ASSESSMENT OF POST-OPERATIVE PAIN MANAGEMENT AMONG PATIENT'S UNDERGOING LOWER LIMB SURGERY AT MUHIMBILI ORTHOPEDIC INSTITUTE DAR ES SALAAM TANZANIA

Eva Y. Shang'a, MD

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Department of Anesthesiology

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By

Eva. Y. Shang'a, MD

Dissertation submitted in (partial) fulfillment of the Requirement for the Degree of Master of Medicine (Anesthesiology) of Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences
October, 2017

CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled, ***"Assessment of post-operative pain management among the patient undergoing lower limb surgery"***, in (partial) fulfillment of the requirement for the degree of Master of Medicine (Anaesthesilogy) of the Muhimbili University of Health and Allied Sciences.

…….

Prof. V. Mwafongo

(Supervisor)

……

Date

DECLARATION AND COPYRIGHT

I, **Dr. Eva Yeriko Shang'a**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature……Date……

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DEDICATION

This dissertation is dedicated to my beloved husband Mr. Frank. Mushi and our two little angels Henry and Hellen.

To my parents Mr. and Mrs. Y Shang'a

To Professor Victor Mwafongo, my supervisor

ABSTRACT

Background:

Lower limb surgery is a common operative procedure in both general surgery and orthopedic practice. Postoperative pain (POP) after orthopedic surgery is more difficult to manage and is often associated with the highest POP scores. In sub-Saharan Africa (SSA), motor traffic accidents (MTA) are the most common cause of trauma and therefore lower limb surgery is very common. Patients undergoing lower limb surgery often suffer from inadequate pain management despite of the increasing advancement in POP management and development of pain control modalities. Studies from both developed and developing countries have revealed high prevalence of POP and poor patient satisfaction. Assessment of POP management and patient satisfaction is important in order to improve medical service. In Tanzania there is limited information regarding lower limb POP management and patient satisfaction hence this study aim to provide evidence for improving POP management in the clinical settings.

Objectives: The objective was to assess the postoperative pain management

Materials and Methodology: This was a clinical based descriptive cross-sectional study. One hundred and forty eight (148) patients aged 18 years and above who underwent lower limb surgeries at Muhimbili Orthopedic Institute, from24th July 2016 to 24th December 2016 were recruited.Pilot tested structured questionnaire was used to collect social demographic, post- operative medication and clinical data. Data were analyzed using the SPSS V.20. Chi-square was used to detect differences in the frequencies of categorical characteristics and statistical significance was set at $P \leq 0.05$.

Results:

Sixty nine (69%) of the participants were male with mean age of 36.99±15.7 years. Immediately after surgery, majority of the patients were reported to have mild pain (76.4%), few moderate pain (23.6%), and none reported severe pain (0%). At 24 hours' post-operative, higher proportion of patients were having moderate pain (52.7%) followed by those who were experiencing severe (43.9%) and 7.4% mild pain. At 48 hours post-operative, majority of participants had mild pain (54.7%), (39.9%) moderate

pain and again small percentages were having severe pain (1.4%).Upon 48 hours, most of the patients were not satisfied (69%)while only minor proportion were satisfied with POPM. High proportions of patients who were satisfied with postoperative pain management received a combination of analgesia with different frequency of drug administration, different route compared to those who received single analgesic intramuscular 8hourly and 12hourly. Following the first 24hours, large proportions of the participants were given Diclofenac alone compared to those who received Tramadol alone or combination of Diclofenac and Paracetamol. Intramuscular route was a leading route of drug administration compare to intravenous and combination with different route, most of the drugs were given 8hourly compare to those which were given 12hourly or in combination with different frequency.

Conclusions: Pain severity was moderate to severe at 12hours to 24hours post-operative. Pain management was not satisfactory post operatively to most patients. It was observed multimodal analgesia favored good post-operative pain management.

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LIST OF ABBREVIATIONS & ACRONYMS

CNS	Central Nervous System
COX-2	Cyclooxygenase-2
GABA	Gamma-Amino Butyric Acid
GCP	Good Clinical Practice
IASP	International Association for Study in Pain
IRB	Institutional Review Board
KCMC	Kilimanjaro Christian Medical College
KOSS	Knee and Osteoarthritis Surveillance Scale
KSS	Knee Surveillance Scale
MD	Medical Doctor
MMED	Master of Medicine
MNH	Muhimbili National Hospital
MOI	Muhimbili Orthopedic Institute
MTA	Motor Traffic Accident
MUHAS	Muhimbili University of Health and Allied Sciences
NSAID	Non-Steroidal Anti-Inflammatory Drugs
POP	Post-Operative Pain
POPM	Post-Operative Pain Management
RTA	Road Traffic Accident
SPSS	Statistical Package for Social Science
SSA	Sub-Sahara Africa
TZS	Tanzanian Shillings

`

DEFINITION OF KEY TERMS

Pain is an unpleasant sensation that can range from mild, localized discomfort to agony**.**

OR

Pain is 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage'(I ASP Subcommittee on Taxonomy 1979).

Post-operative pain is defined as a condition of tissue injury together with muscle spasm after surgery.

CHAPTER ONE

1.0 INTRODUCTION AND BACKGROUND INFORMATION

Surgical intervention is routinely performed for primary or secondary remedies for diseases. In United States of America, about 73 million patients undergo surgical procedures each year of which, 80% experience acute POP, and approximately 20% experience severe POP[1]. Lower limb surgery is a common operative procedure both in general surgery and orthopedic practice.

In sub-Saharan Africa (SSA), trauma resulting from motor traffic accidents (MTA) is the most common cause of lower limb surgery. The observed increase in MTA in SSA is largely attributable to the current demographic transition characterized by increased population growth and increased urbanization with consequent congestion and increased informal settlements in major cities. These cities are often without appropriate infrastructure which exposes people to increased risk of accidents. Noteworthy, road traffic accidents are increasingly recognized as the major cause of lower limb fractures.

Patients undergoing lower limb surgery often suffer from inadequate pain management. In standard practice, intra-operative pain is not anticipated due to the best analgesia prescription and monitoring, but most pain is often experienced post-operatively[2,3]. Despite provision of adequate post-operative analgesia some patients still report ineffective pain management which exposes them to personal sufferings and complications leading to poor outcome. Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage[4]. Pain bears three components which include physical sensation, psychological sensory and emotional experience[5]. This multidimensional facets highlight the subjective and experiential nature of pain in which the patient becomes central to its apprehensions[6].The pathogenesis of pain is a complex phenomenon in terms of perception, mediation and interpretation. POP is an acute pain which occurs in response to tissue damage caused by the surgical act as an expression of autonomic responses towards an unpleasant and unwanted sensory and emotional experience which

involves modulation of different levels of intervention namely, peripheral receptor, sensory spinal tracts and supra-spinal centers[7]. This hierarchical organization forms the basis for formulation of effective protocol for management of POP which typically entails combinational analgesics with multiple intervention levels simultaneously or combination of analgesics with different target points[7].

Lack of prompt treatment of acute POP exposes patients to chronic POP which results from neuronal injury within the peripheral or central nervous systems (CNS). The injury promotes spontaneous and ectopic neuronal excitation and discharge which become persistent or episodic pain without apparent triggers[8].POP is one of the commonly reported postoperative symptoms. A decade-old study conducted at Muhimbili National Hospital (MNH) revealed the prevalence of 60% of severe POP in general surgical patients[2]. Despite the increasing advancement in POP management and development of pain control modalities, more than half of the patients who undergo surgery experience inappropriate level of postoperative pain management[9]. Generally, POP after orthopedic surgery is more difficult to manage and is often associated with the highest POP scores. Extensive tissue damage in major operations, cause immediate changes in the autonomic and somatic nervous system which stimulate release of stress hormones resulting in increased catabolism and compromised immunity, increased oxygen demand, and higher strain on the cardiovascular system[10].

Effective POP management serves to suppress the human suffering from pain and ensures successful postoperative outcome. This can be achieved through the use of standard protocol as guides for tailored care of the individual patient for holistic approach[1]. The most current concept of POP management is the use of preemptive and multimodal approach entails initiation of pain management prior to a surgical incision preferably using a combination of drugs or modalities with different mechanisms or sites for synergistic effects[11,12]. This approach is known to be remarkably effective in reducing consumption of individual drugs particularly opioids which are usually associated with dependence. Preemptive pain management therapy typically involves administration of pharmacological agents such as opioids, non-steroidal anti-inflammatory drugs (NSAIDs), cyclooxygenase (COX)-2 inhibitors and γ – amino butyric acid (GABA) agonists at least one hour prior to surgery or use of

synergistic modalities e.g. regional anesthesia and peripheral nerve block. The correct balance of combination therapy in POP therapy can reduce side effects and complication rates, decrease mobility and enhance patient satisfaction[13]. In parallel both patients education and counseling together with emotional support compliments the role of analgesics in POP management[12,14].

1.1. LITERATURE REVIEW

1.1.1. Prevalence

Hospital are faced with a burden of lot of patient's post –operative pain. A study done by Herbert and his colleagues at Kilimanjaro Christian Medical College (KCMC) revealed that 85.5% of patients suffered POP within 24 hours following surgery[15].Also a study done at MNH reported that prevalence of patients perceived moderate to severe pain was 60% while mild to moderate pain was 39.2 %[2].Another study done at Agha-khan hospital at Nairobi observed that prevalence of post –operative pain is still high as it was 50% ,55.3% and 34.7% within 30 minutes, 24hrs and 48 hours post-surgery respectively[16]. A study done at Ibadan Nigeria by Faponle *et al*[17]reported that patients still experience high incidence of moderate to unbearable pain in the postoperative period.

Adruaan*et al.,* in their study done in South Africa on POP according to anatomical site showed that Lower limb surgery carried high prevalence 71% [18]. In the conclusion Tong .J. Gan study done at Duke University, stated that despite the intensified awareness concerning pain and the clinical advancement in pain controlling, still there has been little improvement in postoperative analgesia and many patient continuous to experience significant pain following surgery. Lower extremities injuries pain is so significant even after a pronounced period. Prevalence of pain after 7 years post- operative to patients with lower limb extremities injuries was observed to be 73 % by Fredrick .P and colleagues in USA[20].

1.1.2. Patient Satisfaction

Patient satisfaction to post- operative pain is influenced by appropriate post-operative pain management thus under treatment to pain lead of both psychological and social disturbances to patients. Adequate assessment of pain and reassessment of pain will ensure proper type and dosage of analgesia administration to patients so as to relieve pain and hence satisfy them[2,3]. Hebert and colleagues reported that despite of high post- operative pain prevalence, percentage of patient's satisfaction to postoperative pain management (PMPM) is high[15]. Lovatsiset al in their study on Assessment of Patient Satisfaction With Postoperative Pain

Management After Ambulatory Gynecologic Laparoscopy at Toronto reported a suboptimal patient satisfaction of 60% with postoperative pain control to patient underwent gynecologic laparoscopy as day surgery[22]While Pakula et al evaluated patients undergoing knee surgery using KOSS and KSS scales in which he reported the adequate management of POP to improve mobility and overall outcome[23].Also, O'toole et al, patient satisfaction was 66% with their study on determinant of patient satisfaction after severe lower extremities injuries in which satisfaction were measured in five aspect and Pain control were one among the factor which can contribute to other factors like returning to physical function (to work) absent of depression. When postoperative pain is well controlled even its complication will be prevented as there will be early recover of physical functioning and return to work and also no development of depression will be observed[24]. Another study done at United Kingdom(UK) by Hamilton on what determine patient satisfaction with surgery shows patient satisfaction was 97% in which the study elaborated that overall satisfaction following lower limb joint arthroplasty is determined by three factors "meeting preoperative expectation, achieving satisfactory pain relief and satisfactory on hospital experience." Pain relieve being as one of the component here need to be managed well[25].

1.1.3. Prescription Pattern

Typically, prevention and treatment of POP is initiated during transition from intraoperative phase to postoperative stage. For instance, transition from epidural anesthesia to oral analgesia has been described to be an effective means of achieving POP control[9]. GABA agonists such as gabapentin and pregabalin inhibit Ca2+ currents via high-voltage-activated channels containing the alpha-2-delta-1 subunit, reducing neurotransmitter release and attenuating the postsynaptic excitability. These drugs have been shown to offer effective remedy in the management of POP and reduction in opioid consumption[26].In management of postoperative pain analgesia intravenous administration has showing significant efficacy in alleviating pain compared to other routes of administration. Herbert and colleagues also stated out that combination analgesia is effective in postoperative pain management compared to single analgesia(21)[15].On other hand Helena et al[27] reported that regardless of combined

administration of analgesia such as opioids and simple analgesia or NSAID and simple analgesia and opioid or simple analgesia and NSAID or NSAID and opioid to patient who underwent orthopedic surgery mostly lower limb surgery. Majority of patient reported pain in all periods during assessment which necessitate focus of attention for the entire multi-professional team especially on individualizing pain management.

Faponle et al in that study postoperative analgesia were to be given only intramuscular route which make them to be limited to only three drugs, and pethidine were prescribed 4hrly, 6hrly and 8hrly which lead to inadequate doses of analgesia to some patients[17]. Also, the study stated that prescription patterns for POP relief has not changed to include many of the new methods which are current available.

Inappropriate prescription pattern of analgesia contributes to failure in management of postoperative pain. Prescribing Pethidine at a frequency of eight hours intervals and not the recommended frequency of four to six hours intervals by the surgeons render it infective in pain alleviation as the drug plasma half-life is three hours[2].

1.2. CONCEPTUAL FRAMEWORK

Lower limb surgeries are among procedures which carry high percentage of postoperative pain and need a good planed analgesic pattern to prevent postoperative pain and hence attain patient satisfaction. It is therefore conceptualized that optimal or suboptimal patient satisfaction to POPM after underwent lower limb surgery rely on analgesic prescription pattern. (See figure 1)

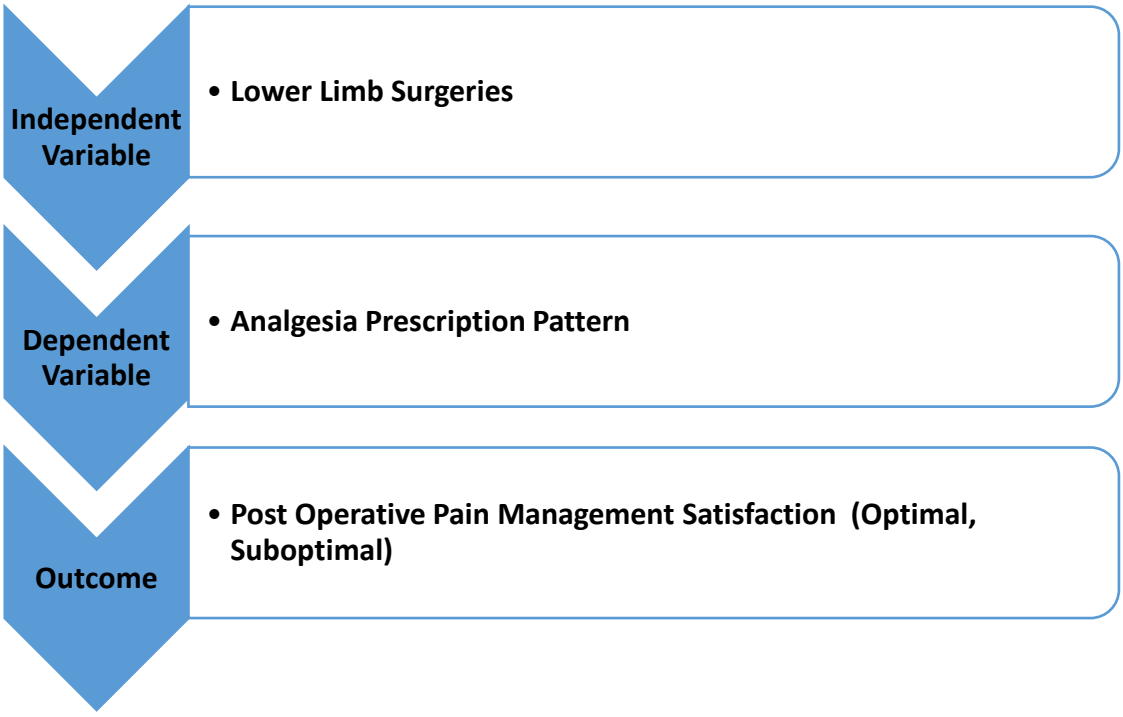


Figure 1: Conceptual framework for assessment of postoperative pain management.

1.3. PROBLEM STATEMENT

Effective post –operative pain management depends on the type of surgery and appropriate choice of analgesia, recommended dose, route and duration of administration as it is stated in the procedure specific pain guidelines[12].Lower limb trauma being one among the procedures with the maximum pain scores, needs proper pain management, as severe pain is accompanied with decreased patient satisfaction, delayed postoperative ambulation, development of chronic postoperative pain, pronounced incidence of pulmonary and cardiac complications, and raised morbidity and mortality[28].Appropriate and effective post-operative pain management is necessary to facilitates early mobilization, functional recovery, and minimum patient discomfort. It also prevents acute pain from developing to chronic pain.

In many parts of the world it is noted that even though there is a variety of clinical practice guidelines, good analgesics and different new technologies for drug administration, the postoperative pain management still is unsatisfactory[2,3,29]). Very little research on patient satisfaction in the domain of orthopedic trauma has been done despite the developing understanding of the high intensity of pain in this type of surgery and the importance of patient satisfaction[24].

In Tanzania, there are limited literatures on post-operative pain management, advanced techniques, newer recommended analgesia and clinical practice guidelines regarding management of pain. Likewise, recording of pain assessment before analgesic administration or pain re-evaluation after the administration of analgesic are not considered important[3].Yet we are managing postoperative pain in our settings, therefore there is a need to do assessment on postoperative pain management.

1.4. RATIONALE

The post-operative pain management is the most crucial element in reducing the consequences of inadequate treatment of acute pain after lower limb surgery. The surgery-induced responses can be exacerbated, posing a danger to patients. For instance, severe POP has been associated with serious complications including ischemic cardiac events and myocardial insufficiency that result from increased stress on the cardiovascular system. In addition, immobilization caused by pain may increase the risk of cardiopulmonary and peripheral venous congestion and thromboembolism. Moreover, severe pain may result in the disturbances in stress hormone secretions and sleep pattern contributing to the worsening immunity and increased risk of infection. Uncontrolled severe POP together with nerve ligation modalities during lower limb amputation may result in the sensitization of the nerve system leading to chronic neuropathic pain[30,31]. Inadequate management of POP delays early rehabilitation and recovery thus contributing to prolonged hospitalization, higher healthcare costs, and increased burden on the healthcare provider.

Effective management of POP generally serves to relieve personal suffering from pain and improves outcomes through prevention of complications. Therefore, this study aimed at assessing the postoperative pain management and patient satisfaction among patient undergoing lower limbs surgery at MOI. The study finding provides improvement on POPM including developing guide line for POPM through the recommendation of this study. It will also create the awareness among clinician on the important of individualization of POPM to attain patient satisfaction.

This study is also a partial fulfillment of my Master of Medicine in anesthesiology.

1.5. RESEARCH QUESTION

Was postoperative pain management among patients undergoing lower limb surgery at MOI satisfactory?

1.6. OBJECTIVE

1.6.1. Broad objective

To assess the post-operative pain management among patients undergoing lower limb surgery at Muhimbili Orthopedic Institute in Tanzania.

1.6.2. Specific objectives

1) To determine the prevalence of moderate to severe postoperative pain among the patient undergoing lower limb surgery at MOI.
2) To assess patient's satisfaction on post-operative pain management among patients undergoing lower limb surgery at MOI.
3) To assess the analgesic patterns for post-operative pain management among patients undergoing lower limb surgery at MOI.

CHAPTER TWO

2.0. MATERIALS AND METHOD

2.1. Study Design

This was a descriptive cross-sectional study done to assess the post-operative pain management among patients undergoing lower limb surgery.

2.2. Study Area

The study was carried out at Muhimbili Orthopedic Institute (MOI); Dar es Salaam, Tanzania a tertiary care facility specialized in orthopedic surgery, traumatology and neurosurgery with a bed capacity of 165. It was in MOI and not another institute at Muhimbili because it is the only institute which deals with orthopedic cases. MOI provides specialized services to referral patients from regional hospitals across Tanzania and some neighboring countries. MOI is in Dar es Salaam City – the largest commercial harbor in Tanzania with a population of about 4.5 million people.

2.3. Study Period

The study was conducted for 6months, (from 24th July 2016 to 24thDecember 2016)

2.4. Study Population

Patients undergoing lower limb surgery at MOI aged ≥ 18 years who were planned for emergency or elective surgery were recruited into the study. Age was selected according to Tanzania's constitution which categorize the age of 18 years as an adult person who can make decision and hence it helped in the study on the issue of signing the consent. Also, the study concentrated only on lower limb because lower limb procedures are among procedures which carry high intensity of pain, so were used to represent other procedures.

2.5. Inclusion Criteria

(a) Patients aged ≥ 18 years
(b) Patients who concerted to participate in the study
(c) Patients who attended at MOI

(d) Patients undergoing lower limb surgery for various indication

2.6. Exclusion Criteria

(a) Critically ill patients (semiconscious and unconscious patients)

(b) Mentally ill patients

(c) Patient undergoing a repeat surgery within 72 hours

2.7. Sampling and Sample Size Calculation

Based on a similar study conducted at MNH by Makia *et al* which revealed a prevalence of 60% of severe POP in general surgery [3],it was determined that 148 patients were statistically sufficient to give power for this study. In this survey the sample size was calculated using the formula below;

$$\mathbf{n=z^2p\ (1\text{-}p)/\varepsilon^2}$$

Where:

n = minimum sample size required

P = prevalence of POP (estimated at 60% according to a previous study)

ε = margin of error; set at 5% (0.05) and

z = z-score (1.96 at 95% confidence level)

The minimum sample size used was148 patients.

2.8. Sampling technique

A convenient sampling technique was used to obtain participants for this study.

2.9. Study procedure

All patients with lower limb problems received or admitted at MOI who met inclusion criteria and consented during data collection were enrolled to participate in the study. Informed consent was provided in both written and verbal form. A structured, pre-tested questionnaire was used to collect information on social demographic characteristics of the patients including age, sex, marital status, education level and occupation. The questionnaire assessed some information like type of surgery, type of anaesthesia given and type of analgesia route and frequency of the drug administration from medical records include case notes, anesthetic notes

and surgical notes together with all available pre-operative, intra-operative and post-operative prescriptions. Patient's pain intensity and satisfaction to POP were assessed by using a 0-10 Numeric Pain Rating Scale which was graded from 0 (no pain) to10 (severe pain) and a 5level scale (not satisfied at all, only slightly satisfied, somewhat or partly satisfied, very satisfied, perfectly satisfied).

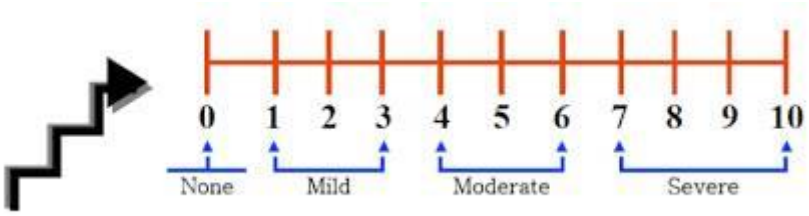


Figure 2: Numerical Pain Rating Scale

2.10. Data collection

A pre-tested Questionnaire was used to collect data (Appendix 1). The first part included social demographic information of the patient's age, sex, marital status, education and occupation, and Clinical information (Procedure, Type of anaesthesia, intraoperative analgesia). Second part assesses the pain and pain intensity using **numerical pain rating scale** in parallel with the measurement of physiological parameters.

Third part assessed analgesic patterns comprised questions on postoperative analgesia and the last part assessed patient satisfaction and comprised one question on patient rating the level of satisfaction soon after recovery, 24 hours and at 48 hours (as adopted from Danny Lovatsis, Jennifer B. José, Amanda Tufman, Harold P. Drutz Kellie Murphy study) using 5-level scale which were **(**not satisfied at all, only slightly satisfied, somewhat or partly satisfied, very satisfied, perfectly satisfied). The outcome was dichotomized by those who satisfied and those who were not satisfied. Patients classified as "satisfied" were those responded as being "very satisfied" or "perfectly satisfied" on all three assessments. All others were classified as "unsatisfied"

The questionnaire had a serial number instead of name of the patient to maintain confidentiality.

Data were collected during week-days of the entire study period by the principal investigator and two assistants. Collected data were checked for the completeness by the principal investigator daily.

2.11. Data processing and analysis

Collected quantitative data were coded and entered in the computer software, data designing and analysis were done using SPSS version 20.Descriptive analysis was used where by frequencies, and percentages, mean, and standard deviation were estimated to describe variables. The Chi-square was used to detect differences in the frequencies of categorical characteristics. A p value 0f $\leq$0.05 indicated statistical significance.

2.12. Ethical approval

Ethical clearance was obtained from the Research and Publications Committee of MUHAS. Permission to conduct this study was obtained from Executive Director of Muhimbili Orthopedic Institute. Only patients who consented to participate in the study were enrolled. Confidentiality on patient information was maintained.

CHAPTER THREE

3.0. RESULT

3.1. Social demographic and clinical characteristics of the study participants

A total number of 148 participants were included in this study with the mean age 36.99±15.7years. The minimum age was 18 years and maximum age was 80 years.

Among the participants male were more than female (68.9) and majority were in age group of≥42and 20-30years. Large number were married (45.9) followed by those who were single (43.2). The leading level of education in this population group was primary school followed by secondary school. (**Table 1**)

Table 1.Baseline demographic characteristics of participants (N=148)

Variable	Frequency(n)	Percentage (%)
Age group (years)		
Below 20	15	10.1
20 - 30	48	32.4
31 – 41	36	24.3
42 and above	49	33.1
Sex		
Male	102	68.9
Female	46	31.1
Marital status		
Single	64	43.2
Married	68	45.9
Divorced	7	4.7
Widow	9	6.1
Educational level		
No formal education	3	2
Primary school	66	44.6
Secondary school	56	37.8
College/diploma	23	15.5

A close fracture was a most common diagnosis then open fracture, and only small proportion were having isolated soft tissue injury. Large number of the participant was categorized as elective type of surgery while others were categorized as emergency type of surgery. The leading procedure done was open reduction and internal fixation and surgical debridement and internal fixation while the least procedure done during the period of this study were amputation. Majority of the participant the operations were done under spinal anaesthesia and others operations were done under general anesthesia. **(Table2).**

Table 2: patient related information obtained from patient file (N=148)

Variable	Frequency	Percentage
Diagnosis		
Open fracture	57	38.5
Close fracture	80	54.1
Isolated soft tissue injuries	2	1.4
Soft tissue and bone infection	9	6.1
Procedure type		
Open reduction &internal fixation	63	42.6
Surgical debridement & internal fixation	39	26.4
Close reduction and External fixation	22	14.9
Surgical debridement & External fixation	13	8.8
Sequestration & socialization	7	4.7
Amputation	4	2.7
Type of surgery		
Emergency	54	36.5
Elective	94	63.5
Type of anaesthesia		
General anaesthesia	29	19.6
Spinal anaesthesia	119	80.4

3.2. Prevalence of post-operative pain

During the period of 48hours, all the participants reported to have some degree of pain which were ranging from mild to severe**. Numerical pain rating scale** was used to assess the prevalence of pain in which it was assessed in three difference intervals (soon after recovery, 24hrs and 48hrs).

The prevalence of mild pain was more than75% soon after recovery followed by the prevalence of moderate pain while the prevalence of severe pain didn't appear at all. 24 hours post-operative, the prevalence of pain was higher in moderate pain, followed by the prevalence of severe pain, the prevalence of mild pain was just minority. At 48 hours the prevalence of mild pain was again flying high, followed by prevalence of moderate pain and very small prevalence severe pain. **(Figure 3)**

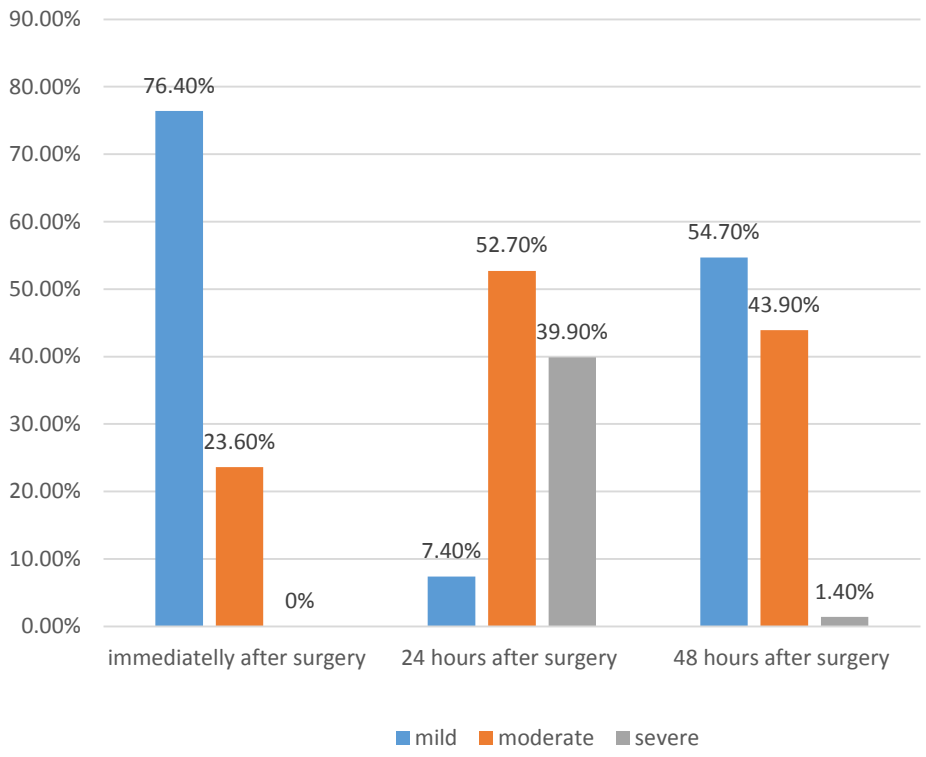


Figure 3: Prevalence of pain at 00hr, 24hrs and 48hrs following lower limb surgery

3.3. Patient satisfaction

Immediately after surgery majority of participants more than **75%** were satisfied with POPM, at 24 hours more than half of the participants were not satisfied while at 48 hours the proportional of satisfied and unsatisfied were almost equal with the former being slightly higher. **(Table 3)**

Table 3: Distribution of post-operative pain management satisfaction among patients' data presented as n (%).

Time after surgery	**Patients satisfactions**	
	Satisfied	**Not Satisfied**
Immediately after surgery	128(86.5)	20(13.5)
24 hours after surgery	49(33.1)	99(66.9)
48hours after surgery	86(58.1)	62(41.9)

The high proportional of participant who were not satisfied at 24hrs contributed to the general/overall satisfaction level on postoperative pain management to be low, as most of the patients were not satisfied while only minor proportion were satisfied with POPM **(Figure 4).**

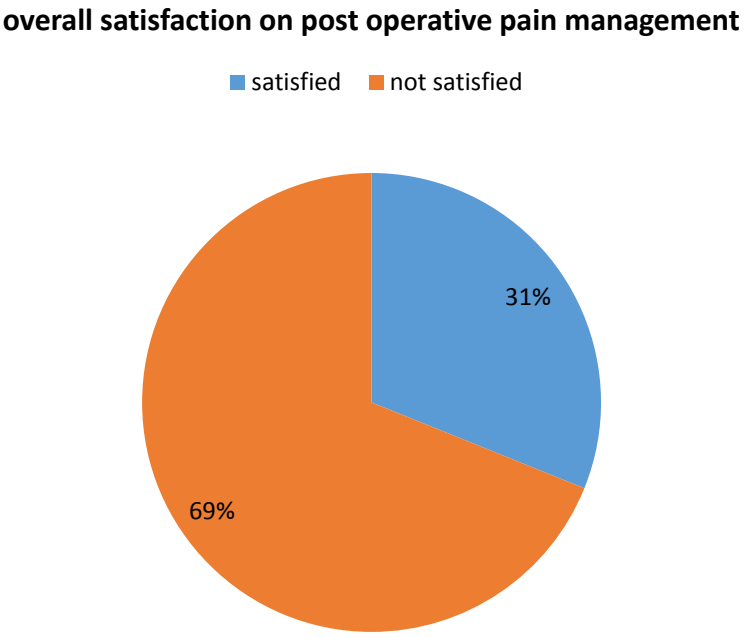


Figure 4: Distribution of post-operative pain satisfaction among patient

The proportion of participant who received analgesia 6hrly within 24hrs were satisfied with postoperative pain management compare**d** to none among those who received analgesia 8hrly.Higher proportion of participant who were satisfied on postoperative pain management after 24hrs received combination of diclofenac and paracetamol compared to those who received diclofenac alone and Tramadol.

Higher proportion of participant who satisfied with postoperative pain management received a combination of analgesia with different frequency of administration compared to those who received single analgesia 8hrly and none among those who receive single analgesia 12hrly.

Higher proportion of participant who was satisfied with postoperative pain management after 24hrs receive**d** combination of analgesia with different route of drug administration compare**d** to those who received single intramuscular analgesia and none among those who received single intravenous analgesia. **(Table 4)**

Table 4: Distribution of postoperative pain management satisfaction with type of drug, frequency and the route of drug administration data presented as n (%)

Variable	Satisfaction		P Value
	Satisfied=46	Not satisfied =102	
Frequency of drug administration within24 hours			
6hourly	46 (35.4)	84 (64.6)	**0.001**
8hourly	0 (0.00)	18 (100)	
Type of analgesia given after 24hrs			
Tramadol	0(0.00)	18 (100)	**0.000**
Diclofenac	31 (28.4)	78 (71.6)	
Diclofenac& Paracetamol	15 (71.4)	6 (28.6)	
Frequency of drug administration after 24hrs			
8hourly	0 (0.00)	17 (100)	**0.000**
12hourly	31 (27.9)	80 (72.1)	
Combination/ different frequency	15 (75.0)	5 (25.0)	
Route of drug administration after 24hrs			
Intravenous	0 (0.00)	20 (100)	**0.000**
Intramuscular	31 (28.4)	77 (71.3)	
Combination/ different rout	15 (75.0)	5 (25.0)	

3.4. Prescription Pattern

Within the first 24hrs all the participants received same analgesia with same route of drug administration (intravenous pethidine), only small proportional of the participants were given 8hrly compared to majority of the participants who received 6hrly **(Figure 5).**

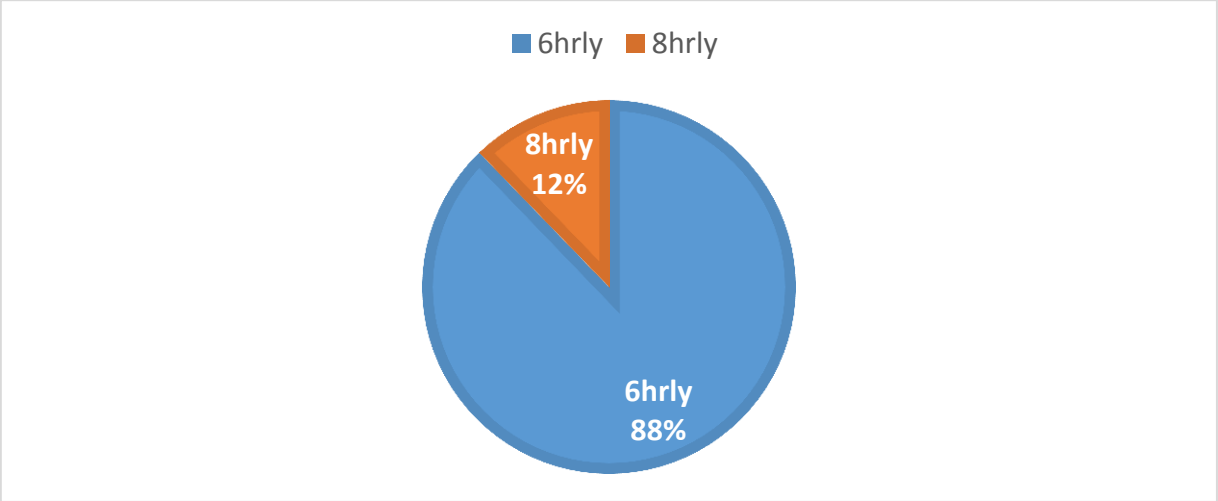


Figure 5: Frequency of intravenous pethidine give within first 24hrs

Following the first 24hrs three different drugs (tramadol, Diclofenac and paracetamol) were used as postoperative analgesia. Majority of the participants being given diclofenac alone compared to those who received tramadol alone or combination of diclofenac and paracetamol. Neither the combination of tramadol and paracetamol nor paracetamol alone were used in this study.

Intramuscular route was a leading route of drug administration compare to intravenous and combination with different route. Most of the drugs were given 8hrly compare to those which were given 12hourly or in combination with different frequency. **(Table 5)**

Table 5. Distribution on Type of drugs, frequency of drug administration and route of drug administration after 24hr (N =148)

Variable	N (%)
Type of analgesia	
Tramadol	18(12.2)
Diclofenac	109(73.6)
Diclofenac + paracetamol	21(14.2)
Route of drug administration	
Intravenous	18(12.2)
Intramuscular	109(73.6)
Combination/different route	21(14.2)
Frequency of drug administration	
8hourly	109(73.6)
12hourly	18(12.2)
Combination/different frequency	21(14.2)

CHAPTER FOUR

4.0. DISCUSSION

4.1. Prevalence

At the recovery area, the prevalence of moderate pain was 23.6% compared to the remaining higher prevalence of mild pain, there were no prevalence of severe pain. The prevalence of moderate pain at recovery area can be explained by the type of anaesthesia given to those participants as all the procedures were done either under general anaesthesia or spinal anaesthesia.

All the participants whose procedures were done under general anaesthesia experienced moderate pain, probably because those who underwent operation under general anaesthesia normally receive intraoperative analgesia once at the beginning of the operation. Intraoperative analgesia used at Muhimbili Orthopedic institute during the period of data collection was morphine 4-6mg depending on the participant's body weight; some procedures can last for 4-6hours while the half-life of morphine is 4 hours. So, at the time of recovery the strength of medication has already finished in the body.

These results differs from the study done at Kenya[16] which reported prevalence of severe pain at recovery area and during the discharge from recovery. The differences could be explained by the type of surgery done, in which all the participants studied at Kenya were having a day case surgery which is not the case in this study. Medications which are used in day case surgery are of rapid onset and short duration. This could explain the presence of participants with severe pain in the recovery area in that study[16].

For the period from recovery to 24hours both the prevalence of moderate to severe pain scored high 52.7% and 43.9% respectively. This might be due to improper timing of the first dose of analgesia after discharge from recovery, as well as improper frequency of drug administration. All participants in this study were given intravenous pethidine 100mg, in which majorities

were given 6hourly and few were given 8hourly, while the strength of pethidine last only for 4hours. The results were similar to the study conducted at Kenya[16] which the prevalence of moderate to severe pain after 24hours were reported to increase.

The prevalence of moderate to severe pain between 24hours to 48hours in this study could be explained by type and number of analgesia given (whether single or combination), frequency and route of administration, since patients who were given more than one analgesia in combination with different frequency and different route of administration the pain was controlled much better than those received single intravenous or intramuscular analgesia.

Similar finding by a study conducted at MNH Tanzania[2] in which majority of the participants experiencing pain throughout 48hrs with high prevalence of 60 percent. These findings were also similar to the study conducted in KCMC Moshi Tanzania[15], which reported higher postoperative pain prevalence at 24 to 48hrs. Other studies with similar result of high prevalence of postoperative pain are reported elsewhere[16,18,31,32].

4.2. Satisfaction

Immediately after surgery majority of the participants were satisfied with POPM, again at 48hours the satisfaction rate was slightly higher compared to that at 24hours, in which more than half of the participants were not satisfied. The higher satisfaction immediately after surgery could be explained by the leading type of anaesthesia at MOI (spinal anaesthesia) which offers postoperative analgesia too.

At 24 hours after surgery majority of the participants were not satisfied, this can be explained by the higher prevalence of moderate and severe pain which merged at this period, so it is obvious that, since their pain was not well controlled they could not be satisfied with POPM. At 48 hours' satisfaction and un-satisfaction rate were almost equal, this is because even though the prevalence of mild pain was high but still the prevalence of moderate and severe pain was still encountered. The higher proportional of un-satisfaction rate at 24 hours contributed to the overall satisfaction rate, as the participants were termed as satisfied only when were satisfied in all the three assessments.

In generally, majority of the participants were not satisfied with postoperative pain management which correlates to the high prevalence of pain. The findings were similar to a study done at Toronto[34] and another study done in 2007 at Mahidol university[33] whereby the prevalence of pain was found to be high and the level of satisfaction to pain management was low.

Other studies reported higher level of patient satisfaction to POPM despite of high prevalence of pain[16,18,34]. The different in level of satisfaction among these studies could be explained by different tools used to assess the level of satisfaction in POPM

Majority of the participants were not satisfied during the first 24hrsof POPM. The reason could be explained by inappropriate interval of pethidine which were prescribed to all the participants. The half-life of pethidine is 4hourly while patient in this study received iv pethidine at interval of 6hourly and 8hourly. The results are similar to a study conducted in Ethiopia[32] which reported inappropriate prescription pattern of analgesia contribute to failure in management of postoperative pain.

Combination analgesia (Diclofenac + Paracetamol) with different frequency of drug administration and different rout of drug administration was associated with participant satisfaction on POPM after 24hrs postoperative. These findings were similar to some studies whereby all supported the ideal of combination analgesia as effective in postoperative pain management compare to single analgesia[35,17,15, 29].

Combination analgesia may provide synergistic analgesic effect and different frequency of drug administration provide shorter interval between drug administration hence higher patient satisfactions to POPM.

4.3. Prescription patterns

There were mainly four drugs used at MOI which are pethidine, tramadol, diclofenac and paracetamol. During the first 24hrs only single drug with same route of drug administration was used (intravenous pethidine) whereby only difference was frequency of drug administration in which majority of the participants received the medication 6hourly and the remaining received 8hourly.Following 24hours majority of the participants received diclofenac either as a single drug or in combination with paracetamol. Minimal proportional of the participants received tramadol alone but none of the participants were given paracetamol as single drug. The participants who received diclofenac alone the drug was administered intramuscularly 8hrly while those who received combination of diclofenac and Paracetamol the drugs were given in different route and frequency and tramadol were administered intravenously 12hourly.This could be due to their availability and affordability in our settings which we lack most advanced technique and more potent drugs which could be more useful than the available one. The results are similar to Herbert G. M et al a study conducted at KCMC by in which same types of analgesia were used[15].

CHAPTER FIVE

5.0. STRENGTH AND LIMITATIONS

5.1. Strength of the study

The strength of this study relies on the fact that the sample size was large enough to statistically assess the prevalence of POP and satisfaction to POPM among the patient who underwent lower limb surgery. Although it was a descriptive cross-sectional study it provides insight on the burden POP and its consequences on patient satisfaction.

5.2. Study limitations

Firstly, POP is a subjective feeling that is equally assessed using subjective scales. The lack of objective means of assessing pain often results in inadequate standardized reporting of the satisfaction of POP management. Secondly, assessment of POP may not be adequately reported in patients recovering from major surgery partly due to the influence of anesthesia in cognitive performance. Thirdly, due to the cross-sectional nature of study design obviously it is inadequate to assess the effectiveness of POP management.

CHAPTER SIX

6.0. CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSIONS

The proportional of moderate and severe postoperative pain was high especially at the period between 12hrs to 24hrs. Majority of the patients were not satisfied with postoperative pain management provided to them. The first 24hrs the prescription patterns did not match with the pharmacokinetic effect of pethidine. Drugs combination favors the ideal of multimodal analgesia to provide good outcome in postoperative pain control.

6.2. RECOMMENDATION

There is a need to have POPM guidelines at the hospital level and to be used as per individuals' pain intensity, advanced techniques, newer drugs and pain assessment scale for post-operative pain management.

The analgesics drugs should be prescribed as per their pharmacological action in order to enhance their outcome. The analgesics may be used in combination taking benefit of their synergistic effect to heighten pain control to postoperative patients.

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8.0. APPENDICES

Structured Questionnaire-Adopted and modified partly from Dr. Eyerusalem Hailemariam study and partly from Danny Lovatsis, Jennifer B. José, Amanda Tufman, Harold P. Drutz, and Kellie Murphy, study.

Appendix: I (a) Questionnaire (English version)

TITTLE; Assessment of postoperative pain management among patient undergoing lower limb surgery at Muhimbili Orthopedic Institute Dar se Salaam Tanzania.

Fill the blanks or put an X in appropriate place in this questionnaire.

A: Part 1:

Socio demographic data

1. Code No_____

2. Age (years) _____

3. Sex: Female ☐ Male ☐

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

3. Educational level: Illiterate ☐ Primary school (1-7) ☐ Secondary school (9-12) ☐

College diploma (Diploma, degree and above) ☐

4. Employment status: Employed ☐ Unemployed ☐ Private ☐ Retired ☐

Clinical information

5. Diagnosis: Open fracture ☐ Close fracture ☐ isolated soft tissue injury ☐ soft tissue/bone ☐ infection others ☐

6. Type of surgery: Emergency ☐ Elective ☐

7. Procedure done: Open reduction & IF ☐ SD &IF ☐ Amputation ☐ Sequestration & socialization ☐ Close reduction & EF ☐ SD & EF ☐

8. Type of anaesthesia given

GA ☐ Spinal ☐ Nerve block ☐

9. Intra operative analgesia

Yes ☐ No ☐

10. If yes specify the name of the administered drug

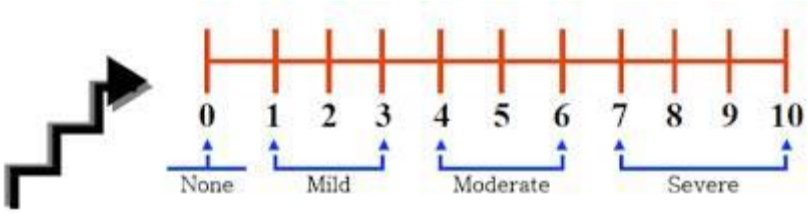
_____

B: Part 2

11. Are you felling any pain now?

Yes ☐ No ☐

12. If the answer to question no 11 is yes specify the intensity of pain by visual numerical pain rating scale g below:



a. Patient pain score at zero hour, 24hours and 48 hours

Intensity/score	00hrs	24hrs	48hrs
Mild			
Moderate			
Severe			

b. Physiological parameters in relation to the pain score at zero hour, 24hours and 48 hours

Patient parameters	00hrs	24hrs	48hrs
BLOOD pressure			
Heart rate			
Respiratory rate			
Spo2			
Palmar sweating			

C: Part 3 Postoperative pain management drug related information

13. Type of medication, dosage, route of drug administration and frequency of drug administration:

a. Morphine ....., ……..., ……, ……
b. Pethidine ....., ……..., ……, ……
c. Tramadol ....., ……..., ……, ……
d. Diclofenac ....., ……..., ……, ……
e. Paracetamol ....., ……..., ……, ……
f. Others ....., ……..., ……, ……

14. What is your satisfaction level with the postoperative pain management provided to you?

5-Level rating scale on satisfaction

Patient satisfaction rating scale	00 hour	24 hours	48hours
Perfectly satisfied			
Very satisfied			
Somewhat or partial satisfied			
Only slightly satisfied			
Not satisfied at all			

Appendix I (b) Dodoso (Swahili version of Questionnaire)

Kichwa cha habari**; Kutathimini matibabu ya maumivu kwa wagonjwa waliofanyiwa upasuaji wa miguu katikaTaasisi ya mifupa Muhimbili, Dar es Salaam, Tanzania.**

Jaza nafasi zilizoachwa wazi au weka alama X kwenye kisanduku husika katika hili dodoso.

A: Sehemuya kwanza:

Taarifa za mgonjwa

1. Namba ya utambulisho _____

2. umri (miaka) _____

3**.** Jinsia: Kike ☐ kiume ☐

2. Habari ya ndoa:Nimeoa/nimeolewa ☐ Sijaolewa ☐ Nimeachika ☐ mjane/mgane ☐

3. Kiwango cha elimu: Sijasoma ☐ Elimuyamsingi ☐ Elimuyasecondari ☐

Elimuyajuu (Diploma, digriiya kwanza na kuendelea) ☐

4. Ajira: Nimeajiriwa ☐ Sinaajira ☐ Nimejiajiri ☐ mstaafu ☐

Taarifazamatibabu

5. Aina ya ugonjwa/ tatizo _____

6. Aina ya upasuaji: upasuaji wa zarura ☐ Upasuaji uliyopangwa ☐

7. Aina ya dawa ya usingizi iliyotumiwa

Nililalakabisa ☐ Sindano ya mgongoni ☐ Kuzuia maumivu ya eneo flani la mwili ☐

8. Dawa yoyote ya maumivu wakati wa upasuaju

Ndio ☐ Hapana ☐

9. Kama ndio kwa swali laeleza dawa gani na kiasi gani

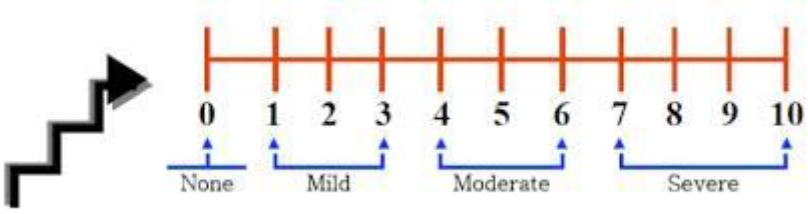
_____

B: Part 2

10. Unamaumivu yoyote kwa sasa?

Ndio ☐ Hapana ☐

11. Kama ndio kwa swali la 10 onesha kiwango cha maumivu ukilinganisha na msitari wenye number 0-10 na maeleo yake kama (0-hakuna maumivu,1-3maumivu kidogo yasiyokera, 4-6 maumivu makali kiasi na yanakera na 7-10maumivu makali sana) hapo chini.



a. **Maelezo ya mgonjwa kuhusu kiwango cha maumivu muamfupi baada ya upasuaji, masaa24 n amasaa 48 baada ya upasuaji**

Kiwango cha maumivu	00hrs	24hrs	48hrs
Hakuna maumivu			
Maumivu kidogo			
Maumivu kiwango cha kati			
Maumivu makali sana			

b. Uwiano baadhi ya vipimo vya mgonjwa kulingana na majibu yake ya kiwango cha maumivu hapo juu.

Patient parameters	00hrs	24hrs	48hrs
BLOOD pressure			
Mapigo ya moyo			
Upumuaji			
Kiwango cha Oxygen			
Viganja kutokwa jasho			

C: Sehemu ya 3:

Maelezo kuhusu dawa za maumivu baada ya upasuaji Postoperative

13. aina ya dawa, dkiasi, njia ya utolewaji wake na mara ngapi kwa siku:

g. Morphine ....., ……..., ……, ……
h. Pethidine ....., ……..., ……, ……
i. Tramadol ....., ……..., ……, ……
j. Diclofenac ....., ……..., ……, ……..
k. Paracetamol ....., ……..., ……, …….
l. Nyingine ....., ……..., ……, ……

14. Nini kiwango cha kuridhika kwako kwa matibabu ya maumivu baada ya upasuaji?

Ngazi-5 za kiwango cha kuridhika kwa matibabu ya maumivu baada ya upasuaji.

*Patient satisfacti*on rating scale	Muda mfupi baada ya upasuaji	Masaa24 Baadae	Masaa48 baadae
Nimerithika sana			
Nimeridhika			
Nimeridhika kiasi			
Nimeridhika kidogo			
Sijaridhika kabisa			

Appendix II (a) Consent Form English Version

Introduction

I am Dr. Eva Yeriko Shang'a, a researcher from Muhimbili University of Health and Allied Sciences (MUHAS). I am conducting a study titled **'Assessment of Post-operative Pain Management among Patients Undergoing Lower Limb Surgery at Muhimbili Orthopedic Institute, Dar es salaam, Tanzania'.** The aim of this research is to 'toassess the post-operative pain management among patients undergoing lower limb surgery at Muhimbili Orthopedic institute, Dar es Salaam**,** Tanzania'**.**

Participation in the study

You are kindly requested to participate in this study. If you accept to participate in this study your particulars/information will be taken and used for the purpose of this research and this will certainly not bother you or cause any discomfort to you. Your participation in this study will involve the following: Taking your records from clinical notes, being directly observed in during the preoperative, intraoperative and postoperative period. Also you will be clinically examined during the post-operative ward stay. You will be as well needed to rate the intensity of pain and level of satisfaction during postoperative ward stay.

Confidentiality: You are strongly assured of the confidentiality of the information obtained that will only be used for the purpose of this research and anonymity will highly be observed when collecting data and compiling report. To assure you, even your name will not be required to appear in the questionnaire.

Risk to participant: No anticipated risk or harm that may result from participating in this study.

Right of participation in the study. Your participation is absolutely voluntary and there is no penalty for refusing to participate. You are free to ask any question and you may stop to participate in this study any time.

Contact Person: The principal investigator, Dr. Eva Yeriko Shang'a (0655812281) is a key contact person with regard to any queries about this study. If you have any questions/concerns about your rights as a participant you may contact Professor Aboud, the chairman of the university senate research and publications, MUHAS P.O.BOX 65001, Dar es Salaam.

Signing of the consent

If you agree to participate in this study please sign in this consent form.

I (initials)…… have read and understood the contents of this form and I have been given satisfactory explanation with all my questions answered. I therefore consent to participate in this study.

Signature of interviewee .....……Date.....

Signature of interviewer .....Date ……

Appendix II (b) Consent form Swahili version

FOMU YA RIDHAA KUSHIRIKI KATIKA UTAFITI YA KISWAHILI

Utangulizi

Mimi naitwa Dkt .Eva YerikoShang'a, mtafiti kutoka Chuo Kikuu cha Sayansi ya Tiba Muhimbili. Ninafanya utafiti kuhusiana na wamama wajewazito kuhusu **'Kutathimini matibabu ya maumivu kwa wagonjwa waliofanyiwa upasuaji wa miguu katika Taasisi ya mifupa Muhimbili, Dar es Salaam, Tanzania'**. Lengo la utafiti huu ni kubaini **tathimini ya matibabu ya maumivu kwa wagonjwa waliofanyiwa upasuaji wa miguu katika Taasisi ya mifupa Muhimbili, Dar es Salaam, Tanzania Kushiriki katika utafiti huu**

Tafadhali unaombwa kushiriki katika utafiti huu, na mara tu utakaporidhia,unahakikishiwa kuwa habari zako na maelezo utakayotoa yatatumika kwa makusudio na malengo ya utafiti huu tu na kuwa hii haitakuletea usumbufu wowote.

Usiri wa taarifa za mshiriki

Unahakikishiwa tena kuwa taarifa zozote zitakazopatikana kutoka kwako wakati wa utafiti huu zitapewa usiri mkubwa sana na hazitatumika kwa malengo mengine yeyote tofauti na utafiti husika. Kuhakikisha hilo dodoso litakalohusika halitakuwa na jina lako wakati wote wa utafiti na hata baada ya utafiti.

Athari za utafiti huu kwa mshiriki: Hakuna athari au madhara yeyote yatakayokupata kutokana na kushiriki katika utafiti huu.

Haki ya kushiriki au kutoshiriki katika utafiti huu: Ushiriki wako katika utafiti huu ni wa hiari kabisa. Unayo haki ya kushiriki au kutoshiriki bila kulazimika. Pia unayohaki ya kukataa kuendelea kushiriki/kuacha kujibu maswali wakati wowote utakapojisikia kufanya hivyo na hakutakuwa na hatua yeyote itakayochukuliwa dhidi yako au kulaumiwa kwa kufanya hivyo.

Mawasiliano: Wasiliana na mtafiti mkuu, Dkt. Eva Yeriko Shang'a, kwa simu namba 0655812281 wakati wowote utakapokuwa na maswali au jambo lolote lenye kuhitaji ufafanuzi kuhusu utafiti huu. Hata hivyo endapo utakuwa na maswali kuhusu haki yako kama mshiriki

unaweza pia kuwasiliana na Prof. Aboud, Mwenyekiti wa Baraza la Utafiti na Uchapishajiwa Chuo Kikuu cha Sayansi ya Tiba Muhimbili. S.L.P. 65001, Dar es Salaam. Simu namba 2150302-6

Kukubali kushiriki

Ukikubali kushiriki tafadhali thibitisha kwa kujaza na kusaini sehemu ya fomu hii hapa chini.

Mimi (Herufi za mwanzo za jina) …….nimesomewa na kuelewa yaliyomo kwenye waraka huu na maswali yangu yote yamejibiwa vizuri. Hivyo ninakubal mwenyewe kwa hiari yangu bila kushurutishwa au kushawishiwa kushiriki katika utafiti huu.

Sahihi ya mhojiwa……..... Tarehe…….....……..

Sahihi ya mhoji. ……Tarehe …….