ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES DEPARTMENT OF ANESTHESIA

ASSESSMENT OF PREVALENCE AND ASSOCIATED RISK FACTORS OF POST-OPERATIVE PAIN AMONG ADULTPATIENTS AT DAGMAWI MENELIK REFERRAL HOSPITAL, ADDIS ABABA, ETHIOPIA

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Study Setting	Dagmawi Menelik Referral Hospital Surgical Wards, Addis Ababa, Ethiopia
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DECLARATION

I Shambel Melaku, Registration Number GSR -7603/2017, do hereby declare that this thesis is my original work and that it has not been submitted partially; or in full, by any other person for an award of a degree in any other university/institution. No part of this thesis may be reproduced without the prior written permission of the Author and/ Addis Ababa University (AAU)

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Declaration by Advisor

This Thesis work has been submitted for Examination with my approval as College Advisor.

Signature: _____ Date: _____

APPROVAL

The undersigned certifies that they have read and hereby recommended to the Addis Ababa University to accept the thesis submitted by Shambel Melakuand entitled "Assessing ofthe prevalence And Associated Risk Factors of Postoperative Pain" Among adult patients for the partial fulfillment of the requirement of Master's Degree in Anesthesia.

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ABSTRACT

Background: Pain is a sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage according to Association of the Study of Pain. It is very common in almost all surgeries**.**

Inability to identify perioperative and medical factors lead to poor pain management which results in suffering, increased risk of morbidity and mortality, longer hospital stay and higher cost.

Despite advances in medical science inadequate post-operative pain management exists in developed and developing countries including Ethiopia

Objective: The aim of this study is to assess postoperative pain prevalence and associated risk factors among adult patients at Dagmawi Menelik Referral Hospital, Addis Ababa Ethiopia.

Methods: Institutional based cross sectional study was conducted at Dagmawi Menelik Referral Hospital from December, 20, 2017 to March 20. 2018.

Data were collected by administering questionnaires via interview and reviewing the patients chart after taking consent. Numeric rating scale was used to assess the level of pain.

Data was entered and analyzed using statistical package for social science (SPSS) version 20. Binary logistic regression was used to determine statistical significance between dependent and each independent variable. P-value 0.05 and 95% CI was used as cut off point.

Results

Incision length of less than 5cm and (5-10cm) had equal number of patients 60 (39.5%) each. While greater than10 cm surgical site incisional length was 32(21.1%).

Intra-abdominal (72.2%) and cardiothoracic (75%) procedures reported the most amounts of patients complaining moderate to severe pain. The least moderate to severe pain was among orthopedic (36.8%) surgery.

Conclusion: The prevalence of moderate to severe pain was found to be 28.3% at 2 hour postoperatively at after the end of surgery, 55.9% at 12 hour and 32.2% at 24 hour.

The result revealed that type of anesthesia and incision length were signicantly4 associated with postoperative pain (OR: 0.03, 95% CI: 0.004- 0.180, $p<0.001$), (OR: 2.6, 95% CI: 1.029-6.355, $p<0.043$) respectively

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TABLE OF CONTENTS

List of tables

List of figures

ABBREVIATION AND CRONYM

AAU-	Addis Ababa University
ASA	American society of anesthesiologists
CPSP	Chronic post-surgical pain
DMRH	Dagmawi Menelik Referral Hospital
EAA	Ethiopian Association of Anesthetists
FMOH	Federal Ministry of Health
IASP	International Association for the Study of Pain
NSAIDs	Non Steroidal Anti-inflammatory Drugs
NRS	Numeric Rating Scale
PCA	Patient Controlled Analgesia
POP	Postoperative pain
SPSS	Statistical Package for the Social Sciences
VRS	Verbal Rating Scale
WHO	World Health Organization

CHAPTER ONE

1. INTRODUCTION

1.1. Background

Pain is a complex multi-dimensional symptom of sensory and emotional experience influenced by physiological, psychological, and situational factors (1). 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, or described in terms of such damage (2).Generally, pain can be classified based on the duration of pain in to acute and chronic (3).

Although pain is a predictable part of the postoperative experience, inadequate management of pain is common and can have profound implications. Patients with severe anxiety depression, female gender and the intensity of pain immediately after procedure were found to be important risk factors (4).

Genetic makeup, passive behavior, and socio-demographic characteristics like age and sex contribute a lot for the individual variation in perceiving pain (5).
Based on the duration of pain symptom it can be divided into acute and chronic pain. Chronicity relates to time periods only, which has ranged from one month to one year after surgery, but in general has been defined as "pathological pain that persists for longer than two months post-surgery" (6).

Classification of pain helps practitioners to successfully manage pain by taking into account its duration, involved body part, type of patient, intensity and its pathology. Severe postoperative pain affects performance of daily activities and it contributes to persistent postoperative pain. In patients submitted to cesarean section, this pain can also interfere with women's ability to care for their babies, to effectively breastfeed, and to satisfactorily interact with their children (7).

Age is predictors of postoperative pain in patients undergoing orthopedic and trauma surgery (8). A high prevalence of clinically relevant pain in patients was found as well as a great variability according to type of patients, clinical wards and hospitals (9).
Patients with more intense of acute postoperative pain on movement, preoperative depression, and longer surgical time had greater risk for CPSP following surgery but prevalence of moderate and severe pain is less than reported in the literature (10).

Prevalence of pain showed no differences observed regarding gender but there is a significant association between the severity of post-operative pain and the type of surgery done (11).

Assessing pain is the first and crucial step in properly managing pain. There are different techniques in assessing pain; self-reported pain assessment tools , physiological and behavioral responses to pain can be of example. The self-reporting methods include numeric rating scale (NRS) and Verbal Rating Scale (VRS).Physiological responses like tachycardia, increased respiratory rate and hypertension may indicate the presence of pain. Nonverbal methods can provide information regarding pain but the most accurate method is self-report (12).

Both non pharmacologic and pharmacologic methods help to manage post-operative 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 and the pharmacologic options include opioids analgesics, Non-Steroidal Anti-inflammatory Drugs (NSAIDs) and regional techniques like epidural and spinal anesthesia (13).

1.2. Statement of the problem

Pain is a common experience for patients in the surgical ward and reported to be undertreated in many parts of the world even in developed countries. A study conducted in France in 2008 by Dominique et al; postoperative pain was not adequately managed and pain intensity monitoring was not also prescribed for all patients and evaluation tools were not standardized (14).

A study conducted in Germany in 2013 by Linda M. Peelen, Ph.D., showed, severe pain after surgery remains a major problem, occurring in 20–40% of patients and Despite numerous published studies, the degree of pain following many types of surgery in everyday clinical practice is unknown. Severe postoperative pain remains a widespread but still underestimated problem; Extensive studies have demonstrated that despite present-day improvements in pain treatment, many Patients still suffer from moderate to severe postoperative pain (15).

A study conducted in a cohort of Danish by Lorentzen *et al*., 2011; also found out that 45.5% of patients had uncontrolled pain and they experienced moderate to severe pain within 24 hours of their surgery (16).

Despite several advances in the understanding of pain, previous researches have reported a 20-80% prevalence of moderate to severe postoperative pain which led to clinical, psychological and institutional consequences (2).

A survey conducted in French showed that post-operative 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 (17).

A research done in Chicago, Illinois, from 441 inpatients the prevalence of POP was 66 %; 12% of patients reported “Severe-to-Extreme” pain and 54% “Moderate-to Extreme pain (18).
Predictors for POP include socio demographic, previous surgery, higher average intensity score of acute postoperative pain on movement, and longer surgical duration (12). A research done in 2012 at Gondar university hospital, North East Ethiopia, showed that in addition to socio demographic factors and ASA, general Anesthesia, incision length of greater than 10 cm were risk factors associated with postoperative pain (19).

1.3. Significance of the study

Postoperative pain is not adequately managed and it is seen to be suboptimal due to inadequate understanding of the prevalence, severity and lack of knowledge in identifying of the common risk factors of POP. This in turn results to poor pain management in postoperative period which has a high incidence of progressing to chronic pain throughout the patients' life.

Inability to identify perioperative and medical factors leads to poor pain management that results in suffering, increased risk of morbidity and mortality, longer stay in hospital and higher cost at patient, hospital and at the country level. Finally decreases/minimizes the working forces and retards the economic development of a given country.

Therefore, the management of POP and prevention of its all complications that will follow mainly depends on adequate knowledge in identifying of factors that contributes for its prevalence

Identification strategies of these risk factors should be developed to reduce adverse outcomes of postoperative pain (POP) and be supplemented with broader efforts to prevent the longer-term consequences of the associated factors. From our literatures we reviewed, different factors are associated with the development of post-operative pain.

Coming to Ethiopian settings, there is a published research with similar topic in Gondar university hospital, the severity and associated factors of postoperative pain.
However there is an inter-individual variability in pain perception, assessment and recognition which is affected by genetic, social, cultural, and cognitive factors.

Generally, this study has given an insight to what the current prevalence, severity and factors associated with postoperative pain looks like in Dagmawi Menelik Referral Hospital, Addis Ababa, Ethiopia.

CHAPTER TWO

LITERATURE REVIEW

A study done in Germany (Peelen LM, Ph D, Kalkman CJ, 2017) demonstrated that despite present day improvements in pain treatment, many patients still suffer from moderate to severe postoperative pain (15).

A study done by Considine J, et al.,2014, showed that postoperative pain is not adequately managed in different parts of the world and its management is different from place to place (20). A survey conducted in the USA 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 (21).

A survey conducted on 175 ambulatory surgery patients in the USA to determine pain severity and analgesic use showed that depending on surgical procedure; 24% patients had pain scores greater than 7 and 24% were delayed in recovery (22).

The overall prevalence of postoperative pain after surgery at the Aga Khan University Hospital in 2013 by Mwaka.G, Nairobi was noted to be different from what has been reported in the literature (10).

One systemic review and meta-analysis done in 2015 by Wang Jiang Mei et al showed acute post-surgical pain is a risk factor for chronic post-surgical pain and concluded that more studies with high quality were still needed to confirm these findings (23).

A research done in Paris-France showed in 2007; higher intraoperative dose of opioids, general anesthesia, and preoperative treatment with analgesics were independent associated factors with severe postoperative pain (24).

An observational study conducted in 24 Italian hospitals by Tufanoin 2012 found out that among the hospitals 10% of patients experience moderate pain while 50% of the patients reported to have mild pain and5% of patients experience severe pain but 20% of the patients did not receive any pain medication even though they were complaining to have pain (25).

Another study which was conducted among Iranian nurses reveals that powerlessness, policies and rules of organization, physicians leading practice, time constraints, limited communication, and interruption of activities relating to pain were some of the factors influencing management of pain after surgery (26).

An observational study was conducted in Pakistan found out that post-operative pain was frequently managed by intravenous infusion of opioids in 94% of patients and other analgesics in 99% of patients. The study employed VAS to assess postoperative pain management and found out postoperative pain management was satisfactory in 91.6 % of patients (27).

A prospective cohort study conducted in Brazil found out that moderate to severe postoperative pain is associated with age, chronic pain and depressive mood. Younger individuals and patients with chronic pain and depressive symptoms were shown to have higher risk for developing moderate to severe post-operative pain (28).

A cross-sectional study conducted in Gondar university hospital showed that; age, sex, ASA physical status, incision length and type of anesthesia were risk factors for developing postoperative pain (19).

CHAPTER THREE

3. Objectives

3.1. General Objective

- To assess the prevalence and risk factors associated with postoperative pain at Dagmawi Menelik Referral Hospital surgical wards

3.2. Specific objectives

- To determine prevalence of post-operative pain
- To determine the Severity of post-operative pain.
- To identify associated risk factors of postoperative pain.

CHAPTER FOUR

4. Methods and Materials

4.1. Study Setting and Period

The study was conducted at Dagmawi Menelik Referral Hospital Addis Ababa, Ethiopia, from December 20, 2017 – March 20, 2018.

This is one of the oldest public hospital in the country located in north east Addis Ababa in Yeka Kefle ketema, which provides health services with a surgical bed capacity of 135 from the catchment population of about one million and six hundred thousand people. Surgery department is one of the major departments and it has three wards with separate female and male wards in each, two referral clinic, and one operation room which is contained three major operation tables and one intensive care unit. The department conducts general, urologic, gynecological, orthopedic, ENT,Cardio-thoraci and emergency surgeries.

4.2. Study Design

Institution based cross sectional study was used for this study.

4. 3.population

4. 3.1. Source population

- All Surgical inpatients that were undergone surgery at Dagmawi Menelik referral hospital.

4.3.2. Study population

- All adult surgical in patients who were admitted post-surgery for at least one day during the study period.

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion Criteria

- ✓ All voluntary surgical inpatients
- ✓ Age>18 year
- ✓ Able to communicate

4.4.2. Exclusion Criteria

- Patients who were not admitted in the ward during the data collection period after surgery
- Children who are below 18
- Age > 60 year
- Patient refusal
- Cognitive dysfunction or inability to communicate during the interview
- Postoperative admission in the intensive care unit were also excluded
- Patient who were discharged before 24 hours after surgery

4. 5. Study variables

4. 5.1. Independent variables

- Age
- Sex
- Marital status
- Educational status
- Intra-operative analgesia
- Presence of prior acute and chronic pain
- Anesthetic technique
- Duration of anesthesia
- Types of surgery
- Duration of surgery
- Incision length
- BMI

4.5.2. Dependent variable

- ➢ Postoperative pain

4.6. Sampling Method and Procedures

4.6.1. Sample size determination

The sample size was determined by single population proportion formula using previous study conducted in Gondar referral and teaching hospital we take P as 0.78 with margin of error (w) 5% and a confidence interval of 95% (Z=1.96) and power of 80 (Admassu et al, 2016).

Sample size (n) = $\frac{Z^2 p (1- P)}{W^2}$

Where:

n = required sample size

p = the expected prevalence of proportion

w = margin of error

Z= Z statistics for a level of confidentiality (95% CI)

$$n= (3.8416) (0.78) (0.22)/0.0025$$

$$n =264$$

142 patients were undergoing procedures within a month during situational analysis.Therefore, capital N were 426 during the study period (three month). Using finite population correction formula;

n =n/1+ (n-1)N or simply= (Nn/n+N)

n=163, Therefore, the number of study participant were163.

4.6.2. Sampling technique:

A Systematic random sampling method was used to recruit samples for the study in each day of the data collection process.

The actual sampling fraction (k) varied in the different days of data collection as the total numbers of study population were varied in different days of surgery. Hence, it was calculated through dividing the number of study population available each day by the maximum possible number of patients' that can be interviewed the same day. Then, every k^{th} patient was interviewed.

4.7. Methods of Data collection and Materials

Data were collected by using self-designed questionnaire and were prepared in English version and translated to the local language Amharic and finally translated back to English to make all the questions clear to the patients and insure consistency of messages.

The questionnaire had both open ended and closed ended questions to assess the severity and associated risk factors of POP. Patient's preoperative assessment, socio demographic characteristics, intraoperative status, medication and post-operative events was recorded from their Medical record.

Patients were asked whether they had pain 2 hour after they recover from anesthesia and at 12 hour and 24hour then. A standard 0- to 10-point numeric rating scale (0-nopain, 10-worst pain possible) was used to assess postoperative pain intensity at the time of interview (29)

Data were collected by two trained nurses from December 20, 2017 to March 07, 2018.

4.8. Data Quality Control

To ensure quality of data pre-test of data collection tools were done. The data were checked out for the completeness, accuracy, and clarity by the principal investigator.

During data collection process at Dagmawi Menelik Referral Hospital (DMRH); each questioner was filled by the data collectors with careful observation and recording of the patient chart. Complete questionnaires were submitted and reviewed daily to avoid loss of data by principal investigator.

Close supervision and daily information exchange included by telephone was used as a means to correct problems in the course of the data collection.

The data abstraction tool was pretested first by taking 5% of the total sample size at DMRH. The data collectors were received half day training on the purpose of the study, how to effectively collect data and how to approach patients for consent. In addition, the completeness of each collected data was assessed by the principal investigator.

4. 9. Data Analysis and Interpretation

The data was coded and entered in to Epi info version 7 and exported to SPSS version 20. Data was analyzed using SPSS version 20 window to run descriptive statistics, to test statistical association between the independent and the dependent variable for statistical analysis.

The results were statistically expressed as means ± standard deviation according to the distribution for continuous variables or as number and percentages for categorical variables when appropriate.

Binary logistic regression was used to compare factors for the development of post operative pain and only variables with P values of less than ≤ 0.2 in bivariate logistic regression analysis were considered as potential predictors for post-operative pain for multivariate backward logistic regression analysis.

Before multivariable logistic regression analysis was done, bivariate analysis was carried out using the Statistical Package for the Social Sciences(SPSS) for windows, binary logistic regression was used to determine the independent association between the outcome variable(POP) and potential predictors of pain.

To control potential confounding variables, and to predict the independent predictors of pain, multivariate logistic regression was employed.

P value<0.05 was considered statistically significant in multivariate logistic regression by taking power of 80%. Results were presented using graphs, narratives, and tables.

4.10. Ethical Consideration

Before starting of data collection process, ethical clearance and support letter for the study was obtained from AAU, College of Health Science Ethical Review Committee to conduct the research at Dagmawi Menelik Referral hospital. Support letter from Health science research coordinating office was written to Dagmawi Menelik Referral Hospital. Permission to conduct the study was also obtained from the medical director's office of Dagmawi Menelik Referral Hospital. Written informed or oral consent were obtained from the study participants after describing the benefits and risks of the study. Any information concerning the participants was kept confidential and the participants were analyzed only for the intended purposes.

4.11. Plan for Dissemination of Result

The final result of this research will be disseminated to Addis Ababa University (AAU) College of health sciences (CHS), Department of anesthesia and to the Hospital medical administration office to recommend action to reduce the prevalence and associated factors of POP in the hospital.

The result of the study will also be forwarded to Ethiopian Association of Anesthetists/EAA, to show the prevalence of POP in DMRH and to forward recommend actions to decrease the prevalence and severity of POP in the hospital. It may also be presented on different seminar. Great effort will be made to publish the finding on international repeatable journal as a base for further studies.

4.12. Operational Definition

Acute pain: pain that persists less than one month

Chronic pain: pain that persists for more than one month in any location

Inpatients: Patients who had a hospital stay ≥24hrs

Postoperative pain: pain after surgery

Nociceptive pain: a type of pain which arises due to or as a result of tissue damage.

Neuropathic pain: is a kind of pain that arises from abnormal neural activity secondary to disease or injury of the nervous system.

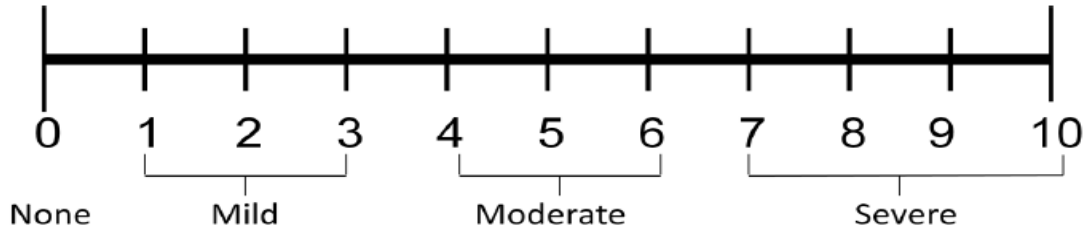
ASA: I- Normal healthy patient comes only for surgery

II- Patient with mild systemic disease and no functional limitation

III- Patient with severe systemic disease and definite functional limitation

IV- Patient with severe systemic disease and a constant limit to life

NRS: is a valid pain severity assessment tool that involves asking a patient to rate his or her pain from 0-10(11 point scale) with the understanding that 0 is equal to no pain and 10 equal to the worst possible pain.



CHAPTER FIVE

5. RESULT

5.1: Socio demographic characteristics of study participants

In all cases of 163 study participants interviewed, 152 were successfully responded that gives a response rate of 93%.

Socio-demographic characteristics of the respondents play a very significant role in the development of post-operative pain and to understand the severity of post-operative pain among respondents. It also answers who were involved in the study, what composition looks like in terms of socio- demography.

Majority 105 (69.1%) were at the age of 31-60 years and 47(30.9%) were at the age of 18-30 years. The mean age was 39 ± 13 years and the mean BMI was 23± 2.83.

Most of the respondents 82(53.9%) were males and the remaining 70 (46.1%) were Females. From the total of 152 respondents 107(70.4%) patients were married, 39(25.7%) were single, the remaining 6(3.9%) were divorced.

One can conclude that the majority of respondents were primary school 43(28.3%), 40(26.3%) were secondary school and 37(24.3%) were college and above. While the rest of the respondents were people who can't read and write, which accounts 31 (21.1%) See (Table 1).

BMI showed most (65.8%) of patients lie in (18.5-24.5) and >24.5which accounts 29.9% and the remaining below 18.5 accounts 4.6%.

ASA classification showed that the bulk of patients were found in ASAI and II (92.7%) while ASAIII took only (7.3%) of study participants

Table 1: Socio-Demographic Characteristics of Study Participants in DMRH December 20, 2017- March 20, 2018

Variables	N (%)	At 2 hour		At 12 hour		At 24 hour	
		No-mild	Moderate-severe	No-mild	Moderate-severe	No-mild	Moderate-severe
Age							
18-30	47	34	13	24	23	35	12
31-60	105	75	30	43	62	68	37
Sex							
Male	82	64	18	40	42	57	25
Female	70	45	25	27	43	46	24
Marital status							
Single	39	31	8	12	27	25	14
Divorced	6	4	2	3	3	3	3
Married	107	74	33	52	55	75	32
Educational level							
Can't read and write	29	17	12	9	20	18	11
Primary school	43	28	15	19	24	25	18
Secondary school	40	32	8	20	20	28	12
College and above	37	29	8	17	20	30	7
BMI (kg/m2)							
<18.5	7	5	2	3	4	4	3
18.5-24.5	100	78	22	45	55	72	28
>24.5	45	26	19	19	26	27	18
ASA							
I	116	90	26	55	61	86	30
II	25	12	13	6	19	10	15
III	4	7	4	6	5	7	4

5. 2: Types of Surgical procedures and Incisional length

From the total of 152 patients, 36(23.7%) patients underwent abdominal surgery 36 (23.7%), urologic surgery 35(23%), endocrine 24(15.8%), orthopedic surgery 19(12.5%) and cardio-thoracic and others were 4(2.6%) and 34(22.4%) respectively.

Incision length of less than 5cm and between (5-10cm) had equal number of patients 60 (39.5%) each. While greater than10 cm surgical site incision length were 32(21.1%).

Intra-abdominal (72.2%) and cardiothoracic (75%) procedures reported the most amounts of patients complaining moderate to severe pain. The least moderate to severe pain was among orthopedic (36.8%) surgery. See below

5. 3: Types of Anesthesia technique, Induction anesthetics and maintenances

General anesthesia 102(67.1%) with propofol 44 (28.9%) and thiopental 43(28.3%) induction drugs was the most anesthetic technique used during the study period and followed by spinal anesthesia50 (32.9%).

Inhalational maintenance with general anesthesia was the anesthesia of choice in 95 (62.2%) patients. Maintenance with Ketamine was 2 (1.3%) and others 4(2.6%).

Study participants were prescribed with different types of analgesic drugs including opioids, and NSAIDS during intra-operative period.

The most frequently used analgesic was tramadol with diclofenac combination 36 (37.7%) and followed by tramadol 30 (19.9%) alone, fentanyl 14 (9.2%), and combination of Diclofenac with fentanyl 11(7.2%).

The least intraoperative analgesic was diclofenac alone. Intraoperative analgesia was not used for 11 (7.2%) of study participants.

Table 2: Intra and post operative factors of the study Participants in DMRH December 20, 2017- March 20, 2018

Variables	N (%)	At 2 hour		At 12 hour		At 24 hour	
		No-mild	Moderate-severe	No-mild	Moderate-severe	No-mild	Moderate-severe
Types of surgery							
Orthopedic	19 (12.5)	19	0	12	7	13	6
Abdominal	36 (23.7)	17	19	10	26	24	12
Cardiothoracic	4 (2.6)	0	4	1	3	2	2
Urologic	35 (23)	27	8	18	17	22	13
Endocrine	24 (15.8),	15	9	12	12	17	7
Others	34 (22.4)	31	3	14	20	25	9
Incisional Length							
<5cm	60 (39.5)	51	9	32	28	43	17
5-10cm	60 (39.5)	38	12	21	39	39	21
>10cm	32 (21.1)	20	22	12	18	21	11
Type of anesthesia							
General	102 (67.1)	61	41	37	65	67	35
Spinal	50 (32.9)	45	2	30	20	36	14
Induction drugs							
Ketamine	12(7.9)	7	5	2	10	6	6
Propofol	44(28.9)	27	16	13	30	31	12
Thiopental	43(28.3)	24	19	20	23	27	16
Others	3(2.6)	3	1	2	2	3	1
Maintenance							
Inhalational	95 (62.5)	54	41	34	61	61	34
TIVA with Ketamine	2 (1.3)	2	0	1	1	1	1
TIVA with Propofol	1 (0.7)	1	0	0	1	1	0
Others	4 (2.6)	3	1	2	2	3	1

Continued (Table 2)

Variables	N (%)	At 2 hour		At 12 hour		At 24 hour	
		No-mild	Moderate-severe	No-mild	Moderate-severe	No-mild	Moderate-sever
Intra operative analgesics							
Tramadol	30 (19.7)	18	12	11	19	20	10
Diclofenac	3 (2)	2	1	2	1	3	0
Phentanyl	14 (9.2)	6	8	2	12	7	7
Tramadol+Diclofe Nac	36 (23.7)	23	13	14	22	23	13
Phentanyl+ Diclofenac	11 (7.2)	8	3	6	5	8	13
None	11 (7.2)	3	8	6	5	7	4
Surgery Time							
< 1 hour	80 (52.6)	59	21	37	43	55	25
1-2 hour	65 (42.8)	47	18	28	37	43	22
>3 hour	7 (4.6)	3	4	2	5	5	2
Anesthesia time							
< 1 hour	56 (36.5)	39	17	27	29	41	15
1-2 hour	88 (57.9)	66	22	37	51	56	32
> 3 hour	8 (5.3)	4	4	3	5	6	2
Nerve block before emergence							
Yes	1 (0.7)	1	0	1	0	1	0
No	151 (99.3)	108	43	66	85	102	49
History of chronic pain							
Yes	12 (7.9)	6	6	6	6	6	6
No	139 (91.4)	102	37	60	79	96	43

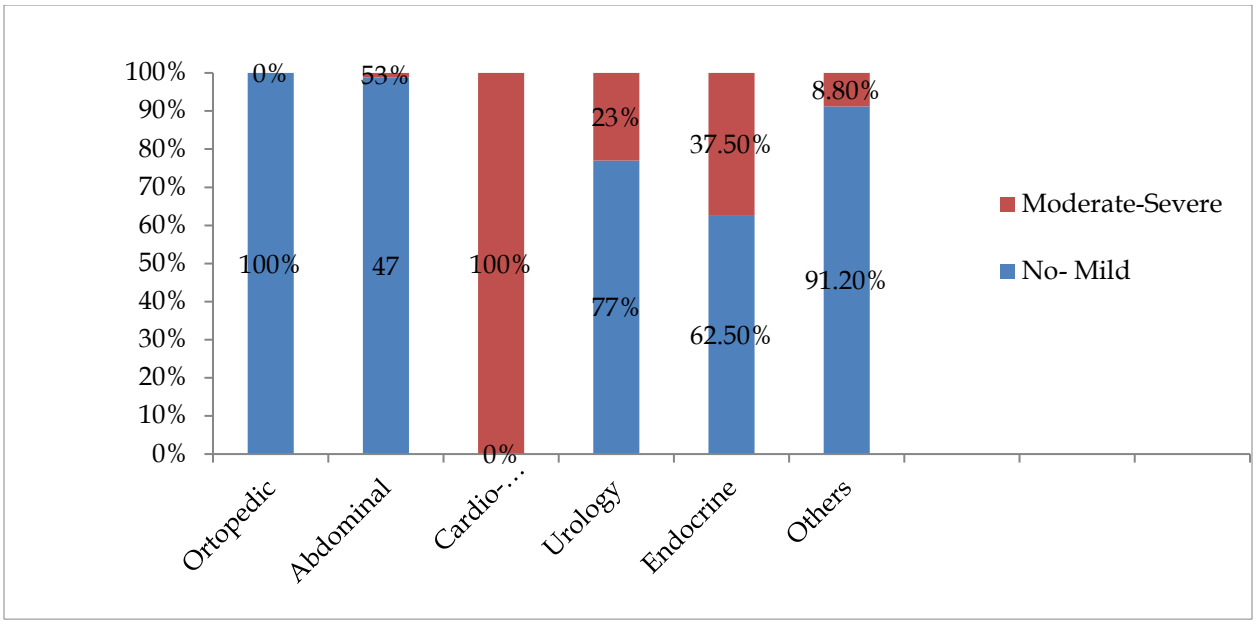


Figure 1**:** Severity of pain at 2 hour in relation to the type of procedure performed of the study participants in DMRH December 20, 2017- March 20, 2018

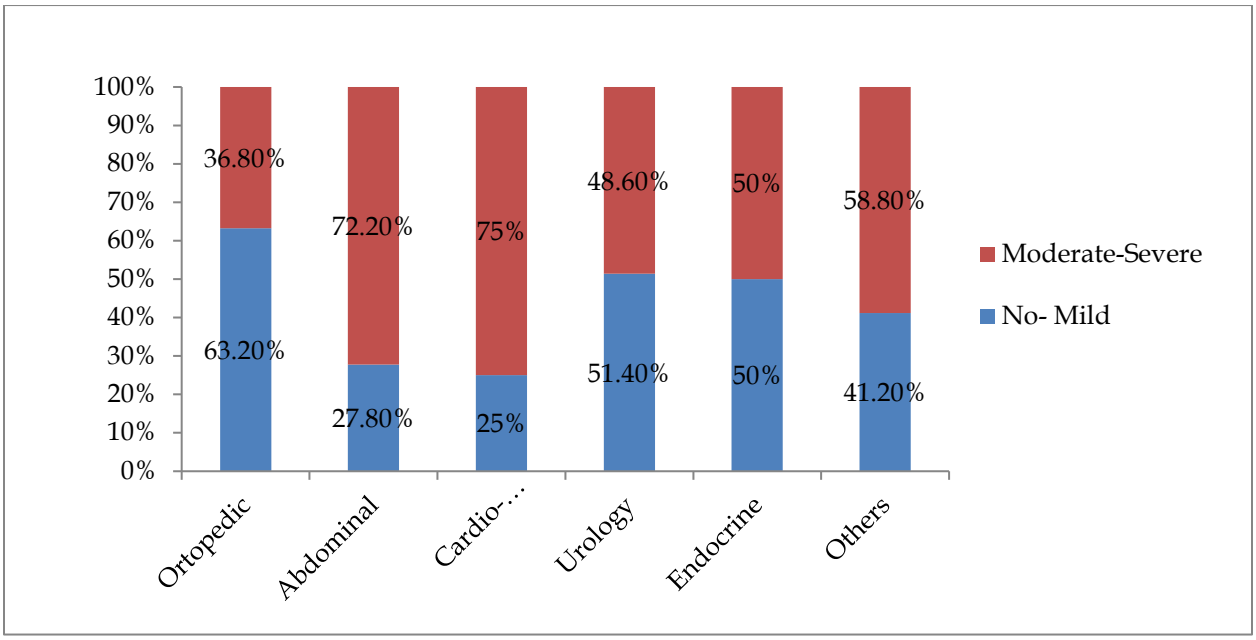


Figure 2 : Severity of pain at 12 hour in relation at to the type of procedure performed of the study participants in DMRH December 20, 2017- March 20, 2018

5. 4: Prevalence and severity of post operative pain

Of the 152 study participants who completed the study, all were reported pain in the operated area.

In this study the prevalence of moderate to severe pain was 43 (28.3%) at 2 hour, 85 (56%) 12 hour and 49 (32.2%) 24 hour). Mild pain was reported to be 51 (33.6%) at 2 hour, 47 (30.9%) at 12 hour and 78 (51.3%) at 24 hour.

Study participants who reported no pain were 58(38.2%) at 2 hour, 20 (13.2%) 12 hour and 25 (16.4%) 24 hour (Table 2).

The 12 hour pain score report showed different result from that of the 2 hour in that only (30.9%)of patients reported mild pain and the majority (55.9%), of patients reported moderate to severe pain. See figure 3

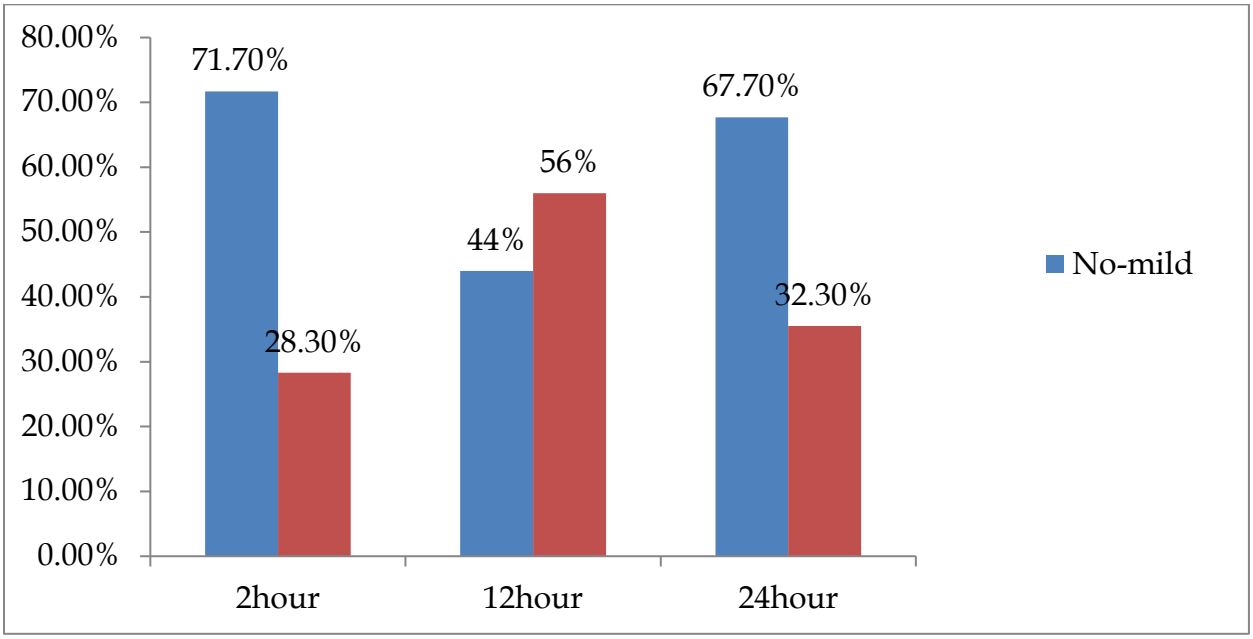


Figure 3: postoperative pain distribution in the ward of DMRH December 2017, 20-March 20, 2018

5. 5: Factors Associated with postoperative pain after analysis

Among the 13 potential risk factors investigated in the bivariate analysis, four were associated with post-operative pain with a statistical significance (P<0.2): BMI, incision length (5-10 cm), type of surgery, and anesthesia (Table 3, 4) at 2 hour and 12 hour.

There was no association at 24 hour (Table 5) between risk factors and post-operative pain. They all were included in the multivariate analysis to be adjusted within the first 24 hour post-surgery at three time intervals

The multivariable logistic regression analysis was performed using all variables that had significant clinical interest in bivaraite regression analysis The results revealed that type of anesthesia and incision length were signicantly associated with postoperative pain (OR: 0.03, 95% CI: 0.004- 0.180, p<0.001), (OR: 2.6, 95% CI: 1.029-6.355, p<0.043) respectively

Therefore in the multivariate model, only surgical incision length (P=0.043) and type of anesthesia technique (P<0.001) were independently associated with post-operative pain at 2 hour and 12 hour. See below (Table 3 and 4)

The severity of pain showed no significant differences regarding gender and age at 2 hour, 12 hour and 24 hour within the first 24 hour

Table 3: Bivariate and multivariate analysis of factors associated with postoperative pain, the odds ratio values and the statistical significance according to the logistic regression model at 2 hour in DMRH, December 20, 2017- March 20, 20, 18

Variables	No-mild	Moderate-severe	COR,95%CI	p-value	AOR,95% CI	p-value
Sex						
Male	64	18	**1.00**			
Female	45	25	1.98(0.96,4.04)	0.062	1.1 (0.425,2.974)	0.813
Educational level						
Can't read and write	17	12				
Primary school	28	15	2.56 (0.87,7.5)	0.087		
Secondary school	32	8	1.94 (0.71,5.29	0.195	0.7 (0.435,1.066)	0.093
College and above	29	8	0.9 (0.3,2.72)	0.861		
BMI (kg/m2)						
<18.5	2	5	**1.00**			
18.5-24.5	78	22	0.55 (0.09,3.13	0.498	(0.715,1.298)	0.806
>24.	26	19	0.39 (0.18,0.82)	0.014		
Incision length						
<5cm	51	9	**1.00**			
5-10 cm	38	22	0.29 (0.11,0.8)	0.017	2.6 (1.029,6.355)	0.043
>10 cm	20	12	0.77 (0.39,2.34)	0.937		
Type of surgery						
Orthopedic	19	0	**1.00**			
Abdominal	17	19	0	0.937		
Cardiothoracic	0	4	11.5 5(3,44.71)	0.000	0.77(0.577,1.027	0.075
Urologic	27	8	0	0.999		
Endocrine	15	9	3.06 (0.74,12.7)	0.123		
Others	31	3	6.2 (1.46,26.3)	0.013		
Type of anesthesia						
General	61	41	**1.00**			
Spinal	48	2	0.06 (0.01,0.27)	0.000	0.03 (0.004,0.180	<0.001
Surgery time						
<1hour	59	21	**1.00**			
1-3hour	43	18	0.27 (0.05,1.29)	0.101	1.4 (0.366,5.371)	0.621
>3hour	3	4	0.28 (0.06,1.41	0.125		
Intra operative analgesia						
Diclofenac	2	1	1.00			
Tramadol	18	12	0.31 (0.06,1.8)	0.142		
Tramadol + Diclofenac	23	13	1.33 (0.09,20.71)	0837	(0.706,1.413)	0.997
Phentanyl	6	8	1.78 (0.39,8.09)	0.457		
Phentanyl +Diclofenac	8	3	1.51 (.34,6.69)	0.590		
None	52	6	3.56 (0.65,19.41)	0.143		
History of chronic pain						
No	102	37	1.00			
Yes	6	6	2.76 (0.84,9.08)	0.096	3 (0.57,15.42)	0.196

Table 4: Bivariate and multivariate analysis of factors associated with postoperative pain, the odds ratio values and the statistical significance according to the logistic regression model at 12 hour in DMRH, December 20, 2017- March 20, 20, 18

Variables	No-mild	Moderate-severe	COR,95%CI	p-value	AOR,95% CI	p-value
Sex						
Male	40	42	**1.00**			
Female	27	43	1.98 (0.96,4.04)	0.062	1.1 (0.425,2.974)	0.813
Educational level						
Can't read and write	9	20				
Primary school	19	24	2.56 (0.87,7.5)	0.087		
Secondary school	20	20	1.94 (0.71,5.29	0.195	0.7 (0.435,1.066)	0.093
College and above	17	20	0.9 (0.3,2.72)	0.861		
BMI (kg/m2)						
<18.5	3	4	**1.00**			
18.5-24.5	45	55	0.55 (0.09,3.13	0.498	(0.715,1.298)	0.806
>24.	19	26	0.39 (0.18,0.82)	0.014		
Incision length						
<5cm	32	28	**1.00**			
5-10 cm	21	39	0.29 (0.11,0.8)	0.017	2.6 (1.029,6.355)	0.043
>10 cm	12	18	0.77 (0.39,2.34)	0.937		
Type of surgery						
Orthopedic	12	7	**1.00**			
Abdominal	10	26	0	0.937		
Cardiothoracic	1	3	11.5 5(3,44.71)	0.000	0.77(0.577,1.027	0.075
Urologic	18	17	0	0.999		
Endocrine	12	12	3.06 (0.74,12.7)	0.123		
Others	14	20	6.2 (1.46,26.3)	0.013		
Type of anesthesia						
General	37	65	**1.00**			
Spinal	30	20	0.06 (0.01,0.27)	0.000	0.03 (0.004,0.180	<0.001
Surgery time						
<1hour	37	43	**1.00**			
1-3hour	28	37	0.27 (0.05,1.29)	0.101	1.4 (0.366,5.371)	0.621
>3hour	2	5	0.28 (0.06,1.41	0.125		
Intra operative analgesia						
Diclofenac	11	19	1.00			
Tramadol	2	1	0.31 (0.06,1.8)	0.142		
Tramadol + Diclofenac	2	12	1.33 (0.09,20.71)	0837	(0.706,1.413)	0.997
Phentanyl	14	22	1.78 (0.39,8.09)	0.457		
Phentanyl +Diclofenac	6	5	1.51 (.34,6.69)	0.590		
None	6	5	3.56 (0.65,19.41)	0.143		
History of chronic pain						
No	6	6	1.00			
Yes	60	79	2.76 (0.84,9.08)	0.096	3 (0.57,15.42)	0.196

CHAPTER SIX

6.1 DISCUSSION

The goal of this study was to identify the severity and possible risk factors for post-operative pain and to establish a relationship between the demographic, preoperative and intraoperative factors as predictors of post-operative pain severity.

The results of multivariable logistic regression analyses indicated that the following two factors predicted significant pain at 2 hour and 12 hour: Type of anesthesia technique and incision length.

The finding of this research is that the prevalence of moderate to severe pain was reported in 28% of cases 2 h after the end of surgery, 56% at 12 hour and 31.3% at 24 hour. Despite the introduction of new standards, guidelines, and educational efforts, information from around the world indicates that postoperative pain continues to be under managed.Researchers agree that post-operative pain is still uncontrolled and plays a major role for surgery outcome.
A study done by Article O in 2016, had found out that 84% prevalence of moderate to severe pain in post-operative period (30).

A survey conducted on the status of acute pain management in some Asian countries and in Nigeria, 2011, showed, moderate to severe pain was reported by 68.7% of 149 study patients at 24 hours and 51.7% at 48 hours (31). Our finding showed a lower number of patients than the number reported but higher than in Tanzania, moderate 33 (26.6%), severe 17 (13.7%) (32).

A meta-analysis which conducted by Access O. in 2015 showed that overall current practice standards have had minimal impact on decreasing patients' account of pain and the incidence of moderate to severe pain has been reported as high as 38.82% (23).

A 5 year survey on a random sample of 250 adults who had undergone surgical procedures in the United Statess in 2016 howed that approximately 82% of patients experienced acute pain after surgery. Of these patients, 21% of patients experienced severe pain, and 18% of patients experienced extreme pain.Experiencing postoperative pain was the most common concernin 59% of patients. But the percentage of patients with overall pain decreased slightly in our study 55.9% (33).

A study done in Netherlands by Neugebauer E, et al showed the prevalence of postoperative pain in 1490 surgical in patients who were received postoperative pain treatment according to an acute pain protocol found out that 41% of the patients on day 0 and 30% on day 1 experienced moderate to severe pain. the fact that they were in acute pain treatment and still experiencing pain shows that we need to do a lot more to avoid post-operative pain (2).
Our study showed that patients who had general anesthesia had a higher incidence of developing post-operative pain. Of the 102 (67.1%) of patients who had general anesthesia, in the second hour and 12 hour postoperatively, 41 (40%) of the patients compared with 2 (4%) of spinal anesthesia patients with (OR=0.3) reported that they are experiencing moderate to severe pain.

A Study conducted in in Gondar, north east Ethiopia and Italy support our result with an odds ratio of 5.5 and 3.96 respectively in that general anesthesia is a significant risk factor for developing post operative pain (19). This might be that spinal anesthesia has better post-operative analgesia than GA as it lasts for several hours postoperatively.

Surgical incision was another major determinant of post-operativepain severity in the first 12 hours after surgery with a p value (0.043). In the 12 hour of post-operative period 12 (27.9%) of patients with surgical incision length longer than 10 cm reported that they experienced moderate to severe pain when compared to 31 (72.1%) of patients with incision less than 10 cm.

In accordance with our research finding a incision length was found to be a predictive factor. In line with this study was a study done in Gondar University hospital that showed incision length was significantly associated with severity of pain (19). But one research shows that, incision length might not have any impact on post-operative pain outcome (34). This might be due to set up difference, experience of the surgeon and invasiveness the surgery

This study showed difference between genders was not significant (p = 0.813) which is line with the study done by COUCEIRO, VALENÇA, LIMA ET AL, with P-value of 0.681 (11). This contradicts the with study conducted by Admassu et al., P= 0.005 (19).
Although the prevalence of moderate to severe pain was higher among patients among 31-60 years (28.6%) than among patients 18-30 (%), this difference was not significant (P= 0.942) in this study.

6. 2. Limitation of the study

- ✓ The study was not multicenter and done only in one hospital.
- ✓ Patients included in the study were not all adult surgical patients admitted for surgery

Strength of the study

- ✓ Homogeneous study participants were included
- ✓ Numerical rating scale was used to assess pain

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATION

7.1. Conclusion

- ✓ The prevalence of postoperative pain was found to be 28% postoperatively at 2 hour after the end of surgery, 55.9% at 12 hour and 31.3% at 24 hour following surgery
- ✓ This study reports that pain was a common and clinically relevant experience often unrecognized in patients admitted to Dagmawi Menelik hospital.
- ✓ Factors related to pain prevalence were anesthesia technique and surgical incision length.

7. 2. Recommendation

- ✓ The study had established the situation of pain in the hospital and had defined a health problem that should be corrected by educational actions.
- ✓ Activities against pain in hospital should be considered as a medical care priority by health authorities to confront and to settle the problems described herein.
- ✓ Postoperative analgesia still needs to be improved to control pain.
- ✓ Wide variability in pain severity highlights the role of patients to report and ward staff to identify factors associated with POP and to manage it timely.
- ✓ Ward staff should be educated to be more aware of the severity of postoperative pain and administer analgesia more regularly.
- ✓ The monitoring of pain severity should be done as part of the routine observations and be documented by using standardized pain scales.
- ✓ Patients should be encouraged to report their pain early and not only when it becomes more severe.
- ✓ The role of anesthesia professionals outside the operating theatre should be emphasized.
- ✓ An acute pain service should established to facilitate patient and staff education on pain management

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Annex 1: Dummy Table

Socio demographic characteristics of patients who was undergone surgery in Dagmawi Menelik Referral hospital from December 20, 2017 – March 20, 2018

Socio-demographic characteristics		n (%)
Sex	Male Female	
Age		
Marital Status	Single Married Divorced Widowed	
Educational level	Who can't read and write Primary School Secondary School College and above	

Pre-operative and intra operative patient information

1.Patient information	**2. Clinical information**	**3. Intra operative analgesia used**_____ a)Induction drug---------- b) Maintenance----------
c. Card No_____	Type of Surgery: Orthopedic ☐ GI surgery ☐ Cardio-thoracic ☐ Urologic ☐ Gynecologic ☐ Endocrine ☐ **Other**	**5. Incisional length in cm_____**
d. Ward_____	c)Duration of surgery _____	
Bed number_____	d)Anesthetic technique_____	
ASA classification: a) I b) II c) III d) IV		

4. Did you have any prior chronic Pain?

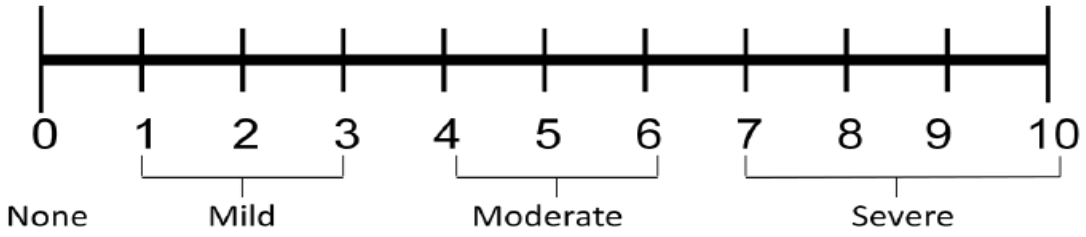
Yes ☐ No ☐

6. Now, do you feel pain? Is it on the surgical site?

a)Yes

b)other place _____

7 .If yes in question no. 6, specify severity of pain by numerical rating scale(NRS) 0 1 2 3 4 5 6 7 8 9 10	at 2 hour	at 12 hour	at 24 hour



Annex 2: Questioner

Addis Ababa University College Of Health Science Department Of Anesthesia Questioner Used To Assess The Prevalence And Associated Risk Factors Of Post-Operative Pain Among Adult Patients Undergoing Surgery In Dagmawi Menelik Referral Hospital From December -February 20, 2018

1. Patient information

a. Age (years) _____

b. Card No_____

c. Ward_____, Bed number _____

d. Weight (kg) _____

e. BMI _____ (kg/m2): (< 18.5 kg/m2, 18.5 -24.5 kg/m2, >24.5 kg/m2)

f. Sex: Female ☐ Male ☐

2. Clinical information

Diagnosis _____

Procedure _____

Duration of surgery

Anesthetic technique

Duration of anesthesia

ASA classification

Type of Surgery: Orthopedic ☐

GI surgery ☐

Cardio-thoracic ☐

Urologic ☐

Gynecologic ☐

Neurologic ☐

Endocrine ☐

Other

3. Intra operative analgesia

Yes ☐ No ☐

If yes specify the name of the administered drug

Part II: Patient interview guides

Self-designed questioner

1. Marital status: Married ☐ single ☐ Divorced ☐ widowed ☐

2. Educational level:

Can't read and write ☐ Primary school ☐ Secondary school ☐

College and above ☐

4. Did you have any prior chronic Pain?

Yes ☐ No ☐

5. Are you felling any pain now?

Yes ☐ No ☐

6. If the answer to question no 5 is yes the severity of pain

I. Mild pain (1-3) ___ II. Moderate pain (4-7) _____ III. Sever pain (>7) _____

7. Where do you feel the pain? Is it on the surgical site?

Yes ☐ other place _____

Numeric Rating Scale

Assessment of POP by numeric rating scale as indicated by the patient (Pain assessment tools)

Annex 3: Verbal consent form before conducting interview

Greeting

Hello, my name is _____ and I'm a data collector for the study entitled "assessment of the prevalence and associated risk factors associated with post-operative pain. It is a study aimed to assess the level of pain you are experiencing after having surgery in this hospital. I will ask you few questions that will only take 3-5 minutes of your time regarding this matter.

Being a part of this study will not affect in any way the service you are getting in this hospital. You are selected randomly to participate in the study just because you undergo 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?

PRINCIPAL INVESTIGATOR

The under signed agrees to accept responsibility for the scientific ethical and technical

Conduct of the research project and for provision of required progress reports as

Per terms and conditions of the Research Publications Office in effect at the time of

Grant is forwarded as the result of this application.

Name of data collector ---------- signature ---------Date----------Name of supervisor ---------- signature---------- date----------