



Department of Anesthesiology and Critical care medicine

**Assessment of postoperative pain management and level of satisfaction at
Saint Paul's Hospital Millennium Medical College**

By Anteneh Yifru (MD) (Anesthesiology and critical care medicine resident)

Advisors: Mathias Nigussie (MD, Anesthesiology and Critical -Care specialist)

: Fatimetu Mohammed (MPH/RH)

**A research paper to be submitted to the department of anesthesiology and
critical care in partial fulfillment of the requirements for the certificate in
Anesthesiology and critical care medicine specialty.**

ADDIS ABABA, ETHIOPIA

2019 G.C.

Acknowledgement

Above all, I would like to thank St. Paul's Hospital Millennium Medical College Department of Internal Medicine for accepting my research topic and for giving me golden chance of doing this clinical research, funding me and writing support letters for offices. My deepest gratitude and sincere appreciation goes to my advisors Dr.Mathias Nigussie (MD, Anesthesiology and Critical -Care specialist) and Mrs.Fatimetu Mohammed (MPH/RH) for their unreserved advice, constructive comments and valuable help from the very beginning to final paper. Finally, I want to thank all involved staffs of Saint Paul's hospital Millennium Medical College & data collectors who were willing to provide and collect important information.

Acronyms

APS-POQ (R): American pain society- Patient outcome questionnaire (Revised)

ENT: Ear, nose and throat

FMOH: Federal Ministry of Health of Ethiopia

HIV: Human Immunodeficiency Virus

IASP: International association for the study of pain

NRS: Numeric rating scale

NSAID: Non-Steroidal Anti-inflammatory Drugs

NRS: Numeric Rating Scale

PACU: Post-anesthesia care unit

PCA: Patient Controlled Analgesia

SPHMMC: Saint Paul's Hospital Millennium Medical College

TVP: Trans Vesicular Prostatectomy

VAS: Visual Analogue Scale

VRS: Verbal Rating Scale

List of tables

Table 1: Socio-demographic characteristics among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

Table 2: Clinical characteristics among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

Table 3: Clinical characteristics among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

Table 4: Pain interference with functional status and adverse drug reactions among 178 postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

Table 5: Barriers to adequate pain management among 178 postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

Table 6: Regression analysis of socio-demographic factors with satisfaction f pain management among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

Table 7: Regression analysis of clinical parameters with satisfaction f pain management among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

List of figures

Figure 1: Histogram representation of age distribution among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

Figure 2: Pie chart representation of 178 postoperative patient's admitting department at Saint Paul's Hospital Millennium Medical College, 2019 G.C.

Figure 3: Chart representations of 178 postoperative patients showing route of administration (A), postoperative analgesic drugs used (B), intra-operative analgesic drugs used (C), and frequencies of postoperative analgesics administration (D).

Abstract

Background: Postoperative pain is very common in almost all surgeries. Its inadequate management will result in suffering, increased risk of morbidity and mortality, longer stay in hospital and higher cost. In most developed and developing countries, postoperative pain is not adequately managed.

Objective: To assess pain management and level of satisfaction among postoperative patients at Saint Paul's Hospital Millennium Medical College

Methodology: A prospective cross sectional survey was conducted at St Paul's Hospital Millennium Medical College from August to October 2019 G.C. Study participants were post-operative patients on 2nd and 3rd post procedural day. Data on pain assessment was collected using a modified American Pain Society Patient Outcome Questionnaire. The collected data was cleaned, coded and entered on SPSS version 25 for analysis. Characteristics of the study participants were analyzed using descriptive statistics for categorical data and mean and standard deviation for continuous data. The data was summarized and described using charts and tables. Binary and multivariate logistic regression analysis was used to explore the association between patient characteristics and the outcome (satisfaction to pain management) and P value less than 0.05 was considered as statistically significant.

Results: The study included a total of 178 post operative patients with a mean age of 38.75 ± 16.78 . The majority of the study populations were females accounting for 65.2 %. There was a 100 % incidence of post operative pain and the mean level of satisfaction from pain management was 7.52 ± 2.52 . Attitude towards pain management and co morbidity were found to have association with level of satisfaction from pain management.

Conclusion: postoperative pain management was suboptimal among postoperative patients. Proper utilization of pain scoring charts, standardizing treatment methods and active patient participation of patients on the care should be considered to improve pain management.

Key words: Postoperative pain, analgesics and St. Paul's Hospital Millennium Medical College

Table of Contents

Contents

Acknowledgement	2
Acronyms	3
List of tables.....	4
List of figures.....	5
Abstract	6
1 Introduction.....	9
1.1 Background	9
1.2 Statement of the problem	11
1.3. Significance of the study	13
2 Literature review	14
3Objectives	Error! Bookmark not defined.
3.1 General objective.....	16
3.2 Specific objectives.....	17
4 Methodology	17
4.1 Study setting.....	17
4.2 Study design	18
4.3 Population.....	18
4.3.1 Source population	18
4.3.2 Study population.....	18
4.4 Sample size determination	19
4.5 Eligibility criteria	19
4.5.1 Inclusion criteria	19
4.5.2 Exclusion criteria.....	20
4.6 Study variables	20
4.6.1 Dependent variable	20
4.6.2 Independent variables	20
4.7 Operational definition	20
4.8 Data collection procedure.....	21
4.9 Data quality assurance.....	21

4.10. Data analysis	21
4.11 Ethical Considerations.....	22
4.12 Dissemination of results	22
6 Results.....	23
6.1 Socio-demographic characteristics.....	23
6.2 Clinical characteristics	25
6.3 Pain experience outcome.....	29
6.4 Pain interference with functional status	30
6.5 Process of postoperative pain management and adequacy of management.....	30
6.6 Attitudes and beliefs towards pain management.....	31
6.7 Satisfaction with pain management.....	32
6.8 Factors associated with level of satisfaction	32
7 Discussion	34
7.1 Demographic characteristics	35
7.2 Clinical characteristics	35
7.3 Pain experience outcome.....	37
7.4 Pain interference with functional status	37
7.5 Process of postoperative pain management and adequacy of management.....	37
7.6 Attitude and belief.....	37
7.7 Satisfaction with pain management.....	38
7.8 Measures of Associations.....	38
8. Limitations of the study	38
9. Conclusions.....	39
10. Recommendations.....	40
11 Annexes.....	41
12 References.....	Error! Bookmark not defined.

1 Introduction

1.1 Background

According to the international association for the study of pain (IASP), pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Genetic makeup, individual behavior, cultural influences, and socio-demographic characteristics like age and sex contribute a lot for the individual variation in perceiving pain (1,2).

Generally, pain can be classified based on the etiology or origin and duration of pain. Classification of pain will help practitioners to successfully manage pain by taking into account its duration, involved body part, type of patient, intensity and its pathology(3).

Pain can also be divided based on etiology, into Nociceptive and neuropathic pain. Nociceptive pain is a type of pain which arises due to or as a result of tissue damage. Postoperative pain can be a good example. Neuropathic pain on the other hand, is a kind of pain that arises from abnormal neural activity secondary to disease or injury of the nervous system. It is further subdivided into sympathetically mediated pain and non-sympathetically mediated pain. The first one arises from a peripheral nerve lesion and associated with autonomic changes. The second one is due to peripheral nerve damage without autonomic change(4).

Based on the duration of pain symptom it can be divided into acute and chronic pain. Acute pain is a type of pain symptom, which lasts only up to 30 days of duration. Chronic pain is a type of pain that persists more than six month and it is not a symptom rather it is a disease state which will interfere with normal activity. Surgery is typically followed by acute pain and correctly identifying the type of pain will enable to choose the appropriate and effective type of treatment. Assessing pain is the first and crucial step in properly managing pain. Not assessing pain accurately is one of the barriers for inadequate management of pain. There are different techniques in assessing pain; self-reported pain assessment tools and physiological and behavioral responses to pain can be of example. The self-reporting methods include numeric rating scale (NRS), the Wong-Backer FACES scale and Verbal Rating Scale (VRS).

Physiological responses like tachycardia increased respiratory rate and hypertension may indicate the presence of pain. The behaviors include splinting, moaning, distorted posture and hesitancy to move. Non-verbal methods can provide information regarding pain but the most accurate method is self-report (1,2,5,6).

Both non-pharmacologic and pharmacologic methods help to manage postoperative pain. The non-pharmacologic methods can be psycho educational care, which can be expressed in terms of providing health care information, skills teaching like bed exercise, breathing and coughing; and providing psycho-social support to the patients. The pharmacologic options include opioid analgesics, Non-Steroidal Anti Inflammatory Drugs (NSAIDs) and regional techniques like epidural and spinal anesthesia (7,8). The concurrent use of more than one class of analgesic drug or technique to target different mechanisms of analgesia has been advocated to improve analgesia through additive or synergistic effects while reducing opioid induced side-effects. Patient controlled analgesia is also being highly advocated. There is improved analgesia and satisfaction, since patients may independently titrate the analgesic to their individual level of pain(9,10).

Inadequately managed postoperative pain will have a long and short term consequences. In the short term it will cause suffering, puts patients at higher risk of postoperative morbidity and mortality and will increase hospital stay and hence will increase cost. In the long term acute surgical pain will be followed by chronic pain and will be debilitating to the patient(11–13).

Several studies have assessed on the validation of the International Pain Outcomes (IPO) questionnaire aiming at improving post-operative pain management. The questionnaire comprises key patient-level outcomes of post-operative pain management, including pain intensity, physical and emotional functional interference, side effects, and perception of care. It provides an instrument for post-operative pain assessment and improvement of quality of care, which demonstrated good psychometric quality when translated into a variety of languages(14–19).

Proper management of postoperative pain is crucial in increasing patient satisfaction and patient health outcome. Hence many researches concerning postoperative pain management were performed in different parts of the world. Most literatures conducted to assess the status of postoperative pain management are from developed countries, but such literatures are limited in developing countries including Ethiopia. Of the few studies done in our country, a research done in Jimma University Hospital showed that postoperative pain is not properly managed. (20–24).

The current study is going to assess the management and prevalence of postoperative pain among surgical patients in St. Paul's Hospital Millennium Medical College between August 01 to October 30, 2019 G.C. In addition, this work identified the factors that contribute for developing postoperative pain.

Therefore, this research on postoperative pain management would provide information for hospital managers to allocate budget properly so as to use the limited resources efficiently and plan for optimum postoperative pain management

1.2 Statement of the problem

Surgery and anesthesia are critical health-care services that reduce the risk of death and disability among millions worldwide each year, and the need for these services is expected to continue to increase over the next decade. Globally, nearly 313 million operations were performed in 2012, whereas in the US an estimated 28 million inpatient surgical procedures and 48 million ambulatory surgeries were reported in 2006 and 2010, respectively.^{3,4} Although possibly life-saving, surgery is also associated with potential harm, which frequently includes pain during and after the procedure. Despite improved understanding of pain mechanisms, increased awareness of the prevalence of postsurgical pain, advances in pain-management approaches, and other focused initiatives aimed at improving pain-related outcomes in recent decades, inadequately controlled postoperative pain continues to be a widespread, unresolved health-care problem.⁽²⁵⁾.

Post-operative pains are reported to be undertreated in many parts of the world even in developed countries. For example, in France postoperative pain was not adequately managed. Pain intensity monitoring was not also prescribed for all patients and evaluation tools were not standardized. A study conducted in a cohort of Danish postoperative patients also found out that 45.5 % of patients had uncontrolled pain. They experienced moderate to severe pain within 24 hours of their surgery (26,27).

In the United States of America a study performed among surgical patients within the year, 80% felt acute postoperative pain while the remaining 20% experienced severe pain. This inadequate pain management led to clinical, psychological and institutional consequences. A study performed to assess the characteristic of pain and patient satisfaction on pain management states that postoperative pain management in rural and urban hospitals of United States was below optimal and strategies for effective pain management was not available. The practice of evaluating pain also varies greatly. A survey conducted in French showed that postoperative pain evaluating tools were with lesser frequency and in all institution the availability of pain was not a criterion for discharge from the recovery room. Another cross sectional study reported that there is a discrepancy between the records and that of the reports from the patients. The nurses' evaluation for pain is not adequate and they do not assess and score postoperative pain and do not evaluate the effect of given analgesic drugs (28–31).

An interventional study was performed to assess the influence of a nurse controlled intravenous administration of morphine on the quality of post-operative pain management of patients. Before the intervention, patients who were interviewed state that they were never asked about their pain intensity after surgery. Every fourth patient will experience pain more than 3 score by the Visual Analog Scale (VAS), which is not acceptable, without receiving any pain controlling medication (32).

With the aim of assessing acute post-operative pain at Jordan university hospital, a survey was conducted by collecting data from patient interview and chart review. The study found out that 72% of the patients experience moderate to severe pain postoperatively at rest while 89.3% of patients felt pain on movement. This shows that post-operative pain is not managed adequately in the hospital. Researches done showed that many factors contribute to the

development of pain after surgery. These factors could be of socio demographic, psychological and clinical factors (33–37).

A local study done at Ayder referral hospital, mekelle, found that 98.7 % had pain of different degrees. Accordingly, mild pain 105 (68.2%), moderate pain 41 (26.6 %), severe pain 6(3.9%) were reported by the patients. The most frequently used medication to manage postoperative pain was tramadol 65 (42.2 %). The prevalence of moderate to severe postoperative pain in this hospital was found to be 30.5 %.(38).

1.3. Significance of the study

Generally, postoperative pain is not adequately diagnosed and managed and it is seen to be suboptimal. Coming to the Ethiopian setting, researches are limited assessing the management of postoperative pain. Therefore, this study will give an insight to what the current status of pain management in St Paul's millennium medical college looks like. Hence, the study results would be used as a milestone to give some picture in postoperative pain management in the hospital.

2 Literature review

As cited in literature, ineffective or inappropriate postoperative pain management may affect the health system especially in these modern times when healthcare is a business and patient satisfaction is a key to sustaining the business (12,39).

Survey conducted in the United States found out that among the study participants, 82% of the patients reported that they experienced pain after their surgery. Of these patients 47% had moderate pain and 39% of them experience severe pain during their recovery period. The most commonly administered pain medications were morphine (33%) and meperidine (27%). When patients were asked about their satisfaction concerning their pain management, 90% of them reported to be satisfied (40).

Study was conducted in Denmark to describe the current postoperative pain treatment in Danish tertiary university hospital. It was found out that postoperative pain was not recorded in most of the patients. It was also observed that greater than 75% of the patients receive opioids. However, sufficient 24 hour treatment was only given to 57%, 85% and 65% of patients during the first, second and third postoperative days respectively (41).

According to a study in Chelsea and Westminster Hospital, London, United Kingdom the high prevalence of pain in post-anesthesia care unit (PACU) resulted from cautious use of morphine and co-analgesics, as well as overreliance on the success of local anesthesia infiltration (42).

Evidence from a prospective German cohort study of 50,523 patients from 179 surgical groups showed that pain scores on the first postoperative day were highest after obstetric and orthopedic/traumatic procedures, but scores were high after even common minor surgical procedures, such as appendectomy, cholecystectomy, hemorrhoidectomy, tonsillectomy, and some laparoscopic procedures (43).

A study conducted in Thailand aimed to assess the status of postoperative pain management and factors influencing the quality of services. It was found out that in anesthesia care unit anesthesia personnel's prescribed pain medication for 55% of the cases. Intravenous route was the most frequently used mode of administration and it was also reported that there was no postoperative pain management guideline in this unit. In the surgery wards however, 91%

of the cases surgeons managed postoperative pain and there was pain assessment record in the wards for 71% of the cases(44).

An observational study was conducted in Pakistan to assess the strategy, effectiveness and safety of postoperative pain management. The study found out that postoperative analgesia was given to patients by either the obstetric team or the anesthesia team. Postoperative pain was frequently managed by intravenous infusion of opioids in 94% of patients and other analgesics were also co-administered with the opioids in 99% of patients. The study employed VAS to assess postoperative pain management and found out that pain at rest was mild in 89.7% of the patients, moderate in 9.5% and severe in 0.8% of the patients. Patients' opinion on postoperative pain management was satisfactory in 91.6 % of patients (21).

A study done in Kilimanjaro medical center ,Tanzania in 2014 have shown that, among the patients involved in the study, 85.5% and 77.4% of patient experienced postoperative pain (POP) ranging from mild to severe in 24 and by 48 hours postoperative respectively (45).

Questioner survey conducted in Thailand, India, China, Philippines, Ethiopia and Nigeria showed that management of pain is not optimal. In all countries most opioids are available except that oxycodone is not available in India, Thailand and Nigeria. Postoperative pain is managed by surgeons, anesthesiologist or by both in these countries. The frequent reasons given for not adequately managing postoperative pain are lack of potent analgesics, lack of knowledge and not giving priority for pain management. (46–48).

A prospective descriptive study, which was conducted at the University of Ilorin Teaching Hospital in Nigeria, showed that postoperative pain remains a significant problem in the hospital. Drugs used in postoperative pain management were prescribed by surgeons and they were administered by nurses. Pentazocin was prescribed for 86.4% of the patients and the remaining 13.6% of the patients received Tramadol. Most patients,95%, experienced pain during the first period of surgery. And patients report that they have experienced moderate to severe pain in the recovery room (79.6%) and day one of surgery (54.6%) (49,50).

A cross sectional study done at St Paul's millennium medical college ,Ethiopia 28.6% of the study population were having moderate to severe pain with intramuscular administration of NSAIDS being the common mode of postoperative pain management. Physician prescribed

nurse administered analgesia is the mainstay of postoperative pain management also (51)[37].

Even with our current knowledge and an armamentarium of analgesic agents, and also being very abundant postoperative pain management has not changed much in the past two decades and much postoperative pain is not optimally treated and appropriate local guideline from WHO pain ladder were not also devised or utilized in many developing countries (52,53).

Post-operative analgesia in patients dependent on psychoactive substances pose special problems since these patients are often suffering from severe medical illness including organ damage and infectious diseases like HIV, tuberculosis, hepatitis and others. Furthermore drug specific adaptations such as tolerance, physical dependence, withdrawal symptoms may diminish analgesic effectiveness. Addiction and pain are interrelated, with each condition influencing the treatment of the other(54–57).

Pain is a major co morbidity in many psychiatric disorders like depression and anxiety, adding significantly to the overall disability. Additionally, pain is a common presenting symptom of psychosomatic and somatoform disorders. Although pain medicine has seen intense research in the past decade, psychological and psychiatric concomitants of pain are still under-researched. (47,58).

3. Objectives

3.1 General objective

- ✓ To assess the management of post-operative pain and level of satisfaction at St. Paul's Hospital Millennium Medical College between August 01 to October 30, 2019 G.C.

3.2 Specific objectives

- ✓ To determine the severity of postoperative pain
- ✓ To assess the prevalence of postoperative pain
- ✓ To assess factors associated with satisfaction in postoperative pain management.

4 Methodology

4.1 Study setting

The study was conducted in St. Paul's Hospital Millennium Medical College (SPHMMC) which is one of the largest tertiary referral public hospitals in the capital under the Federal

Ministry of Health. The hospital is located at Gullele Sub city at Swaziland Street, Addis Ababa, Ethiopia. It was established by Emperor Haile-Selassie in 1961 E.C in collaboration with the German Evangelical Church, as a source of medical care for underserved populations. It's the second largest hospital in the country with a catchment population of more than 5 million. The hospital gives service under different units including internal medicine, pediatrics, gynecology/obstetrics, surgery, orthopedics, public health, dentistry, psychiatry, ophthalmology, hospital pharmacy, dermatology, ENT and Maxillo-facial.

Currently it has 392 beds, with an annual average of 200,000 patients; the hospital provides service to an estimated 169,204 people annually who are referred from all over the country. Out of this, 5915 patients are expected to undergo surgeries. The hospital has 12 operation tables. The department of anesthesiology and critical care has a total of 8 anesthesiologists and 23 residents from year one to year three and is involved in almost all operations in the hospital. The surgery department of the hospital has 112 surgical beds, 24 senior surgeons and 86 surgery residents. The department conducts general, urologic, pediatrics and emergency surgeries. In addition, orthopedics, ophthalmologic, maxillofacial neurologic, ENT and gynecological surgeries are also conducted in their respective specialty departments.

4.2 Study design

An institutional based prospective cross sectional study design

4.3 Population

4.3.1 Source population

The source population constituted of all patients who undergo surgical procedure at St. Paul's Hospital Millennium Medical College from August 01 to October 30, 2019 G.C.

4.3.2 Study population

Postoperative patients with age ≥ 18 years who were admitted at Saint Paul's Hospital Millennium Medical College surgical ward and who fulfills the inclusion criteria during the study period.

4.4 Sample size determination

The sample size for the study was determined using **single population proportion formula**:

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

Where; n = required sample size

Z= Confidence level, 95%

d= Margin of error, 0.05

P= 88% Prevalence taken from (59)

$$n = \frac{1.96^2 * 0.88(1 - 0.88)}{(0.05)^2}$$

$$n = 162$$

With the assumption of 10% incomplete data the final sample size determined to be 178.

4.5 Eligibility criteria

4.5.1 Inclusion criteria

- Postoperative patients who are volunteer and able to communicate
- Age $\geq$ 18 years old
- Postoperative period $\geq$ 24 hours and $\leq$ 72 hours

4.5.2 Exclusion criteria

- Patients not fulfilling the inclusion criteria
- Incomplete data's

4.6 Study variables

4.6.1 Dependent variable

- ✓ Postoperative pain
- ✓ Level of satisfaction

4.6.2 Independent variables

- ✓ Sex
- ✓ Age
- ✓ Marital status
- ✓ Educational status
- ✓ Psychiatric disease
- ✓ Substance use
- ✓ Type of drug used for pain management
- ✓ Intra-operative analgesia
- ✓ Presence of prior chronic pain
- ✓ Co morbidities
- ✓ Type of surgery
- ✓ Interference with functional status
- ✓ Attitudes and beliefs towards pain management

4.7 Operational definition

- Pain = unpleasant sensory and emotional experience associated with actual and potential tissue damage.(1)
- Severity of pain based on verbal rating system on a scale of 1-10(52)
 - Mild=1-3
 - Moderate=4-6
 - Severe=7-10
- Chronic pain=any pain that lasted for more than six month.(1)
- Substance abuse= harmful or hazardous use of psychoactive substances including alcohol and illicit drugs.(57)
- Level of Satisfaction: patients response of satisfaction to pain management on a scale of 1-10

- Very dissatisfied=patient with a score of 0
- Dissatisfied=patients with a score 1-3
- Satisfied = patients with a score 4-6
- Very satisfied=patients with a score 7-10

4.8 Data collection procedure

The study participants were postoperative patients admitted at Saint Paul's Hospital Millennium Medical College from August 01 to October 30, 2019 G.C who has stayed a minimum of 24 hours postoperatively.

Using the 2010 version of the American Pain Society Patient Outcome Questionnaire (APSQ), a contextually modified questionnaire was prepared to collect data on patient socio demographic characteristics, clinical parameters, satisfaction level, beliefs about pain and pain treatment, pain intensity, and effect of pain on function through face-to-face interview(15). Data on intra-operative, postoperative pain management and clinical parameters were collected from patients chart using data abstraction tool. The patient interview guide was translated into Amharic and oromiffa languages to make all the questions clear to the patients and translated back to English to insure consistency of messages.

4.9 Data quality assurance

Pretesting of the questionnaire was conducted on 10 patients before the study period and appropriate modifications were applied. Data collectors were recruited; training and orientation was given to data collectors. Pre-test was done using the data-collecting tool to ensure whether data collectors understood the questionnaires. Close supervision was made during data collection and the collected data was reviewed and checked for completeness and consistency by principal investigator on regular basis.

4.10. Data analysis

Data was fed into a computer using Statistical Package for Social Science (SPSS) version 25. Descriptive statistics (frequency, mean, standard deviations, and percentages) were used to describe participants. The results were summarized and described using tables. Regression analysis was used to identify associated factors on post operative pain management and

satisfaction. Both crude (COR) and adjusted odds ratio (AOR) with 95 % confidence interval (CI) were calculated to see the strength of association between predictors and outcome variables. Variables with p-value of < 0.05 were considered as significantly associated with the outcome variables. The data was summarized and presented using text document.

4.11 Ethical Considerations

Formal letter of support was written from Saint Paul's Hospital Millennium Medical College, department of Internal medicine to the concerned units. Ethical clearance and permission was requested and obtained from Institutional Review Board (IRB) of Saint Paul's Hospital Millennium Medical College. Permission to conduct the study was accepted from the hospital administration. During the data collection the aim of the study was explained to all the study participants and informed written consent was obtained. Participants were given adequate time to go through the consent form if they are literate. If they are not literate data collectors were read the forms for them. Participants were informed that they will be free to withdraw at any time without giving reasons. A decision not to participate will be respected and the participants were assured that non-participation would not affect the health care. Confidentiality was insured through involvement of physicians and other involved professionals. Names and other identification that reveal patients' identity was kept strictly hidden. Information gained from the patients was also used only for research purpose. Privacy and confidentiality was safeguarded throughout the course of the study.

4.12 Dissemination of results

The results of the study will be presented to the college community using presentations and web posts. It will be submitted to Saint Paul's hospital millennium medical college, anesthesiology and critical care medicine department, post-graduate coordinator's office and

shared to department of public health. After taking inputs from examiners and public health comments, the findings will be published in locally accessible journals. Findings will also be presented on different conferences and professional society meetings like Ethiopian Society of anesthesiologist's professional association annual meeting, Ethiopian public health association and Ethiopian Medical association annual meetings.

5 .Results

5.1 Socio-demographic characteristics

In this study, a total of 178 study participants were included. The mean age of the study population was 38.75(SD = ± 16.78). The minimum and the maximum ages were found to be 18 and 89, respectively. Majority of the study population were female accounting for 65.2% (n=116). From the total population, 144 (80.9%) were married. Regarding educational status, approximately 75% (n=133) had formal education. Nearly half of the population, 48.9% (n=87), were unemployed and a total of 123 (69.1%) participants were residing in urban

cities. Orthodox Christianity and Islamic were the dominant religions comprising 112(62.9%) and 39 (21.9%), respectively (Figure 1, table 1).

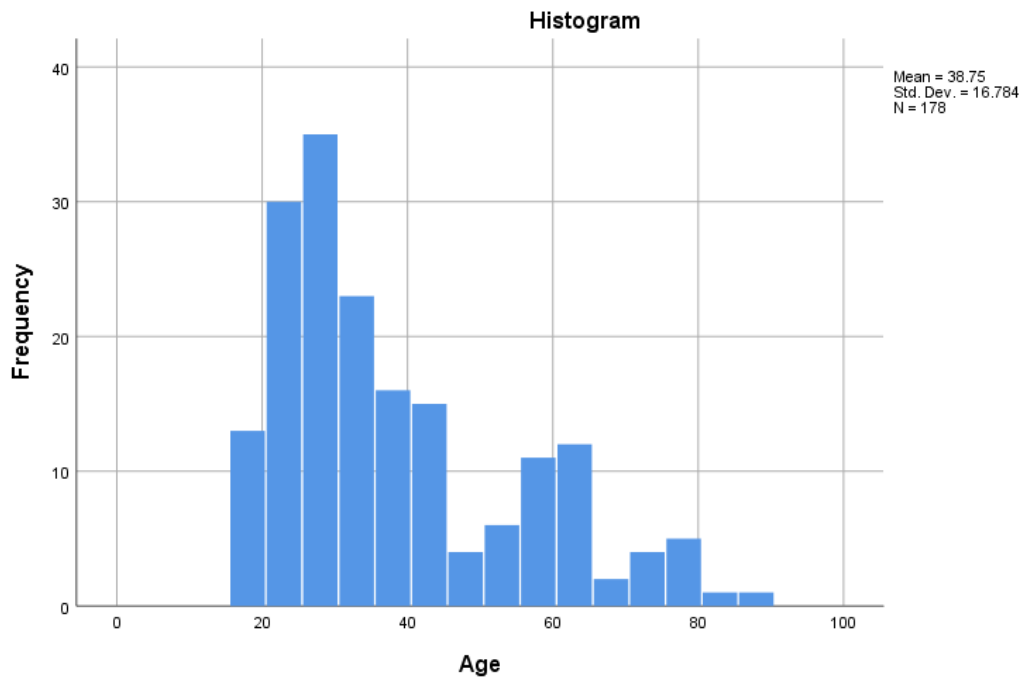


Figure 1: Histogram representation of age distribution among postoperative patients at Saint Paul’s Hospital Millennium Medical College, 2019 G.C

Baseline characteristics		Frequency	Percent
Sex	Male	62	34.8%
	Female	116	65.2%
Marital status	Single	23	12.9%
	Married	144	80.9%
	Divorced	4	2.2%

	Widowed	7	3.9%
Employment	Governmental	16	9 %
	Private	48	27 %
	Unemployed	87	48.9 %
	Peasant/farmer	27	15.2 %
Residency	Urban	123	69.1%
	Rural	55	30.9%
Educational level	No formal education	45	25.3 %
	Primary education	50	28.1 %
	Secondary education	52	29.2 %
	Tertiary education	31	17.4 %
Religions	Orthodox Christianity	112	62.9 %
	Protestant	25	14 %
	Muslim	39	21.9 %
	Jehovah Witness	1	0.6 %
	Catholic	1	0.6 %

Table 1: Socio-demographic characteristics among postoperative patients at Saint Paul’s Hospital Millennium Medical College, 2019 G.C

5.2 Clinical characteristics

Co-morbid illness were present in 45 (25.3%) of the participants, with hypertension accounting for 11.8 % of the total study population. There was one patient with history of psychiatric illness. Fifteen patients were active users of substance and chat was the dominant substance comprising 66.6 % of the substance users. For 65.7% of the participants this was their first surgical exposure. Forty-six patients reported to have chronic pain other than post-operative pain. General surgery and obstetric procedures were the dominant operations

comprising 74(41.6%) and 45(25.3%) respectively. Scheduled surgery accounted for 68.5% of the study population and the minimum and maximum time spent on surgery were 20 minutes and 4 hours respectively. The mean duration of surgery was 82.02(±50.93) minutes. General anesthesia was administered in 107 (60.1 %) of the surgical procedures (Figure 2, table 2).

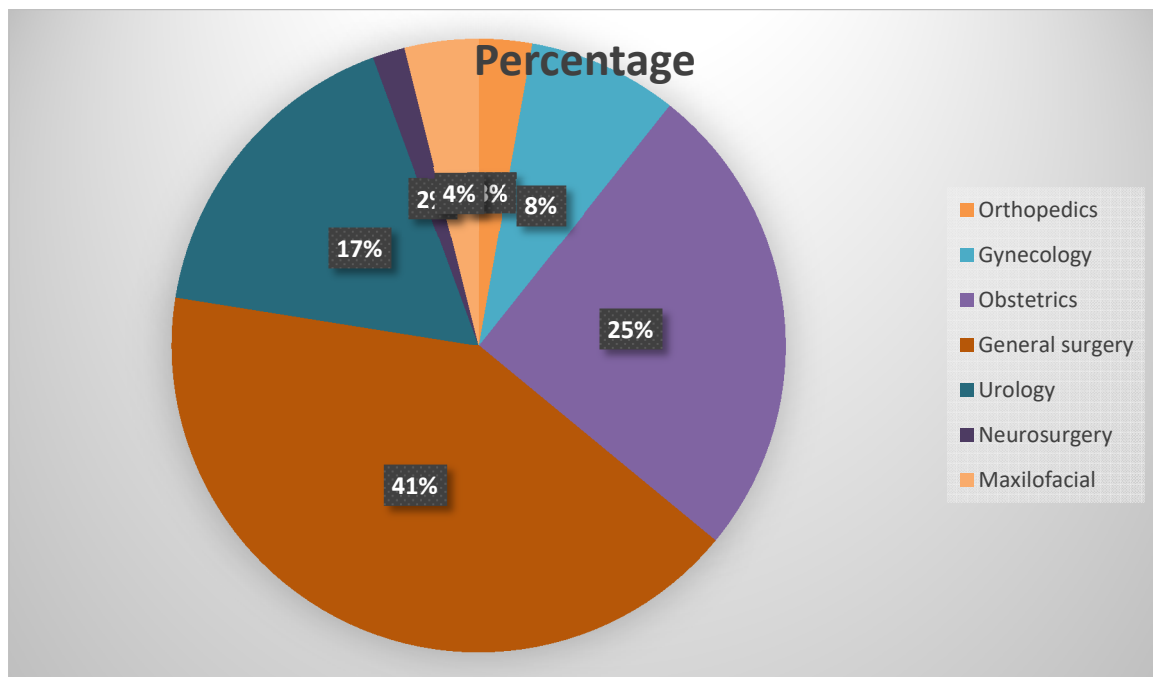


Figure 2: Pie chart representation of 178 postoperative patient's admitting department at Saint Paul's Hospital Millennium Medical College, 2019 G.C.

Of the total study population, intra-operative analgesia was administered to 79 (44.4%) patients. Solo analgesics were the dominant regimen accounting for 82.3% of the intra-operative analgesia administered with 46.2 % being tramadol.

Clinical parameters		Frequency(N)	Percentage(%)
Comorbidity	DM	4	2.2
	hypertension	21	11.8
	malignancy	12	6.7
	Other	2	1.1
	DM and HTN	3	1.7

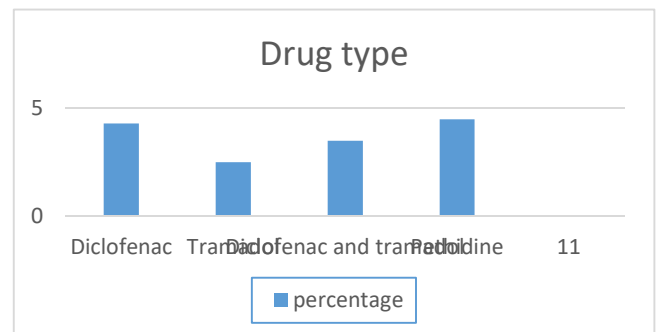
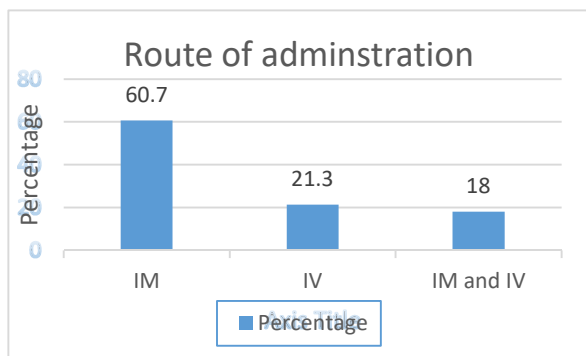
	HTN and malignancy	2	1.1
	none	133	74.7
	Asthma	1	0.6
	Total	178	100
Psychiatry	yes	1	0.6
	No	177	99.4
	Total	178	100
History of substance use	Yes	15	8.4
	No	163	91.6
	Total	178	100
Type of substance use	None	163	91.6
	Khat	6	3.4
	alcohol	4	2.2
	smoking and alcohol	1	0.6
	khat & smoking	3	1.7
	khat, smoking & alcohol	1	0.6
	Total	178	100
History of chronic pain	yes	46	25.8
	No	132	74.2
	Total	178	100
Previous surgery	Yes	61	34.3
	No	117	65.7
	Total	178	100

Table 2: Clinical characteristics among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C.

Documentation of pain rating was present in 125 (70.2%) patients. Postoperative analgesia order was written on patient's chart on 97.2% of the cases with 66.9% of them being ordered by surgical residents. From the ordered analgesics all were documented as given as per the order and nurses are the principal administrators in 95.5% of the cases. The dominant pattern of postoperative analgesic prescription is scheduled one with 80.3%. The majority, 83.5%, patients were prescribed solo analgesics for post-operative pain and tramadol accounted for 63 % of them. Intravenous was the most common route of drug administration with 78.7% of the total population (Figure 3 and Table 3).

Clinical parameters		Frequency	Percent
length of surgery (Mean= 82 minutes)	< mean	108	60.7
	>mean	70	39.3
	Total	178	100
Anesthesia	General anesthesia	107	60.1
	Regional anesthesia	71	39.9
	Total	178	100
Surgery type	Elective	122	68.5
	Emergency	56	31.5
	Total	178	100
Analgesia	Yes	79	44.4
	No	99	55.6
	Total	178	100
Postoperative Analgesia ordered	Yes	173	97.2
	No	5	2.8
	Total	178	100
Postoperative analgesiaAdministration	Yes	151	84.8
	No	27	15.2
	Total	178	100
Pain rating	Yes	125	70.2
	No	51	28.7
	3	2	1.1
	Total	178	100

Table 3: Clinical characteristics among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C



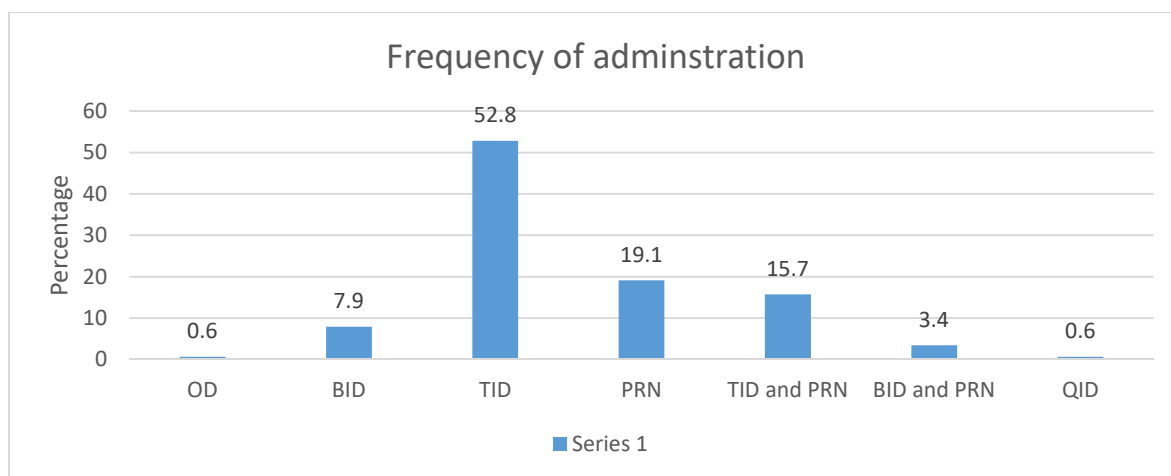
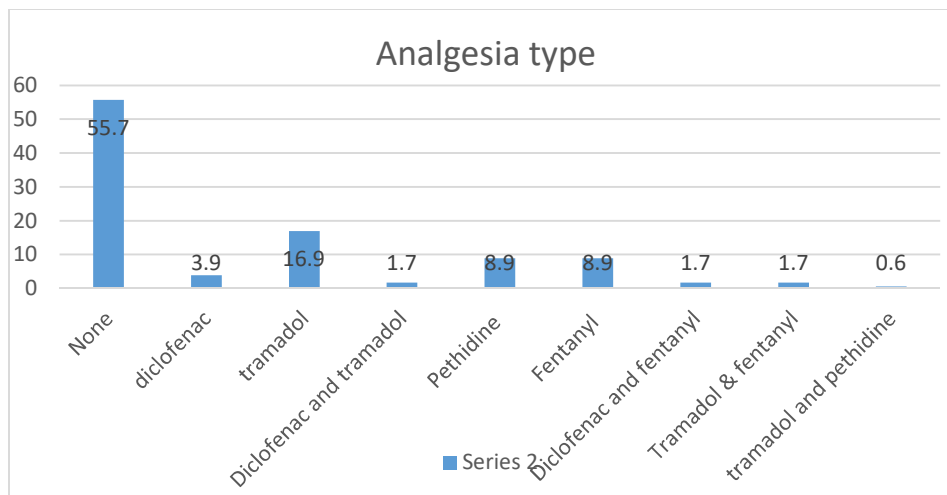


Figure 3: Chart representations of 178 postoperative patients showing route of administration (A), postoperative analgesic drugs used (B), intra operative analgesic drugs used (C), and frequencies of postoperative analgesics administration (D).

5.3 Pain experience outcome

From 178 respondents, all of them experienced pain in the first 24 hours postoperatively. The mean value for least pain reported among respondents was $3.23(\pm 2.09)$ and median value of 3. The reported mean of worst pain among respondents was $7.59(\pm 1.81)$ with median value of 8. The mean value for time spent in severe pain during the first 24 hour is $7.17(\pm 1.75)$ and a median value of 8. All respondents reported that the worst pain they experienced was severe pain.

5.4 Pain interference with functional status

Across the four factors used to assess the pain interference with activities, walking was found to have a highest mean score of 5.69(± 2.54) and the lowest mean score was for staying asleep with a value of 3.74(± 2.40). On the side effects of the pain management, nausea was reported in all patients but one with a mean value of 2.05(± 2.89). While drowsiness and itching were noticed in 6.6% of the patients with respective mean of 0.12 (± 0.57) and 0.13 (± 0.68), dizziness was found to be present in 17.4% of the patients with mean value of 0.37(± 0.97) (table 4).

5.5 Process of postoperative pain management and adequacy of management

Sixty seven percent of the respondents have asked for pain medications after operations and 97.8% of them received the anti-pain medications. Out of these, 51.1 % received the medications in less than 10 minutes after their request. Information about pain treatment options were not offered for 79.8 % and 49.4% of the respondents reported that they were never encouraged by health care providers to use non pharmacological pain management. Approximately half of the patients, 48.3%, reported nurses or physicians didn't inform them about the importance of pain management and 62.4 % responded 'yes' when asked about whether they want stronger medication for pain relief. Despite all these 15.7 % of the patients also used non pharmacological methods of pain management and prayer and changing positions were the ones commonly used with a frequency of 28.6 % and 42.9 %, respectively. On a scale of 1-10 the mean value for participation on patient's own pain management was 1.33(± 1.52)

Parameters	Minimum	Maximum	Mean ($\pm$ SD)	
Functional Interference				
Turning	0	9	5.24 (± 2.73)	
Walking	1	9	5.68 (± 2.54)	
Sleeping	0	9	3.74 (± 2.39)	

Staying asleep	0	10	4.85 ($\pm$ 2.55)
Adverse drug effects			
Nausea	0	9	2.05 ($\pm$ 2.89)
Dizziness	0	6	0.36 ($\pm$ 0.96)
Itching	0	7	0.13 ($\pm$ 0.67)
Drowsiness	0	6	0.11 ($\pm$ 0.56)

Table 4: Pain interference with functional status and adverse drug reactions among 178 postoperative patients at Saint Paul’s Hospital Millennium Medical College, 2019 G.C

5.6 Attitudes and beliefs towards pain management

Patients were asked to rate on a 0 to 5 scale (0: do not agree at all, 5: agree very much) how much they agree with seven statements focused on common pain management misconceptions. The higher the rate on the Likert’s scale, the greater the barrier (hindering attitude) to adequate pain management. Patients reported relatively higher levels of agreement with all 7 statements, with the highest level of agreement for the statement on taking pain as a sign of disease worsening (3.21 ± 1.26) (table 5).

SN	Statements	Mean $\pm$ SD
1	Pain medication should be ‘saved’ in case the pain gets worse	2.84 ± 1.35
2	Complaints of pain could distract the doctor from treating my underlying illness	2.52 ± 1.38
3	Good patients avoid talking about pain	2.90 ± 1.23
4	It is easier to put up with pain than with the side effects that come with pain treatments	2.65 ± 1.35
5	Pain medication cannot really control pain	2.60 ± 1.45

6	The experience of pain is sign that the illness has gotten worse	3.21 ± 1.27
7	People get addicted to pain medication very easily	2.43 ± 1.28

Table 5: Barriers to adequate pain management among 178 postoperative patients at Saint Paul’s Hospital Millennium Medical College, 2019 G.C

5.7 Satisfaction with pain management

With a range of 1–10, the mean overall satisfaction with pain relief management was 7.52 ± 2.32 for all patients with the minimum and maximum score being 1 and 10 respectively. The satisfaction level was then categorized into four groups, very dissatisfied (score=0), dissatisfied (score=1-3), satisfied (score=4-6) and very satisfied (score=7-10). From the total study populations, 87.1 % were satisfied or very satisfied with the overall pain management.

5.8 Factors associated with level of satisfaction

The reliability of the APSPOQ used in this study was estimated by using the Cronbach’s α coefficient. Reliability estimates for the various subscales were 0.76 for pain intensity (3 items), 0.85 for pain interference (4 items), and 0.86 for beliefs about pain (7items). The overall reliability for all items was 0.75.

The associations between patient satisfactions were analyzed with the demographic and clinical characteristics using binary and multiple regression model. Patients with satisfaction score of ≥ 4 were reclassified as satisfied and those with score less than 4 as unsatisfied. On the regression analysis, co-morbidity and attitude were found to have statistically significant association with pain management satisfaction. Adjusted odds ratio of 6.59 and P value of 0.04 were found for co-morbidity with negative association while 33.16 and 0.00 were the respective values for attitude but with positive association. There was no statistically significant association with other parameters including pain intensity (Table 6 and 7).

	Assessment of satisfaction		Patients with a response satisfied			
	Satisfied (%)	Unsatisfied (%)	COR	P-value (95% CI)	AOR	P-value (95% CI)

Sex	Male	85.5	14.5	0.80	0.64 (0.321.99)	2.17	0,48 (0.24-19.2)
	Female						
Age	18-25	83.7	16.3	0.52	0.33 (0.14-1.9)	0.004	0.08 0.00-2.28
	26-33	85.7	14.3	0.61	0.47 (0.16-2.3)		
	34-41	93.9	6.1	1.5	0.60 (0.279.25)		
	42-49	76.5	23.5	0.33	0.15 (0.73-1.52)		
	≥50	90.7	9.3				
Marital status	Living with partner	86.8	13.2	0.87	0.82 (0.27-2.76)	0.02	0.08 (0.00-1.96)
Employment	employed			0.83	0.76 (0.25-2.76)	0.004	0.12 (0.00- 4.22
	unemployed						
	Farmer						
Residency	Urban	87.8	12.2	1.22	0.66 (0.48-3.08)	319	0.03 ()
	Rural						

Table 6: Regression analysis of socio demographic factors with satisfaction f pain management among postoperative patients at Saint Paul’s Hospital Millennium Medical College, 2019 G.C

	Satisfied (%)	Unsatisfied (%)	Patients with a response satisfied			
			COR	P-value (95% CI)	AOR	P-value (95% CI)
Co-morbidity	90.2	9.8	2.63	0.03 (1.06-6.52)	6.59	0.04 (1.07-40.58)
Substance use	86.7	13.3	0.96	0.96 (0.20-4.56)	10	0.27 (0.16-694)

History of chronic pain		89.1	10.9	1.29	0.63 (0.45-3.71)	0.22	0.30 (0.14-3.81)
Length of surgery (Mean= 80 min.)	< 80min	89.8	10.2	1.8	0.18 (0.75-4.4)		
Type of anesthesia (General)	general	86	14	0.77	0.59 (0.31-1.94)	0.07	0.19 (0.0013.66)
Information about pain treatment option		86.1	13.9	0.90	0.84(0.31-2.6)	0.07	0.13 (0.02-2.2)
Time of analgesia	<10 min						
	>10min	82.8	17.2	0.46	0.098 (0.18-1.15)		
Type of surgery (Elective)	Elective	87.7	12.3	1.18	0.71 (0.47-2.99)		
Previous surgery		90.2	9.8	1.55	0.37 (0.58-4.1)		
Pain management participation (mean)				1.09	0.93(0.78-1.53)	1.06	0.91(0.35-3.1)
Attitude(mean)				9.67	0.00(3.79-24.66)	33.16	0.00(5.16-214)
Interference (mean)				1.00	0.93(0.82-1.22)	0.91	0.78(0.50-1.63)
Time spent in severe pain (mean)				1.16	0.2(0.92-1.42)	1.21	0.50(0.69-2.13)

Table 7: Regression analysis of clinical parameters with satisfaction of pain management among postoperative patients at Saint Paul's Hospital Millennium Medical College, 2019 G.C

6 Discussion

This study evaluates the quality of postoperative pain management in SPHMMC using the quality improvement standards recommended by American pain society (15). It assessed intensity and interference of pain, and the pattern of pharmacologic and non-pharmacologic interventions.

Findings from this study should be interpreted and understood within the context of barriers of pain management in Africa, and postoperative pain management in Ethiopia. At the time of data collection, there was one national general guideline prepared by the Federal Ministry of Health (MOH). This guideline is intended to chaperon professionals to effectively manage postoperative pain. It was prepared to be in tune with the World Health Organization (WHO) ladder of pain management (52,60).

In most hospital settings in developing countries like, Nigeria and Tanzania, the pain management is based on the medical staff's experience, and not always consistent with recommendations from 'American Pain Society' pain management guidelines. Maximum doses of paracetamol and non-steroidal anti-inflammatory drugs are rarely used unlike in the developed world (15,20,45).

The incidence and level of severity of pain reported among studies vary significantly depending on the study setting and geographical location. Literatures show an incidence of report of pain reaching 80 % in western countries(26,40) while an incidence of 68.7 % was reported in Tanzania(45). Despite limitation in clinical setup and resources, the lower incidence of pain reported in the Tanzania could be due to relatively lower number of study population and the sampling technique used.

6.1 Demographic characteristics

In most of demographic parameters, this study had comparable findings to two other studies done in Ethiopia with notable difference coming at sex and religion parameters. Female sex and orthodox Christianity were dominant in this study but for the other two studies male and Islam were the dominant sex and religion respectively which could be explained by this study having assessed many obstetric patients and the difference in geographic areas and religion dominance of the 3 study areas(23,38).

6.2 Clinical characteristics

Most studies conducted to assess satisfaction level in post-operative pain management had used co-morbidity, chronic pain and previous surgery to characterize their study populations. In our study Co-morbid illness were present in 45 (25.3%) of the participants, with

hypertension being the commonest. For 65.7% of the participants this was their first surgical exposure(9,14,38,61).

Different literatures clearly address that Psychiatric illness and substance use disorder pose a significant challenge on postoperative pain management and negatively affect patients' satisfaction of the pain management. Depending on the geographic and cultural setup, different types of substances are incriminated for abuse. In our study, 'khat' was the commonest substance use reported by patients and there were only a total of 16 patients with substance use making the measure of its effect on pain management and satisfaction difficult. There was also one patient with history of psychiatric illness (47,54–57).

For effective post-operative pain management, using different types of intra-operative analgesia plays a pivotal role by decreasing the severity of early post-operative pain and the requirement of subsequent analgesics requirement. In our country, there is a significant gap on the reports of intra-operative analgesia use. In one study at St Paul's millennium medical college, intra-operative analgesia was administered for 28.6 % of the patients only which shows low figure than the current study which is at 44.5 %. Though both studies were conducted on the same facility, the increased intra-operative analgesia could be partly explained by the start of anesthesiology residency program and availability of drugs (26,51).

The common mode of postoperative pain management in this study was administration of solo analgesia, the commonest one being intravenous tramadol (37.7%) which is also the same trend in other two local studies done in Jimma and Mekelle. This was not in line with both the national and WHO pain management guideline which says that pain should be assessed regularly and should be treated accordingly with severity including combinations of different analgesics drugs. This could be explained by lack of analgesia, knowledge deficit, lack of pain guidelines and lack of interest(23,24,38,52,60). While other studies in developed world has shown multimodal analgesia and regional analgesia techniques were the common practice than the solo analgesia (25,53).

In the current study, physician prescribed nurse administered analgesia is the mainstay of postoperative pain management. This is similar to the management seen in the two local studies and a study in Nigeria (23,50,51) but Patient Control Analgesia (PCA) is used in other developed countries better than physician prescribed nurse administered analgesia. It

has lower postoperative morbidity, faster recovery, rapid ambulation and early discharge(10,25,53).

6.3 Pain experience outcome

The American pain society- Patient outcome questionnaire (APS-POQ) is the most widely used questionnaire for assessing post-operative pain and cancer pain which is also been translated to more than 10 languages. But its use in Africa is very limited and there is only a single study done in Ethiopia using the tool (14–16,23).

The incidence and level of severity of pain reported in this study is higher than those from most Western and developing countries (16,27,62). But, an earlier study done in China reported a 100% postoperative pain incidence(17). and a study from Malaysia reported higher level of mean scores for least and worst pain intensity (18).

6.4 Pain interference with functional status

The interference scores reported by the patients in this study were lower than the local study done at Jimma but higher than those reported in other studies done in developed countries. This high scores could be partly explained by the correlation of high pain intensity with interference of functional status and our study population has high level of pain intensity(16,18,19).

6.5 Process of postoperative pain management and adequacy of management

The principal non-medical means the study participants used to cope with pain were tolerating pain, self-prayer, family help, and changing positions. This finding is consistent with findings from Chinese and Mexican studies(48,62).

6.6 Attitude and belief

Like the local study done in Jimma,the participants in this study has shown high level of agreement to the barrier statements regarding post-operative pain management whereas studies in developed countries Norway and Malaysia reported only a modest result that can be explained by the education status and patient to health professional communication level being higher in the developed countries(16,18).

6.7 Satisfaction with pain management

A paradoxical high satisfaction despite high pain intensity was observed in our study samples which is similar to the local study done at Jimma and other studies done in developed countries(16,18,19,23).

The main reasons identified by most studies for higher rate of satisfaction despite the presence of high pain intensity are the exceptionally good caring attitude of health care professional, presence of frequent pain assessment, high rate of preoperative pain education, and presence of good communication environment(12,16,43,63).Despite this, in this study the majority of participants reported they had not received pain management education, and backing on the use of non-pharmacological methods was minimal which contradicts the above statement.

6.8 Measures of Associations

Several studies have shown that there is an association between the level of satisfaction and the intensity of pain, attitude towards pain and also socio-demographic factors. The presence and strength of association widely vary across different studies depending on the study design and the statistical methods used. In our study, binary regression models were used to find if any association and multiple regression was used to avoid the effect of confounders on the measure of association. The level of satisfaction, when analyzed with the socio-demographic and clinical parameters, was found to be statistically significant associated was found with co morbidities and attitudes. Though much of the studies reported gender, level of interference with functional status and severity of pain having an effect on the satisfaction of pain management, simple linear regression models were used mostly. The lack of association with the aforementioned demographic and pain parameters in our study could be partly explained by the statistical methodology used and also the difference in study setting and study population (16,23).

7. Limitations of the study

Given that the present study employed cross sectional study design, only the level of pain on the date of survey was recorded and did not record the trend of patients' pain over time. Collection of data being in a single site and the majority of the patients having similar socio-

demographic characteristics which also affect variability of responses could result in a limitation to the external generalizability of this study. Furthermore, there are known multifactorial influences related to setting of facility, patient's expectations, professionals' attitude and knowledge on pain experience that have not been explored in this study.

8. Conclusions

In conclusion, postoperative pain management was suboptimal among postoperative patients in SPHMMC which was evidenced by the high incidence of postoperative pain and its consequences. Proper utilization of pain scoring charts, standardizing treatment methods as per national and WHO guideline and active patient participation of patients on the care should be considered to improve pain management and patient satisfaction.

9. Recommendations

- ✓ Further research is needed to explore the barriers hindering effective pain management for patients.
- ✓ Assessment of pain should be performed for every post-operative patient using appropriate pain rating scales and should be documented.
- ✓ Variety of analgesics should be included in the management of post operative pain depending on the level of pain felt by the patient.
- ✓ Documented pain rating scales should be used as a guide for choosing analgesics as well as changing type of medication according to the patients' pain.

- ✓ Studies should be conducted to find out the reason for the limited use of opioid analgesics and for the poor practice of pain assessment.
- ✓ Larger population studies should be conducted to assess the impact of different parameters like substance use and psychiatric illness relation on post-operative pain management.
- ✓ Anesthesiologists and Anesthesiology residents involvement on post-operative pain management should be improved

10. Annex

Verbal consent form before conducting interview

Hello, my name is _____ and I'm a data collector for the study entitled "assessment of pain management and level of satisfaction among postoperative patients at St. Paul hospital millennium medical college". It is a study aimed to assess the level of pain you are experiencing after surgery and level of your satisfaction regarding the pain management. I will ask you few questions that will only take 15-20 minutes of your time regarding this matter.

Being a part of this study will neither affect the service you are getting in this hospital nor provide direct benefits but it is intended to be used for improving the management of patients in the future. You are selected randomly to participate in the study just because you

underwent a surgery in this hospital no other special criteria. You are free to withdraw from the study and you can stop answering to any questions that are forwarded to you at any time you want. In the study any answer you gave will be confidential and in addition your name, address or any information that identifies you will not be used.

Do you agree to participate in the study?

Yes ☐ no ☐

Questionnaires

Date _____
code _____

1.Patient socio demographic information

Card No _____ Ward _____

Age (years) _____

Sex: Female ☐ Male ☐

Marital status: Married ☐ single ☐ Divorced ☐ widowed ☐

Educational level:

Illiterate/no formal education ☐ Primary education (1-8) ☐

Secondary education (9-12) ☐ Tertiary education (Diploma, degree and above) ☐

Employment status:

Gov't Employed ☐ Unemployed ☐

Private ☐ farmer/peasant ☐

Place of residence

Urban ☐ rural ☐

Religion

Muslim ☐ orthodox ☐ protestant ☐

catholic ☐ jeovah witness ☐ other _____

2. Clinical information

1 Co-morbidities

DM ☐ hypertension ☐ malignancy ☐ other-----

2 history of psychiatric illness ?

Yes ☐ no ☐

3 history of substance use ?

Yes ☐ no ☐

4 if yes to above question specify-----

5 Did you have any pain that lasted more than 6 month?

Yes ☐ No ☐

6 Have you ever had previous surgery ?

Yes ☐ No ☐

From chart review

1. Type of Surgery:

Orthopedic ☐ Gynecologic ☐ Plastic ☐ ENT ☐
 Obstetrics ☐ General surgery ☐ Urologic ☐
 Neurosurgery ☐ Cardio-thoracic ☐ Maxillofacial ☐

2. Intra operative analgesia

Yes ☐ No ☐

If yes specify the name of the administered drug

3 was post op analgesia ordered?

Yes ☐ no ☐

4 analgesia administration documented?

Yes ☐ no ☐

5 Postoperative pain management drug related information

Name of Drug/drugs	
Route of Administration	Oral ☐ Intravenous ☐ Intramuscular ☐ Other _____
Frequency of administration	QD ☐ BID ☐ TID ☐ PRN ☐

6. Was any pain rating documented?

Yes ☐ No ☐

7. Prescriber related information

Prescriber's specialty	Surgeon	
	Anesthesiologist	
	Surgical resident	
	Anesthesiology resident	
	Other_____	
Administrator's speciality	Nurse	
	Other_____	

8 type of surgery

Elective emergency

9 length of surgery-----

10. type of anesthesia

General anesthesia regional anesthesia

APSPOQ

The following questions are about pain you experienced during the first 24 hours after operation

1 did you have any experience of pain in the first 24?

Yes no

If the answer is yes to the above question

2 on this scale please indicate the least pain you had in the first 24 hours?

0 1 2 3 4 5 6 7 8 9 10

No pain

worst pain possible

3 on this scale please indicate the worst pain you had in the first 24 hours?

0 1 2 3 4 5 6 7 8 9 10

No pain

worst pain possible

4 how often were you in severe pain in the first 24 hours?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Never in severe pain always in severe pain

5 which number below best describes how much pain interfered or prevented you from

A doing activities in bed such as turning, sitting up, repositioning

0 1 2 3 4 5 6 7 8 9 10

Doesn't completely

Interfere interferes

B doing activities out of bed such as walking, sitting in a chair, standing at the sink

0 1 2 3 4 5 6 7 8 9 10

C falling asleep

0 1 2 3 4 5 6 7 8 9 10

D staying asleep

0 1 2 3 4 5 6 7 8 9 10

6 have you had any of the following side effects? If yes which number shows the severity of each?

A nausea 0 1 2 3 4 5 6 7 8 9 10

None severe

B dizziness 0 1 2 3 4 5 6 7 8 9 10

C itching 0 1 2 3 4 5 6 7 8 9 10

D drowsiness 0 1 2 3 4 5 6 7 8 9 10

7 did you receive any information about your pain treatment options?

Yes ☐ no ☐

8 if yes, how helpful the information was?

0 1 2 3 4 5 6 7 8 9 10

Not extremely

helpful helpful

9. Did you ask any pain medication for your pain?

Yes ☐ No ☐

10. Did you receive any medication for your pain?

Yes ☐ No ☐

11. If yes to question No 10, after how long from your requisition did you receive the medication?

Less than 10minutes ☐ within 10-60minutes ☐ >60 minutes ☐

12. Did you use non medicine methods to relieve your pain?

Yes ☐ no ☐

13. If yes which method did you use? more than one answer is possible

Cold pack ☐

meditation ☐

Deep breathing ☐

prayer ☐

Changing position ☐

walking ☐

Massage ☐

other-----

14 How often a nurse or a doctor encourage you to use non medication method ?

Never ☐ sometimes ☐ always ☐

15 If you still have pain would you like a stronger dose of pain medication?

Yes ☐ no ☐ if no why? _____-

16 Were you allowed to participate in decisions about your pain treatment as much as you wanted to?

0 1 2 3 4 5 6 7 8 9 10

Not at all very much

17 Earlier in your care, did a physician or nurse make it clear to you that they consider treatment of pain very important and that you should be sure to tell them when you have pain?

Yes ☐ no ☐

Attitude and belief

Select the number that comes closest to how much you agree with that item.

1 pain medication should be withheld in case pain gets worse

0 1 2 3 4 5

Don't agree at all agree very much

2 complaints of pain could distract my doctor from treating my underlying illness.

0 1 2 3 4 5

Don't agree at all agree very much

3 good patients avoid talking about pain

0 1 2 3 4 5

Don't agree at all agree very much

4 It is easier to put up with pain than the side effects of pain treatments

0 1 2 3 4 5

Don't agree at all agree very much

5 pain medication can't really control pain

0 1 2 3 4 5

Don't agree at all agree very much

6 The experience of pain is a sign that the illness has gotten worse

0 1 2 3 4 5

Don't agree at all agree very much

7 peoples get addicted to pain medication very easily

0 1 2 3 4 5

Don't agree at all agree very much

8 how satisfied are you with the results of your pain management?

0 1 2 3 4 5 6 7 8 9 10

Extremely extremely

Dissatisfied satisfied

12 References

1. Merskey H, Bogduk N, International Association for the Study of Pain, editors. Classification of chronic pain: Descriptions of chronic pain syndromes and definitions of pain terms. 2nd ed. Seattle: IASP; 1994. 222
2. Andersson V, Bergman S, Henoeh I, Ene KW, Otterström-Rydberg E, Simonsson H, et al. Pain and pain management in hospitalized patients before and after an intervention. Scand J Pain. 2017;15(1):22–9.
3. Cole BE. Pain Management: Classifying, Understanding, and Treating Pain. 2002.
4. Olorunto WA, Galandiuk S. Managing the Spectrum of Surgical Pain: Acute Management of the Chronic Pain Patient. J Am Coll Surg. 2006 ;202(1):169–75.

5. Anderson KO, Mendoza TR, Valero V, Richman SP, Russell C, Hurley J, et al. Minority cancer patients and their providers: Pain management attitudes and practice. *Cancer*. 2000;88(8):1929–38.
6. Wells N, Pasero C, McCaffery M. Improving the quality of care through pain assessment and management: Patient safety and quality: Agency for Healthcare Research and Quality. 2008
7. Power I. Recent advances in postoperative pain therapy. *Br J Anaesth*. 2005;95(1):43–51.
8. Ramsay MAE. Acute postoperative pain management. *Proc Bayl Univ Med Cent*. 2000;13(3):244–7.
9. Rawal N. Current issues in postoperative pain management: *Eur J Anaesthesiol*. 2016;33(3):160–71.
10. Walder B, Schafer M, Henzi I, Tramer MR. Efficacy and safety of patient-controlled opioid analgesia for acute postoperative pain. A quantitative systematic review. *Acta Anaesthesiol Scand*. 2001;45(7):795–804.
11. Katz J, Jackson M, Kavanagh BP, Sandler AN. Acute pain after thoracic surgery predicts long-term post-thoracotomy pain. *Clin J Pain*. 1996 Mar;12(1):50–5.
12. Macrae WA. Chronic post-surgical pain: 10 years on. *Br J Anaesth*. 2008;101(1):77–86.
13. Sharrock NE, Cazan MG, Hargett MJ, Williams-Russo P, Wilson PD. Changes in mortality after total hip and knee arthroplasty over a ten-year period. *Anesth Analg*. 1995;80(2):242–8.
14. Rothaug J, Zaslansky R, Schwenkglenks M, Komann M, Allvin R, Backström R, et al. Patients' Perception of Postoperative Pain Management: Validation of the International Pain Outcomes (IPO) Questionnaire. *J Pain*. 2013;14(11):1361–70.
15. Gordon DB, Polomano RC, Pellino TA, Turk DC, McCracken LM, Sherwood G, et al. Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R) for quality improvement of pain management in hospitalized adults: Preliminary psychometric evaluation. *J Pain*. 2010;11(11):1172–86.
16. Dihle A, Helseth S, Kongsgaard UE, Paul SM, Miaskowski C. Using the American Pain Society's Patient Outcome Questionnaire to Evaluate the Quality of Postoperative Pain Management in a Sample of Norwegian Patients. *J Pain*. 2006;7(4):272–80.
17. Tsui SL, Lo RJ, Tong WN, Yang JC, O'regan AM, Ng KF, et al. A clinical audit for postoperative pain control on 1443 surgical patients. *Acta Anaesthesiol Sin*. 1995;33(3):137–48.
18. Subramanian P, Ramasamy S, Ng KH, Chinna K, Rosli R. Pain experience and satisfaction with postoperative pain control among surgical patients: Pain among postoperative patients. *Int J Nurs Pract*. 2016;22(3):232–8.

19. Ramia E, Nasser SC, Salameh P, Saad AH. Patient Perception of Acute Pain Management: Data from Three Tertiary Care Hospitals. *Pain Res Manag*. 2017
20. Faponle AF, Soyannwo OA, Ajayi IO. Post operative pain therapy: a survey of prescribing patterns and adequacy of analgesia in Ibadan, Nigeria. *Cent Afr J Med*. 2001;47(3):70–4.
21. Ismail S, Shahzad K, Shafiq F. Observational study to assess the effectiveness of postoperative pain management of patients undergoing elective cesarean section. *J AnaesthesiolClinPharmacol*. 2012;28(1):36–40.
22. Tufano R, Puntillo F, Draisci G, Pasetto A, Pietropaoli P, Pinto G, et al. Italian Observational Study of the management of mild-to-moderate Post-Operative Pain (ITOSPOP). *Minerva Anesthesiol*. 2012;78(1):15–25.
23. Woldehaimanot TE, Eshetie TC, KerieMW. Postoperative pain management among surgically treated patients in an Ethiopian hospital. *PLoS ONE*. 2014;9(7).
24. Emiru M. Assessment of Adult Postoperative Pain Management Practice Among Nurses Working in Addis Ababa Public Hospitals, Addis Ababa, Ethiopia, 2015
25. Gan TJ. Poorly controlled postoperative pain: prevalence, consequences, and prevention. *J Pain Res*. 2017;10:2287–98.
26. Fletcher D, Fermanian C, Mardaye A, Aegerter P. Pain and Regional Anesthesia Committee of the French Anesthesia and Intensive Care Society (SFAR). A patient-based national survey on postoperative pain management in France reveals significant achievements and persistent challenges. *Pain*. 2008;137(2):441–51.
27. Lorentzen V, Hermansen IL, Botti M. A prospective analysis of pain experience, beliefs and attitudes, and pain management of a cohort of Danish surgical patients. *Eur J Pain Lond Engl*. 2012;16(2):278–88.
28. Hutchison RW. Challenges in acute post-operative pain management. *J Am Soc Health-Syst Pharm*. 2007 Mar 15;64(6 Suppl 4):S2-5.
29. Sherwood GD, McNeill JA, Starck PL, Disnard G. Changing acute pain management outcomes in surgical patients. *AORN J*. 2003;77(2):374, 377–80, 384-390.
30. Fletcher D, et al. A national survey of postoperative pain management in France: Influence of type of surgical centres. *Ann Fr AnesthReanim*. 2008; 27(9): 700-8
31. Ene KW, Nordberg G, Bergh I, et al. Postoperative pain management - the influence of surgical ward nurses. *J ClinNurs*. 2008;17(15):2042–50.
32. Gross T. Pain management in surgical wards. Quality and solutions for improvement in the early postoperative period. *Chirurg*. 2002; 73(8): 818-26.

33. Massad IM, Mahafza TM, Abu-Halawah SA, Attyyat BA, et al. Postoperative pain is undertreated: Results from a local survey at Jordan University Hospital. *East Mediterr Health J.* 2013;19(5):485–9.
34. Caumo W, Schmidt AP, Schneider CN, Bergmann J, et al. Preoperative predictors of moderate to intense acute postoperative pain in patients undergoing abdominal surgery. *Acta Anaesthesiol Scand.* 2002;46(10):1265–71.
35. Chesterton LS, Barlas P, Foster NS, Baxter GD, and Wright CC. Gender differences in pressure pain threshold in healthy humans. *Pain.* 2003; 101: 259-266
36. Jennifer K, Ellen LP, Carl HA, Robert HD. Risk factors for acute pain and its persistence following breast cancer surgery. *Pain.* 2008; 119(1-3): 16-25
37. Lau H, Patil NG. Acute pain after endoscopic totally extraperitoneal (TEP) inguinal hernioplasty: Multivariate analysis of predictive factors. *SurgEndosc.* 2004;18(1):92–6.
38. Shanmugam DR, Abrha K, Tsegay A, Shumbahri A, Asir M, Yemane A, et al. Assessment of postoperative pain management in Mekelle public hospitals, Ethiopia. 2018;08:7.
39. Glowacki D. Effective pain management and improvements in patients' outcomes and satisfaction. *Crit Care Nurse.* 2015 Jun;35(3):33–41; quiz 43.
40. Apfelbaum JL, Chen C, Mehta SS, Gan TJ. Postoperative pain experience: Results from a national survey suggest postoperative pain continues to be undermanaged. *Anesth Analg.* 2003 ; 97(2):534–40.
41. Mathiesen O, Thomsen BA, Kitter B, Dahl JB, Kehlet H. Need for improved treatment of postoperative pain. *Dan Med J.* 2012;59(4):A4401.
42. Ward S, Guest C, Goodall I, Bantel C. Practice and bias in intraoperative pain management: results of a cross-sectional patient study and a survey of anesthesiologists. *J Pain Res.* 2018 Mar 15;11:561–70.
43. Gerbershagen HJ, et al. Pain intensity on the first day after surgery: a prospective cohort study comparing 179 surgical procedures. *Anesthesiology.* 2013; 118(4): 934-44
44. Charuluxananan S, Thienthong S, Rungreungvanich M, Srirojanakul W, Punjasawadwong Y, Sripajittichai P. A survey of post anesthetic pain management in Thailand. *J Med AssocThail.* 2009;92(8):1028–32.
45. Masigati HG, Chilonga KS. Postoperative pain management outcomes among adults treated at a tertiary hospital in Moshi, Tanzania. *Tanzan J Health Res.* 2014;16(1).
46. Prof. Ramani V. Managing Acute Pain in the Developing World - IASP. 2011; 19(3)
47. Mauro GC. Clinical Practice & Epidemiology in Mental Health. 2019; 15.

48. Qu Shen, Sherwood GD, McNeill JA, Zheng Li. Postoperative pain management outcome in Chinese inpatients. *West J Nurs Res.* 2008;30(8):975–90.
49. Kolawole IK, Fawole AA. Postoperative pain management following caesarean section in University of Ilorin Teaching Hospital (UITH), Ilorin, Nigeria. *West Afr J Med.* 2003 Dec;22(4):305–9.
50. Ogboli-Nwasor E, Sule, Yusufu. Pattern of postoperative pain management among adult surgical patients in a low-resource setting. *J Pain Res.* 2012;117.
51. Hailemariam E, Pharm B. Assessment of postoperative pain management in Saint Paul's Hospital Millennium Medical College. 2015
52. WHO :WHO's cancer pain ladder for adults 2008
53. Present-day challenges and future solutions in postoperative pain management: Results from PainForum.2014.
54. Prince V. Pain Management in Patients with Substance-Use Disorders. *Pain Manag.* :18.
55. Jage J, Bey T. Postoperative analgesia in patients with substance use disorders: Part I. *Acute Pain.* 2000 Sep;3(3):29–44.
56. Quinlan J, Cox F. Acute pain management in patients with drug dependence syndrome: *PAIN Rep.* 2017;2(4):e611.
57. Melendez I. Analgesia and anesthesia for the Substance Use Disorder patient. *Am AssocNurAnest.* 2019:1-16.
58. Kowshik S, Sudhir K. Pain in psychiatry disorders. *IndianJMedRes.* 2017; 146:142-46
59. Eshete MT, Baeumler PI, Siebeck M, Tesfaye M, Haileamlak A, Michael GG, et al. Quality of postoperative pain management in Ethiopia: A prospective longitudinal study. *PLOS ONE.* 2019;14(5):.
60. Burssa D, Teshome A, Iverson K, Ahearn O, Ashengo T, Barash D, et al. Safe Surgery for All: Early lessons from implementing a National Government-Driven Surgical Plan in Ethiopia. *World J Surg.* 2017;41(12):3038–45.
61. Jackman C. Perioperative pain management for the chronic pain patient with long-term opioid use. *OrthopNurs.* 2019;38(2):159.
62. Sherwood G, McNeill JA, Hernandez L, Penarrieta I, Petersen JM. A multinational study of pain management among Hispanics: An evidence-based approach. *J Res Nurs.* 2005;10(4):403–23.
63. Grass JA. Patient-Controlled Analgesia: *AnesthAnalg.* 2005 ;101(Supplement):S44–61