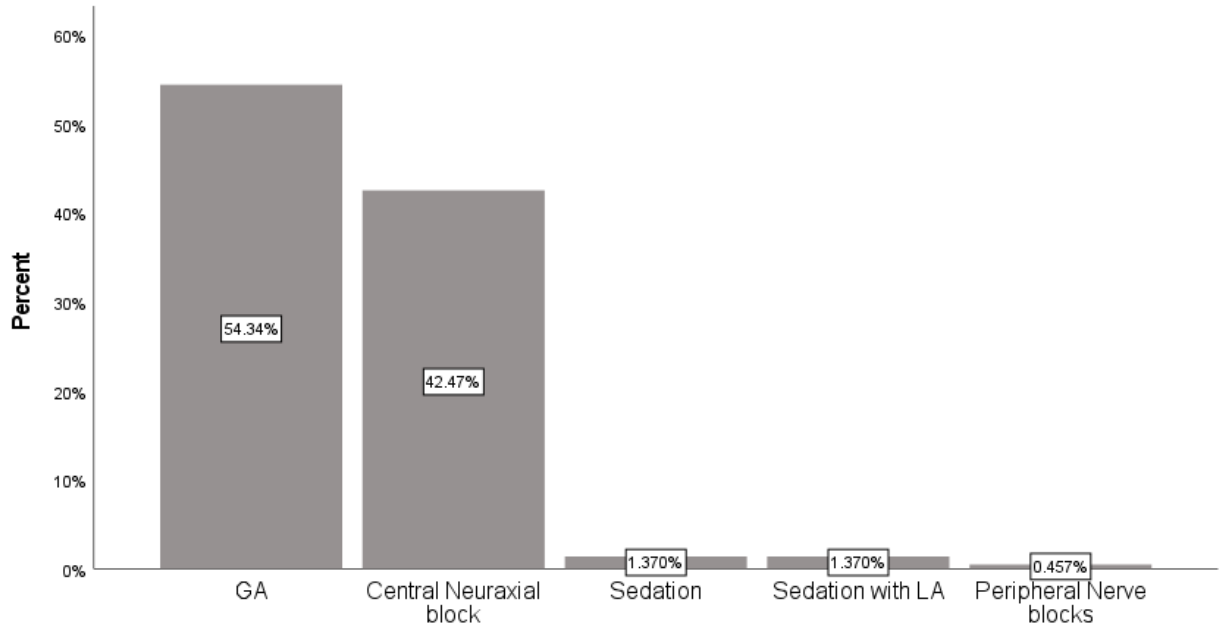


Figure 2: Types of anesthesia given for study participants who underwent elective surgical procedures in AAU, TASH (n=219)

Most commonly used intraoperative analgesics were opioids alone 45.2% and Opioids with PCM and/or regional analgesic techniques was used for 18.3% of the patients. 35.6% of the patients did not receive any systemic analgesics intraoperatively.

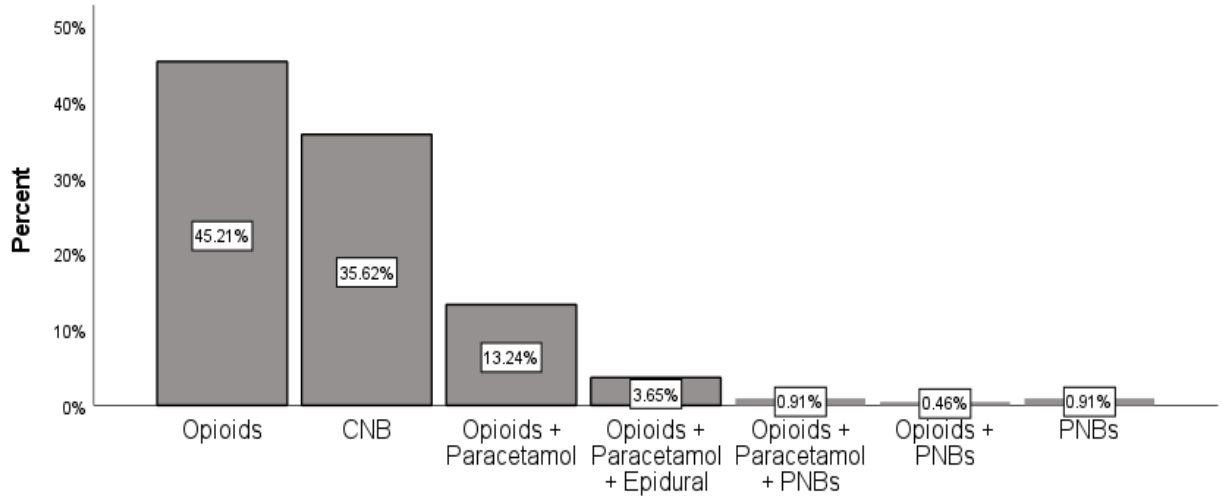


Figure 3: Intraoperative analgesics given for study participants who underwent elective surgical procedures in AAU, TASH (n=219)

5.4. Incidence of acute postoperative Pain

Among the 219 participants, 180 or 82.2% developed acute postoperative pain. The remaining 39 or 17.8% did not develop acute postoperative pain.

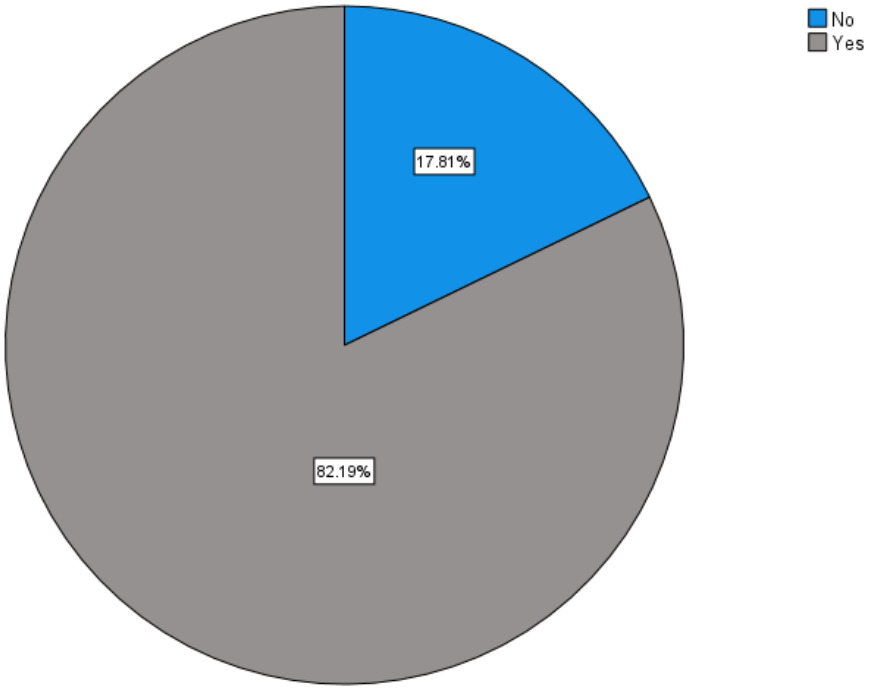


Figure 4: Incidence of acute postoperative pain among study participants who underwent elective surgical procedures in AAU, TASH (n=219)

5.5. Severity of Acute Postoperative Pain

We asked the 219 participants about the pain they experienced in the first 24 hours. 47.9% reported Mild Pain, 31.9% reported Moderate Pain, 17.8% reported No Pain and 2.3% reported Severe Pain.

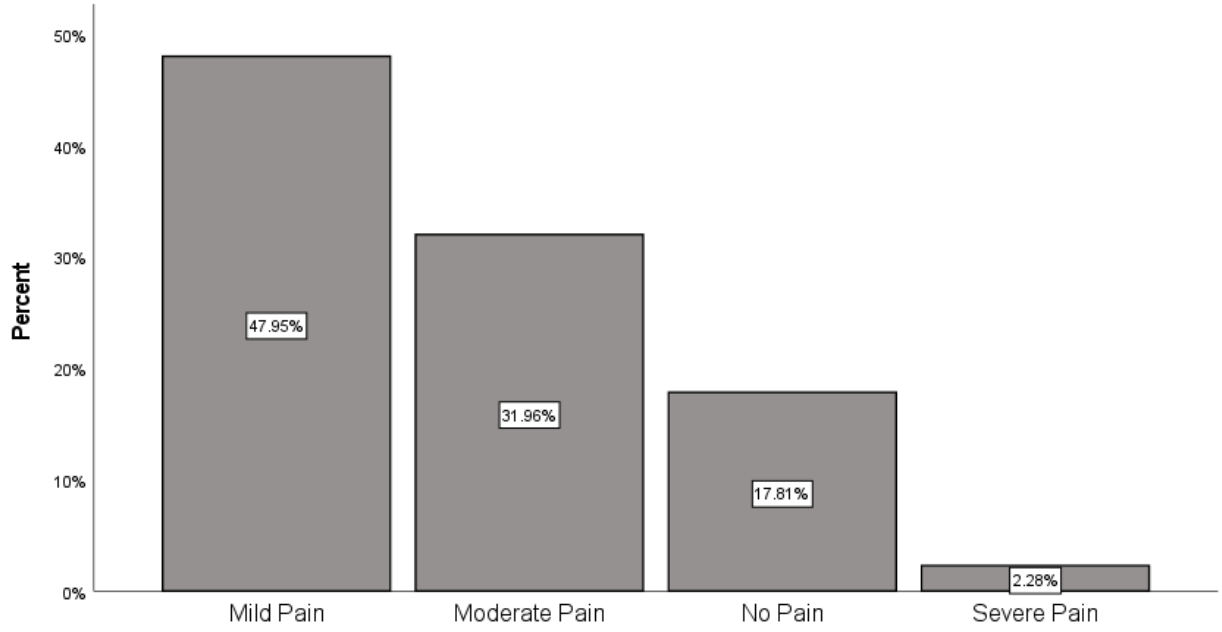


Figure 5: Report of Postoperative pain within the 1st 24hrs in study participants who underwent elective surgical procedures in AAU, TASH (n=219)

Out of the 180 patients who developed acute postoperative pain, 45.7% reported they received good relief, 22.4% reported they received complete relief, 18.7% reported receiving fair relief, 10.0% reported receiving poor relief whereas 3.2% reported they did not receive any pain relief within the first 24 hours postoperatively.

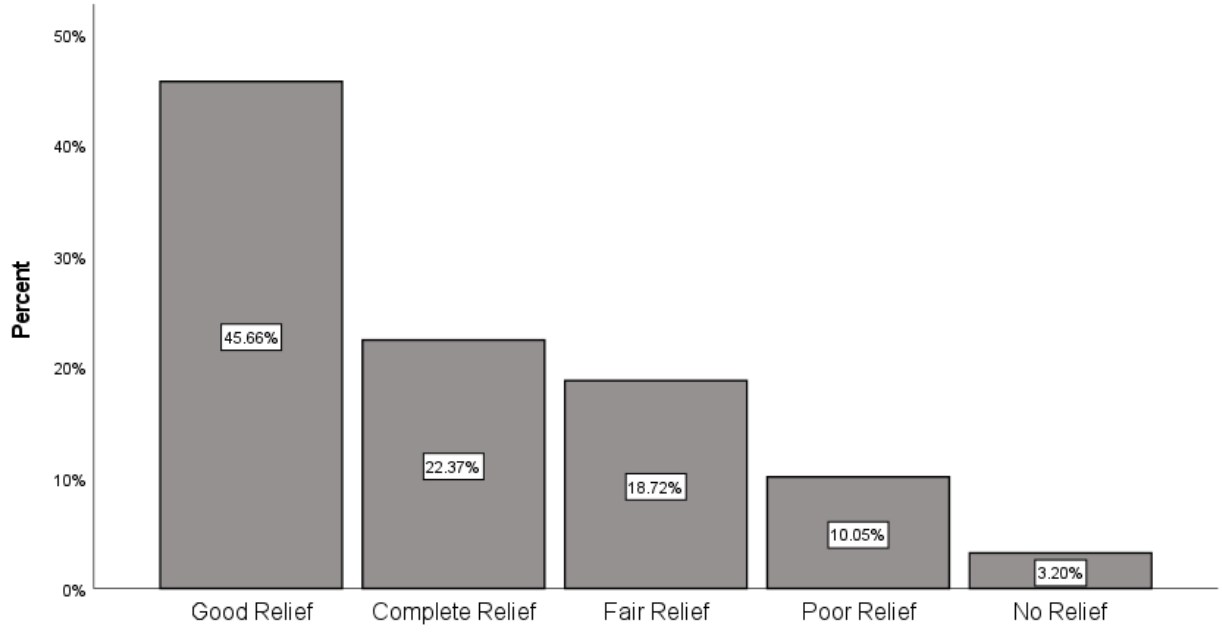


Figure 6: Report of pain relief received within the 1st 24hrs by the study participants who underwent elective surgical procedures in AAU, TASH (n=219)

5.6. Factors associated with acute postoperative pain

A total of 219 patients were included in this study, 180 or 82.2% developed acute postoperative pain while 39 or 17.8% did not develop acute postoperative pain. Initially all independent variables were entered in the bi-variable logistic regression model in order to determine the factors associated with development of acute postoperative pain. On the bi-variable logistic regression model, those variables with a p-value less than 0.25 were selected as a candidate variable and Finally a step-down method of multivariate logistic regression was carried out for the variables Age, Sex, History of previous surgery, Presence of Preoperative anxiety, Use of anxiolytics preoperatively, Intraoperative use of Analgesics, Incision size, Duration of surgery and Duration of Anesthesia. A" p value" less than 0.05 was considered statistically significant and presented with 95% CI and AOR. (Table 4). This study demonstrated that Preoperative

anxiety, use of intraoperative analgesics, incision size and duration of surgery were the main factors associated with the incidence of Acute postoperative pain.

In this study participants who had preoperative anxiety were 6.162 times more likely to develop acute postoperative pain as compared to those who did not have preoperative anxiety (AOR=6.162,95%CI=1.915-19.831, p=0.002).

Table 4: Bivariate and Multivariate analysis to identify factors associated with Incidence of Postoperative Pain in the first 24hrs.

Variables	Categories	Incidence of Postoperative Pain		p Value	COR (95%CI)	p Value	AOR (95%CI)
		Yes	No				
Age	18-45	121	29	0.141	.391(.112-1.367)	0.141	2.556(.732-8.931)
	46-60	27	7	0.168	.362(.085-1.536)	0.168	2.765(.651-11.745)
	60-85	32	3		1.0 (Ref.)		
Sex	F	96	28	0.038	2.227(1.045-4.745)	0.056	2.106(.982-4.513)
	M	84	11		1.0 (Ref.)		
Previous Surgery	No	135	24	0.091	.533(.258-1.104)	0.268	.651(.304-1.392)
	Yes	45	15		1.0 (Ref.)		
Preoperative Anxiety	Yes	82	29	0.002	3.446(1.595-7.533)	**0.002**	**6.162(1.915-19.831) ***
	No	98	10		1.0 (Ref.)		
Took anxiolytics preoperatively	Yes	5	3	0.113	.255(.047-1.382)	0.062	.111(.011-1.113)
	No	175	36		1.0 (Ref.)		

Intraoperative Analgesics	Opioids	86	13	0.009	2.776(1.294-5.913)	0.058	.645(.210-1.025)
	Opioids + Paracetamol	28	1	0.019	11.709(1.503-91.244)	**0.011**	**.019(.001-.405) ***
	Opioids + Paracetamol + Epidural	7	1	0.328	2.927(.341-25.157)	0.528	.489(.053-4.502)
	Opioids + Paracetamol + PNBS	1	1	0.544	.418(.025-6.975)	0.192	6.909(.379-125.814)
	Opioids + PNBs	1	0	1.000			
	PNBs	2	0	0.999			
	CNBs	55	23		1.0 (Ref.)		
Incision size	>10cm	44	2	0.017	5.985(1.386-25.848)	**0.042**	**5.436(1.064-27.768) ***
	<10cm	136	37		1.0 (Ref.)		
Duration of Surgery	<1hr	45	23	0.537	.699(.224-2.181)	<**.001**	**0.144(1.130-1.848) ***
	1-2hrs	43	5	0.111	3.071(.774-12.191)	0.993	4.571(1.130-19.102)
	2-4hrs	78	6	0.022	4.643(1.245-17.313)	0.107	.060(.002-1.832)
	>4hrs	14	5		1.0 (Ref.)		
Duration of Anesthesia	<1hr	39	23	0.062	.377(.135-1.049)	0.750	.786(.179-3.454)
	1-2hrs	37	5	0.449	1.644(.454-5.952)	0.082	.258(.051-1.191)
	2-4hrs	77	5	0.057	3.422(.966-12.128)	0.115	.162(.017-1.554)
	>4hrs	27	6		1.0 (Ref.)		

***-** Statistically significant at $p<0.05$

The study also demonstrated that patients who received Opioids + Paracetamol intraoperatively were 0.981 times less likely to suffer from acute postoperative pain as compared to those who did not receive any analgesics intraoperatively (AOR=0.019,95%CI=0.001-0.405, p=0.011).

Length of incision was significantly associated with postoperative pain. Patients with incision size greater than 10 cm were 5.436 times more likely to develop acute postoperative pain as compared to those with incision size <10cm (AOR=5.436,95%CI=1.064-27.768, p=0.042).

This study also demonstrated that patients with duration of surgery less than 1hr were 0.856 times less likely to develop acute postoperative pain as compared to those with duration of surgery more than 4hrs (AOR=0.144,95%CI=1.130-1.848, p<0.001).

6. Discussion

Postoperative pain appears to be undermanaged despite the adoption of new standards, guidelines and educational initiatives, according to data from throughout the world. Postoperative pain is poorly studied in developing countries. Most indicate high prevalence of post-operative pain with unfavorable relief.

This study set out to assess the incidence and associated factors of postoperative pain in adult elective surgical patients at Tikur Anbessa Specialized Hospital from November to January 2023. The study revealed that the incidence of acute postoperative pain was 82.2% in the first 24 hours of the postoperative period. Out of this 3.24% of patients had no pain relief at all within the first 24 hours while 22.37% of these patients had complete pain relief within the first 24 hours of postoperative period. Preoperative anxiety, use of intraoperative analgesics, incision size and duration of surgery were the main factors associated with the incidence of Acute postoperative pain.

The incidence of moderate to severe pain was found to be 34.24%. This finding is lower than most of the previous studies done in Ethiopia except from one study conducted in Mekelle (30.5%). Another relatively comparable study was a study conducted in Saint Paul's Hospital Millennium Medical College (SPHMMC) which reported prevalence of moderate to severe pain to be 49.7%. Most studies done in Ethiopia revealed a higher incidence as compared to this study. For instance, Studies done in University of Gondar Comprehensive Specialized Hospital (UGCSH) 69.5% and 75.8%, Gondar and Debretabor Comprehensive Specialized Hospitals 70.5% and 85.5%, Tibebe Ghion Specialized Hospital 72.9%, Hawassa University Comprehensive specialized Hospital 89.8%, Public Hospitals of Addis Ababa 85.5%. This variation may be due to differences in infrastructure, a postoperative pain management protocol, sample size, and pain assessment time. In this study, most of the patients were interviewed in the first 24 hours after surgery and ranged from 6hrs to 4 days in other studies. And also 22.7% & 45.66% of participants in this study received complete and good pain relief within the first 24 hours postoperative period.

This study demonstrated that Preoperative anxiety, use of intraoperative analgesics, incision size and duration of surgery were the main factors associated with the incidence of Acute postoperative pain.

Preoperative anxiety was found to be significantly associated with postoperative pain. This result is supported in the study done in Public Hospitals of Addis Ababa. Intraoperative use of Analgesics, especially use of Multimodal analgesia consisting of Opioids + Paracetamol decreased the incidence of acute postoperative pain significantly. This result has not been demonstrated in previous studies done in Ethiopia but is supported by American Pain Society and Guidelines. Patient with incision size greater than 10 cm was associated with development of acute postoperative pain. This is supported by the studies conducted in Gondar and Public Hospitals of Addis Ababa. It is also supported by the fact that larger incision size will increase actual tissue damage leading to increased pain. This study also found out a significant association between incidence of acute postoperative pain and duration of surgery which is also reported in a study done in Gondar. All of these findings are corroborated by several other studies conducted in Ethiopia and throughout the world.

6.1. Limitations of the study:

This study was conducted in a single government Tertiary hospital in Addis Ababa which has several Anesthesiologists and Anesthesiology, Critical Care and Pain Medicine Residents which are involved in the perioperative care of surgical patients including providing inpatient Acute Pain Service (APS), hence the results may not be representative of the entire country especially non-tertiary institutions. Since the study is cross-sectional, it is difficult to establish the cause and effect relationship. Study participants were adult elective surgical inpatients and results might not be applicable to pediatric patients, emergency or out of OR surgical patients.

6.2. Strengths of the study:

The study included all the surgical disciplines that are provided in the hospital. We also used standard assessment tools to collect data.

7. Conclusion and Recommendation

7.1. Conclusion:

Evidence from the study revealed that the overall incidence of postoperative pain was relatively higher when compared to studies done in western countries and lower in the study area when compared with previous studies done in the country. This reflects attention given to postoperative pain management is better when compared to others, but there is still significant gap in managing postoperative pain. It also demonstrated that Preoperative anxiety, use of intraoperative analgesics, incision size and duration of surgery were the main factors associated with the incidence of Acute postoperative pain. The use of Multimodal intraoperative analgesia has negative association with incidence of postoperative patients while the other factors have positive associations.

7.2. Recommendations:

In accordance to our study findings, we propose the following recommendations to the concerned body.

- Perioperative clinicians should give emphasis to preoperative anxiety assessment and address uncertainties by establishing trusting clinician-patient relationship and educate patients about their conditions and procedure.
- The analgesic benefits of implementing intraoperative multimodal strategy should be maximized to facilitate patient's convalescence.
- The department of Anesthesiology, Critical Care and Pain Medicine should strive to provide a structured Inpatient Acute Pain Service (APS) collaborating with other parties involved in the Perioperative care.
- The department of Anesthesiology, Critical Care and Pain Medicine along with Ethiopian Society of Anesthesiologists Professional Association and MOH Ethiopia should take the initiative to develop practice guidelines for acute pain recognition and management in the perioperative setting.

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9. Annexes

9.1. Annex 1: Information sheet

Hello, my name is _____. I am collecting data on behalf of Dr. Eyob Asefa, final year resident at Addis Ababa University, School of Medicine, department of Anesthesiology, Critical care and pain medicine. He is conducting a research on "INCIDENCE AND ASSOCIATED FACTORS OF ACUTE POSTOPERARIVE PAIN in Adult Patients Undergoing Elective Surgery at Tikur Anbessa Specialized Hospital". He has received permission from department of Anesthesiology, Critical care and pain medicine, Addis Ababa University School of Medicine to conduct the study.

You are selected to participate in this study because you are a client who had elective surgery at this Hospital. Your participation in this surgery will only be based on your willingness to participate. You have the right to choose not to take part in this study. If you are willing, you have the right to stop at any time or withdraw without giving any reason which you will not be subjected to any mistreatment. There will be no direct benefit by participating in this research but in the future the information gathered by this study will help policy makers, programmers and researchers to give appropriate attention on issues of postoperative pain management.

The information that you provide will be kept confidential by using only code numbers and locking the data. Only the members of the research will have access to the non-coded data and the data will not be used for purposes other than the study. Your willingness and active participation is very important for the success of this study.

Based on the understanding of the above information, are you willing to participate in this study?

_____Yes _____No

If yes, Signature _____ Date_____

Data collector, Name_____ Signature_____

Questionnaire ID

Date of data collection

9.2. Annex 2: Questionnaire

Addis Ababa University

College of Health Sciences

Department of Anesthesiology, Critical care and Pain medicine

Part one

Socio demographic Characteristics

1. Age _____
2. Sex _____
3. BMI _____

Preoperative Factors

4. Preoperative pain Yes_____ No_____
5. If yes, level of preoperative pain NRS _____
6. Preoperative analgesics, Yes_____ No_____
7. If yes, Drug _____Dose _____ Frequency _____ Duration
8. ASA Class _____
9. History of previous surgery, Yes_____ No_____
10. Preoperative information of postoperative pain management, Yes_____ No_____
11. If yes, what information_____
12. Preoperative anxiety, Yes_____ No_____
13. Did the patient take anxiolytic agent Yes_____ No_____
14. If yes, Drug _____Dose _____

Intraoperative Factors

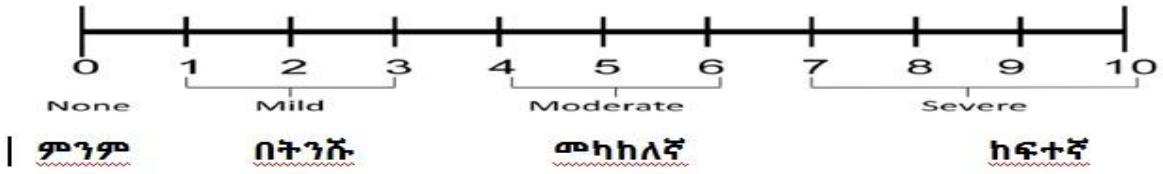
15. Site of surgery _____
16. Type of surgery,
17. Mode of anesthesia,

- GA
- Central Neuraxial
- PNB
- Others, specify

18. Mode of Analgesia

    A. Opioids B. Opioids + PCM C. PCM D. PNB E. Epidural F. Others, Specify

19. Incision length in centimeter
    - <10 cm
    - >10cm
20. Duration of surgery_____
21. Duration of Anesthesia _____
22. On NRS scale, please indicate the least pain you had in the first 24 hours
23. On NRS scale, please indicate the worst pain you had in the first 24 hours
24. On NRS scale, please indicate the average pain you had in the first 24 hours
25. In the first 24 hours, how much pain relief have you received from all your treatments combined?



Thank you for your time and participation!!